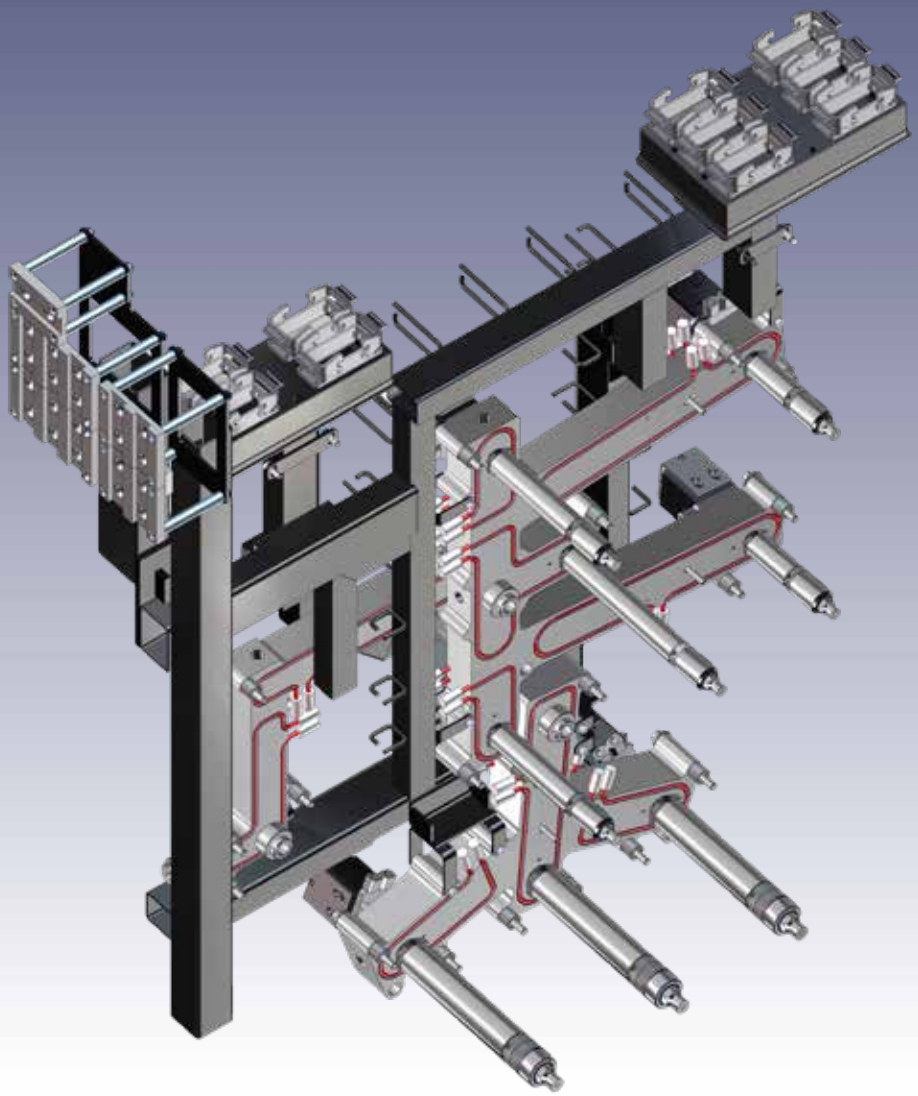
Hot Runner System
Installation Guide



Stabilize your Process

Synventive™ molding solutions
A business of BARNES

SVC-17-0001_EN-Rev13 EN 12 / 2022 DTP: RS

Introduction

Dear Customers,

Thank you for purchasing a Synventive Hot Runner System. Our objective is to provide you with a product that is a good fit for the application, trouble free in performance, and support it with the best service in the industry. If problems occur during the use of this product please contact us at one of the locations provided.

This manual is designed as a reference only document for the proper installation, operation and maintenance of Synventive Hot Runner Systems as well as a guideline for securing occupational health and safety in connection with the use of this system. Synventive does not warrant that the information is complete or accurate for every application. Synventive reserves the right to make changes to this document from time to time as new products are developed and new information identified.

This manual contains essential information, to ensure its general applicability to Synventive Hot Runner Systems. The customer is exclusively responsible for the protection of their equipment and personnel. Synventive is not liable for any personal injury or damage caused by improper use, installation or handling of the product. This product should only be installed and used by fully trained and qualified personnel. The customer is required to provide the necessary personal protective equipment, such as protective gloves, hearing protection, protective shields etc. In no case does this document provided by Synventive release the customer from its obligations.

This manual is intended for tooling and molding personnel who install and maintain the hot runner system. It should be forwarded with the hot runner system when shipped from the tool maker to the molder or between molding locations.

This document is copyright protected and it is intended exclusively for the users of Synventive Hot Runner Systems. It may not be copied and distributed without the written consent of Synventive Molding Solutions.

Yours faithfully,

Synventive Molding Solutions

Headquarters:

USA – Peabody, MA
Synventive Molding Solutions Inc.
10 Centennial Drive
Peabody, MA 01960
Tel.: +1 978 750 8065
Fax: +1 978 646 3600
Email: info@synventive.com

Germany – Bensheim
Synventive Molding Solutions GmbH
Heimrodstraße 10
P. O. Box 3123
64625 Bensheim
Tel. :+49 (0)6251 9332-0
Fax :+49 (0)6251 9332-90
Email: infohrde@synventive.com

China – Suzhou
Synventive Molding Solutions (Suzhou) Co. Ltd.
12B Gang Tian Industrial Square
Suzhou Industrial Park, China 215021
Tel.: +86 512 6283 8870
Fax: +86 512 6283 8890
Email: infohrcn@synventive.com

Customer Service:

North America
24/7 Technical Support Line
1-800-367-5662 – Press 4 from the Main Menu

Europe
Technical Support
+49 6251 93320 (8:00 am - 5:00 pm)
For after hours service, please contact your local service representative

Asia
24/7 Technical Support
+86 512 62838870-866 (8:30 am - 5:00 pm)

+86 13862017765 after hours

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1 Safety Instructions

1.1 CE approved Equipment

- Only CE approved equipment rated for application should be used with Synventive Hot Runner Systems.

1.2 Purpose of use of a Hot Runner System

1.2.1 Use compatible with the intended Purpose

- The goal of the Hot Runner System is to carefully transport the melt from the plastification unit to the cavity with an optimum temperature distribution and optimum distribution concept.
- Synventive Hot Runner Systems and single nozzles are not stand alone systems and must be incorporated in the injection mold for use.
- All Synventive Hot Runner Systems are used exclusively for the processing of thermoplastic materials based on the individual requirements of the specified material.
- A max. injection pressure of 30,000 psi (2068 bar) applies to Synventive HR standard components (unless otherwise stated).
- Use in conformity with the specified purpose also includes the study and understanding of and the compliance with all instructions and tasks of the submitted instructions for use.
- Synventive Hot Runner Systems may be incorporated only into specially designed cavities of injection molds.
- To guarantee a reliable operation of the Hot Runner System, it is necessary to comply with the specified periodic inspections and regular maintenance.

1.2.2 Use in conflict with the intended Purpose

- Synventive Hot Runner Systems may be only used in the manner described in section 1.2.1 Use compatible with the intended Purpose. Any other use is excluded. If the Hot Runner System is used in any manner that contradicts the intended purpose, the right to any warranty claims shall cease to exist.

1.3 Definition of Qualified Persons with Technical Knowledge

Technical knowledge means that personnel must -

- Be capable of reading and fully understand electrical/hydraulic circuits
- Fully understand the interrelationship of the built-in safety systems
- Have knowledge regarding the function and build-up of technical components.

A qualified person is one who, due to his technical training and experience, has sufficient knowledge that he can evaluate the work transferred to him or she -

- can recognise possible hazards.
- can instigate measures to eliminate hazards.
- has the required repair and assembly knowledge.

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1.4 Safety Instructions within the Instruction Manual

- The Hot Runner System is an incomplete machine. When the Hot Runner System is fitted into a machine, the interaction between the entire machine and the Hot Runner System, causes changes to the potential hazards. In particular, the influence of hydraulic and electrical controls on hydraulic drives which cause mechanical movements. This necessitates a hazard analysis and operating instructions for the entire machine.
- These operating instructions are intended to provide information and to prevent hazards when installing the Hot Runner System in the machine as well as information and guidelines for transport, storage and maintenance (inspection, servicing, repair) of the Hot Runner System.
- Only by strictly observing these operating instructions, is it possible to prevent accidents and material damage and ensure fault-free operation of the Hot Runner System.

1.5 The HR System Instruction Manual / Part of the Synventive Customer Documentation

- Comply with all safety instructions contained in the customer drawings.
- Use customer drawings for general information only. For detailed information, refer to the supplied Synventive 3D model.

Parts of the Synventive customer documentation are:

- User instruction (http://www.synventive.com/servicesupport/----------)
- Customer drawings
- Electrical wiring information
- Product Certificate / Hot Runner Check List
- Manifold mounting check list
- Parts list
- 3D-Model (in digital form)
- General safety instruction for the Synventive HR-system

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1.6 Safety Instructions and Symbols used

The following safety instructions and symbols and operating advice are used in this manual. They are highlighted by the respective word. The described measures are used to prevent injuries and avoid damage to the Hot Runner System and must be followed.

1.6.1 Danger Symbols Definitions

DANGER	**Danger** indicates an imminent hazardous situation which may result in death or serious injury.
WARNING	**Warning** indicates a dangerous situation that may lead to irreversible injury.
CAUTION	**Caution** indicates a dangerous situation that may lead to reversible injury.
NOTICE	**Notice** indicates a situation that may lead to material damage and provides additional information on proper procedures and trouble-free labor without the possibility of personal injury.

1.6.2 Mandatory Safety Signs of the Personal Protective Equipment

	Read the user instruction		Wear safety shoes		Wear close-fitting working cloth
	Wear headgear		Wear protective goggles		Wear face protection
	Wear work gloves or anti oil gloves		Wear apron against high temperature		Wear hearing protection

1.6.3 Symbols of Warnings

	General warning		Warning of electrical danger		Warning of hot surface
	Warning of overhead load		Warning of fork lift trucks operating		Warning of falling objects
	Warning of oxidising materials		Warning of explosive atmosphere		

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1.6.4 Symbols of Prohibition

	Don't use the cylinder housing as assembly support to get the system into the mold:		Do Not Pinch Signal Wire

1.7 General Safety Instructions

All safety instructions shall be carefully studied before the operation of the Synventive Hot Runner System is initiated. When working with the Hot Runner System, all safety instructions contained here in must be followed.

Noncompliance with safety notes and instructions could result in serious injuries.

⚠ DANGER		
	**Danger to Life by Electric Shock** **Serious personal injury or death can result from electrical contact.** Electrical work must be carried out by qualified persons. Verify that all power source connections are properly grounded. **In Emergency case - Switch all systems off.** **For first aid contact your medical / safety representing.**	

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Safety Instructions



Danger to Life by Hydraulic

Serious personal injury or death can result from connecting or disconnecting hydraulic hoses under pressure.

Hydraulic works must be carried out by qualified persons.

Use personal protective equipment, face protection, headgear, anti oil gloves.

The hoses in Hot Runner systems and the injection mold are under high pressure and high temperatures

Before disconnecting or connecting any hydraulic hoses:

- The Injection Molding Machine must be shut down.
- The electrical disconnect properly locked out.
- The hoses have to be depressurized.

In Emergency case - Switch all systems off.

For first aid contact your medical / safety representing.



DANGER



Danger to Life by Pneumatics

Serious personnel injury or death can result from connecting or disconnecting pneumatic hoses under pressure.
Pneumatic works must be carried out by qualified persons.
Use protective goggles or face protection or protective goggles, hearing protection (PPE)
The hoses in Hot Runner systems and the injection mold are under high pressure.
Before disconnecting or connecting any Pneumatic hoses:

- The injection machine / pneumatic compressor must be shut down.
- The electrical disconnect properly locked out.
- Pressure from the hoses must be removed.

For first aid contact your medical / safety representing.



WARNING





Heavy Weight Hazard

Transport and lifting equipment should be operated only by trained personnel.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.

When unpacking the Hot Runner System, there is a risk of injury due to falling parts and sharp edges. Maintain a minimum distance of 1 m from the Hot Runner System.

Use personal protective equipment, such as head gear, safety shoes and work gloves.

For first aid contact your medical / safety representing.



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Safety Instructions



Danger of Unexpected Discharge

If production operation stops while Hot Runner heating is on, the melt can overheat easily. Overheated plastic may emit dangerous vapors that could eject explosively if the mold gate is opened.

Upon each interruption of production operations, retract the machine's injection unit to make sure the pressure in the Hot Runner System can normalize through the inlet bushing.

Hot Surfaces Hazard

Contact between the skin and the hot injection mold could result in burns.

Use personal protective equipment, such as work gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.



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NOTICE



Danger of Material Defects

Only approved and CE certified temperature controllers rated for application with over current / voltage protection should be used with Hot Runner Systems.

Verify that all cables are damage free and in good condition.

Verify that all electrical connectors are clean and making good contact, and are securely fastened and latched. Dirty or otherwise contaminated connector pins can cause loss of signal and subsequent errors.

Clean all connectors with a spray-type commercial electrical contact cleaner / degreaser and allow them to dry fully before reconnecting.

Verify that all hydraulic hoses and connectors are damage free and in good condition.

All Synventive Hot Runner Systems shall be fitted with a temperature controller to provide separate temperature adjustment for each heating zone; the controller shall have the Soft-Start function for gradual heat-up. In this way you can prevent premature wearing and damage to the hot runner system.

To extend the lifetime of temperature sensors, avoid long-term operation of temperature control in manual mode.

Immediately replace defective temperature sensors.

If you replace heaters or their parts, always use original spare parts from Synventive and carry out the replacement as described in this Manual.

Do not interchange power supply cables with temperature sensor cables. Temperature sensor cables are not suitable for high voltage applications and will melt if exposed to high currents. Power supply cables are not suitable for use as temperature sensor cables for data transfer to the temperature controller.

To maximize the life of temperature sensors, maintain the operating temperature as specified in the respective material safety data sheets during processing.

Take notice of the production and color identification of temperature sensor cables (section 5.2.3.1).

Always use the specified temperature sensor.

Check that the aluminum surfaces of heaters do not come in contact to the nozzle cut-outs. If they do, enlarge the nozzle cutout´s as needed. Any contact between the heaters and the nozzle cutouts will lead to the risk of improper temperature control, which could result in damage to the aluminum casting.

If applicable, set the necessary operating temperature to the lowest level possible to avoid plastic degradation and to prevent damage to the temperature sensors.

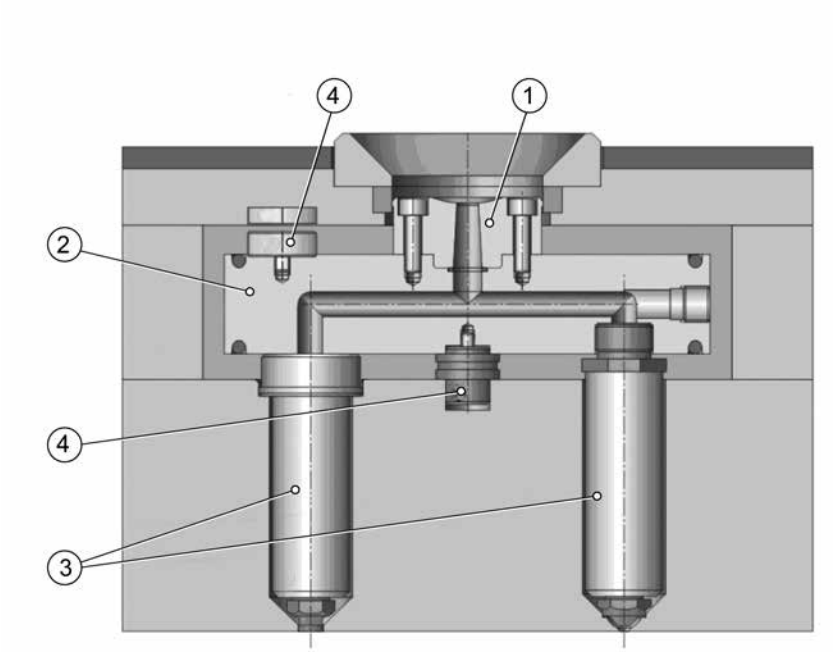
The highest operating temperature of nozzles with heat pipes (APT nozzles) is 343 °C (650 °F). Operation above this temperature will result in heat pipe failure and loss of thermal performance.

The cooling compound for nozzles with a cooling insert should always have the correct mixing ratio to prevent corrosion and obstructed circulation.

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2 Product Description

Synventive Hot Runner Systems are temperature-controlled runner systems (230V) installed in injection molds for melt distribution and generally for plastics manufacturing optimization.



Doc003085.png

Synventive Hot Runner Systems generally comprise an:

(1) Inlet bushing

(2) Manifold

(3) Nozzles

(4) System support elements

NOTICE

These essential parts can be optionally supplemented with meltflow control, connections, hot halves and temperature controllers, depending on type or application.

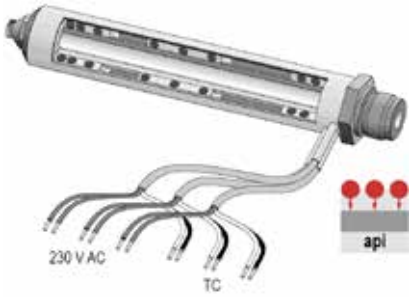
2.1 Nozzle Types

There are three types of Synventive hot runner nozzles which can be heated in two ways.

- Sprue bushings
- Support ring nozzles
- Threaded nozzles

2.1.1 API heating

API nozzles are heated from outside through one or more heating zones with the corresponding power distribution. These zones are placed in multiple points along flow path so as to provide an optimum energy amount to the specific sections, thus ensuring a homogeneous temperature profile.



Doc003086.png

2.1.2 APT heating

APT nozzles are heated from outside using a single zone. Heat pipes are located parallel to the flow channel; through active energy transfer and distribution from the respective thermal source, these pipes ensure a homogeneous temperature profile along flow path. A heater is usually incorporated, depending on application specifics.



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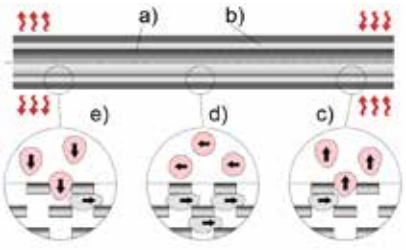
2.1.2.1 Heat pipe operation

The heat pipe comprises of a vacuum cut out (a) with a capillary structure (b) inside. Heat transfer inside this pipe is ensured by circulation provided by evaporation, vapor expansion, vapor condensation and condensate backflow due to capillary forces.

c) Energy intake through evaporation

d) Vapor expansion in the direction of lower pressure

e) Heat transfer through condensation



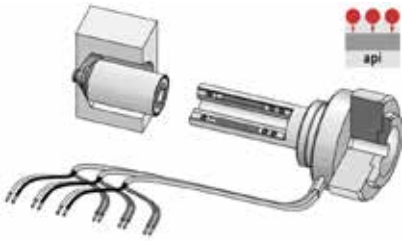
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2.1.3 Sprue Bushing Nozzles

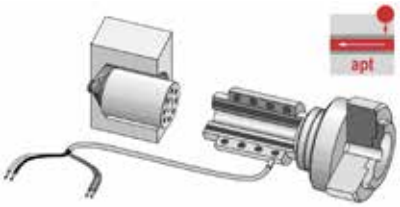
Single nozzles are hot runner nozzles with the inlet bushing directly mounted on the nozzle head. These nozzles are therefore also called heated inlet bushings or heated sprue bushings.

Sprue Bushing, API type



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Sprue Bushing, APT type

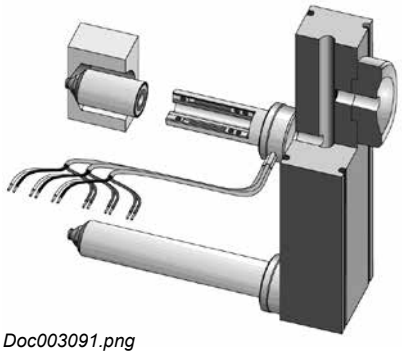


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2.1.4 Support Ring Nozzles

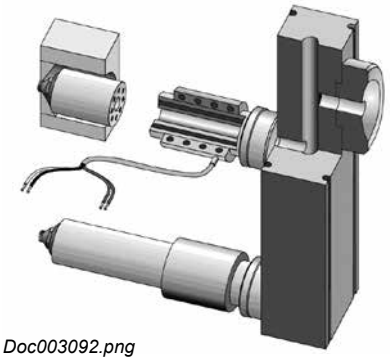
Support ring nozzles are hot runner nozzles mounted to manifolds by pressing the face of the nozzle head to the bottom surface of the manifold, the connection being such that during heating, the expanding manifold can “slide” on the nozzle heads.

Support ring nozzles, API type



Doc003091.png

Support ring fit nozzles, APT type

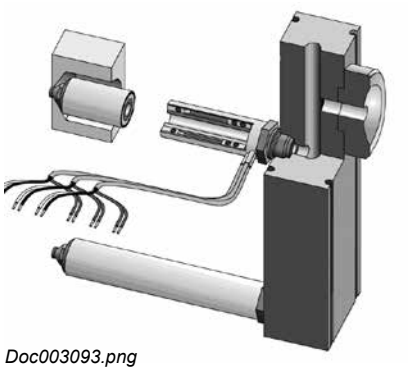


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2.1.5 Threaded Nozzles

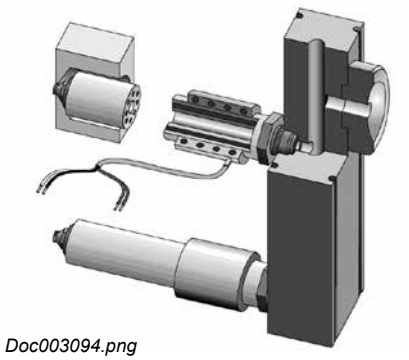
Threaded nozzles are hot runner nozzles screwed into the manifold.

Threaded nozzles , API type



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Threaded nozzles , APT type – Doc003094.png

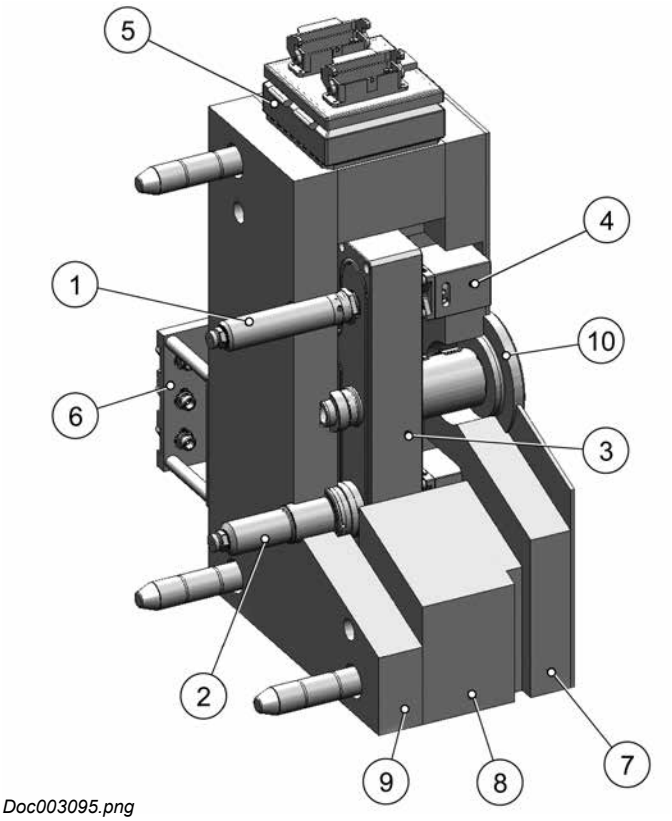


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2.2 Hot Half

Synventive can also supply Hot Runner Systems as a complete hot half. Hot half is a preliminary stage for the fixed mold half and, as such, is supplied inclusive of the respective plates. The plates are fitted with cables and, if applicable, hose connections (hydraulics and pneumatics, if applicable), fully mounted and ready for assembly. Hot halves are designed and built to the customer's mold specifications.



Doc003095.png

Components

(1) Threaded nozzle
(2) Support ring nozzle
(3) Manifold
(4) Valve gate actuator
(5) Connection box (electricity)
(6) Hose connections
(7) Clamping plate
(8) Spacer plate
(9) Cavity plate
(10) Inlet bushing

2.2.1 Hot Half Installation with Nozzles Hot Straight

This system has been designed with the nozzles to be straight in the hot condition. The nozzle locations have been offset to allow for the thermal expansion of the manifold. The nozzle tips will align with the gate locations in the mold after the manifold has reached operating temperature. To install the system onto the mold the manifold and inlet must be preheated.

⚠WARNING

Hot Surfaces Hazard

As the manifold is heated any plastic inside will expand. It is important to also heat the inlet to allow the plastic to expand out the inlet orifice and avoid any buildup of pressure in the manifold.

NOTICE

Refer to the Synventive Instruction Manual for complete instructions for Hot Runner installation and Servicing.
These instructions are in addition only to the Synventive Instruction Manual.

Additional Installation Procedure:

1) Pre heat the manifold to 220°C by using all manifold heating zones and the inlet zone. Refer to the Synventive Instruction manual for proper procedure.
2) Do not heat the nozzles.
3) Allow the manifold to soak for 15 minutes to be sure it is fully expanded.
4) Install the hot half onto the mold and secure with the required screws.

Additional Procedure to remove the Hot Half from the mold:

1) Remove the screws that secure the Hot Half to the mold.
2) Separate the hot half from the mold.
3) No preheating is needed to separate the Hot Half from the mold.

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3 Preparation for Incorporation

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<tr>
<td>  </td>
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Heavy Weight Hazard

Transport and lifting equipment should be operated only by trained personnel.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.

When unpacking the Hot Runner System, there is a risk of injury due to falling parts and sharp edges. Maintain a minimum distance of 1 m from the Hot Runner System. Use personal protective equipment, such as head gear, safety shoes and work gloves.

For first aid contact your medical / safety representing.

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<td> 
Pneumatic</td>
<td>

Hazard of Pressurized Air

When working with pressurized air, there is a risk of flying metal chips and other foreign bodies getting into the eyes.

Hearing impairment could arise.

Use work gloves, protective goggles or face protection and hearing protection (PPE).

For first aid contact your medical / safety representing.

</td>
<td>  </td>
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</table>

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3.1 Unpacking the Hot Runner System

1) Verify that the transport crate is not damaged.

NOTICE

If damage is noted, contact Synventive and the shipping carrier immediately to report a claim.

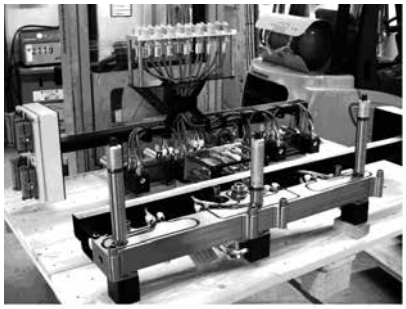
Synventive cannot be held liable for damage occurred during shipping.

Failure to report shipping damage may void any future warranty claims.



Doc003071.png

2) Open the transport crate
   - Loosen the crate's side walls and cover.
   - Dismantle the whole crate.



Doc003072.png

3) To prevent occupational injuries, allow for a sufficient access to the transport crate and a sufficient area around it.

4) Verify the crate's contents against the supplied Bill of Materials and that the supplied parts match the customer drawing. Verify that the Hot Runner System has not been damaged during transport.

5) Check if all major dimensions, such as the mold cavity, gauge and length of cables and hoses connected to the Hot Runner System, match the customer drawing.

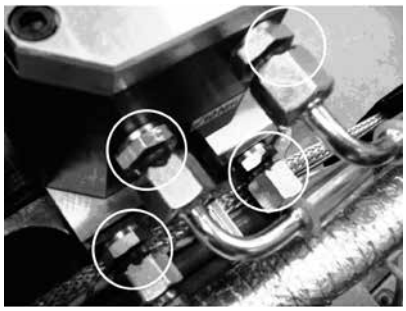
6) Unscrew the screws that affixed the Hot Runner System during transport.

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7) Check if the paint applied during assembly for sealing reasons is not damaged on the hose connections of the hydraulic system.

NOTICE

If the paint has been damaged or otherwise shows signs of tampering, contact Synventive immediately.



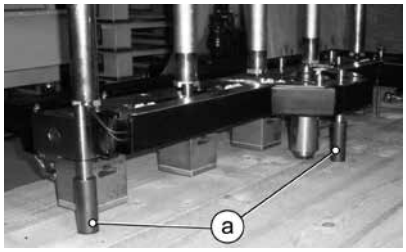
Doc003073.png

8) Before the HR-System will be assembled into the hot-half, remove the assembly pillars (a), provided with the HR-system.

NOTICE

Keep the assembly pillars (a) for storage and transport of the hot runner system.

This hot runner system has been shipped with assembly pillars installed to prevent damage to the actuators and valve pin bushings while being assembled or in transit. These assembly pillars must be removed prior to installing the top clamp plate.



Doc003233.png

WARNING

Do not use the assembly pillars as lifting device.

NOTICE

Synventive does not accept returns on transport packages and any other packaging. This does not apply to euro-pallets, which are to be returned to Synventive (please note regional distinctions).

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3.2 Cleaning Hot Runners and Cutout

WARNING

Pneumatic

Hazard of Pressurized Air

When working with pressurized air, there is a risk of flying metal chips and other foreign bodies getting into the eyes.

Hearing impairment could arise.

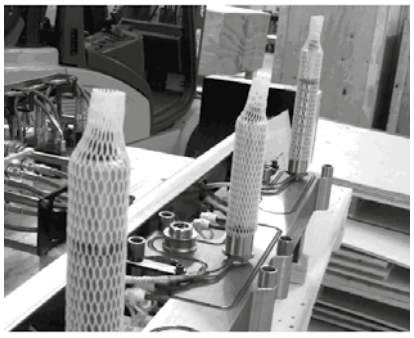
Use protective goggles or protective goggles **and hearing protection (PPE).**



NOTICE

Before the hot runner is installed, the whole surface of the plate and the cutouts shall be carefully and completely cleaned.

1) Remove the protective cases from the nozzles.



Doc003074.png

2) Remove any residual anti-corrosion agent used by Synventive for preservation of the individual system parts using a dry cloth.

3) Clean the cavity plate using a dry cloth.

4) If the cutouts are not easily accessible, blow them out with pressurized air and wipe with a clean cloth.

WARNING

Hazard of Pressurized Air

5) For larger and difficult to access areas, a small quantity of solvent or chemical cleaner can be used.

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3.3 List of necessary Tools

Table 1: List of necessary tools

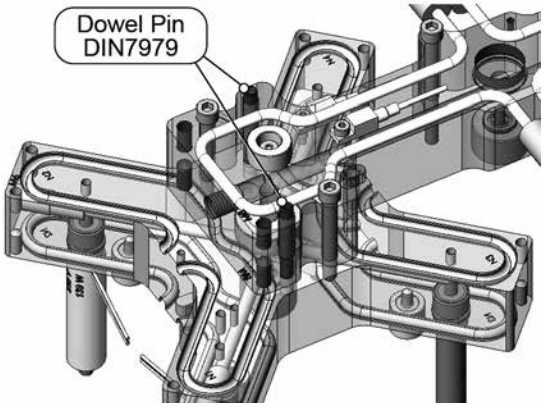
Tools	Purpose of use	Size / Design
Allen screw key	Hexagonal socket screws	Depends on system and parts (See section 13).
Micrometer depth gauge	Depth measurement	-
Slide gauge	Depth and thickness measurement	-
Torque wrench	For the uniform tightening of nozzles, screws and nozzle tips using the defined force	4-400 Nm / 3-295 ft-lbs. Depends on system and parts (See section 13).
Spotting paste (Engineer's blue)	Blueing of all contact points where the manifold contacts the mold	Common type
High-temperature assembly paste	Applied to make sure all threaded connections are easily disassembled at a later date	Resistant to temperature Solid lubricant paste (e.g. Molykote®1000)
Carpenter's hammer or hammer and chisel	Opening the transport crate	Common type
Box end wrench	For unscrewing nozzle tips from nozzle bodies	HEX 7, 10, 14, 17, 21, 24, 27, 36, 46, 55 (depends on nozzle size)
Anti-corrosion agent	Protection of parts	We recommend the multipurpose spray CC 80 by Metaflux.
Engineer's wrench	Nozzle tip	HEX 7
Braces for vice jaws	Tightening of nozzles, actuators etc. for dismantling	Common type (aluminum)
Soft face hammer	For assistance during work, if needed	Common type
Pliers	General use	-
Round-nosed pliers	Bend the cold length of heater	
Spiral wire brush	Cleaning of the nozzle flow channels	Common type, matching the flowbore diameter
Tools by Synventive		
Tools for assembling and disassembling the actuator	Mounting and dismantling of actuators of various design series	Upon request from Synventive (See also 8)
Pulling hammer	For releasing nozzles	Upon request from Synventive

4 Installation of the Hot Runner System

This section describes the steps for installing the Hot Runner System in the injection mold. Please identify the necessary dimensions from the customer drawing for the Synventive Hot Runner System.

4.1 General Instructions for Installation

- If the cavity plate is not guided on pillars or pins when moving, there is a risk of damage to the nozzle tips.
- Electrical terminals for attaching cables to the Hot Runner System shall never be allowed to come into contact with the coolant or hydraulic fluid. This could lead to a short circuit in the system, or cause an electrical fire which may lead to damage of the Hot Runner System.
- To ensure long life and continued flawless operation of the actuator, we recommend using a coolant that complies with the requirements of classification 21/18/13 pursuant to ISO 4406. The coolant used should be properly modified, e.g. filtered water with an anti-corrosion and frost proof agent.
- Power cables and fluid distribution systems should be installed loosely, making sure they are not compressed during assembly. Keep in mind the thermal expansion of the Hot Runner System during operation.
- During assembly, the Hot Runner System and the injection mold shall have the same temperature. Synventive Hot Runner Systems are designed to be installed and removed from the mold at room temperature. Installing or removing Hot Runner Systems while hot could result in damage to the mold or the Hot Runner System, or both.
- All Synventive systems work with alternating current and the operating voltage of 230V ±10%.
- The prescribed torque values of fittings and fasteners must be met, using a torque wrench to properly torque all fasteners to specification. See the torques indicated in the torque table (section 13).
- All parts subjected to thermal and dynamic stress shall be treated with high-temperature assembly paste (anti-seize compound) to guarantee an easy release of the connections. This especially applies to screwed connections between the manifold and the injection mold.
- Whenever installing any threaded component or fastener, always use high-temperature assembly paste (anti-seize compound).
- During assembly, avoid moisture on all surfaces.
- In case of Hot Runner Systems with Support Ring nozzles replace all sealing rings after each dismantling and before each assembly.
- After mounting a hot runner system with bridge manifold, the dowel pins with internal threads (DIN7979) must be removed. Otherwise, it may cause damage due to thermal expansion on the hot runner system.



Doc007450.png

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4.1.1 Requirements on the Injection Mold

This section defines design and technical requirements essential for the flawless operation of the Synventive HR System.

- The planned injection cavity shall be designed as instructed by Synventive to ensure suitability of fluid distribution systems and minimal heat convection. It is therefore necessary to provide sufficient mold rigidity.
- “Balancing” only applies to Synventive Hot Runner System. Effects related to runners and balanced part filling are the toolmakers responsibility.
- All dimensions specified in the customer drawing apply to the reference temperature of 20 °C (68 °F).
- The toolmaker needs to adjust the relevant parts to fit the injection mold taking into account the specific heat expansion of the following parts:
  - All nozzles, except for SR16, SR20, SR24, T16, T20 and T24 (unless otherwise noted).
  - All injection nozzle tips.
  - Support elements (center support, support pad and support pillar) supplied with extra trim stock.

  NOTICE

  Not designated in the PLUG´N PLAY®-Hot Runner System is an adjustment of center support and support pad with extra trim stock.
- The machine nozzle orifice diameter (machine nozzle – inlet bushing) shall be made with a tolerance of 0/-1 mm (0/- 0.04“).
- The machine nozzle shall be centered with respect to the inlet bushing. The inlet bushing shall be centered as instructed by Synventive using a centering ring and secured against lateral stress.
- If the hoses and pipes leading to the injection system actuators are not part of Synventive’s supply, the toolmaker has to prepare a space with appropriate clearance for them.
- To avoid leakage between the manifold and the nozzles, a pre-load of 0.1 mm (0.004“) is needed for nozzles SR16, SR20 and SR24.
- All modifications to the hot runner system should be carried out only in consultation with Synventive. Exception is a contour adjustment at the nozzle tip.
- To ensure a correct gate break point, it is necessary to control the temperature around the hot runner gate using a temperature control system.
- The thermal transfer losses of the Hot Runner System shall be compensated by corresponding temperature control (cooling fluid) channels. Appropriate cooling channels must be incorporated in the appropriate areas of the injection mold as specified by Synventive to ensure proper Hot Runner System operation.
- To facilitate assembly, install any threaded components using high-temperature assembly paste (anti-seize compound).
- The operating safety of our Synventive Hot Runner Systems is based on the assumption that the molds, injection molds and injection molding machines intended for them have a sufficient stability to withstand deflection and are fitted with adequate temperature control systems, which properly manage the heat loss from the Synventive Hot Runner System.
- All machined surfaces shall have a medium roughness level of Ra 1.6 at the maximum after processing. If roughness is greater, leakage may occur on the Hot Runner System, resulting in severe damage.
- Nozzle length expansion due to heating shall be taken into account at the nozzle tip face, so the nozzle tip face shall be placed so that it is opposite a piece of plastic with the minimum thickness of 0.5 – 1.0 mm (0.02 – 0.04“) during injection.

- In the area of the inlet orifice, it is recommended to use replaceable hardened inserts with the minimum required hardness of 52 +2/-1 HRC.
- The design of all cut outs and contact surfaces shall comply with the requirements submitted by Synventive. Contact with any other surfaces will compromise proper temperature control of the Synventive Hot Runner System.
- To ensure the static stability of the Hot Runner System as a whole, use the supports supplied together with the system, or as pre-fitted.
- To ensure support of the hot runners in the nozzle area, it is necessary to screw the clamping plate and the cavity plate together with a radius of approx. 80 – 100 mm (3.15 – 3.94“) using two opposite screws, min. M10 as per DIN912-12.9. Both plates must be sufficiently rigid so as to avoid flexion under clamping and injection pressure.
- When the valve pin is mated with the nozzle tip, the front geometry of the pin shall be fitted with a radius / bevel as originally specified / supplied by Synventive.
- All mating surfaces and surfaces that come into contact with plastics that are finished later (pre-chamber) shall be made with a roughness of Ra 0.8.
- All mounting threads in the manifold shall be used during installation and disassembly of the Hot Runner System from the injection mold.
- After disassembly of the Hot Runner System, the original sealing rings shall be replaced with new sealing rings as required by Synventive.
- The support pads and support elements of the hot runner body shall mate with the hardened surfaces with the minimum required hardness of 52 +2/-1 HRC. If hardened inserts are not applied, it is necessary to use a mold plate with the minimum hardness of 52 +2/-1 HRC to prevent spot deformation due to the effect of these support elements. For the hardened discs diameter we recommend 1.5 times the diameter of the thrust pads.
- Each nozzle shall be fitted with two screw connections. The screws shall be fixed in the manifold to retain tension caused by thermal expansion, i.e. preventing plate deflection.

4.1.2 Requirements on Temperature Control

- On your system it is necessary to clearly define the applicable connection points of hydraulic and coolant distribution systems to make sure that Synventive Customer Service could easily install the Hot Runner System.
- Most commonly available systems can be used for temperature control.

  NOTICE

  In case of any uncertainty, please contact Synventive Customer Service or Technical Support.
- The power interface between the injection mold and the temperature controller comprises of connection boxes on either the wire management channels of the system, or directly on the injection mold.

  NOTICE

  The connections supplied are in accordance with your specifications.
- Not more than three actuators can be connected in series in any single cooling circuit.

  NOTICE

  The connection of more than three actuators will result in insufficient cooling, which could lead to severe actuator damage.
- Temperature sensors are positioned to provide precise temperature control.

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NOTICE

Never relocate a temperature sensor without first contacting Synventive.

- Connection cables must never be in contact with the Hot Runner manifold.
- Synventive Hot Runner Systems shall always be operated with a single temperature control system. The use of multiple, separate control systems can cause poor temperature stability.

4.2 Table - Expansion Gap (Joint Z)

Manifold production series	Dimension (mm)	Steel	Z (mm) for ΔT (K) =				
			100	150	200	250	300
VB	37	1.2311	0.00	0.00	0.00	0.00	0.00
		1.2316	0.00	0.00	0.00	0.00	0.00
VC	37	1.2311	0.00	0.02	0.05	0.07	0.09
		1.2316	0.00	0.01	0.03	0.05	0.07
VD	43	1.2311	0.00	0.03	0.06	0.09	0.12
		1.2316	0.00	0.02	0.04	0.07	0.09
VE	50	1.2311	0.01	0.05	0.08	0.11	0.14
		1.2316	0.00	0.03	0.06	0.09	0.11
VF	65	1.2311	0.03	0.08	0.12	0.16	0.20
		1.2316	0.02	0.06	0.09	0.13	0.16
Recommended plastic			POM, PVC		PE, PP, PA, PBT, PS, ABS, PC	PEI	

NOTICE

Incorrectly adjusted support pads could result in high heat stress and plastic leakages in the injection mold (Hot Runner cutout).

Comply precisely with the dimensions specified in the customer drawing.

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4.3 Installation of HR Systems with Support Ring Nozzles (APT)

⚠ WARNING




Heavy Weight Hazard

Transport and lifting equipment should be operated only by trained personnel.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.

When unpacking the Hot Runner System, there is a risk of injury due to falling parts and sharp edges. Maintain a minimum distance of 1 m from the Hot Runner System. Use personal protective equipment, such as head gear, safety shoes and work gloves.

For first aid contact your medical / safety representing.



NOTICE



Hazard of Material Damage

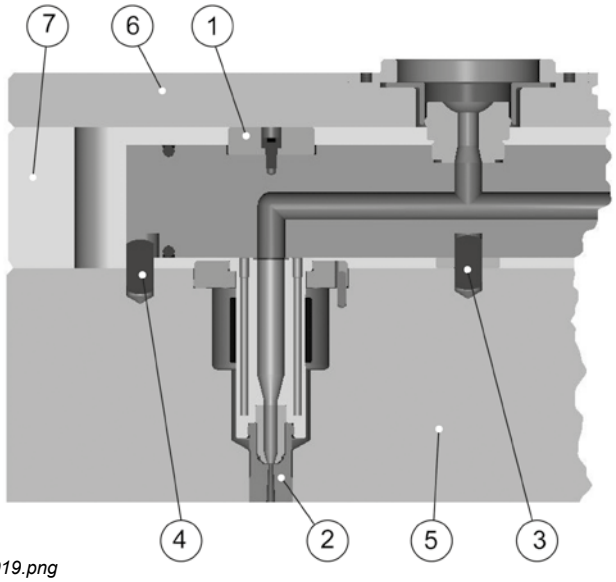
Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

Move the Hot Runner System only up or down at room temperature 20 °C (68 °F).

Always tighten the screws to the torque specified in the respective table in section 13.

Depending on system complexity, some Synventive Hot Runners will include special assembly notes and instructions, which will be included on the system general assembly drawing.

The following pages use numbers for the individual parts of the Hot Runner System based on the figure on this page.



Doc003019.png

Parts of the Hot Runner System with Support Ring Nozzles

(1) Thrust pad
(2) Nozzle tip
(3) Center locater
(4) Positioning dowel
(5) Cavity plate *
(6) Clamping plate *
(7) Spacer plate *

* Not included in delivery

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4.3.1 Support Ring Nozzle Installation

1) Clean the nozzle cutout and remove metal chips if necessary.
2) Confirm that the nozzle cutouts match the hot runner general assembly drawing.


Doc003105.png

NOTICE

The nozzle should have contact only on the sealing diameter of the nozzle tips and the face and diameter of the support ring.

The nozzle assembly should not make any other contact with the mold.

3) Confirm the diameter and depth of the support ring counterbores and positioning dowel (4) holes.

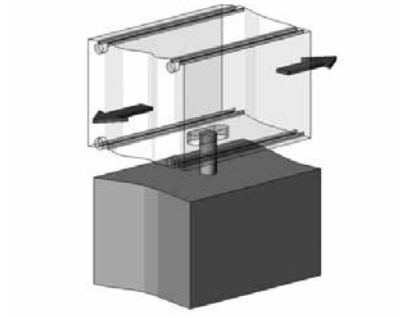

Doc003106.png

4) Confirm that positioning dowel locations match the hot runner and the customer drawing.


Doc003107.png

NOTICE

These positioning dowels (4) locate the manifold and control the direction of thermal expansion.


Doc003100.png

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5) Carefully slide the nozzles into the nozzle cutouts in the tool.

Each nozzle is numbered.

NOTICE

Check the general assembly drawing for the correct location of each nozzle.

NOTICE

Pay careful attention not to pinch the heater and thermocouple wires.

These wires will exit through the slot in the cavity plate under the support ring.



Doc003108.png

6) Once all nozzles have been installed measure the height that the face of each nozzle protrudes from the cavity plate using a depth gauge.

NOTICE

All nozzles should be within 0.1 mm (.004") of each other.



Doc003109.png

7) Install the positioning dowels (4) into the cavity plate (5).

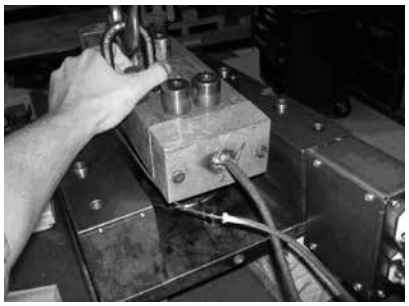


Doc003110.png

WARNING

Heavy Weight Hazard

8) Without the nozzle sealing rings in place, and using the lift holes provided, carefully lower the manifold onto the nozzles and dowels.



Doc003111.png

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9) Measure the distance between the face of the thrust pads (1) and the top of the spacer plate (7).
10) Confirm with the general assembly drawing that there is the correct amount of cold gap or preload.



Doc003112.png

WARNING

Heavy Weight Hazard

11) Carefully lift the manifold off the dowels and nozzles.



Doc003113.png

12) Check to see if there are any loose heaters or thermocouples that need to be installed onto the hot runner system.

NOTICE

If a heater or thermocouple needs to be installed, label the end of the wires with the correct zone number.



Doc003114.png

13) Insert the new sealing rings in the seal ring groove on each nozzle face.

NOTICE

Verify that the sealing rings always stand slightly proud above the nozzle head contact face upon first insertion.



Doc003115.png

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WARNING

Heavy Weight Hazard

14) Using lift holes provided on the manifold, carefully lower the hot runner system into the mold.

NOTICE

Pay special attention to any wiring underneath or on the side of the hot runner manifold so no wires are pinched or crushed during installation.

Be careful not to dislodge the seal rings.

NOTICE

It is often helpful, using non flammable tape, to tape any loose wires to the manifold prior to dropping the hot runner into the mold.



Doc003116.png

WARNING

Heavy Weight Hazard

15) Install the clamping plate (6).

NOTICE

Be careful not to pinch or trap any wires or other components.



Doc003119.png

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4.3.2 For non pre-wired Systems

DANGER

Danger to Life by Electric Shock

Serious personal injury or death can result from electrical contact.

Power supply should only be connected by properly trained and qualified personnel.

Verify that all power source connections are properly grounded (proceed as described in section 5.2).

For first aid contact your medical / safety representing.

1) Run all the wiring through wire slots in the cavity plate out to the location of the wiring box.

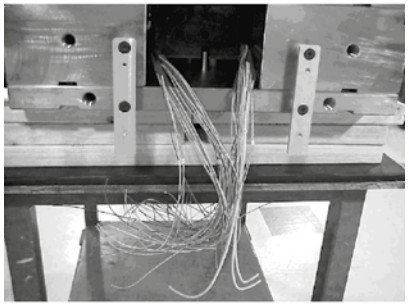
   NOTICE

   Allow enough wire length for a service loop, which will allow the connectors to be removed from the terminal box without removing the wiring.

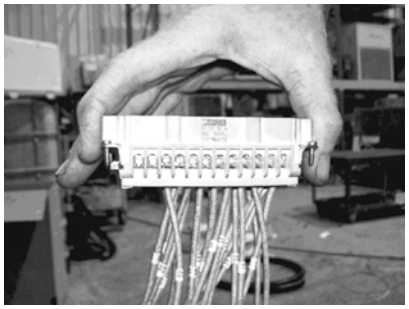
2) Re-label the wires before cutting to length.
3) If wire lengths are excessive, trim wires to proper length.
4) It may be necessary to re-label the zone numbers if the original numbers are on the length of wire being removed.
5) Connect wires to power and thermocouple connectors.

   NOTICE

   The manner in which they connect is dependent on the electrical connectors being used.



Doc003117.png



Doc003118.png

4.3.3 For pre-wired Systems



Doc006541.png



Doc006540.png

DANGER

This terminal box contains components with electrical potential, if it is connected to voltage.
Do not open this housing.

NOTICE

Removal of the Synventive label external and internal will void the warranty.

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4.4 Installation of HR Systems with Threaded Nozzles (API)

⚠ WARNING




Heavy Weight Hazard

Transport and lifting equipment should be operated only by trained personnel.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.

When unpacking the Hot Runner System, there is a risk of injury due to falling parts and sharp edges. Maintain a minimum distance of 1 m from the Hot Runner System. Use personal protective equipment, such as head gear, safety shoes and work gloves.

For first aid contact your medical / safety representing.



NOTICE



Hazard of Material Damage

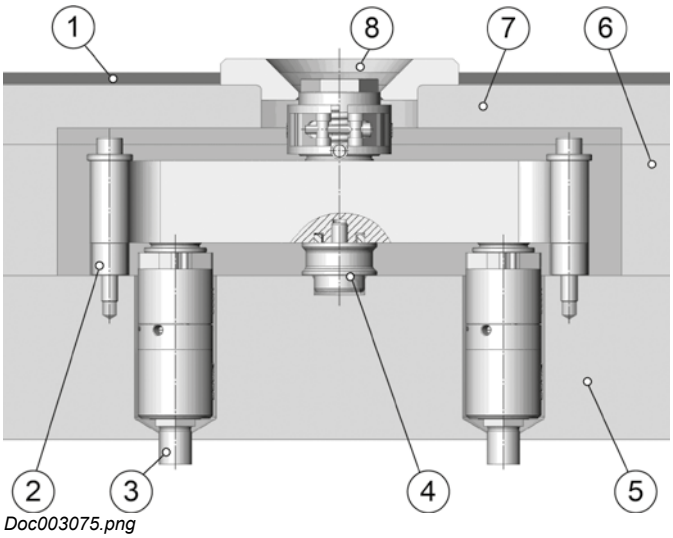
Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

Never install or remove the hot runner when the manifold or nozzles are hot, this may cause damage to the nozzles.

Move the Hot Runner System only up or down at room temperature 20 °C (68 °F).

Always tighten the screws to the torque specified in the respective table in section 13.

The following pages use numbers for the individual parts of the Hot Runner System based on the figure on this page.



Doc003075.png

Parts of the Hot Runner System with Threaded Nozzles (API)

(1) Insulation plate *
(2) Support pillar
(3) Nozzle tip
(4) Center support
(5) Cavity plate *
(6) Spacer plate *
(7) Clamping plate *
(8) Center locating ring *

* Not included in delivery

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4.4.1 Preparation for System Installation

1) Clean the nozzle clearances and remove metal chips if necessary.

2) Apply plasticine or any other similar substance on the nozzle tip (3).

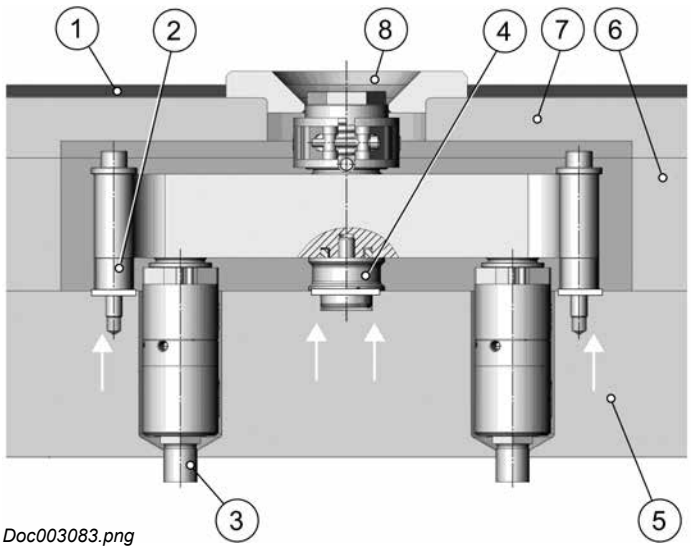


Doc003081.png

3) Apply a general-purpose grease to the mating surface (d) of the nozzle tip.



Doc003070.png



Doc003083.png

4) Apply spotting ink on support elements:
   - Center support (4)
   - Support pillar (bottom surface) (2).

5) If your Hot Runner System has guiding elements, install them into the respective bores.

NOTICE

Take care the guiding elements are fully seated in the drilled holes.

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The following steps have to be done at room temperature 20 °C (68 °F).

WARNING

Heavy Weight Hazard

6) Lower the Hot Runner System into the mold without twisting.

   Carefully and slowly lower the Hot Runner System, paying close attention especially during the last 10 mm.

   The guiding elements have to remain inside the mold.

7) Ensure that the Hot Runner System seats completely on the cavity plate.

8) Lubricate the thread of the screws manifold / cavity plate (5) with high-temperature assembly paste (antiseize compound).

   NOTICE

   This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

9) Bolt together the Hot Runner System and the cavity plate.

   NOTICE

   Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

10) Unscrew the fastening screws.

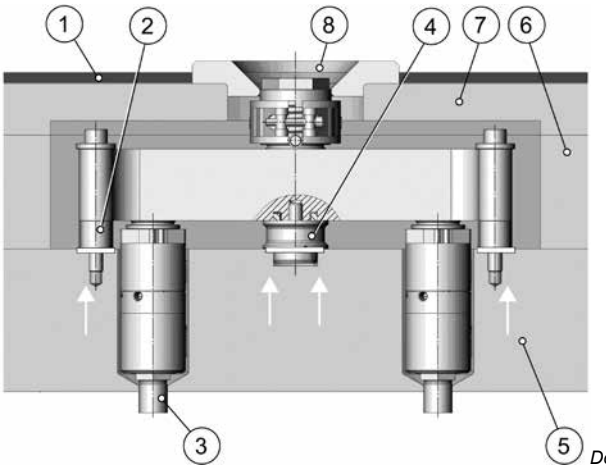
WARNING

Heavy Weight Hazard

11) Lift up the Hot Runner System carefully.

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Installation of HR Systems with Threaded Nozzles (API)



Doc003083.png

Parts of the HR system with Threaded Nozzles (API)

(1) Insulation plate
(2) Support pillar
(3) Nozzle tip
(4) Center support
(5) Cavity plate
(6) Spacer plate
(7) Clamping plate
(8) Center locating ring

12) Check the spotting ink matching of:

- Support pillar (2)
- Center support (4)

NOTICE

The edge of the center support should not bear on the manifold.

If this happens, the issue must be resolved by the corresponding beveling of the outer edge of the center support (4).

13) All contact surfaces have to be clearly recognizable.

NOTICE

If not check the mold and the support elements, if necessary rework them.

In case of any uncertainty, please contact the Synventive Customer Service or Technical Support.

14) Clean spotting ink surface.

15) Check possible damages from the first assembly.

16) Check if the plasticine at the nozzle tip (3) or nozzle is evenly distributed.

NOTICE

Ensure there is enough gap between mold and nozzle tip (3). If not rework them.

Please note that the distance between mold and nozzle tip (3) will be reduced by thermal expansion while the hot runner is heated up.



Doc003082.png

17) Remove the plasticine.

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4.4.2 Nozzle Tip Adjustment

In some cases it is necessary to adjust the nozzle tips to the cutout shape for the injected part. If the nozzle tips are too long, they have to be removed and cut shorter.

WARNING

Hot Surfaces Hazard

Contact between the skin and the hot injection mold could result in burns.

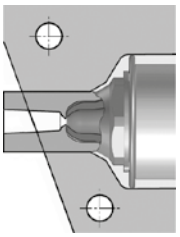
Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

Precondition for nozzle tip adjustment is a complete installed system (Hot half)

WARNING

Hot Surfaces Hazard

1) Heat up the complete assembled system to operating temperature.
2) Check the length from the nozzle tip (3) at the cavity plate.
3) Mark the contour at the nozzle tip.



Doc003068.png

4) Wait until the system cools down to room temperature.
5) Unscrew the fastening screws.

WARNING

Heavy Weight Hazard

6) Lift up the Hot Runner System carefully from the cavity plate (5).

7) Check possible damage from the first assembly.

NOTICE

In case of any uncertainty, please contact the Synventive Customer Service or Technical Support.

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NOTICE

Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

When removing the nozzle tip from the threaded nozzles, secure the nozzle body using an engineer's wrench at the hexagonal section.

This is done to prevent the nozzle body from rotating which could result in leakage.

When cutting nozzle tips short, make sure not to shorten beyond the dimension L (nominal size).

The nominal size is the size between the seat of the nozzle (face fit nozzle) respectively the lower edge of the manifold (screw fit nozzles) and the nozzle tip (point F0).

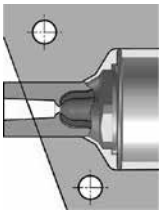
For the dimension L refer to the general assembly drawing.

The dimension "L" is the nominal dimension of a heated nozzle.

8) If necessary you must shorten the nozzle tip (3).

NOTICE

Unscrew the nozzle tip (3) and machine to length.



Doc003068.png

9) Mount the shortened nozzle tip (3) on the nozzle body.

WARNING

Heavy Weight Hazard

10) After reassembly of the Hot Runner System lower it into the mold without twisting.

NOTICE

Carefully and slowly lower the Hot Runner System, paying close attention especially during the last 10 mm.

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Hot Runner System

11) Ensure that the Hot Runner System seats completely on the cavity plate.

12) Lubricate the thread of the fastening screws Hot Runner System / cavity plate (5) with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

13) Bolt together the Hot Runner System and the cavity plate.

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

VB-Hot Runner System

Bolt together the Hot Runner System and the cavity plate.

Meet the prescribed torque values and use high-temperature assembly paste for the threads.

14) Remove all guiding elements if used.

WARNING

Hot Surfaces Hazard

15) Heat the hot runner to normal operating temperature.

16) Contour the nozzle tip to the cavity if required.

17) Machine the contour of the nozzle tip when nozzle is installed in the cavity.

18) In the case where the final contour needs to be placed on the valve pin, the valve pin must be rounded at the adjusted area also.

NOTICE

Generally only tips with extension are allowed to be contoured.

WARNING

Heavy Weight Hazard

19) Install the clamping plate (7) and the insulation plate (1).

20) Lubricate the thread of the screws insulation plate (1) / clamping plate (7) with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.



Doc003122.png

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21) Screw the insulation plate (1) and the clamping plate (7) together.

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

Requirements on the injection mold:

The machine nozzle orifice diameter (machine nozzle – inlet bushing) shall be made with a tolerance of 0 /-1 mm (0 / -0.04“).

The machine nozzle shall be centered with respect to the inlet bushing.

The inlet bushing shall be centered as instructed by Synventive using a centering ring and secured against lateral stress.



Doc003036.png

22) Place the center locating ring (8) on the inlet bushing.

23) Check if the center locating ring inner diameter correctly accommodates the fit diameter of the inlet bushing without side pre-load or a gap.

---

24) Lubricate the threads of the center locating ring (8) fastening screws with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

25) Screw the center locating ring (8) together with the clamping plate (7).

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

---

26) Lubricate the thread of the hot half / mold plate screws with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

27) Screw the hot half and the mold plate together.

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

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4.4.3 For non pre-wired Systems

DANGER

Danger to Life by Electric Shock

Serious personal injury or death can result from electrical contact.

Power supply should only be connected by properly trained and qualified personnel.

Verify that all power source connections are properly grounded (proceed as described in section 5.2).

For first aid contact your medical / safety representing.

1) Run all the wiring through wire slots in the cavity plate out to the location of the wiring box.

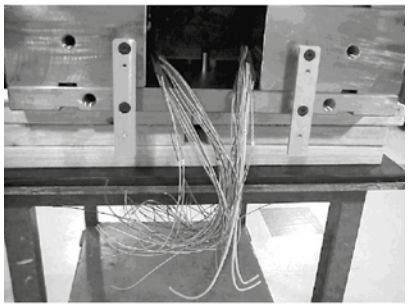
   NOTICE

   Allow enough wire length for a service loop, which will allow the connectors to be removed from the terminal box without removing the wiring.

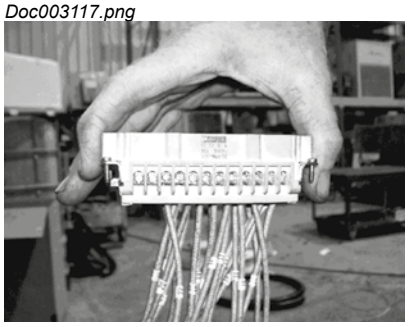
2) Re-label the wires before cutting to length.
3) If wire lengths are excessive, trim wires to proper length.
4) It may be necessary to re-label the zone numbers if the original numbers are on the length of wire being removed.
5) Connect wires to power and thermocouple connectors.

   NOTICE

   The manner in which they connect is dependent on the electrical connectors being used.



Doc003117.png



Doc003118.png

4.4.4 For pre-wired Systems



Doc006541.png



Doc006540.png

DANGER

This terminal box contains components with electrical potential, if it is connected to voltage.
Do not open this housing.

NOTICE

Removal of the Synventive label external and internal will void the warranty.

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4.5 Installation of PLUG´N PLAY® HR Systems with Threaded Nozzles

WARNING



Heavy Weight Hazard

Transport and lifting equipment should be operated only by trained personnel.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.

When unpacking the Hot Runner System, there is a risk of injury due to falling parts and sharp edges. Maintain a minimum distance of 1 m from the Hot Runner System.

Use personal protective equipment, such as head gear, safety shoes and work gloves.

For first aid contact your medical / safety representing.



NOTICE



Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

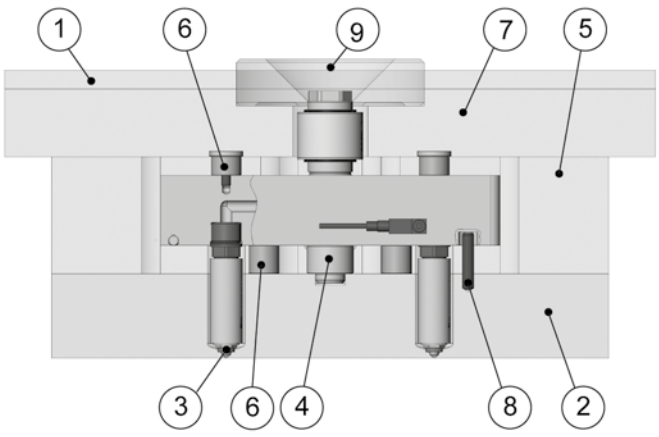
Never install or remove the hot runner when the manifold or nozzles are hot, this may cause damage to the nozzles.

Move the Hot Runner System only up or down at room temperature 20 °C (68 °F).

Always tighten the screws to the torque specified in the respective table in section 13.

The PLUG´N PLAY® hot runner system is supported by thrust pads, center support and positioning dowels. It is not screwed to the cavity plate. The system can be assembled without adjustment. The thrust pads take up the thermal expansion.

The following pages reference numbers for the individual parts of the Hot Runner System based on the figure on this page.



Doc003029.png

Parts of the PLUG´N PLAY® Hot Runner System

(1) Insulation plate *
(2) Cavity plate *
(3) Nozzle tip
(4) Center support
(5) Spacer plate *
(6) Thrust pad
(7) Clamping plate *
(8) Positioning dowel
(9) Center locating ring *

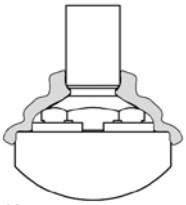
* Not included in delivery

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4.5.1 Preparation for System Installation

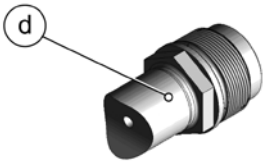
1) Clean the mold cutout and remove metal chips if necessary.

2) Apply plasticine or any other similar substance on the nozzle tip (3).



Doc003034.png

3) Apply a general-purpose grease to the mating surface (d) of the nozzle tip.

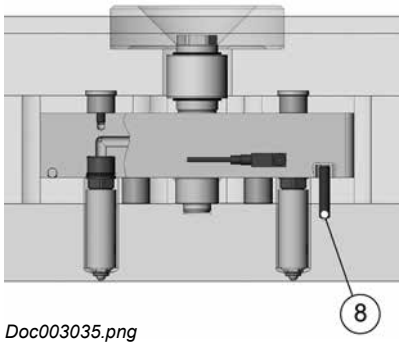


Doc003070.png

4) Place positioning dowel (8) in the cavity plate (2).

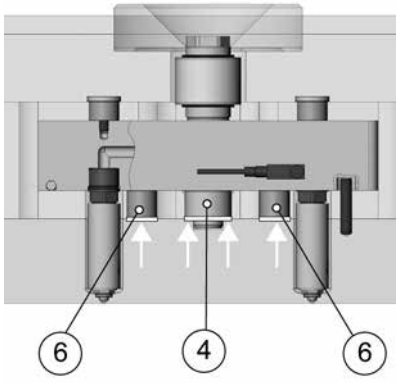
NOTICE

Ensure the positioning dowel is fully seated in the bottom of the drilled hole.



Doc003035.png

5) Apply spotting ink on the support elements center support (4) and thrust pad (6) (bottom surface).



Doc003032.png

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NOTICE

The following steps have to be done at room temperature 20 °C (68 °F).

WARNING

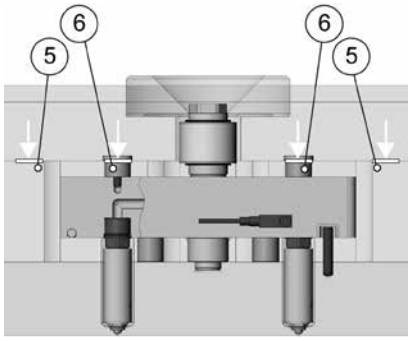
Heavy Weight Hazard

6) Lower the Hot Runner System into the mold without twisting.

   Carefully and slowly lower the Hot Runner System, paying close attention especially during the last 10 mm.

7) Ensure that the Hot Runner System seats completely on the mold / cavity plate (2).

8) Spotting ink thrust pad (6) and spacer plate (5).



Doc003031.png

WARNING

Heavy Weight Hazard

9) Carefully lift the clamping plate (7) on the Hot Runner system.
10) Remove clamping plate (7).
11) Lift up the Hot Runner system carefully from the cavity plate.

12) Check the spotting ink surfaces on:
    - Thrust pad (6)
    - Spacer plate (5)

NOTICE

All contact surfaces have to be clearly recognizable.

If not check the mold and the support elements, if necessary rework them.

In case of any uncertainty, please contact the Synventive Customer Service.

13) Clean spotting ink surface.
14) Check possible damages from the first assembly.

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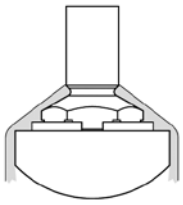
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15) Check if the plasticine at the nozzle tip (3) or nozzle is evenly distributed.

NOTICE

Ensure there is enough gap between mold and nozzle tip (3). If not rework them.

Please note that the distance between mold and nozzle tip (3) will be reduced by thermal expansion while the hot runner is heated up.



Doc003030.png

16) Remove the plasticine.

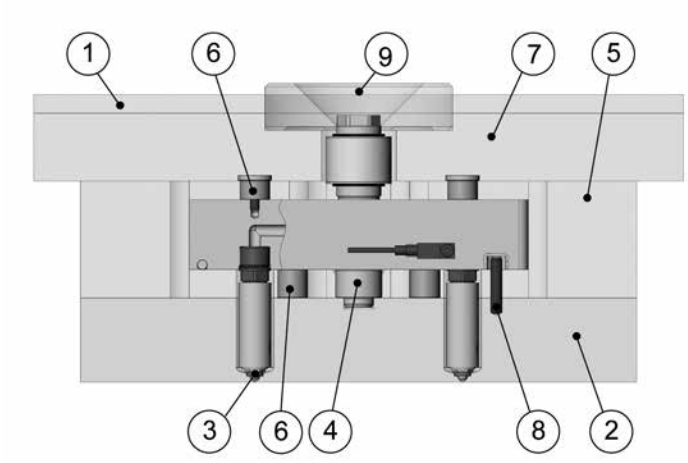
4.5.2 System Installation

NOTICE

Hazard of Material Damage

Precondition to assembly the system is:

- Applied spotting ink test in the relevant areas.
- Applied plasticine test regarding the nozzle cutouts.



Doc003029.png

Parts of the PLUG´N PLAY® Hot Runner Systems with Threaded Nozzles (API)

(1) Insulation plate
(2) Cavity plate
(3) Nozzle tip
(4) Center support
(5) Spacer plate
(6) Thrust pad
(7) Clamping plate
(8) Positioning dowel
(9) Center locating ring

1) Clean the mold cutout and remove metal chips if necessary.

2) Place positioning dowel (8) in the cavity plate (2).

NOTICE

Ensure the positioning dowel is fully seated in the bottom of the drilled hole.

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WARNING

Heavy Weight Hazard

3) Lower the Hot Runner System into the cavity plate without twisting.

NOTICE

Carefully and slowly lower the Hot Runner System, paying close attention especially during the last 10 mm.

WARNING

Heavy Weight Hazard

4) Carefully lift the clamping plate (7) on the Hot Runner System.

---

5) Lubricate the thread of the fastening screws (clamping plate / spacer plate / cavity plate) with high-temperature assembly paste (anti-seize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

---

6) Screw the clamping plate / spacer plate / cavity plate together with the fastening screws.

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

Requirements on the injection mold:

The machine nozzle orifice diameter (machine nozzle – inlet bushing) shall be made with a tolerance of 0 /-1 mm (0/-0.04“).

The machine nozzle shall be centered with respect to the inlet bushing. The inlet bushing shall be centered as instructed by Synventive using a centering ring and secured against lateral stress.



Doc003036.png

7) Place the center locating ring (9) on the inlet bushing.
8) Check if the center locating ring inner diameter correctly accommodates the fit diameter of the inlet bushing without side pre-load or a gap.

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9) Lubricate the threads of the center locating ring (9) fastening screws with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

10) Screw the center locating ring (9) together with the clamping plate (7).

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

11) Lubricate the thread of the fastening screws hot half / cavity plate with high-temperature assembly paste (antiseize compound).

12) Bolt together the hot half and the cavity plate.

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

4.5.3 Nozzle Tip Adjustment

In some cases it is necessary to adjust the nozzle tips to the cutout shape for the injected part. Only nozzle tips with tip extension can be cut. If the nozzle tips with extension are too long, they have to be removed and cut shorter.

WARNING



Hot Surfaces Hazard

Contact between the skin and the hot injection mold could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

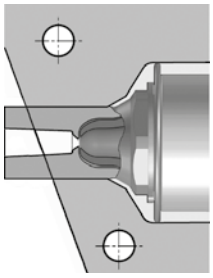


Precondition for nozzle tip adjustment is a complete installed system (Hot half)

WARNING

Hot Surfaces Hazard

1) Heat up the complete assembled system to operating temperature.
2) Check the length from the nozzle tip (3) at the cavity plate.
3) Mark the contour at the nozzle tip.



Doc003068.png

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NOTICE

Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

When removing the nozzle tip from the threaded nozzles, secure the nozzle body using an engineer's wrench at the hexagonal section.

This is done to prevent the nozzle body from rotating which could result in leakage.

When cutting nozzle tips short, make sure not to shorten beyond the dimension L (nominal size).

The nominal size is the size between the seat of the nozzle (face fit nozzle) respectively the lower edge of the manifold (screw fit nozzles) and the nozzle tip (point F0).

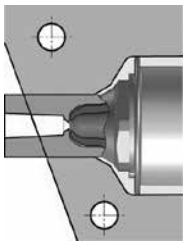
For the dimension L refer to the general assembly drawing.

The dimension "L" is the nominal dimension of a heated nozzle.

4) Wait until the system cool down to room temperature.
5) If necessary you must shorten the nozzle tip (3).

NOTICE

To shorten the nozzle tip, the hot runner system has to be disassembled out of the mold and the nozzle tip has to be unscrewed from the nozzle (e.g. section 10.1.1.2 Page 274).



Doc003068.png

6) Install the shortened nozzle tip (3) on the nozzle (e.g. section 10.1.1.3 Page 279).

WARNING

Heavy Weight Hazard

7) After reassembly of the Hot Runner System lower it into the mold without twisting.

NOTICE

Carefully and slowly lower the Hot Runner System, paying close attention especially during the last 10 mm.

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8) Lubricate the thread of the fastening screws (clamping plate / spacer plate / cavity plate) with high-temperature assembly paste (anti-seize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

9) Bolt together the clamping plate / spacer plate / cavity plate with the fastening screws.

NOTICE

Meet the prescribed torque values and use high-temperature assembly paste for the threads.

10) Remove all guiding elements if used.

WARNING

Hot Surfaces Hazard

11) Heat the hot runner to normal operating temperature.

12) Contour the nozzle tip to the cavity if required.

13) Machine the contour of the nozzle tip when nozzle is installed in the cavity.

14) In the case where the final contour needs to be placed on the valve pin, the valve pin must be rounded at the adjusted area also.

NOTICE

Generally only tips with extension are allowed to be contoured.

WARNING

Heavy Weight Hazard

15) Install the clamping plate (7) and the insulation plate (1).

16) Lubricate the thread of the insulation plate (1) / clamping plate (7) screws with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

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17) Screw the insulation plate (1) and the clamping plate (7) together.

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

Requirements on the injection mold:

The machine nozzle orifice diameter (machine nozzle – inlet bushing) shall be made with a tolerance of 0/-1 mm (0 /-0.04“).

The machine nozzle shall be centered with respect to the inlet bushing.

The inlet bushing shall be centered as instructed by Synventive using a centering ring and secured against lateral stress.



Doc003036.png

18) Place the center locating ring (9) on the inlet bushing.

19) Check if the center locating ring inner diameter correctly accommodates the fit diameter of the inlet bushing without side pre-load or a gap.

---

20) Lubricate the threads of the center locating ring (9) fastening screws with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

21) Screw center locating ring (9) together with the clamping plate (7).

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

---

22) Lubricate the thread of the fastening screws hot half / cavity plate with high-temperature assembly paste (antiseize compound).

23) Screw the hot half and the cavity plate (2) together.

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

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4.5.4 For non pre-wired Systems

DANGER

Danger to Life by Electric Shock

Serious personal injury or death can result from electrical contact.

Power supply should only be connected by properly trained and qualified personnel.

Verify that all power source connections are properly grounded (proceed as described in section 5.2).

For first aid contact your medical / safety representing.

1) Run all the wiring through wire slots in the cavity plate out to the location of the wiring box.

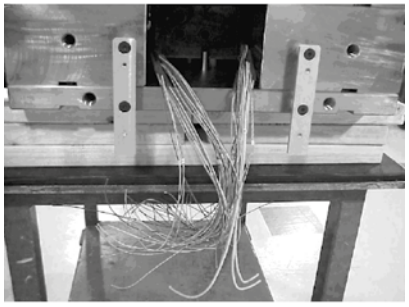
   NOTICE

   Allow enough wire length for a service loop, which will allow the connectors to be removed from the terminal box without removing the wiring.

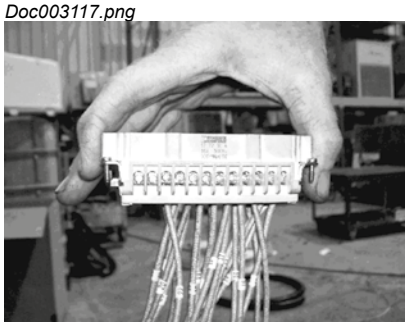
2) Re-label the wires before cutting to length.
3) If wire lengths are excessive, trim wires to proper length.
4) It may be necessary to re-label the zone numbers if the original numbers are on the length of wire being removed.
5) Connect wires to power and thermocouple connectors.

   NOTICE

   The manner in which they connect is dependent on the electrical connectors being used.



Doc003117.png



Doc003118.png

4.5.5 For pre-wired Systems



Doc006541.png



Doc006540.png

DANGER

This terminal box contains components with electrical potential, if it is connected to voltage.
Do not open this housing.

NOTICE

Removal of the Synventive label external and internal will void the warranty.

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4.6 Installation of HR Systems with Threaded Nozzles (APT)

⚠ WARNING

Heavy Weight Hazard

Transport and lifting equipment should be operated only by trained personnel.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.

When unpacking the Hot Runner System, there is a risk of injury due to falling parts and sharp edges. Maintain a minimum distance of 1 m from the Hot Runner System. Use personal protective equipment, such as head gear, safety shoes and work gloves.

For first aid contact your medical / safety representing.

NOTICE

Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

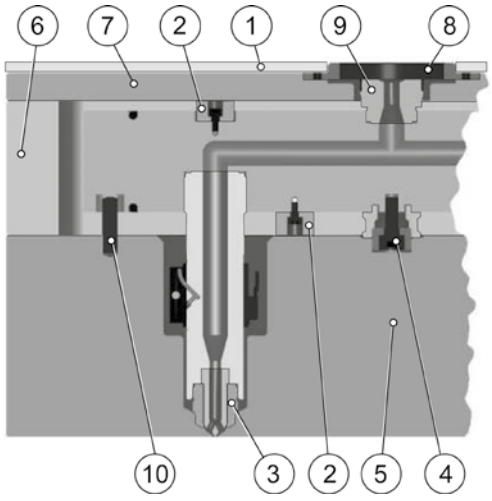
Never install or remove the hot runner when the manifold or nozzles are hot, this may cause damage to the nozzles.

Move the Hot Runner System only up or down at room temperature 20°C (68 °F).

Always tighten the screws to the torque specified in the respective table in section 13.

Depending on system complexity, some Synventive Hot Runners will include special assembly notes and instructions, which will be included on the system general assembly drawing.

The following pages use numbers for the individual parts of the Hot Runner System based on the figure on this page.



Doc003028.png

Parts of the Hot Runner System with Threaded Nozzles.

(1) Insulation plate *
(2) Thrust pad
(3) Nozzle tip
(4) Center support
(5) Cavity plate *
(6) Spacer plate *
(7) Clamping plate *
(8) Center locating ring *
(9) Inlet bushing
(10) Positioning dowel

* Not included in delivery

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4.6.1 Preparation for System Installation

1) Clean the nozzle cutout and remove metal chips if necessary.

2) Confirm that the nozzle cutout match the hot runner general assembly drawing.

3) Confirm the positioning dowel (10) locations match the hot runner general assembly drawing.

4) Install the positioning dowel (10) into the cavity plate (5).



Doc003110.png

5) Apply plasticine or any other similar substance on the nozzle tip (3).



Doc003081.png

6) Apply a general-purpose grease to the mating surface (d) of the nozzle tip.



Doc003070.png

7) If your Hot Runner System has guiding elements, install them into the respective bores.

NOTICE

Take care the guiding elements are fully seated in the drilled holes.

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8) Spotting ink the contact surface of:
   - Thrust pad (2)
   - Center support (4).

WARNING

Heavy Weight Hazard

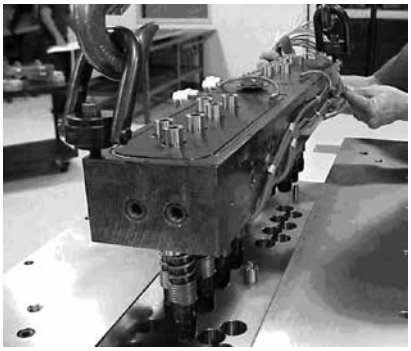
NOTICE

Ensure no wires are pinched or crushed during installation.

9) Lower the Hot Runner System into the mold without twisting.

   Carefully and slowly lower the Hot Runner System, paying close attention especially during the last 10 mm.

   The guiding elements have to remain inside the mold.

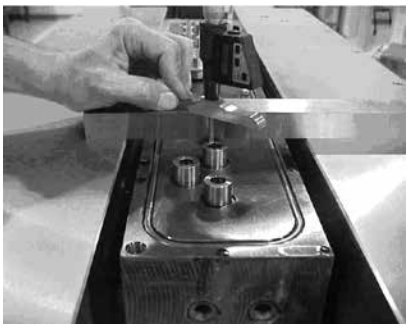


Doc003120.png

10) Once the hot runner is in the mold and resting on the support pillar, ensure that the Hot Runner System seats completely on the cavity plate.
11) Take measurements to confirm proper thrust pad clearance or preload.

NOTICE

The proper top thrust pad clearance or preload is shown on the general assembly drawing.



Doc003121.png

12) Spotting ink the contact surface of:
   - Thrust pads (2)
   - Spacer plate (6)

13) Lubricate the thread of the fastening screws (clamping plate / spacer plate / cavity plate) with high-temperature assembly paste (anti-seize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

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14) Bolt together the clamping plate (7), spacer plate (6) and the cavity plate (5).

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

---

15) Unscrew the fastening screws cavity plate (5), spacer plate (6), clamping plate (7).

WARNING

Heavy Weight Hazard

16) Lift up the clamping plate (7) carefully.

---

17) Check the spotting ink surfaces of:

- Thrust pads (2)
- Spacer plate (6)

NOTICE

All contact surfaces have to be clearly recognizable.

If not check the mold and the support elements, if necessary rework them.

In case of any uncertainty, please contact the Synventive Customer Service.

18) Clean spotting ink surface.

19) Check possible damages from the first assembly.

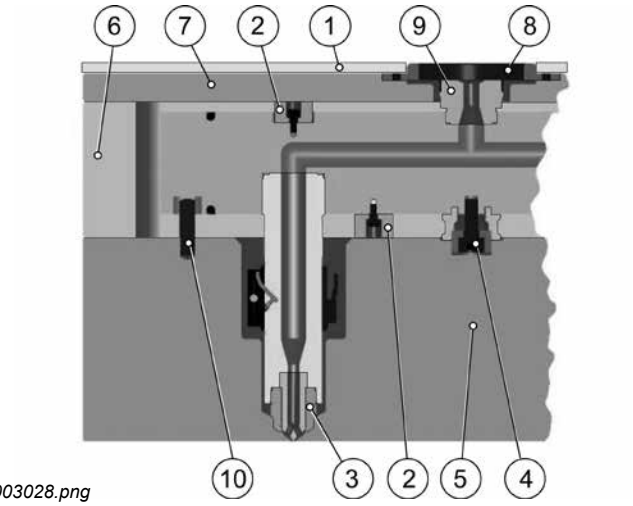
WARNING

Heavy Weight Hazard

20) Lift up the Hot Runner System carefully from the cavity plate (5).

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Installation of HR Systems with Threaded Nozzles (APT)



Doc003028.png

Parts of the HR system with Threaded Nozzles.

(1) Insulation plate
(2) Thrust pad
(3) Nozzle tip
(4) Center support
(5) Cavity plate
(6) Spacer plate
(7) Clamping plate
(8) Center locating ring
(9) Inlet bushing
(10) Positioning dowel

21) Check the spotting ink matching of:

- Thrust pad (2)
- Center support (4)

NOTICE

The edge of the center support should not bear on the manifold.

If this happens, the issue must be resolved by the corresponding beveling of the outer edge of the center support (4).

22) All contact surfaces have to be clearly recognizable.

NOTICE

If not check the mold and the support elements, if necessary rework them.

In case of any uncertainty, please contact the Synventive Customer Service or Technical Support.

23) Clean spotting ink surface.

24) Check possible damages from the first assembly.

25) Check if the plasticine at the nozzle tip (3) or nozzle is evenly distributed.

NOTICE

Ensure there is enough gap between mold and nozzle tip (3).

If not rework them.

Please note that the distance between mold and nozzle tip (3) will be reduced by thermal expansion while the hot runner is heated up.



Doc003082.png

26) Remove the plasticine.

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4.6.2 Nozzle Tip Adjustment

In some cases it is necessary to adjust the nozzle tips to the cutout shape for the injected part. If the nozzle tips are too long, they have to be removed and cut shorter.

WARNING

Hot Surfaces Hazard

Contact between the skin and the hot injection mold could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

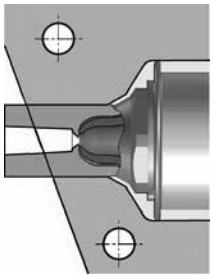
For first aid contact your medical / safety representing.

Precondition for nozzle tip adjustment is a complete installed system (Hot half)

WARNING

Hot Surfaces Hazard

1) Heat up the complete assembled system to operating temperature.
2) Check the length from the nozzle tip (3) at the cavity plate.
3) Mark the contour at the nozzle tip.



Doc003068.png

4) Wait until the system cool down to room temperature.
5) Unscrew the fastening screws cavity plate (5), spacer plate (6), clamping plate (7).

WARNING

Heavy Weight Hazard

6) Lift up the Hot Runner System carefully.

7) Check possible damages from the first assembly.

NOTICE

In case of any uncertainty, please contact the Synventive Customer Service or Technical Support.

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NOTICE

Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

When removing the nozzle tip from the threaded nozzles, secure the nozzle body using an engineer's wrench at the hexagonal section.

When cutting nozzle tips short, make sure not to shorten beyond the dimension L (nominal size).

The nominal size is the size between the seat of the nozzle (face fit nozzle) respectively the lower edge of the manifold (screw fit nozzles) and the nozzle tip (point F0).

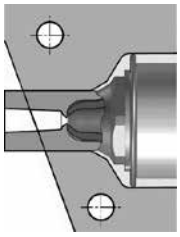
For the dimension L refer to the general assembly drawing.

The dimension "L" is the nominal dimension of a heated nozzle.

8) If necessary you must shorten the nozzle tip (3).

NOTICE

Unscrew the nozzle tip (3) and machine to length.



Doc003068.png

9) Install the shortened nozzle tip on the nozzle (e.g. section)

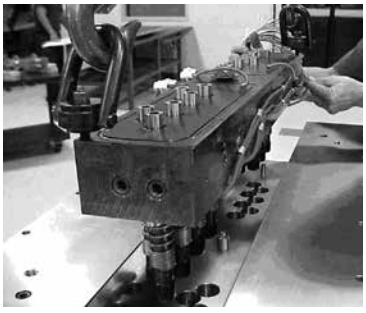
WARNING

Heavy Weight Hazard

10) After reassembly of the Hot Runner System lower it into the mold without twisting.

NOTICE

Carefully and slowly lower the Hot Runner System, paying close attention especially during the last 10 mm.



Doc003120.png

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NOTICE

Ensure that the Hot Runner System seats completely on the cavity plate.

11) Lubricate the thread of the fastening screws (Hot Runner System / cavity plate) with high-temperature assembly paste (anti-seize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

12) Install fastening screws (Hot Runner System / cavity plate).

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

13) Remove all guiding elements if used.

WARNING

Hot Surfaces Hazard

14) Heat the hot runner to normal operating temperature.

15) Contour the nozzle tip to the cavity if required.

16) Machine the contour of the nozzle tip when nozzle is installed in the cavity.

17) In the case where the final contour needs to be placed on the valve pin, the valve pin must be rounded at the adjusted area also.

NOTICE

Generally only tips with extension are allowed to be contoured.

WARNING

Heavy Weight Hazard

18) Install the clamping plate (7) and the insulation plate (1).



Doc003122.png

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Installation of HR Systems with Threaded Nozzles (APT)

Requirements on the injection mold:

The machine nozzle orifice diameter (machine nozzle – inlet bushing) shall be made with a tolerance of 0 /-mm (0 /-0.04“).

The machine nozzle shall be centered with respect to the inlet bushing.

The inlet bushing shall be centered as instructed by Synventive using a centering ring and secured against lateral stress.



Doc003036.png

19) Place the center locating ring (8) on the inlet bushing.
20) Check if the center locating ring inner diameter correctly accommodates the fit diameter of the inlet bushing without side pre-load or a gap.

---

21) Lubricate the threads of the center locating ring (8) fastening screws with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

22) Screw center locating ring (8) together with the clamping plate (7).

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

---

23) Bolt together the hot half and the mold plate.

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

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4.6.3 For non pre-wired Systems

DANGER

Danger to Life by Electric Shock

Serious personal injury or death can result from electrical contact.

Power supply should only be connected by properly trained and qualified personnel.

Verify that all power source connections are properly grounded (proceed as described in section 5.2).

For first aid contact your medical / safety representing.

1) Run all the wiring through wire slots in the cavity plate out to the location of the wiring box.

NOTICE

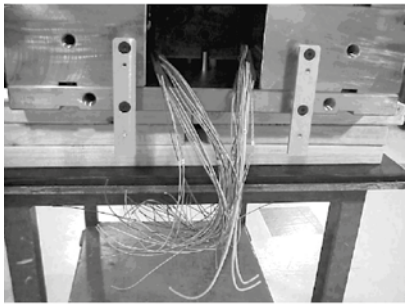
Allow enough wire length for a service loop, which will allow the connectors to be removed from the terminal box without removing the wiring.

Re-label the wires before cutting to length.

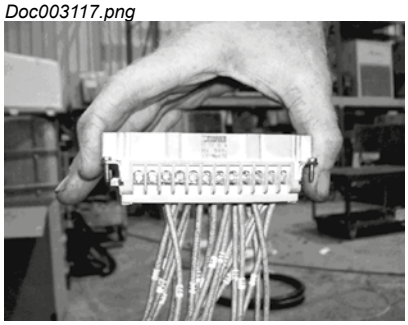
2) If wire lengths are excessive, trim wires to proper length.
3) It may be necessary to re-label the zone numbers if the original numbers are on the length of wire being removed.
4) Connect wires to power and thermocouple connectors.

NOTICE

The manner in which they connect is dependent on the electrical connectors being used.



Doc003117.png



Doc003118.png

4.6.4 For pre-wired Systems



Doc006541.png



Doc006540.png

DANGER

This terminal box contains components with electrical potential, if it is connected to voltage.
Do not open this housing.

NOTICE

Removal of the Synventive label external and internal will void the warranty.

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5 Start-up of the Hot Runner System

DANGER



Danger to Life by Disfunction of Safety Devices

Serious personal injury or death can result from disfunctions of safety devices.

Before machine operation, properly set all safety devices and use them at all times.

For first aid contact your medical / safety representing.



Danger to Life by Electric Shock

Serious personal injury or death can result from electrical contact.

Electrical work must be carried out by qualified persons.

Verify that all power source connections are properly grounded.

When working on electric parts of the machine, switch off:

- Temperature control of the Hot Runner System
- Injection molding machine
- Electric connections to the Hot Runner System or machine have to be disconnected.

For first aid contact your medical / safety representing.



Hydraulic

Danger to Life by Hydraulic

Serious personal injury or death can result from connecting or disconnecting hydraulic hoses under pressure.

Hydraulical works must be carried out by qualified persons.

Before you start any hose related work:

- The hoses have to be depressurized.
- The electrical disconnect properly locked out.

For first aid contact your medical / safety representing.



WARNING





Heavy Weight Hazard

Transport and lifting equipment should be operated only by trained personnel.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Use personal protective equipment, such as head gear, safety shoes and work gloves.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.

When unpacking the Hot Runner System, there is a risk of injury due to falling parts and sharp edges. Maintain a minimum distance of 1 m from the Hot Runner System.

For first aid contact your medical / safety representing.



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Start-up of the Hot Runner System

⚠ WARNING



Mandatory

Safety instructions

Oil sprayed from leakages in the oil distribution systems

May result in injury, e.g. to the eyes.

Use personal protective equipment, in this case specifically a face shield or protective goggles.



Leaking oil may result in severe injuries due to slipping

Eliminate contamination from lubricants.

When you are working in the vicinity of the machine, pay close attention to the safety of your workplace.

For first aid contact your medical / safety representing

NOTICE

DO NOT heat the Hot Runner System if cooling is not available

Severe damage to actuators will result.

Cooling shall be switched on together with the heating system.

Average temperature: min. 30 °C (86 °F), max. 60 °C (140 °F), max. pressure 8 bar (116 psi); max. temperature difference between inlet and outlet 5 °C (9 °F).

Parts of the system obstruct movable parts of the machine

Make sure the hoses of the hydraulic, pneumatic and cooling systems as well as all electric cables do not obstruct movable parts of the machine, do not interfere with the machine's area of movement and the area of automatic handling, if applicable.

Rheologic calculation from the customer's point

To provide to the mold function, to determine operating data and to verify the eligibility and functional reliability of the Synventive Hot Runner System as specified and approved by the customer, it is necessary to carry out a rheologic calculation from the customer's point of view based on our knowledge.

Upon request at the time of the purchase order, we can submit free of charge the dimensions of the melt flow channels, necessary for the calculation, converted into the form of three-dimensional data.

Air intake in the hydraulic hoses

may result in incomplete valve pin closing, which may lead to a large gate vestige on the molded part.

Make sure that the connected hydraulic hoses are fully bled of all air prior to molding parts.

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5.1 Preparation for Start up

NOTICE

If you are restoring the operation of the injection mold use the list of adjustment values that state the operating conditions under which the injection mold was initially tested.

1) Check if the molding machine nozzle flow channel diameter = ØA matches the inlet bushing flow channel diameter = ØE, or if it is smaller by not more than 1.0 mm (0.04").

   $Ø_E = Ø_A$ + 0/-1.0 mm (+0/-0.04")

2) Attach the complete injection mold using the applicable screws and, if necessary, fix to the injection molding machine using retaining or clamping elements.

3) Connect the hoses of the coolant distribution systems to the connection points of the Hot Runner System and check for leakage.

4) Connect the hoses of the hydraulic and / or pneumatic distribution systems to the connection points of the Hot Runner System and check for leakage.

5) If you are restoring the operation of the injection mold, make sure that the fittings on the tool in the molding machine are tight.

5.2 Power Supply Connection

⚠ DANGER



Danger to Life by Electric Shock

Incorrectly installed power supply lines may result in severe burns and even cardiac arrest and possible risk of death.

Power supply have to be connected by qualified persons.

For any work on the Hot Runner System, check that the system is properly grounded.

For first aid contact your medical / safety representing.

1) Close the injection mold.

2) Switch off temperature control of the Hot Runner System and the control system of the injection molding machine.
3) Disconnect all power supply lines to the Hot Runner System, temperature controller and the injection molding machine.

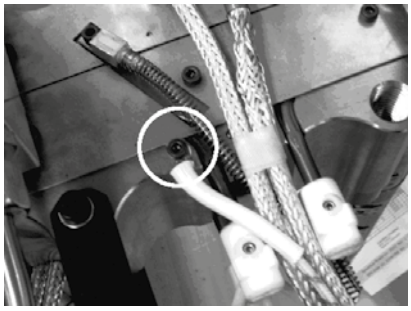
4) Check if the connector arrangement of your temperature control system matches the connection diagram and wiring schematics supplied by Synventive.

5.2.1 Grounding Check

1) To check if the Hot Runner System is grounded, hold a multimeter between temperature control grounding and manifold grounding.

DANGER

The measured resistance value should be zero Ω.



Doc003123.png

5.2.2 Verification of Heater Grounding

DANGER



Danger to Life by Electric Shock

Electrical work must be carried out by qualified persons.

For any work on the Hot Runner System, check that the system is properly grounded.

For first aid contact your medical / safety representing.

DANGER

Never operate the heaters at full capacity if resistance is below 230 kΩ.

NOTICE

Heaters may accumulate ambient humidity, which could reduce resistance to a value between 100 kΩ and 10 MΩ.

1) In case resistance is below 230 kΩ, heat the system to 50 °C (122 °F) for the first 10 to 15 minutes. (Slow start).
2) If resistance is lower than 1 MΩ, heating can be set to the processing temperature.

5.2.3 Information on Heater Connection

5.2.3.1 Color coding of Thermocouples

NOTICE

Take notice of the production and color identification of thermocouple cables.

Synventive uses J and K type thermocouples. Their color coding is given in the following table.

Table 1: International color coding for temperature sensors

Type	International standard IEC 584-3	
J	Black	+ Black
		- White
K	Green	+ Green
		- White

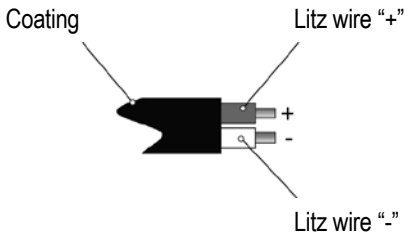


Table 2: Color coding of temperature sensors by customer request

Type	ANSI/MC 96.1		JIS C-1610-1981	
J	Black	+ White	Yellow	+ Red
		- Red		- White
K	Green	+ Yellow	Blue	+ Red
		- Red		- White

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5.3 Hot Runner System Start-up

⚠ WARNING

Danger of Unexpected Discharge

If the inlet bushing does not heat up as quickly as the manifold, pressure inside the manifold may increase due to the thermal expansion properties of plastics.

Move injection unit towards the injection mold to engage the heated machine nozzle is pressed against the inlet bushing.

NOTICE

This ensures additional heat supply for the inlet bushing, to be transmitted to the cold plastic.

Use personal protective equipment.

For first aid contact your medical / safety representing.



1) Switch on machine control, temperature control of the injection molding machine and the mold cooling.

2) Move the injection unit slowly to the injection mold until the heated molding machine nozzle is pressed against the inlet bushing.

3) Set the temperature control of the Hot Runner System and the plastification unit (screw and barrel) to the operating temperature given in the plastic's material safety data sheet.

NOTICE

Ideally, all hot runner heating zones and the plastification unit should reach the given temperature at the same time.

It is advisable to wait at least 15 minutes after operating temperature is reached to allow for full thermal soak prior to attempting to mold parts.

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Start-up of the Hot Runner System

⚠ WARNING

Danger of Unexpected Discharge

Uneven heating of the Hot Runner System and the material may result in damage to the Hot Runner System.

When the machine reaches the required temperature (based on the temperature control indicator), let it heat soak for another fifteen minutes prior to beginning molding operations.

If the injection mold is opened, the material injected into the Hot Runner System under high pressure could be ejected causing severe injury.

Never inject the melt under high pressure into an open injection mold.

If production operation stops while Hot Runner heating is on, the melt can overheat easily. Overheated plastic may emit dangerous vapors that could eject explosively if the mold gate is opened.

Upon each interruption of production operations, retract the machine's injection unit to make sure the pressure in the Hot Runner System can normalize through the inlet bushing.

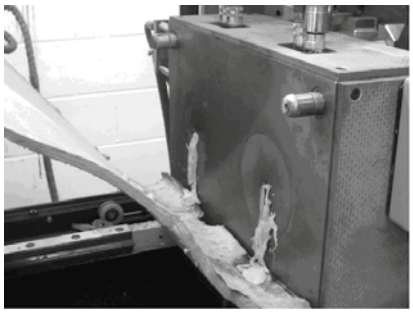
Use personal protective equipment.

For first aid contact your medical / safety representing.

4) Start-up of a new and empty Hot Runner System (initial start-up):

Extrude or gently purge plastic material through the Hot Runner System and the injection mold under a low pressure of 10 bar (145 psi) to 14 bar (200 psi).

Doc003125: Mold flush

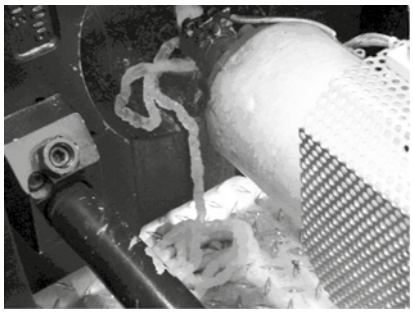


Doc003125.png

5) Start-up if there is plastic in the Hot Runner System (repeated start-up):

Retract the plastification unit from the inlet bushing and purge the unit until fresh, clean plastic material is exiting the machine nozzle, then return it back to the hot runner inlet bushing.

Doc003126: Injection unit flush



Doc003126.png

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Start-up of the Hot Runner System

6) Set the molding parameters of shot size, time and pressure depending on the size of the molded part, runner size and material.

7) Set the valve pin open time to 0.2 to 0.5 s before injection starts.

NOTICE

At least one valve gate must be opened before start of injection.

8) In manual mode do a visual check (using a mirror if possible) that each valve pin opens and closes.

9) Make sure the valve pins are closed before starting the injection cycle.

10) Start the injection cycle in semi-automatic mode and verify that all machine functions are operating correctly.

11) Switch the machine to automatic mode.

NOTICE

The production process may require some additional fine-tuning. Record the optimum set-point values for operating cycle or on the molded part's quality.

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5.4 Color Change

If a Hot Runner System is to be used for color-change applications, it is advisable to use a clear or natural material at first shots to ease future color changes.

NOTICE

If possible, colors should be changed from light to dark to prevent any unnecessary waste.

5.4.1 Color Change of direct contact Nozzles (plunged through-Nozzles)

1) Remove all residues of the previously processed material from the hopper.

2) Retract the plastification unit from the inlet bushing and flush the plastification unit with the new material until no signs of the previous material are visible.

NOTICE

Do not change the barrel temperature in the process.

Set the temperature of the injection mold as follows:

3) While cleaning the plastification unit, increase the temperature of the hot runner manifold and the nozzles by 38°C (68 °F).

NOTICE

The condition is that the plastic intended for processing withstands this temperature increase.

4) Increase the mold temperature on the nozzle side by 15°C (27 °F).

WARNING

Danger of Unexpected Discharge

There is a risk of material degradation or unexpected discharge.

Once the new required temperature is achieved, leave the hot runner at least 4 minutes at the increased temperature.

Purge or extrude through the manifold.

Use personal protective equipment.

For first aid contact your medical / safety representing.



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5) If possible, purge or extrude the new material through the open injection mold until no residues of the old material are visible.

NOTICE

If this is not possible, go to the next step.

6) Perform 20-30 shots at a reduced injection speed (approx. by 30%) and reduced part cooling time (approx. by 20%) to make sure that the color in the injection mold can change.

NOTICE

If the material cannot be purged or extruded through the open mold, you may be required to run more than 30 shots.

7) Reduce the temperature of the hot runner and the injection mold back down to normal operating temperature.

8) Run 10-20 shots to completely remove all scattered material residues from the whole injection mold.

9) Resume normal production once all evidence of the previous color has disappeared from the parts.

10) If the color is still not fully changed, repeat steps (1-7) once more or use a granulated cleaner instead of natural or clear plastic.

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5.4.2 Color change of Nozzles with pre-chamber isolation without removable cavity plate

In case of difficult color change and material (e.g. from black to white) the isolation cap should be removed from the nozzle.

For such cases the injection mold is equipped with a replaceable cavity plate, so it is possible to remove the isolation caps directly on the mold.

If your injection mold is not fitted with a removable cavity plate, please contact our Customer Services.

5.4.3 Color change of Nozzles with pre-chamber isolation and replaceable cavity plate

(not plunged through-Nozzles)

1) Remove residues of the previously processed material from the hopper.

---

2) Purge the plastification unit with the new material until no signs of the old material are visible.

NOTICE

Do not change the barrel temperature in the process.

Set the temperature of the injection mold as follows:

---

3) While purging the plastification unit, increase the temperature of the hot runner manifold and the nozzles by 20-30 °C (36-54 °F)

NOTICE

The condition is that the plastic intended for processing withstands this temperature increase.

---

4) Switch off the Hot Runner System (manifold and nozzles).

NOTICE

System with Support Ring Face Fit nozzles:

Leave the nozzles until they cool down to not more than 50 °C (122 °F), to prevent damage to the nozzle tip. (The manifold temperature may be higher).

System with Threaded Screw Fit nozzles:

Leave the hot runner system (manifold and nozzles) until it cool down to not more than 50 °C (122 °F), to prevent damage to the nozzle tip.

Start-up of the Hot Runner System

⚠ WARNING

Danger of Unexpected Discharge

There is a risk of material degradation or unexpected discharge.

Once the new required temperature is achieved, leave the hot runner at least 4 minutes at the increased temperature.

Flush through the manifold.

Use personal protective equipment.

For first aid contact your medical / safety representing.



5) Slide away the cavity plate on the guiding elements.

6) Heat the nozzles to a temperature 50°C (90°F) lower than the processing temperature for the specific plastic.

Example:

Processing temperature = 260 °C (500 °F) - 50 °C (90 °F) = 210 °C (410 °F).

In this case the nozzle temperature would be set to 210 °C (410 °F).

7) Remove all isolation caps using a suitable aluminum or brass tool.

8) Switch off the nozzles once again and wait until they cool down to about 50 °C (122°F).

9) Slide the cavity plate onto the guiding pins until the cavity plate engages the nozzle tips. Fasten the plates.

⚠ WARNING

Hot Surfaces Hazard

10) Heat the hot runner to normal operating temperature and produce parts using normal cycle.

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5.5 Hot Runner System Switch-off

NOTICE		
 Mandatory Safety instructions	**Hazards Material Damage** **Do not switch the machine off, if there is ethylene vinyl alcohol (EVOH) copolymer inside.** Because of its low viscosity, it could be difficult to remove the cleaning material from the hot runner. Switch off hot runner heating and continue injecting until the melt in the hot runner solidifies and the material stops spreading. Solidification occurs when the cavity plates do not fill with the material any more. Then finish injecting. **System shutoff without aftercooling could result in damage to the sealing at actuator seals.** To avoid this, the cooling of hydraulic actuators should continue for at least 15 minutes after the system power is disconnected. **The liquid flowing from leaking hoses or connections could result in short circuit or fire in case of contact with electric parts.** Maintain good condition of the hoses and their connections through regular maintenance. **The coolant and the hydraulic fluid should not be located near the electric connections and devices on the machine.**	

1) Close the valve pin after the last molding shot.

2) Switch off the temperature control of the Hot Runner System.

3) Switch on mold cooling and wait until the material inside the Hot Runner System freezes, i.e. until the temperature in the manifold drops under the melting point of the processed material.

4) Retract the injection unit from the inlet bushing.

5) Flush the injection unit with a suitable granulated cleaner.

6) As soon as the granulated cleaner is completely discharged from the injection unit without any impurity, disconnect the unit.

7) Switch off the control system and the temperature control of the machine.

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5.6 Storage of Hot Runner System during Shutdowns

If you want to shut down the Hot Runner System temporarily, comply with the following instructions after dismantling.

1) Treat the Hot Runner System by injecting a protective anti-corrosion agent.

   NOTICE

   We recommend the multipurpose spray CC80 by Metaflux as an anti-corrosion agent.

2) Store the mold in the horizontal position.

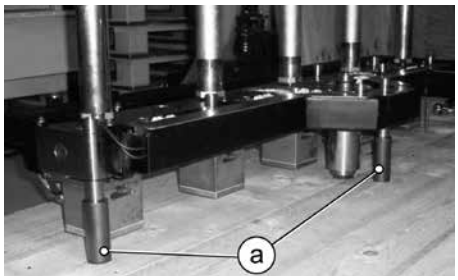
   NOTICE

   Use the assembly pillars (a) for a secure storing.

   This hot runner system has been shipped with assembly pillars installed to prevent damage to the actuators and valve pin bushings while being assembled or in transit. These assembly pillars must be removed prior to installing the top clamp plate.

   WARNING

   Do not use the assembly pillars as lifting device.



Doc003233.png

3) Store the Hot Runner System in a dry location.

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6 Defect Identification and Troubleshooting

6.1 Defects Table

The following table contains a list of some of the most frequent molding problems, their possible causes and methods of rectify. Although the description is made to the best of our knowledge, we cannot guarantee that the problems will be successfully rectified using these measures. The list is to be used as a general guideline. The operator should make a detailed analysis of the defect on-site.

Table 6: List of defects

Sign	Possible cause	Resolution
Sink marks on the molded part	Cushion too small. Sink marks close to the gate or in thick-wall areas.	Shot-size increase Increase backpressure, optimize backpressure time. Increase backpressure. Decrease mold wall temperature. Increase melt temperature. Decrease shot speed. Adjust gate diameter.
	Sink marks far from the gate or in thin-wall areas.	Optimize backpressure time. Increase backpressure. Increase shot speed. Increase melt temperature. Increase mold wall temperature. Adjust gate diameter.
	Deformation during ejection.	Increase cooling time.
	Melt too cold, resulting in too high shear stress.	Increase melt temperature. Increase hot runner temperature.
	Melt too hot, resulting in damage to the molded part due to high temperature.	Decrease material setpoint temperature. Decrease hot runner temperature (do not decrease nozzle temperature too much, could cause freezing-off). Decrease shot speed. Adjust gate diameter.
	Temperature sensor of the hot runner (inlet bushing, manifold, nozzle).	Temperature sensor position: Sensor too far from heating, in a cold area. Place the sensor closer to heating. Temperature sensor function: Correct sensor type (K, J)? Correctly calibrated controller (K, J)?

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Defect Identification and Troubleshooting

Sign	Possible cause	Resolution
Burnt smudges (brown or silver)	Cushion too large.	Reduce cushion.
	Shear stress on the actuator too high.	Decrease screw rotation speed.
	Long residence time in plastification unit under critical conditions.	Decrease cycle time. Increase delay at feeding. Use a smaller plastification unit.
	Shear stress at gate too high.	Decrease shot speed. Check / adjust gate diameter. Remove transitions with sharp edges from the hot runner system.
	Material too dry.	Check/reduce temperature/drying time. See drying instructions from material producer.
	Differences in hot runner diameter too big Channel diameter for the melt too big (long residence time).	Clean the hot runner. Adjust the channels for the melt in the hot runner. Wrong, excessive dimensioning.
	Contact between hot runner nozzles and manifold, resulting in overheating (noticeable on the high load of the heating zone).	Check the cut out and the contact surfaces of the hot runner and the manifold vs. the injection mold. Increase the isolation gap (Joint Z). Cut out dimensions as per the customer drawing
The cavity stops filling with material after more than 5 shots	Check the cut out and the contact surfaces or the hot runner and the manifold vs. the injection mold. Cold nozzles, frozen gate.	Check if the nozzle does not bear on the cut out (take into account thermal expansion), correct, if needed. Check injection mold, machine nozzle and inlet bushing for tightness. Check the function of heaters and replace them, if needed. Check the temperature at mold gate using a pyrometer. Increase temperature at mold gate by 28-56°C (50-I00°F) above operating temperature until all cavities are filled, and decrease to normal operating temperature. Caution is required: not all plastics withstand this temperature increase. If this is the case do not set such a high temperature.

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Defect Identification and Troubleshooting

Sign	Possible cause	Resolution
Dark spots	Granulate contaminated.	Prevent contamination. Clean the plastification unit and the hot runner.
	Melt temperature too high.	Decrease melt temperature. Decrease hot runner temperature. Decrease screw rotation speed. Decrease hot runner temperature (avoid nozzle freezing). Decrease dynamic pressure.
	Too long melt residence time in the system.	Decrease cycle time. Increase delay at feeding. Use a smaller plastification unit. Check the channel diameter in the hot runner.
	PC processing.	When production is interrupted, decrease hot runner and actuator temperature to max.160°C (320°F). If temperature is to drop in general, it is essential to flush the hot runner and the plastification unit in advance (natural PP or natural PE).
	Wearing, dead spots.	Check plastification unit, gate system and hot runner for contamination, wearing and dead spots.
Stringing in the gate area	Melt temperature too high.	Decrease melt temperature. Decrease hot runner temperature. Decrease screw rotation speed. Decrease hot runner temperature (avoid nozzle freezing).
	Gate area too hot.	Decrease mold temperature. Check contact tightness between nozzle tip and mold. Check mating between nozzle tip and mold. Check isolation cap thickness. Use colder nozzle / cone point insert. Temperature sensor position: Sensor too far from heating, in a cold area. Place the sensor closer to heating. Temperature sensor function: Correct sensor type (K, J)? Correctly calibrated controller (K, J)?
Part deformation	Injection pressure too low.	Increase injection pressure. Increase cooling time. Increase injection mold surface temperature. Decrease regrind percentage. Increase gate diameter.
	Afterpressure time too short.	
	Heating defect.	
Smudges	Material too cold.	Increase material temperature. Increase injection mold surface temperature. Increase gate or runner channel.
	Gate or channel too small.	
	Injection mold too cold.	
	Nozzle hole too small.	
Matt surfaces	Material / injection mold too cold.	Increase material / injection mold temperature.
Molded parts are brittle	Material / injection mold too cold / hot. Injection speed too high. Gate or flow channel too small.	Increase material/ injection mold temperature. Decrease injection speed. Increase/decrease injection mold temperature. Increase gate or flow channel.

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Defect Identification and Troubleshooting

Sign	Possible cause	Resolution
Actual temperature does not reach the required value:	Heating power does not cover heat losses due to support elements, center rings and inlet bushing.	Verify correct Hot Runner System installation in mold.
	Nozzle heating in contact with the injection mold.	
Unstable value of actual temperature	Unstable value of actual temperature.	Check temperature controller Notify Services Verify correct assembly dimensions.
	Unsuitable sensor position.	
	Defective sensor.	
	Unstable system contact, synchronization with injection cycle.	
Max. heating power cannot be reached	Weak temperature control. Heating power limited by manual setting.	Increase heating power set manually.
Gate freezing	Gate too small.	Check for presence of cold / non-plastified material. Check injection mold and processing temperature. Check for presence of foreign material. Check temperature controller. Notify Services.
	Contact surfaces too large.	
	Foreign body in the gate.	
	Nozzle run, cold plug.	
	Defective sensor or heating.	
	Heating in contact with the mold.	
	Irregular injection cycle.	Mold temp too low.
Plastic leakage	Temperature too high.	Check temperature. Increase screw decompression. Check pressure.
	Gate too large.	
	Matt places around the gate or at sharp edges.	
	Contact surfaces too small.	Replace tips
Matt places around the gate or at sharp edges	Shot speed too high.	Graduated injection speed profile slow – medium – fast.
	Melt temperature too low.	Increase injection pressure. Increase mold temperature.
	Mold temperature too low / uneven.	Increase mold temperature.
	Melt face speed too high.	Significantly decrease shot speed before the flow face reaches sharp edges in the mold.

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7 Service and Maintenance

This section describes maintenance procedures that need to be carried out by the user. For any replaced parts, always verify contact surfaces dimensions using spotting paste, or by comparing the measurement with the part being replaced.

7.1 Maintenance of Valve Gate Systems

To provide for the continuous optimum operation of the Hot Runner System with valve gates, it is necessary to perform periodic visual inspections after every 6 months of operation or after each 150,000 shots (whichever is reached first).

7.1.1 Checklist for Valve Gate System Maintenance

1) Check of pneumatic and hydraulic distribution systems
   - □ Are the connections and lines properly installed?
   - □ Are the connections and lines intact (pipe / hose bends and fittings, damaged or worn hoses, uncontaminated distribution etc.)?
   - □ Is there a noticeable loss of oil?
   - □ Are the warranty seals intact?

2) Check of actuator cooling (only for manifold mounted actuator)
   - □ Are the connections and lines properly installed?
   - □ Is the condition of the closing plug of the cooling circuit good?
   - □ Are the connections and lines intact (pipe/ hose bends and fittings, damaged or worn hoses, uncontaminated?
   - □ Is there a visible coolant leakage?

3) Check of valve pin guide bushing
   - □ Is there any plastic leakage visible (leaking melt)?
   - □ Do the valve pins or guide bushings show any signs of wearing?
   - □ This inspection should be done more frequently when using materials with fillers such as glass-fiber, ceramics, minerals, talc, or metals.

4) Check of tightness between valve pin and nozzle tip
   - □ Is there any leakage visible (is a large circular residue created when demolding)?
   - □ Does the valve pin or nozzle tip show any signs of wear?

5) Test of temperature sensors (thermocouples)
   - □ Are all temperature sensor cables properly installed?
   - □ Are all cables intact (insulation, contacts)?
   - □ Using a surface pyrometer, verify that the controlled temperature is correct.

6) Check of cables
   - □ Are all heating circuit and temperature sensor cables properly installed?
   - □ Are all cables intact (insulation, contacts)?
   - □ Are any of the coolant lines clogged?
   - □ Are any parts of the system corroded or otherwise showing signs of wear?

7) Check of manifold – nozzle connection
   - □ Is there any leaking melt visible?

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7.1.2 Cleaning out the Hot Runner System

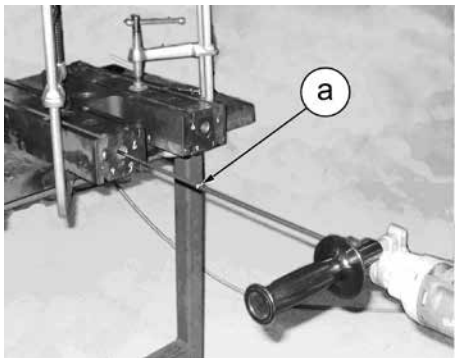
If your Hot Runner System is highly contaminated you may drill it out if it is provided with replaceable runner plugs.

To drill out the hot runner you need the following tools:

- Drilling machine
- An extended drill bit. The diameter of the drill bit has to be 2,5 mm (0,1”) smaller than the diameter of the hot runner. The drill bit end has to be rounded off. The brazed extension has to be concentric.
- An extended reamer. The diameter of the reamer has to be 0,05 mm (0.02”) smaller than the diameter of the hot runner. The brazed extension has to be concentric.
- A spiral wire brush. The diameter of the brush has to be a little bigger than the diameter of the hot runner. The spiral wire brush can be extended through a conduit and it has to be concentric to the extension.

1) Prior to drilling, mark the maximum depth (a) at the drill bit extension, the drill bit is allowed to go into the hot runner.

   (a) = Depth labeling



Doc003084.png

2) Do not drill deeper than about 13 mm (1/2“) at once, then remove the material from the drill bit.

   NOTICE

   This is done to avoid the drill sticking inside the material or getting damaged.

3) Repeat this process until it reaches the end of the bore.

4) Ream the bore carefully with the reamer.

5) Brush the bore out with the spiral wire brush.

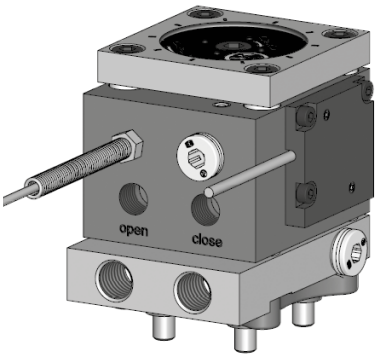
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8 Actuators

8.1 Hydraulic Actuators

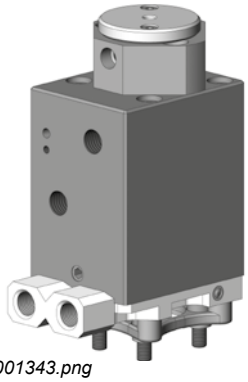
This section describes the disassembly and reassembly process to replace seals and adjust the valve pin for the following production series:

HB...Series



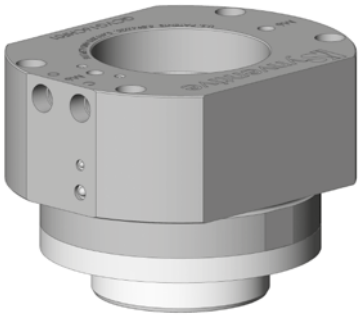
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HYC...M Series



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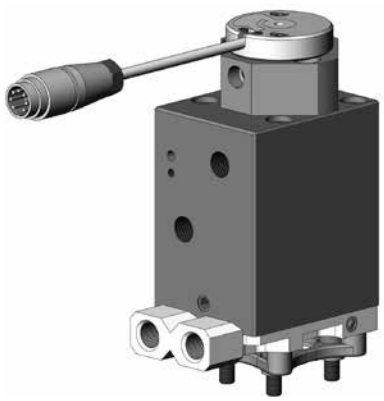
QCVG Series



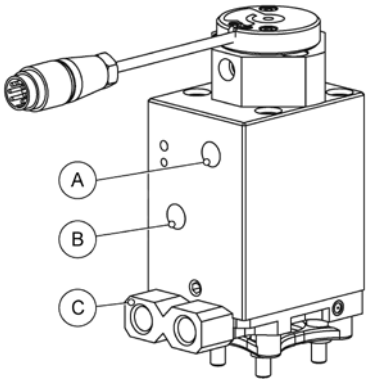
Doc003005.tif

8.1.1 Actuator HYC4520M04 Series

8.1.1.1 Technical Data HYC4520M04-F, HYC4520M04-R



Doc001186.png



Doc001356.png

(A) CLOSED

(B) OPEN

(C) COOLING

Actuator, bolted to manifold.	
Valve pin Operation	
Operation medium	hydraulic
Operation pressure	120 bar (1740 psi)
Flow rate	3 l/min / 40 bar (580 psi)
Valve pin response time	~0.5 s / 40 bar (580 psi)
Valve pin stroke	20 mm
Valve pin adjustment	± 1.5 mm via adjustment threads from outside
Closing force	14100 N / 120 bar (1740 psi)
Opening force	14100 N / 120 bar (1740 psi)
Connections	M 12 x 1,5 (8-L)
Cooling	
Medium	Cooling water
Flow rate	6 l/min
Pressure	max. 8 bar (116 psi)
Temperature	30 - 60 °C (86 °F - 140 °F) Temp. difference IN/OUT max. 5 °C
Connections	M 12 x 1,5 (8-L) max. 3 actuators in a row
Valve Pin	
Valve gate pin	Ø 6 mm, Ø 8 mm
Attachment	Quick coupling, antirotation

NOTICE

To ensure long life and continued flawless operation of the actuator, we recommend using a service medium that complies with the requirements of classification 21/18/13 pursuant to ISO 4406.

The coolant used should be properly modified, e.g. filtered water with an anti-corrosion and frost-proof agent.

After switch off the hot runner heater, the cooling for the actuator have to be turned on for at least 15 minutes, to avoid damages of the actuator sealing.

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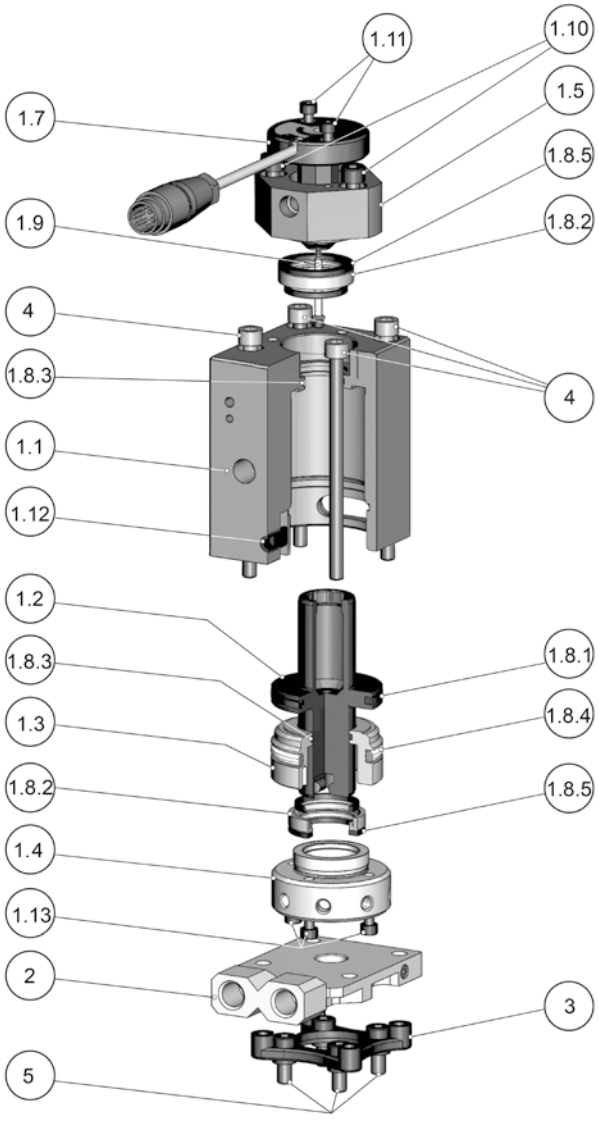
8.1.1.2 Exploded View HYC4520M04 Series

HYC4520M04 Series- This actuator is for position monitoring with position sensor unit.

In this section the actuator parts are identified with the numbers indicated in the following figure, which shows the components.

NOTICE

Always tighten the screws to the torques specified in the respective table (section 13).



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Actuator parts HYC4520M04 Series

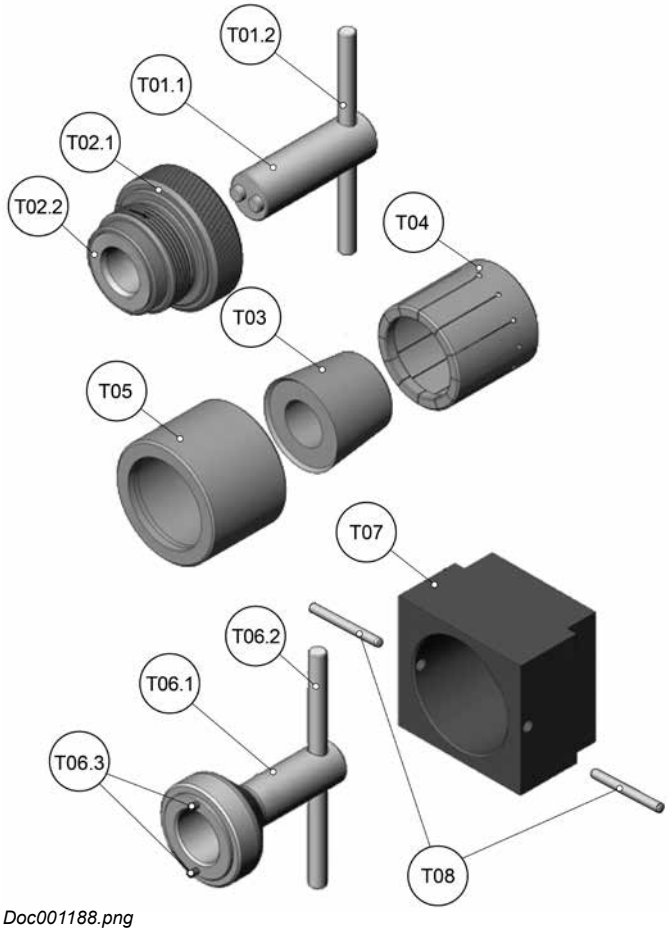
No.	Qty.	Description	Item
1	1	Cylinder housing complet	HYC4520HC01
1.1	1	Cylinder housing	HYC4520CH02
1.2	1	Piston	HYC4520PI02
1.3	1	Adjustment screw	HYC4520AS01
1.4	1	Adjustment screw core	HYC4520AC01
1.5	1	Spacer	HYC4520SP01
1.6	-	Vacant	
1.7	1	Position sensor unit	DFPS02
1.8	1	Seal kit (complet)	HYC4520SK01
1.8.1	1	Piston seal	2G2/45-37,5-3,2
1.8.2	2	Rod seal	C1-2038-V3664
1.8.3	2	Guiding element	FB2,3-1,5L70,5
1.8.4	1	O-ring	VIOR37x4FPM80
1.8.5	2	Back up ring	Y22331PS030
1.9	1	Adapter	HYC4520AD02
1.10	3	Socket head cap screw	DIN912-M6x20-12.9
1.11	2	Socket head cap screw	DIN912-M4x12-12.9
1.12	1	Socket set screw	DIN913-M8x16-45H
1.13	4	Socket head cap screw	DIN912 M4x16-12.9
2	1	Cooling plate (F) full contact surface	HYC4018CP01
2	1	Cooling plate (R) reduced contact surface	HYC4018CP02
3	1	Spacer plate	HYC4013MP02
4	4	Socket head cap screw	DIN912-M6x95-12.9
5	4	Socket head cap screw	DIN912-M6x14-12.9

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8.1.1.3 Tools for Assembling and Disassembling the Actuator

The following overview contains a list of special tools needed for the assembly and disassembly of the actuator.

In this section assembly and disassembly tools are identified as shown in this figure, which shows the components.



Doc001188.png

Assembly and Disassembly Tools - ATCYL04		
No.	Description	Item
(T01)	Adjustment Tool cpl.	ATCYL0301
(T01.1)	Body	ATCYL030101
(T01.2)	Handle	ATCYL030102
(T02)	Fitting nut cpl.	ATCYL0402
(T02.1)	Fitting nut	ATCYL040201
(T02.2)	Socket	ATCYL040202
(T03)	Installation cone	ATCYL0404
(T04)	Spread tube	ATCYL0405
(T05)	Calibration tube	ATCYL0406
(T06)	Assembly tool cpl.	ATCYL0407
(T06.1)	Assembly tool body.	ATCYL040701 AS
(T06.2)	Handle	ATCYL040702
(T06.3)	Parallel pin	DIN6325-3m 6x10
(T07)	Assembly tool	ATCYL0408 AS
(T08)	Cylinder pin	ATCYL0104

NOTICE

These tools are not included with the Hot Runner System and must be ordered from Synventive separately.

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8.1.1.4 Enhancements, Options and Accessories

	Cooling Full for Valve Pin Guide	Cooling Reduced for Valve Pin Guide	Position Sensor Unit
HYC4520M04-F	●	–	●
HYC4520M04-R	–	●	●

● Standard

○ Optional

– not possible

Cooling Plate with Contact Surface to the Valve Pin Guide

HYC4520M04-F with cooling plate HYC4018CP01 for full contact surface to the valve pin guide.

HYC4520M04-R with cooling plate HYC4018CP02 for reduced contact surface to the valve pin guide.

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8.1.1.5 Disassembling the Actuator HYC4520M04 Series

DANGER

Hydraulic

Danger to Life by Hydraulic

Serious personal injury or death can result from connecting or disconnecting hydraulic hoses under pressure.

Hydraulic works must be carried out by qualified persons.

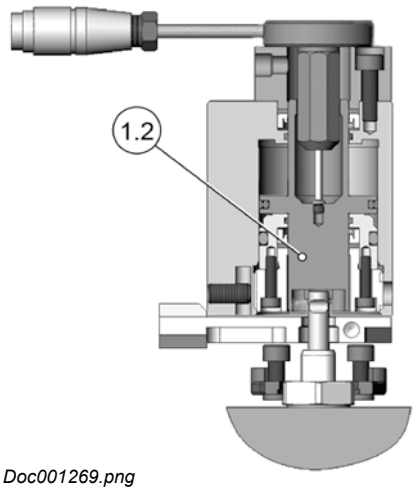
Use personal protective equipment, face protection, headgear, anti oil gloves.

The hoses in Hot Runner systems and the injection mold are under high pressure and high temperatures

Before disconnecting or connecting any hydraulic hoses:

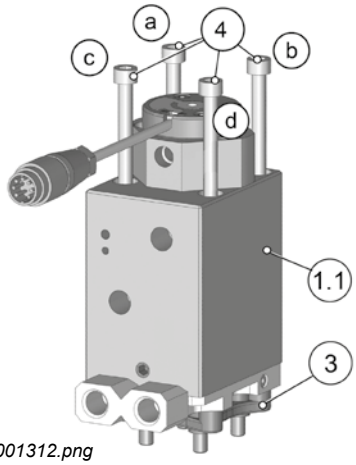
- The Injection Molding Machine must be shut down.
- The electrical disconnect properly locked out.
- The hoses have to be depressurized.

In Emergency case - Switch all systems off.



Doc001269.png

1) Close the valve pin gate, so that the piston (1.2) is in bottom position.
2) Remove the hydraulic hoses from the actuator connection ports.



Doc001312.png

3) Unscrew and remove the socket head cap screws (4).

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4) Slide the actuator in the indicated direction (Sign, Pin Release) on top of the actuator.

NOTICE

This will disengage the actuator from the valve pin.



Doc001339.png

Regular positioning of the actuator on the cooling plate (A)

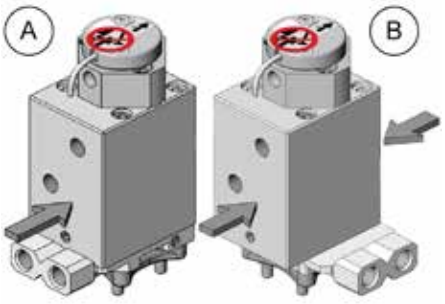
NOTICE

The movement depends on the direction of connections for coolant distribution.

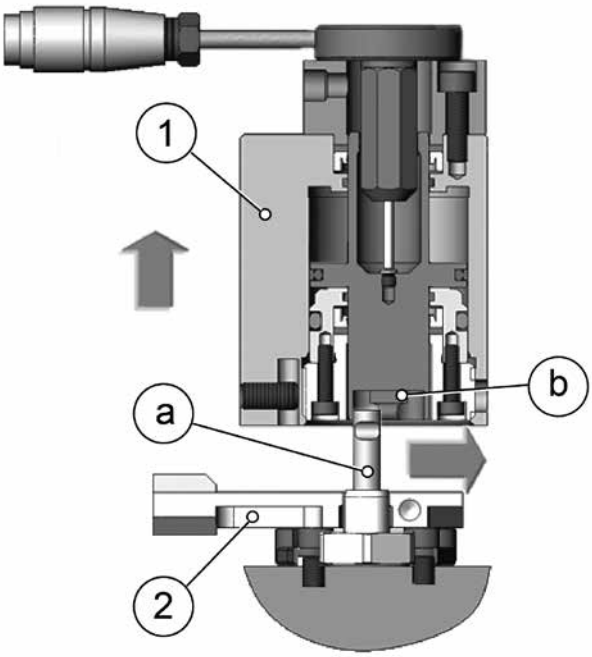
Positioning of the actuator crosswise to the cooling plate (B)

NOTICE

In case of mounting crosswise on the cooling plate, it is possible to disengage the actuator from the valve pin in oposite direction too.



Doc001189.png



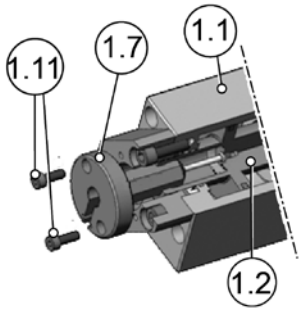
Doc001190.png

5) Remove the actuator housing (1) from the cooling plate (2).

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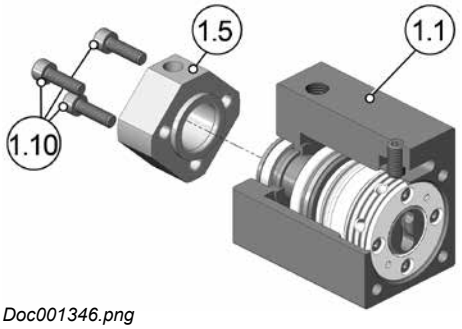
Disassembling the Adjustment Screw Assembly and Piston

1) Unscrew the two socket head cap screws (1.11).
2) Remove the position sensor unit (1.7).



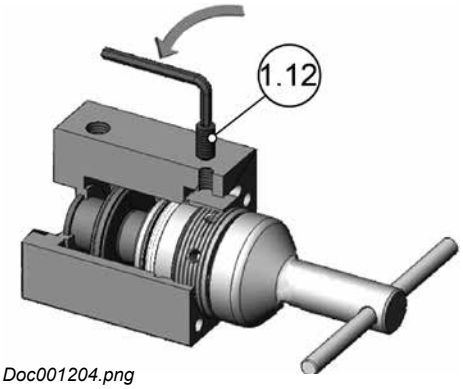
Doc001277.png

3) Unscrew the three socket head cap screws (1.10).
4) Remove the spacer (1.5).



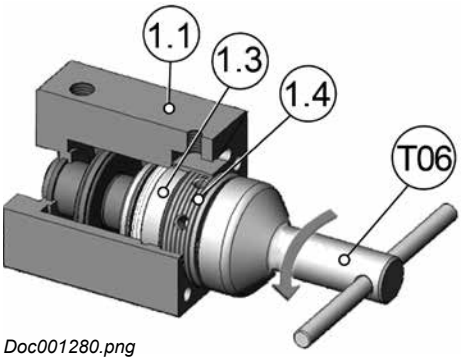
Doc001346.png

5) Loosen the socket set screw (1.12).



Doc001204.png

6) Using the assembly aid (T06), unscrew the adjustment screw (1.3) inclusive adjustment screw core (1.4) out of the actuator housing (1.1).



Doc001280.png

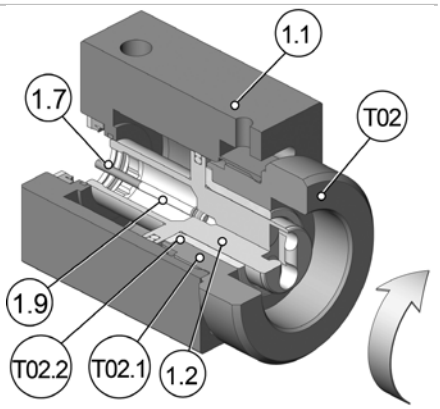
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NOTICE

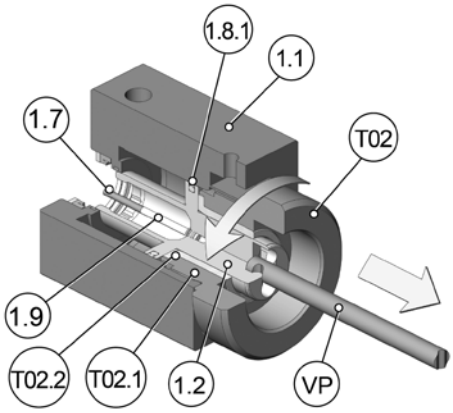
During the work at the piston, make sure the magnetic core will not be damaged.

7) Screw the fitting nut (T02) into the actuator housing (1.1).



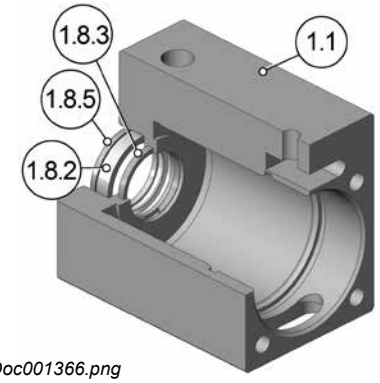
Doc001274.png

8) Install a valve pin (VP) so it engages into the slots of the piston (1.2).
9) Pull the piston (1.2) with the valve pin (VP) while turning the fitting nut (T02) until the piston (1.2) is released.
10) Dismount the two elements of the piston seal (1.8.1).
    - O-ring (1.8.1) (a)
    - sealing element (1.8.1) (b)



Doc001275.png

11) Dismount the following seals out of the actuator housing (1.1).
    (1.8.2) Rod seal
    (1.8.3) Guiding element
    (1.8.5) Back up ring

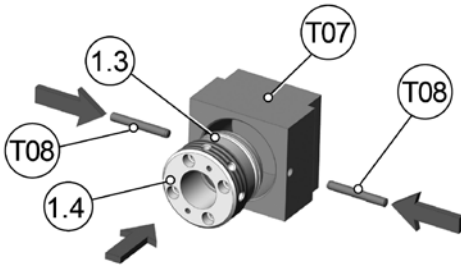


Doc001366.png

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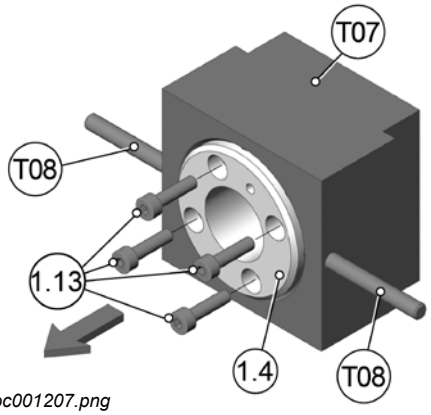
Dismounting the Adjustment Screw Seal Kit

1) To unscrew the adjustment screw core (1.4) from the adjustment screw (1.3), insert this assembly in the assembly tool (T07).
2) Insert cylinder pins (T08) in the respective holes of the assembly tool (T07).



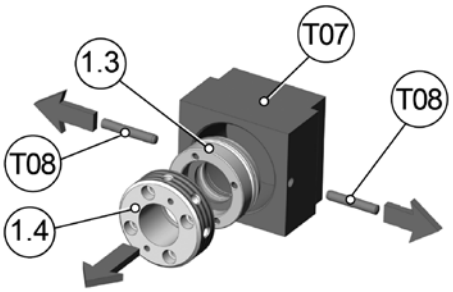
Doc001206.png

3) Unscrew the four socket head cap screws (1.13).



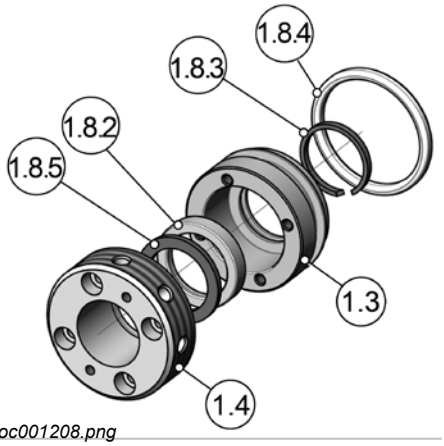
Doc001207.png

4) Pull the cylinder pins (T08) from the holes.
5) Pull the adjustment screw (1.3) from the assembly aid (T07).



Doc001279.png

6) Pull out the complete sealing kit from the adjustment screw assembly (1.3), (1.4):
   - (1.8.2) Rod seal
   - (1.8.3) Guiding element
   - (1.8.4) O-ring
   - (1.8.5) Back up ring



Doc001208.png

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8.1.1.6 Assembling the Actuator HYC4520M04 Series

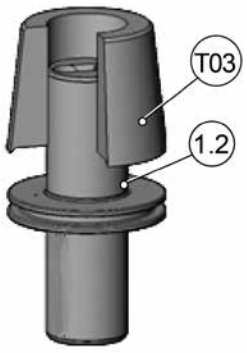
Installing the Piston Seal

To mount the piston seal (1.8.1) on the piston (1.2), proceed as follows:

NOTICE

During the work at the piston, make sure the magnetic core will not be damaged.

1) Fit the mounting cone (T03) on the piston (1.2).



Doc001193.png

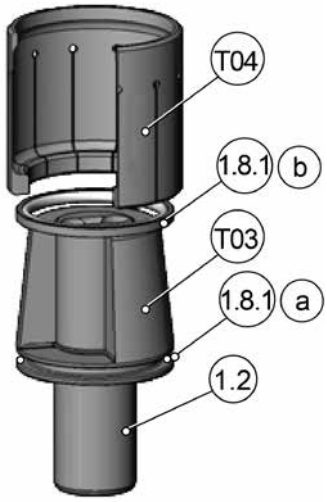
NOTICE

After disassembly of the sealing elements, the original seals should be replaced.

2) Mount the O-ring (1.8.1) (a) into the seal groove of the piston (1.2).
3) Lubricate the sealing element (1.8.1) (b) of the piston (1.2) with hydraulic oil or white grease.
4) Using the spreader sleeve (T04) and the mounting cone (T03), push the sealing element (1.8.1) (b) into the seal groove of the piston (1.2).

NOTICE

The sealing element (1.8.1) (b) is placed in the seal grove of the piston (1.2) above the O-ring (1.8.1) (a).

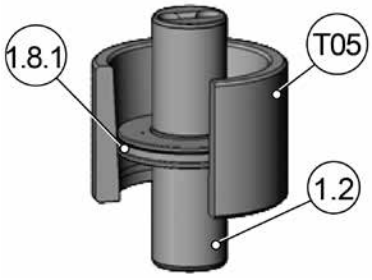


Doc001194.png

5) Insert the piston (1.2) uniformly in the calibration sleeve (T05).

NOTICE

This will precisely align the piston seal (1.8.1) with the piston (1.2).



Doc001195.png

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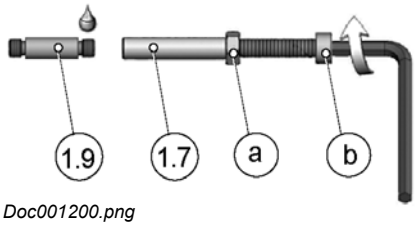
Installing the Piston into the Actuator Housing

1) Apply Loctite 272 adhesives to the thread of the adapter (1.9) at the position sensor side.



NOTICE

To screw in the magnetic core (1.7) into the adapter (1.9) use a screw M2 (b), a counter nut (a) and an allen key.



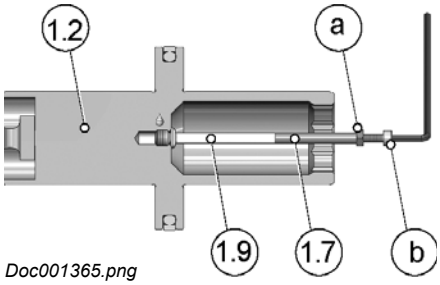
Doc001200.png

2) Screw the magnetic core of the position sensor (1.7) into the adapter (1.9).

3) Apply Loctite 272 adhesives to the thread of the adapter (1.9) at the piston side.



4) Screw the premounted magnetic core (1.7) and adapter (1.9) with a screw M2 (b), counter nut (a) and allen key into the piston (1.2).

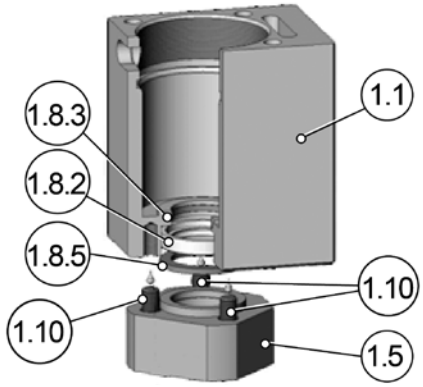


Doc001365.png

NOTICE

After disassembly of the system, the original sealing elements should be replaced.

5) Lubricate the following seals with hydraulic oil or white grease.
   - (1.8.2) Rod seal
   - (1.8.3) Guiding element
   - (1.8.5) Back up ring
6) Insert seals (1.8.2) (1.8.3) (1.8.5) into the actuator housing (11).
7) Fix spacer (1.5) with three socket head cap screws (1.10) secured by Loctite adhesives.



Doc001197.png

8) Position the fitting nut (T02.1) (T02.2) over the piston (1.2).



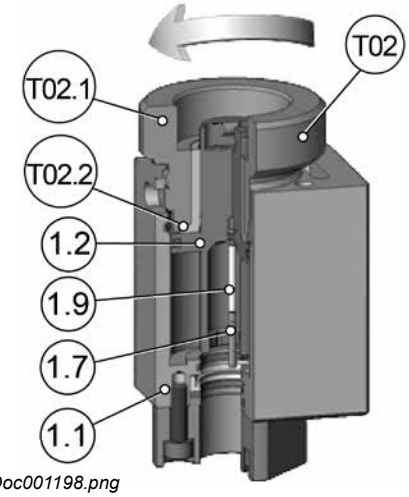
Doc001196.png

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NOTICE

During mounting of the piston (1.2), it is important the piston is not jammed in the actuator housing (1.1).

9) Install the piston (1.2) while turning clockwise the fitting nut (T02.1) (T02.2) into the actuator housing (1.1) up to the stop.

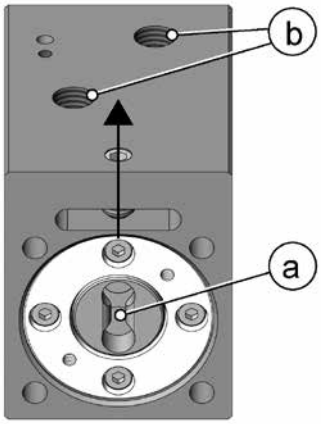


Doc001198.png

10) Position piston by using the adjustment tool (T01).

NOTICE

Ensure, valve pin slot (a) in piston is facing in the direction of hydraulic supplies (b).



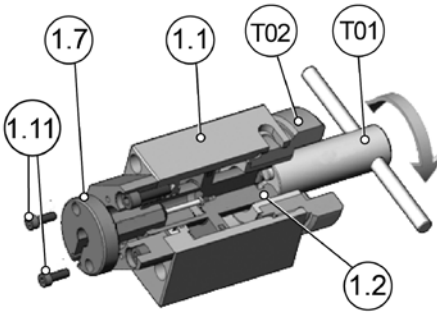
Doc001201.png

11) Insert the position sensor (1.7) into the octagonal cutout of the piston.

NOTICE

The cable at the position sensor (1.7) has to be facing in the direction of hydraulic supplies (b) at the actuator housing (1.1).

12) Fix position sensor unit (1.7) with two socket head cap screws (1.11) secured by Loctite adhesives.



Doc001199.png

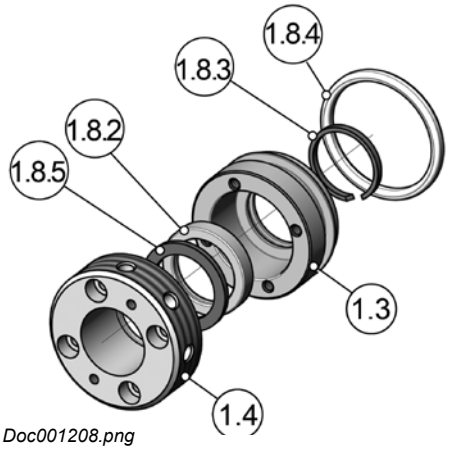
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Installing the Adjustment Screw Assembly into the Actuator Housing

NOTICE

After disassembly of the system, the original sealing elements should be replaced.

1) Lubricate the following seals with hydraulic oil or white grease.
   (1.8.2) Rod seal
   (1.8.3) Guiding element
   (1.8.4) O-ring
   (1.8.5) Back up ring
2) Insert seals into adjustment tool assembly (1.3) (1.4).

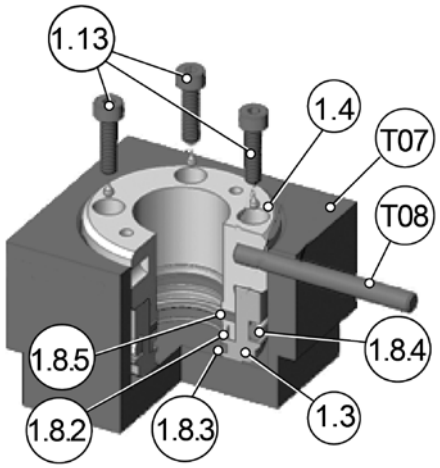


Doc001208.png

3) Put upper adjustment tool (1.3) and lower adjustment tool core (1.4) into assembly tool assembly tool (T07).
4) Secure against rotation with cylinder pins Ø 5 mm (T08).
5) Lubricate the thread of the socket head cap screws (1.13) with Loctite adhesives.
6) Screw adjustment tool (1.3) and adjustment tool core (1.4) together by using four socket head cap screws (1.13).

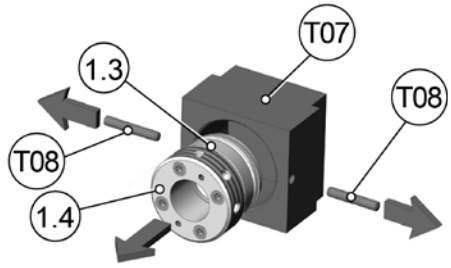
NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.



Doc001202.png

7) Pull the cylinder pins (T08) out of the holes.
8) Take the adjustment screw assembly (1.3) (1.4) out of the assembly tool (T07).



Doc001345.png

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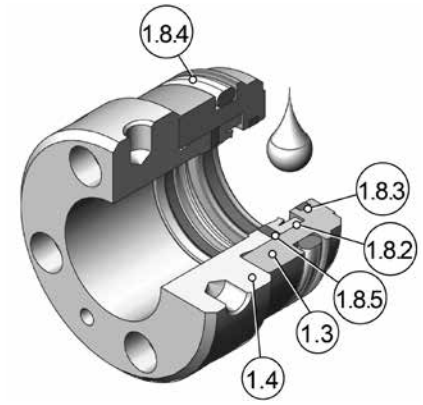
9) Lubricate all seals of the adjustment tool assembly (1.3) (1.4) with hydraulic oil or white grease.

(1.8.2) Rod seal

(1.8.3) Guiding element

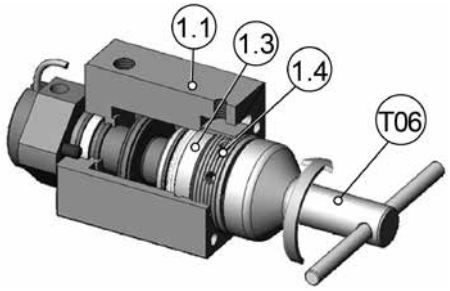
(1.8.4) O-ring

(1.8.5) Back up ring



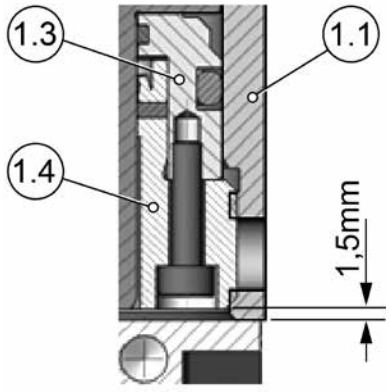
Doc001205.png

10) By using assembly tool cpl. (T06) screw adjustment screw (1.3) (1.4) into cylinder housing (1.1).



Doc001271.png

11) Screw the adjustment screw assembly (1.3) (1.4) to basic position, 1,5 mm deep into the actuator housing to the basic position.



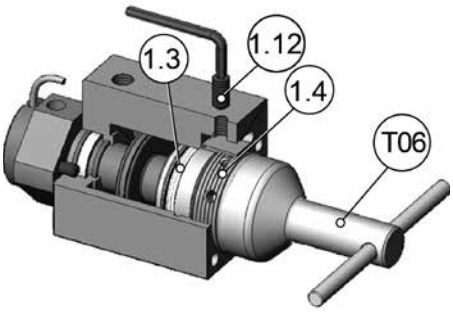
Doc001203.png

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12) Fix the adjustment screw assembly (1.3) (1.4) with the hexagon socket set screw (1.12).

NOTICE

Use a torque wrench for a torque of 15 Nm (11 ft-lbs).



Doc001270.png

Mounting the Actuator on the Manifold

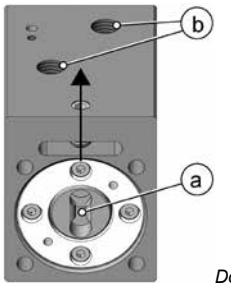
Insertion of valve pin head into piston cutout

NOTICE

Do not use the cylinder housing as support to get the system into the mold (no hammering e.g.).



This sign refers to the direction of valve pin release.

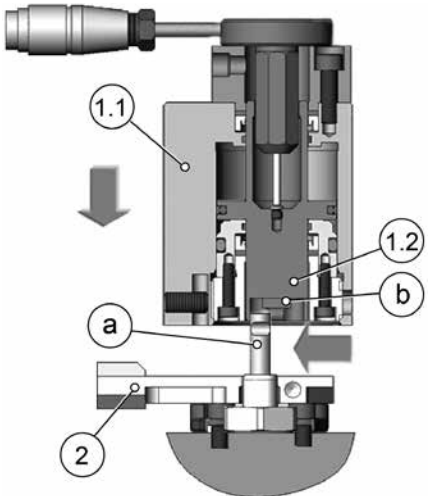


Doc001201.png

NOTICE

Ensure, needle slot (a) in piston is lined up for insertion of the valve pin head in the direction of hydraulic supplies (b).

1) Slide the actuator so it engages the pin head slots (b).
2) Place the actuator on the cooling plate (2).
3) Move the actuator so that the valve pin head (a) slides in the final position inside the piston (1.2) cutout (b).



Doc001214.png

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4) Lubricate the thread of the socket head cap screws (4) with high-temperature assembly paste (anti-seize compound).

NOTICE

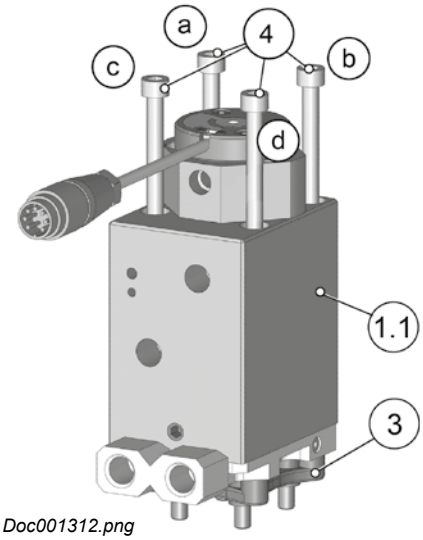
This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

5) Screw the actuator with socket head cap screws (4).

NOTICE

Tighten socket head cap screws (4) in an X pattern (a, d, c, b).

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.



Doc001312.png

8.1.1.7 Valve Pin Height Adjustment HYC4520M Series

Precondition for the following steps are to be performed with the Hot Runner installed in the mold, and the system at operating temperature.

⚠ WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing



NOTICE



Hazard of Material Damage

The following steps are to be performed with the Hot Runner installed in the mold, and the system at operating temperature.

Actuator cooling must be on to prevent damage to the actuator seals.

- Cooling medium temperature: min. 30 °C max. 60 °C
- Pressure cooling medium max. 8 bar
- Temp. difference IN/OUT max. 5 °C

After switch off the hot runner heater, the cooling for the actuator have to be turned on for at least 15 minutes, to avoid damages of the actuator sealing.

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Height Adjustment of Cylindrical shut-off Valve Pin

NOTICE

For part identification see the related exploded views in the actuator section 8.1.2.2

WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

1) Loosen the socket set screw (1.12).
2) Close the valve gate by pressure on the hydraulic connection (A) (closed).



Doc001340.png

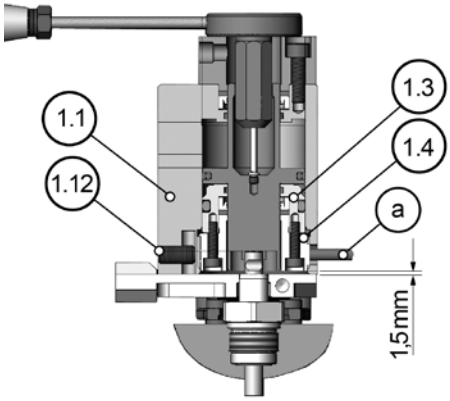
3) Turn the adjustment screw assembly (1.3) (1.4) with the suitable pin (a) in the required position.

   HYC4520M series - dowel pin (a) 5 mm Ø (0.197")

   NOTICE

   HYC4520M series valve pin height can be adjusted within +/- 1,5 mm (0.06").

   Turning one hole forward results in a height adjustment of 0,25 mm at the valve pin.



Doc001213.png

4) Fix the adjustment screw assembly (1.3) (1.4) with the socket set screw (1.12) in the actuator housing (1.1) to the torque value below.

   NOTICE

   Torque value 15 Nm (11 ft-lbs)

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Height Adjustment of Conical shut-off Valve Pin

WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

1) Loosen the socket set screw (1.12).
2) Close the valve gate by pressure on the hydraulic connection (A) (closed).
3) Turn the adjustment screw assembly (1.4) (1.3) with the suitable dowel pin (a) clockwise to the front position.

   HYC4520M series - dowel pin (a) Ø 5 mm (0.197")

   NOTICE

   Turning one hole forward results in a height adjustment of 0.25 mm at the valve pin.

   HYC4520M series valve pin height can be adjusted within +/- 1.5 mm (0.06").

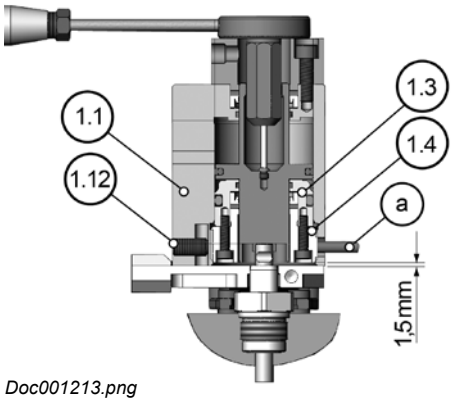


Doc001340.png

4) Move the valve gate pin in the valve gate closed position with a reduced air pressure of approx. 2.76 bar (40 psi) at the „CLOSED" hydraulic connection (b).
5) Turn the adjustment screw assembly (1.4) (1.3) using the suitable pin (a) counter clockwise until you feel resistance.

   NOTICE

   Now the valve pin is adjusted without preload.



Doc001213.png

6) Depressurize the actuator and turn the adjustment screw assembly (1.4) (1.3) clockwise in the range from a half to a full pitch (0.13 mm, 0.005" - 0.25 mm, 0.010") of hole to preload the valve pin
7) Fix the adjustment screw assembly (1.4) (1.3) with the socket set screw (1.12) in the actuator housing (1.1) to the torque value below.

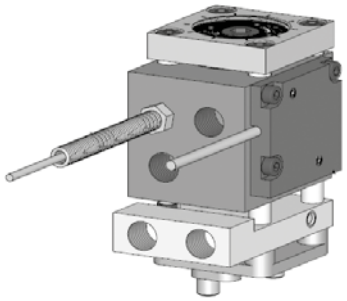
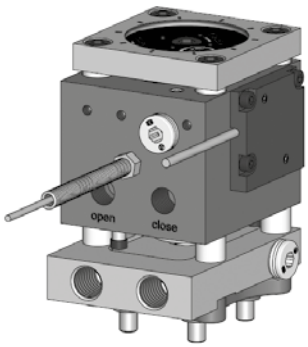
   NOTICE

   Torque value 15 Nm (11 ft-lbs)

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8.1.2 Actuator HB Series

8.1.2.1 Technical Data

	 Doc006521.png	 Doc006419.png
Parameters	**HB2508#**	**HB4016#**
Valve Pin Diameter	3 mm, 3.8 mm	5 mm, 6 mm, 8 mm, 12 mm
Nozzle Series	06E, 09E	12E, 16E, 22E
Pin Adjustment	+/- 1 mm	+/- 1.5 mm
MIn/Max Close Forces	1963/2945N	5027/7540N
Min/Max Open Forces	443/2267N	3506/5259N
Min/Max. Hydraulic Pressure	40/60 bar (600/870 psi)	40/60 bar (600/870 psi)
Valve Pin Stroke	8 mm	16 mm
Hydraulic Connections	M10x1.0	M10x1.0
Cooling Temperature	30-60°C	30-60°C
Cooling Connections	M10x1.0	M12x1.5

Thermocouple and Position Sensor optional on all models.
Maximum 3 Actuators per cooling zone on all models.

Recommended HB4016 Actuator Pressure Settings when Hydraulic Manifold Block is not Supplied on Hot Runner		
Pin Diameter (mm)	Actuator Pressure	
	PSI	Bar
5	300	20
6	450	30
8 & 12	600	40

NOTICE

To ensure long life and continued flawless operation of the actuator, we recommend using a service medium that complies with the requirements of classification 21/18/13 pursuant to ISO 4406.

The coolant should be properly modified e.g. filtered water with an anti-corrosion and frost proof agent.

After switching off the Hot Runner heater, the cooling for the actuator should remain on for at least 15 minutes, to avoid damage to the Actuator seals and the position sensor.

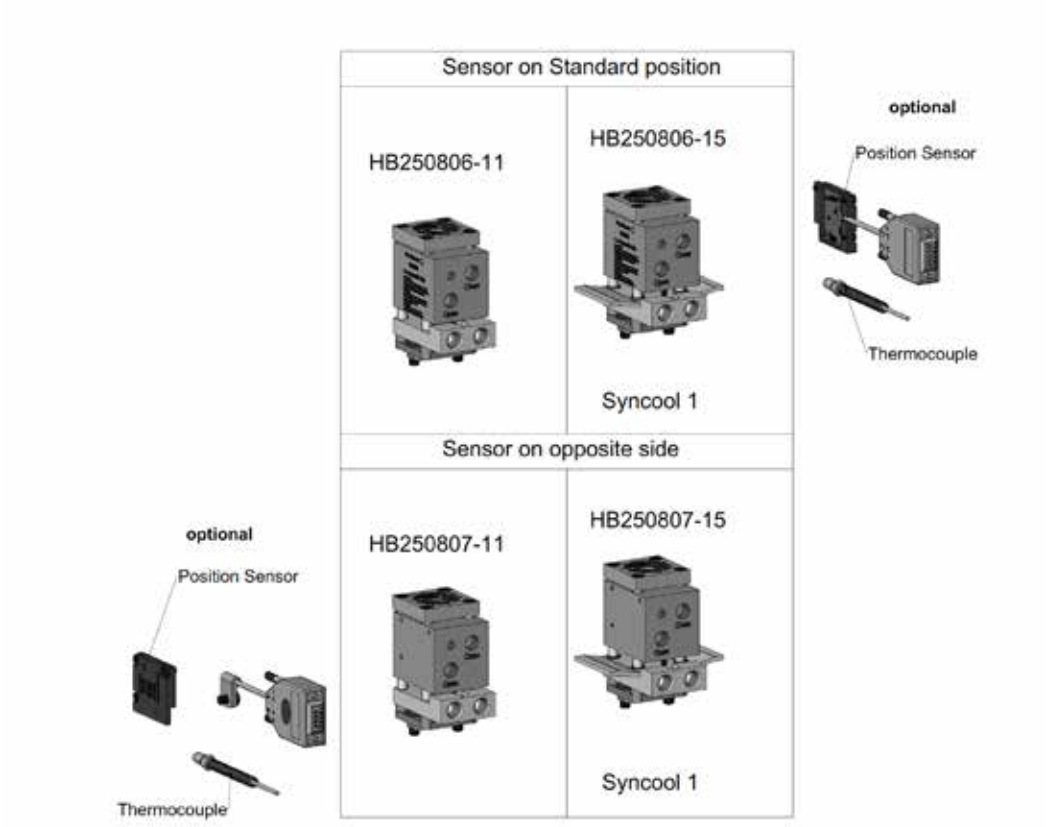
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8.1.2.2 Overview of the described actuators

This manual describes the assembly process to build the HB Series Actuators. The Actuator parts are identified with the numbers indicated in the following figure, which shows the components.

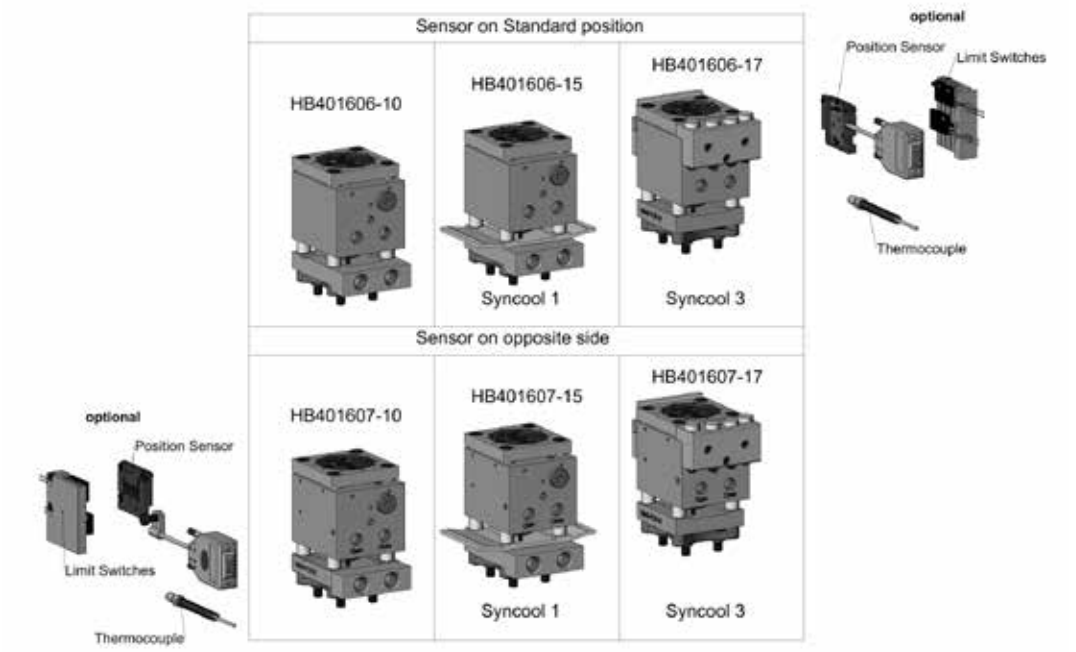
NOTICE

Always tighten the screws to the torques specified in the respective table in section 13.



Doc008513.png

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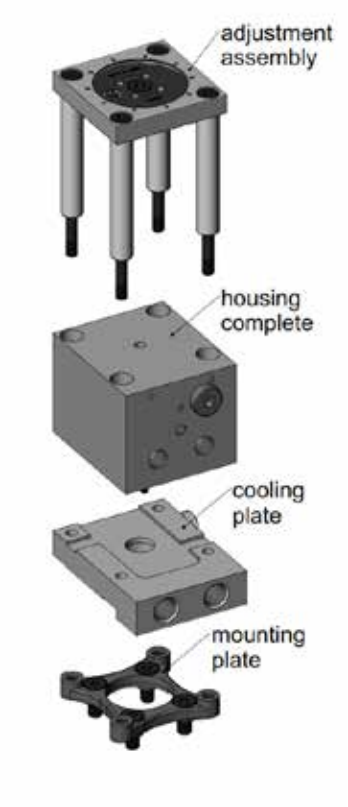


Doc008514.png

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8.1.2.3 HB Series assemblies

The picture shows the HB401606-10 as example.

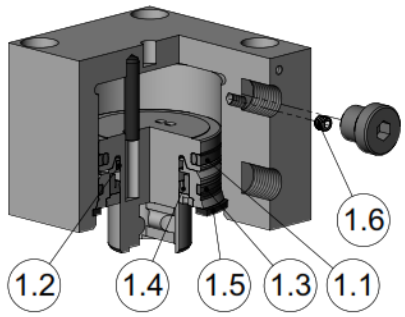


Doc008515.png

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8.1.2.4 HB Series seal kits

The picture shows the housing complete from actuator HB401606-10 as example.



Doc008516.png

At service, the parts from the seal set should be replaced.

Seal kit					
			HB250806-11 HB250806-15 HB250807-11 HB250807-15	**HB401606-10 HB401606-15 HB401606-17 HB401607-10 HB401607-15 HB401607-17**	
Item	**Description**	**Qty**	**Item**	**Qty**	**Item**
1	Seal Kit	1	SKT2508	1	SKT4016
1.1	Piston Seal	1	2G0/25-19-2.9	1	K30-40-40-32-3.2
1.2	Guiding Element	1	15.2X12X1.6/1.6	1	FB2.3-1.5L70.5
1.3	O-Ring Seal	1	VIOR-21.95X1.78-FPM-75-G	1	VIOR-35X2.28-FPM-80-G
1.4	Rod Seal	1	C1-1028-V3664	1	C1-2038-V3664
1.5	Retaining Ring	1	DIN472-27X1,2	1	DIN472-42X1,75
1.6	Restrictor	1	EIS-TM-04-010	1	EIS-TM-04-010

NOTICE

1) All components must be cleaned (and oil free) prior to beginning assembly process.
2) All Seals and O-rings must be lubricated prior to installation.
3) This procedure is intended for use together with HCO-HB####-##, HB######-## drawings.

8.1.2.5 HB assembly tools

These tools are needed for assembly and service of the Actuator. The tools are identified with the numbers indicated in the following figure.

No.	Description	Figure	HB2508	HB4016
T3	Valve pin disassembly tool	 *Doc001229.tif*	ATCYL0805	ATCYL0303
T4	Piston seal installation cone	 *Doc006650.png*	ATCYL0203	ATCYL0304
T5	Piston seal spread tube	 *Doc006651.png*	ATCYL0202	ATCYL0105
T6	Piston seal calibration sleeve	 *Doc006652.png*	ATCYL0204	ATCYL0107
T9	Piston and cap assembly tool	 *Doc006653.png*	ATCYL45	ATCYL27
T10	Dowel insertion tool	 *Doc006654.png*	ATCYL48	ATCYL49
T11	Top CV plug assembly tool	 *Doc006655.png*	Tool not needed	ATCYL40
T13	CV Plug Tool	 *Doc006657.png*	EIS-HT-050	EIS-HT-050
T14	Adjustment Tool	 *Doc006420.png*	ATA01	ATA01
T15	Piston Cap Tool	 *Doc008087.png*	AT-PIC25010 AT-PIC2502	AT-PIC4001 AT-PIC4002

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8.1.2.6 Dismounting the Actuators of the HB Series

DANGER



Danger to Life by Hydraulics

Serious personnel injury or death can result from connecting or disconnecting hydraulic hoses under pressure.
Hydraulic works must be carried out by qualified persons.
Use personal protective equipment, such as face protection, headgear, anti oil gloves.
The hoses in Hot Runner Systems and the injection mold are under high pressure and high temperatures.
Before disconnecting or connecting any Hydraulic hoses:

- The injection machine / hydraulic pump must be shut down.
- The electrical disconnect properly locked out.
- Pressure from the hoses must be removed.

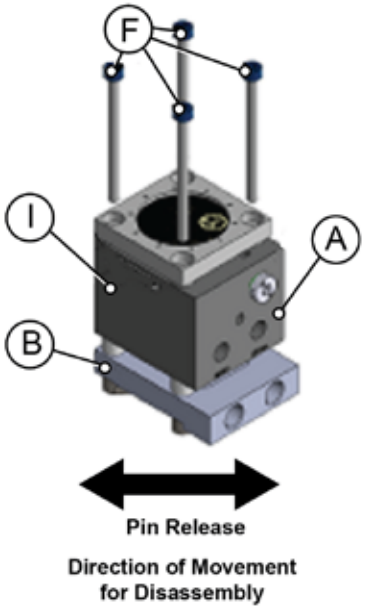
For first aid contact your medical / safety representing



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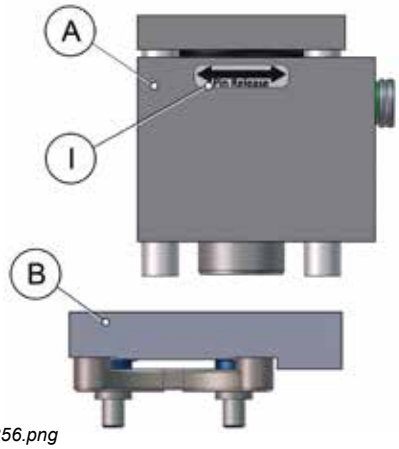
Dismounting Procedure

1) Locate and remove the four screws (F) on top of the actuator housing (A).
2) Push the whole actuator housing (A) in the direction specified on the pin release indicator label (I).
This will disengage the actuator from the valve pin.



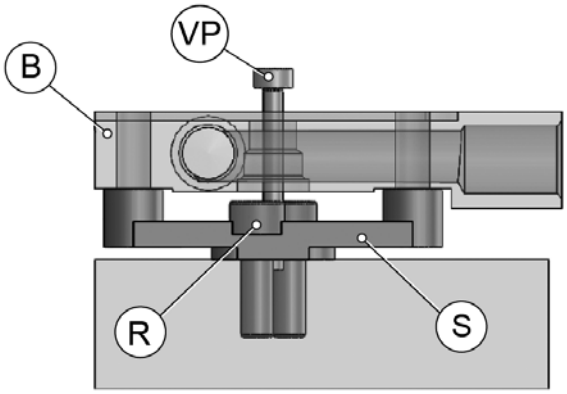
Doc006358.png

3) Lift the entire actuator housing (A) out of the assembly. Removal of the cooling plate (B) is not required when removing the actuator housing assembly.



Doc006356.png

4) Unscrew and remove the M6 socket head cap screws (R).
5) Lift out the mounting plate (S).



Doc006357.png

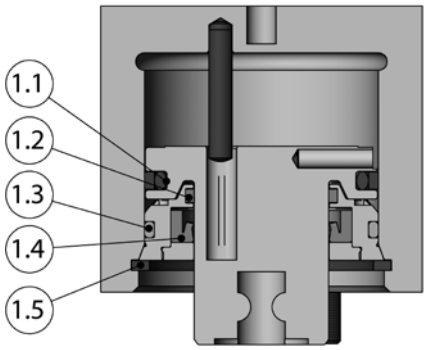
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8.1.2.7 Seal Replacement

Disassembly

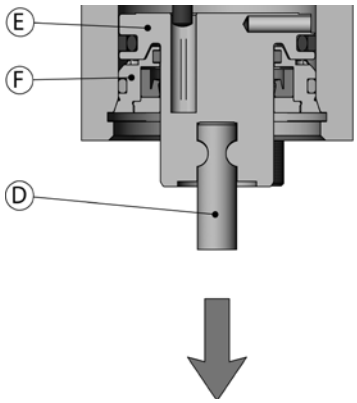
1) Remove Snap Ring (A).

LETTER	PART
1.1	Piston Seal
1.2	Guiding Element
1.3	O-Ring Seal
1.4	Rod Seal
1.5	Retaining Ring
1.6	Restrictor



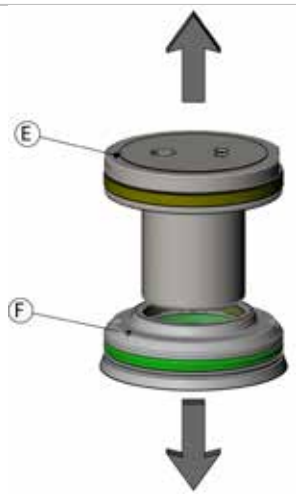
Doc008517.png

2) Remove piston (E) and cap (F) with a valve pin.



Doc008518.png

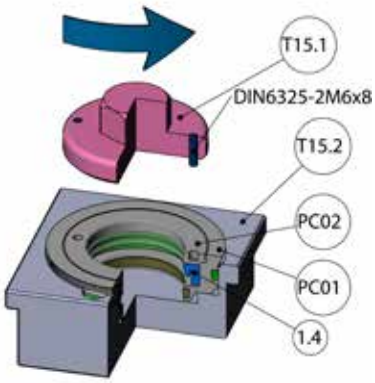
3) Separate piston (E) from cap (F).



Doc008505.png

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4) Use tools T15.1 and T15.2 to disassemble the piston cap PC02 from PC01.
5) Remove Rod Seal 1.4.



Doc008506.png

6) Dismount seals:
   - Piston Seal (1.1)
   - Guiding Element (1.2)
   - O-Ring Seal (1.3)
   - Rod Seal (1.4)
7) After disassembly of the sealing elements, the original seals must be replaced. See the following sections for additional details.



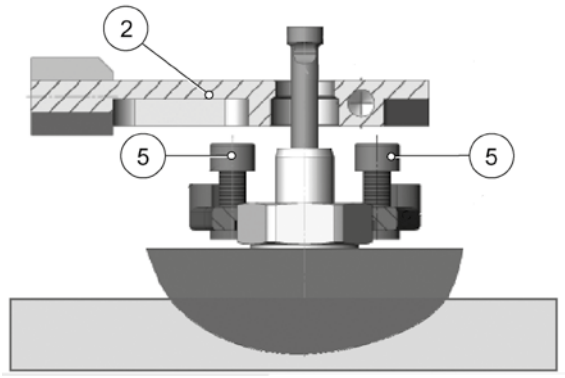
Doc008507.png

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8.1.2.8 Cooling Plate Maintenance

Cooling Plate Removal

1) With the actuator dismounted, lift up the cooling plate (2).

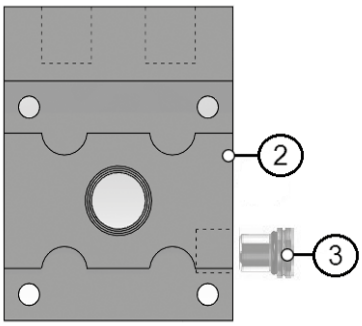


Doc006359.png

Cleaning the Cooling Plate

Removing the cooling plate plug (VSTI10X10RVITCF) facilitates the cleaning of the cooling plate.

1) Remove the cooling plate plug (3) with a HEX5 wrench.
2) Clean the cooling plate (2).
3) Replace plug by torqueing to 6 Nm.

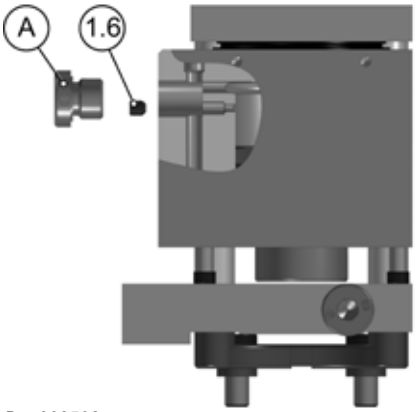


Doc006360.png

Replace of the Restrictor

The seal kit is also supplied with a replacement Restrictor (1.6). Replace the Restrictor (1.6) at the same intervals as when replacing the actuator seals.

1) Unscrew and remove the Plug (A).
2) Unscrew and remove the Restrictor (1.6).



Doc008508.png

3) Insert the Restrictor (1.6) into the housing and torque.

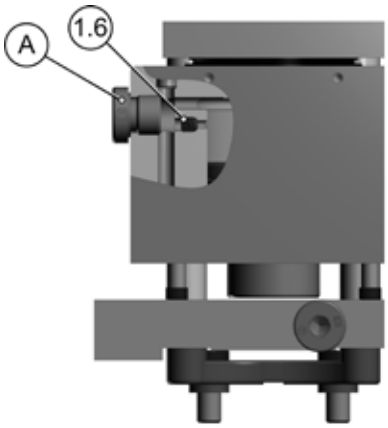
NOTICE

Use a torque wrench for a torque of 2 Nm (1.63 ft-lbs).

4) Insert Plug (A) and torque.

NOTICE

Use a torque wrench for a torque of 12 Nm (8.9 ft-lbs).



Doc008509.png

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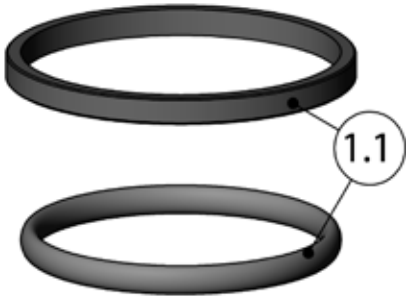
8.1.2.9 Assembling the Actuator HB Series

Installing the Piston Seal

1) Liberally lubricate Piston Seals 1.1 with hydraulic oil:

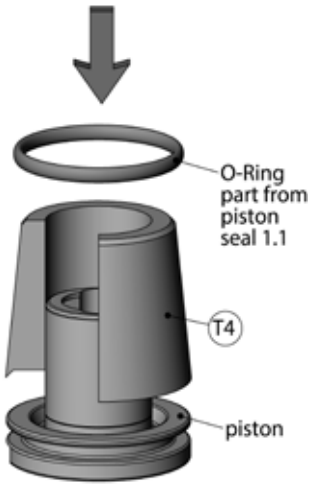
NOTICE

The piston seal kit consists of a piston seal ring and an O-ring. They are combined as one unit.



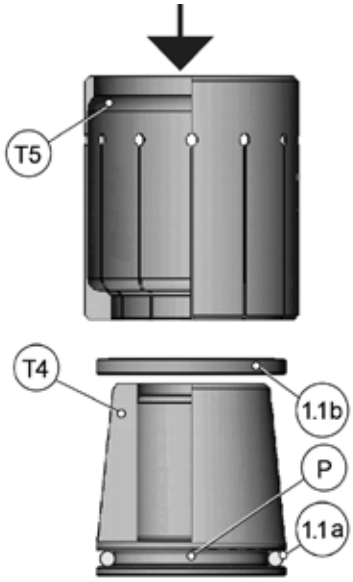
Doc008528.png

2) Insert O-ring into piston seal groove.



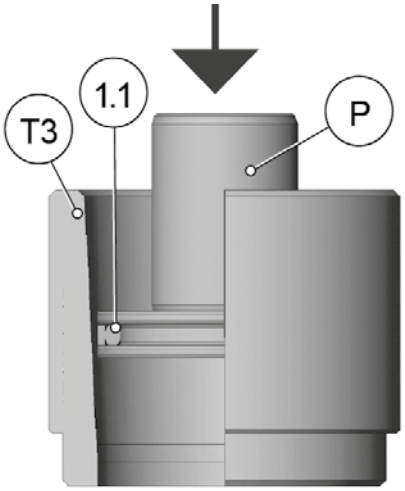
Doc008529.png

3) Insert Sealing Element (1.1b) into piston seal groove (over the O-ring 1.1a) using the mounting cone (T4) and spreader sleeve (T5).



Doc006695.png

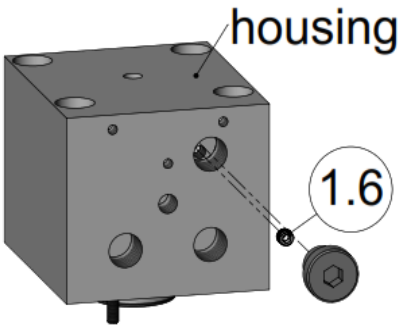
4) Precisely align the piston seal (1.1) with the calibration sleeve (T3).



Doc006692.png

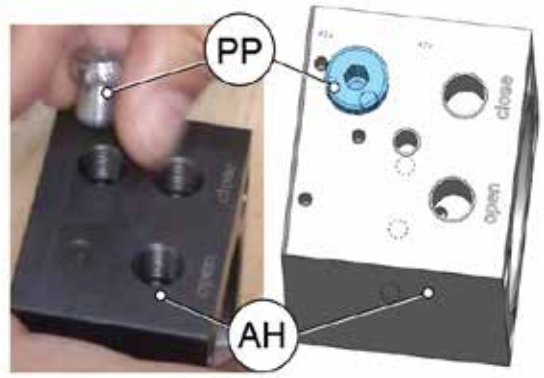
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5) Screw in the restrictor (1.6) into housing and torque to specification on drawing (2 Nm).



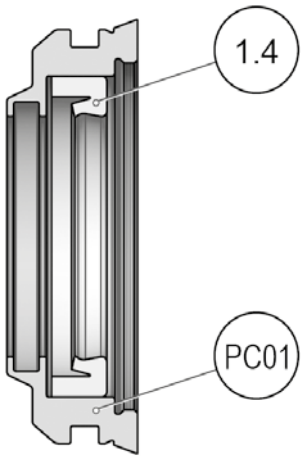
Doc008523.png

6) Insert threaded plug (PP) and torque to specification on drawing (12 Nm Min).



Doc006674.png

7) Liberally lubricate Rod Seal (1.4) with Krytox GPL205 and insert Rod Seal (1.4) into Piston Cap (PC01) in orientation shown.



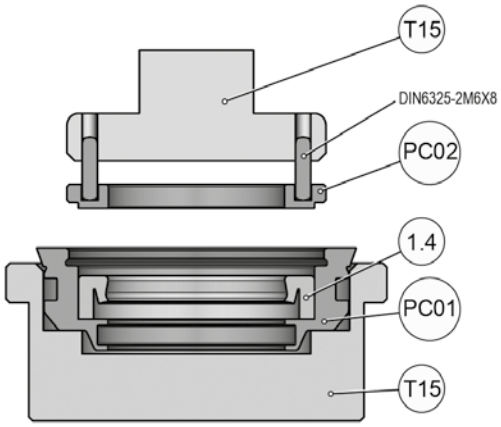
Doc008088.png and Doc008527.png



Doc008527.png

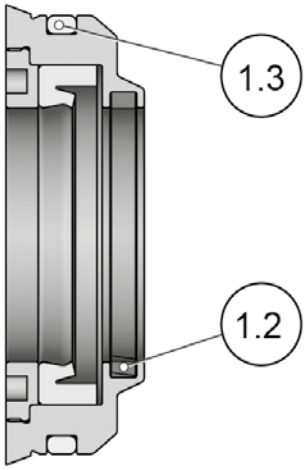
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8) Use tools T15 Mount piston cap (pc01 and pc02).
15Nm for HB2508
45Nm for HB4016



Doc008089.png

9) Liberally lubricate Guiding Element (1.2) and O-Ring Seal (1.3) with Krytox GPL205 and insert them into Piston Cap.

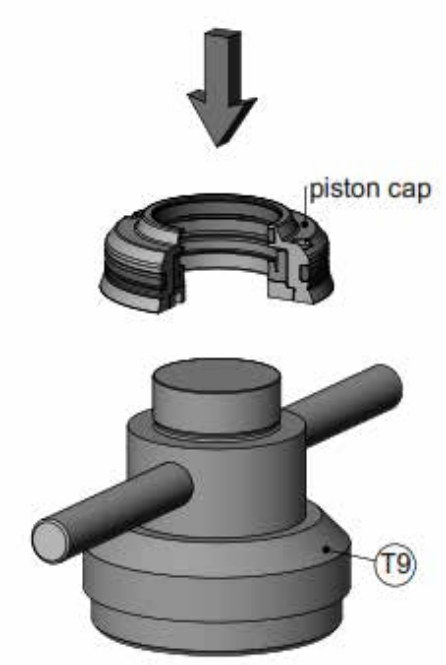


Doc008090.png

NOTICE

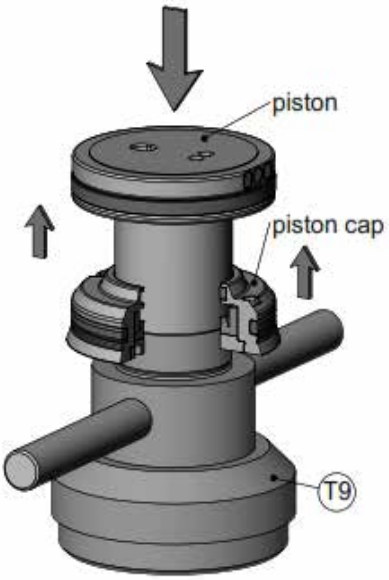
To avoid damage to the seals, the T9 assembly tool should be used.

10) Guide the piston cap onto the assembly tool (T9).



Doc008525.png

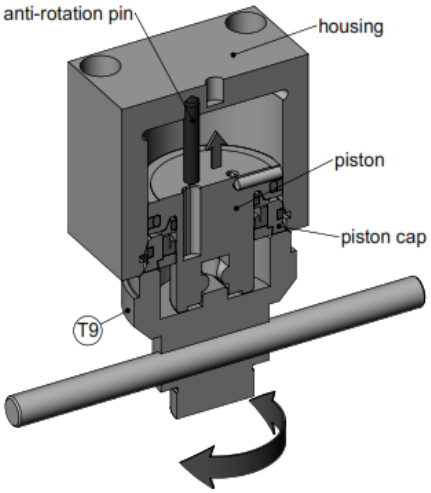
11) Set the piston on the assembly tool (T9) and slide the piston cap onto the piston.



Doc008524.png

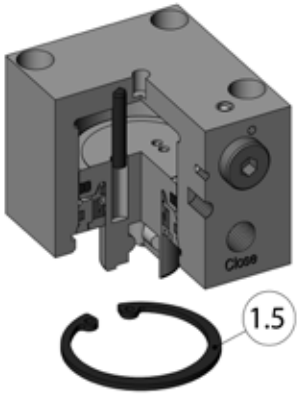
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12) Use the assembly tool (T9) to guide the piston into the housing. With the assembly tool, the piston can be rotated so that the hole in the piston is aligned with the anti-rotation pin.



Doc008526.png

13) Install retaining ring (1.5).



Doc008530.png

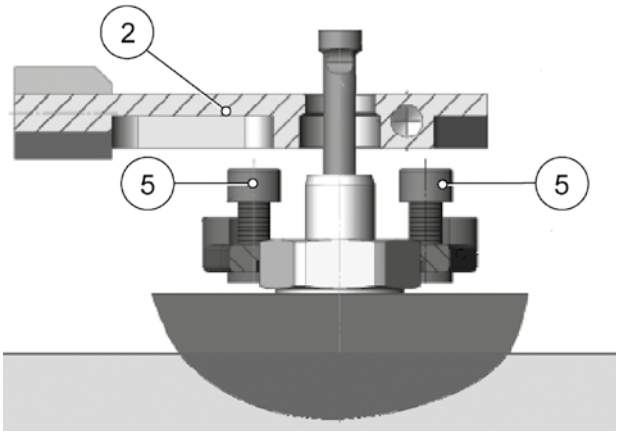
Mounting the Actuator on a Manifold

1) Position the mounting plate on the manifold.
2) Lubricate the thread of the hexagon socket head cap screws (5) with high temperature assembly paste (anti-seize compound).

NOTICE

Anti-seize compound is an important measure to prevent thread corrosion due to aggressive gasses which could be released during plastic processing.

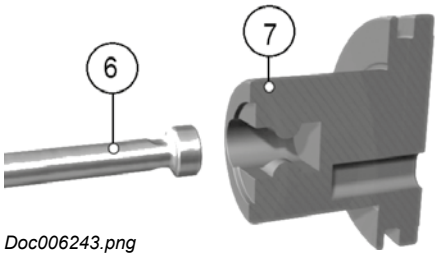
3) Screw the mounting plate (3) onto the manifold with the socket head cap screws (5) M6x14.
4) Place the cooling plate (2) on the mounting plate (3).



Doc006359.png

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5) Insert valve pin (6) into bushing (7).



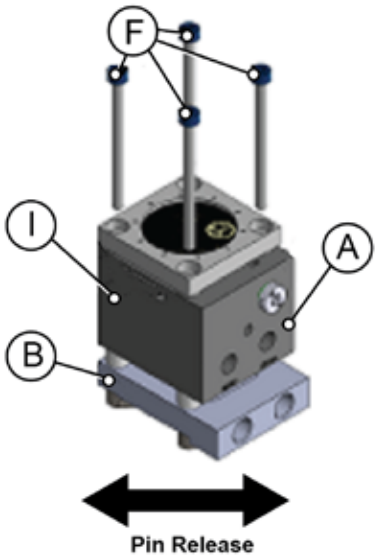
Doc006243.png

6) Slide the actuator so it engages the pin head slots of the piston.
7) Lubricate the thread of the socket head cap screws (F) with high temperature assembly paste (anti-seize compound).

NOTICE

Anti-seize compound is an important measure to prevent thread corrosion due to aggressive gasses which could be released during plastic processing.

8) Secure the actuator with socket head cap screws (F).
9) Tighten the socket head cap screws (F) in an "X" pattern (a, d, c, and b). Use a torque wrench to torque to specifications listed in the table in section 13.



Doc006358.png

NOTICE

Do not use cylinder housing as support to get the system into the mold, (no hammering e.g.)

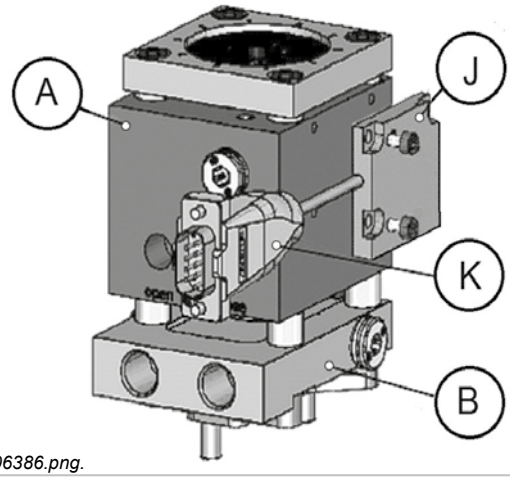


8.1.2.10 Position Sensor

The Position Sensor (J) provides the user with additional information such as if the pins are in the fully open, fully closed or in an intermediate position.

NOTICE

The position sensor (J) has a maximum temperature rating of 150 degrees C and a maximum cable (K) rating of 200 degrees C.



Doc006386.png.

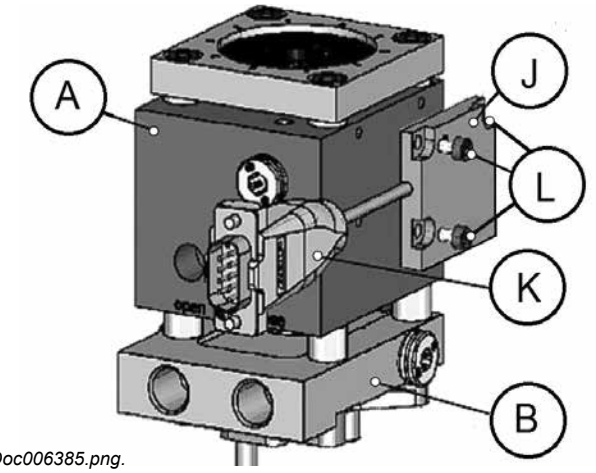
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Removal

NOTICE

Before removal and installation check that the cable (K) is not pinched and is free of tension.

1) Locate and remove the three M3 screws (L) on the side of the actuator housing (A).
2) Gently remove the position sensor (J) and cable (K) making sure not to touch the printed circuit board underneath.



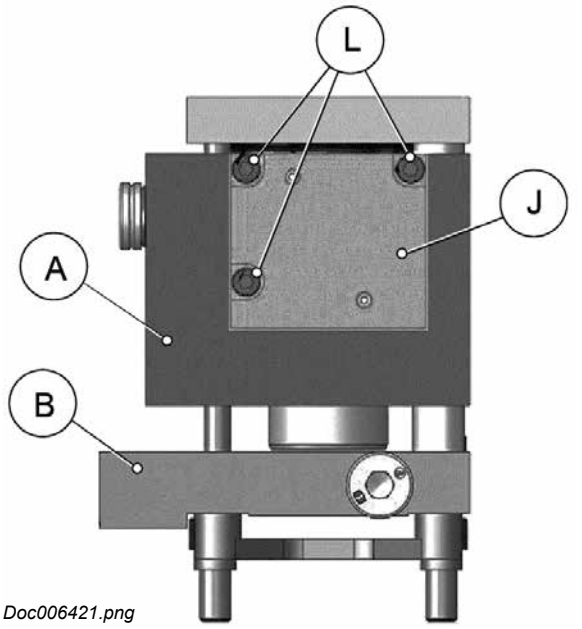
Doc006385.png.

Installation

NOTICE

When reinstalling make sure the mating surface is clean of oil and debris.

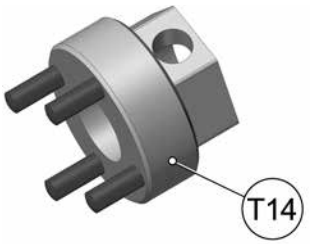
1) Place sensor in the correct location and install the three M3 screws (L).
2) Torque M3 screws to 1.5 Nm.



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8.1.2.11 Valve Pin Adjustment



Doc006420.png

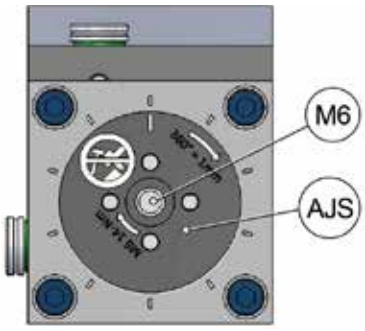
WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns. When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

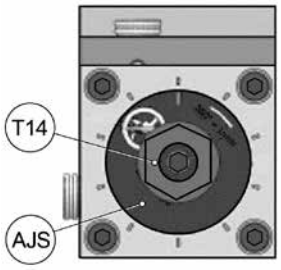
1) Bring the manifold and mold to the operating temperatures for the material to be molded.
2) Insert the adjustment tool (T14), Synventive part number ATA01, on the top of the actuator.
3) Loosen the locking screw (M6).
4) Close the valve gate by applying pneumatic pressure on the closed port.
5) Rotate the adjusting screw (AJS) in a clockwise (forward) direction to pre-set the valve pin position.
   - Conical Gate: Turn the adjusting screw (AJS) clockwise until the valve pin seats firmly in the gate.
     When valve pin position is achieved, then turn adjusting screw clockwise (forward) an additional 1/10th of a turn in order to achieve proper valve pin position during operation. 1/10th increments are provided adjacent to the screw for reference.
   - Cylindrical Gate: Turn the adjusting screw (AJS) clockwise until the valve pin protrudes beyond the gate according to dimension specified on general assembly drawing.



Doc006387.jpg

NOTICE

One full (360 degree) rotation equals one millimeter of adjustment.
Stop if heavy resistance is felt.
Do not overtighten as damage to components may occur. Remove pneumatic pressure and loosen the adjusting screw (AJS).

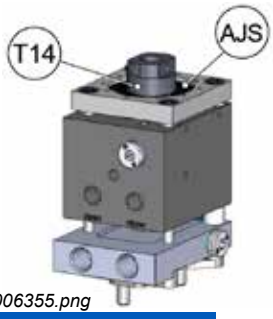


Doc006354.png

6) Remove adjustment tool (T14) and tighten locking screw (M6) to the specification on the locking screw.

NOTICE

It is necessary to always adjust the pin position by rotating the adjusting screw (AJS) in a clockwise (forward) direction in order to achieve proper pin position during operation. In the event that the actuator was “over adjusted” or needs re-adjustment, first remove pressure from the “close” port, fully loosen the adjusting screw (AJS) then return to step 4.



Doc006355.png

NOTICE

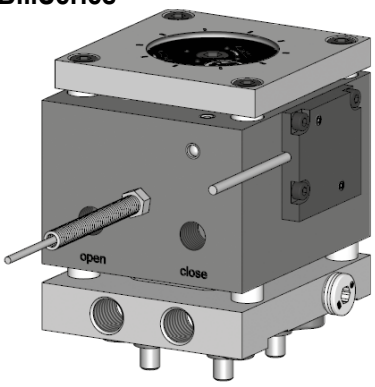
Torque Value locking screw (M6)
HB2508 - 14 Nm / HB4016 - 18 Nm

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8.2 Pneumatic Actuators

This section describes the disassembly and reassembly process to replace seals and adjust the valve pin for the following production series:

PB...Series



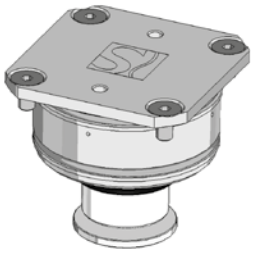
Doc006016.png

PNC...B Series



Doc003006.png

VP...P Series



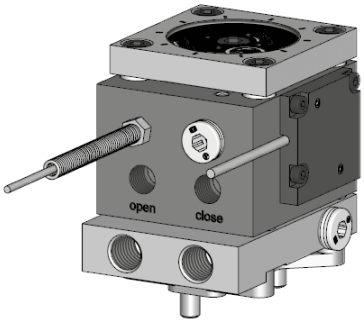
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8.2.1 Actuator PB Series

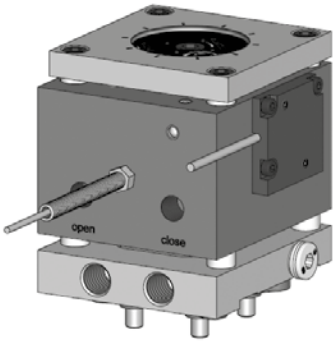
8.2.1.1 Technical Data

PB4008



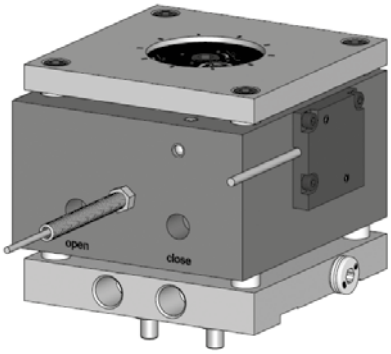
Doc006364.png

PB6016



Doc006363.png

PB8016



Doc006362.png

Parameters	PB4008	PB6016	PB8016
Valve Pin Diameter	3 mm, 3.8 mm	5 mm, 6 mm	5 mm, 6 mm, 8 mm
Nozzle Series	06E, 09E	12E	12E, 16E, 22E
Pin Adjustment	+/- 1 mm	+/- 1.5 mm	+/- 1.5 mm
MIn/Max Close Forces	754/1508N	1696/3393N	3016/6032N
Min/Max Open Forces	526/1052N	1468/2937N	2788/5576N
Min/Max. Pneumatic Pressure	6/12bar (87/175psi)	6/12bar (87/175psi)	6/12bar (87/175psi)
Valve Pin Stroke	8 mm	16 mm	16 mm
Pneumatic Connections	M10x1.0	M10x1.0	M10x1.0
Cooling Temperature	30/60°C	30/60°C	30/60°C
Cooling Connections	M12x1.5	M12x1.5	M12x1.5

Thermocouple and Position Sensor optional on all models.
Maximum 3 Actuators per cooling zone on all models.

NOTICE

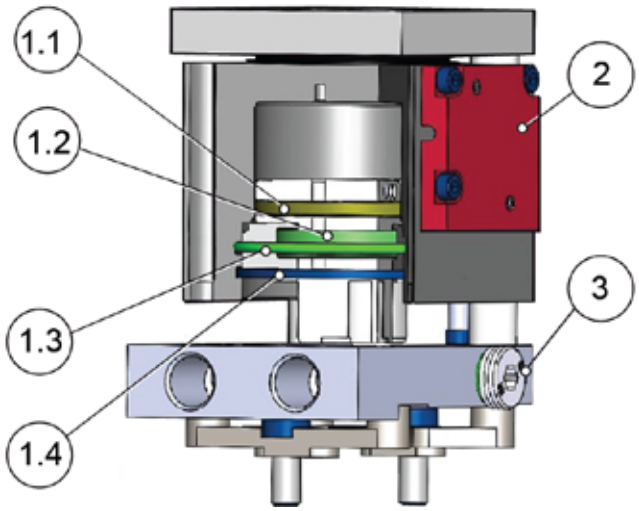
To ensure long life and continued flawless operation of the actuator, we recommend using filtered compressed air.

The coolant should be properly modified e.g. filtered water with an anti-corrosion and frost proof agent.

After switching off the Hot Runner heater, the cooling for the actuator should remain on for at least 15 minutes, to avoid damage to the actuator seals and the position sensor.

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8.2.1.2 Exploded View



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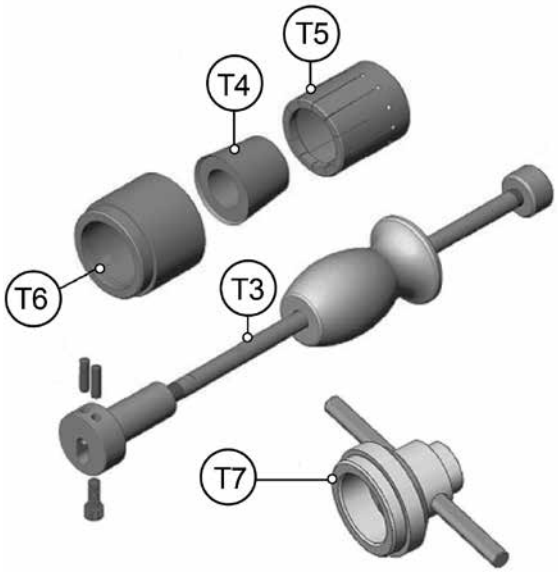
Replacement Items							
		PB4008		PB6016		PB8016	
Item	Description	Qty	Item	Qty	Item	Qty	Item
1	Seal Kit	1	SKT40B-02	1	SKT60B	1	SKT80B
1.1	Piston Seal	1	K30-40-40-32-3.2	1	K30-60-49-4.2	1	K30-80-69-4.2
1.2	Rod Seal	1	C1-2038-V3664	1	C1-2038-V3664	1	C1-2038-V3664
1.3	O-Ring Seal	1	VIOR45X2FPM80	1	VIOR65X2FPM80	1	VIOR85X2FPM80
1.4	Retaining Ring	1	DIN472-45X1.75	1	DIN472-65X2.5	1	DIN472-85X3
2	Position Sensor, 1 m Cable	1	HESASSY01	1	HESASSY01	1	HESASSY01
2	Position Sensor, 3 m Cable	1	HESASSY03	1	HESASSY03	1	HESASSY03
2	Position Sensor, 5 m Cable	1	HESASSY05	1	HESASSY05	1	HESASSY05
3	Plug	2	VSTI10X1ORVITCF	2	VSTI10X1ORVITCF	2	VSTI10X1ORVITCF

Parts	Thread Size	Wrench Size	Nm	ft-lbs
DIN912-12129/ISO4762	M5	HEX4	8	6
DIN912-12129/ISO4762	M6	HEX5	14	10
DIN913-45H/ISO4062	M6	HEX4	10	7
DIN912-M3X5-8.8ISO4762	M3	HEX2.5	1.5	1.1
VSTVSI10X1ORVITCF (cooling)	M10	HEX5	6	4.5
VSTI10X10RVITCF	M10	HEX5	14	10

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8.2.1.3 Tools for Assembling and Disassembling the Actuator

The following overview contains a list of special tools required for the assembly and disassembly of the actuator and to replace seals. The assembly and disassembly tools are identified in the table below.



Doc006361.png

Assembly and Disassembly Tools - ATCYL##				
Pos.	Description	PB4008 Tools	PB6016 Tools	PB8016 Tools
T3	Valve pin disassembly tool	ATCYL0805	ATCYL0303	ATCYL0303
T4	Installation cone	ATCYL0304	ATCYL38	ATCYL39
T5	Spread tube	ATCYL0105	ATCYL36	ATCYL37
T6	Calibration sleeve	ATCYL0107	ATCYL17	ATCYL35
T7	Piston and Cap Assembly Tool	ATCYL47	ATCYL28	ATCYL29

NOTICE

These tools are not included with the Hot Runner system and must be ordered from Synventive separately.

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8.2.1.4 Dismounting the PB Series Actuators

DANGER

Danger to Life by Pneumatics

Serious personnel injury or death can result from connecting or disconnecting pneumatic hoses under pressure. Pneumatic works must be carried out by qualified persons. The hoses in Hot Runner systems and the injection mold are under high pressure and high temperatures. Before disconnecting or connecting any Pneumatic hoses:

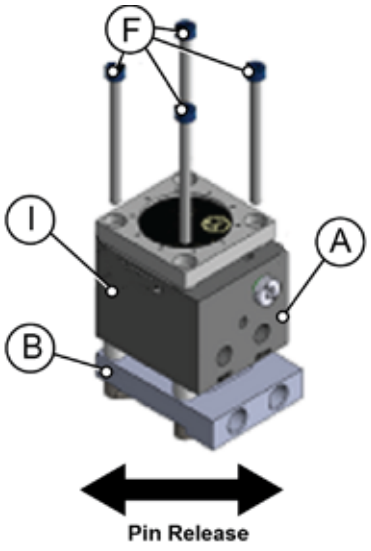
- The injection machine / pneumatic compressor must be shut down.
- The electrical disconnect properly locked out.
- Pressure from the hoses must be removed.



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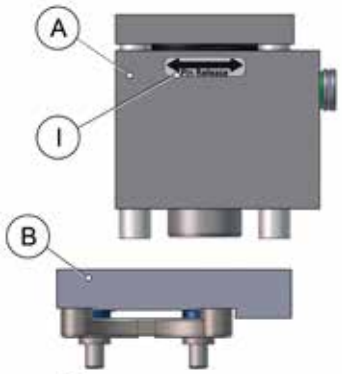
Dismounting Procedure

1) Locate and remove the four screws (F) on top of the actuator housing (A).
2) Push the whole actuator housing (A) in the direction specified on the pin release indicator label (I). This will disengage the actuator from the valve pin.



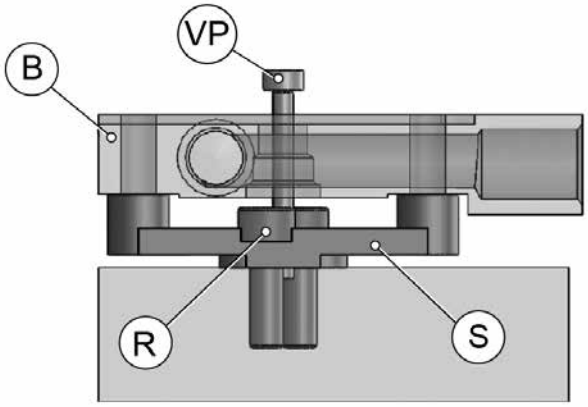
Doc006358.png

3) Lift the entire actuator housing (A) out of the assembly. Removal of the cooling plate (B) is not required when removing the actuator housing assembly.



Doc006356.png

4) Unscrew and remove the M6 socket head cap screws (R).
5) Lift out the mounting plate (S).



Doc006357.png

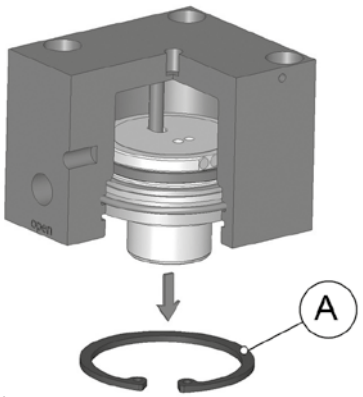
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8.2.1.5 Seal Replacement

Disassembly

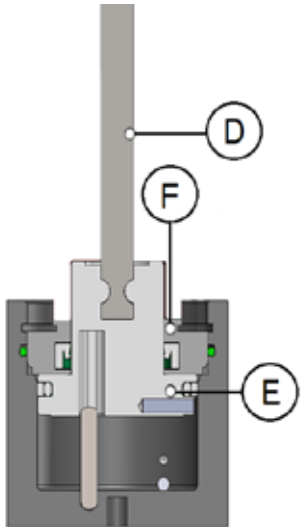
1) Remove Snap Ring (A).

LETTER	PART
A	Snap Ring
B	Piston Seal
C	Rod Seal
D	Valve Piston
E	Piston
F	Piston Cap
G	O-Ring
J	Actuator Housing



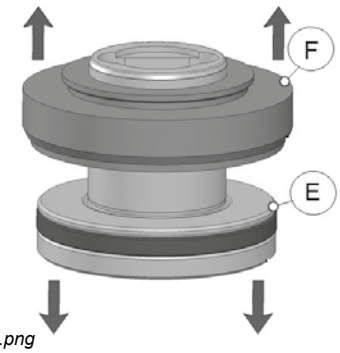
Doc006383.png

2) Remove piston (E) and cap (F) with a valve pin.



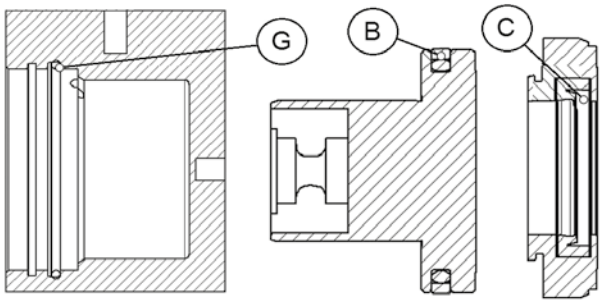
Doc006379.png

3) Separate piston (E) from cap (F).



Doc006382.png

4) Dismount seals: Rod seal (C), piston seal (B) and O-Ring (G).
5) After disassembly of the sealing elements, the original seals must be replaced. See the following sections for additional details.

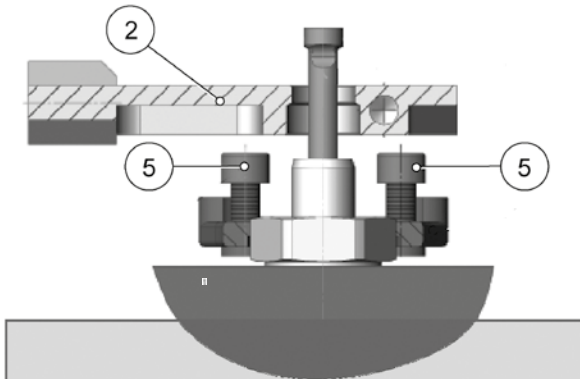


Doc006381.png

8.2.1.6 Cooling Plate Maintenance

Cooling Plate Removal

1) With the actuator dismounted, lift up the cooling plate (2).

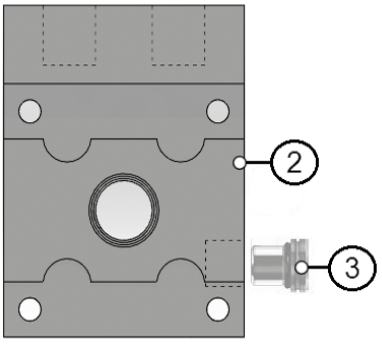


Doc006359.png

Cleaning the Cooling Plate

Removing the cooling plate plug (VSTI10X10RVITCF) facilitates the cleaning of the cooling plate.

1) Remove the cooling plate plug (3) with a HEX5 wrench.
2) Clean the cooling plate (2).
3) Replace plug by torqueing to 6 Nm.



Doc006360.png

8.2.1.7 Assembling the Actuator PB Series

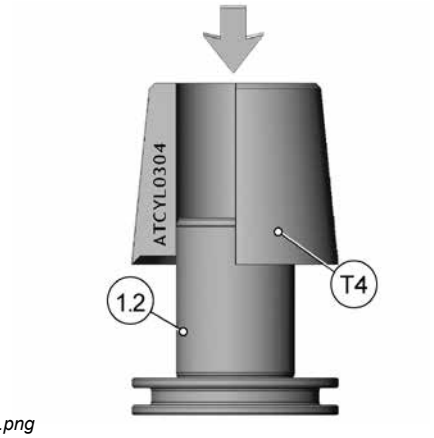
Installing the Piston Seal

To mount the piston seal (1.9.1) on the piston (1.2) proceed as follows:

1) Fit the mounting cone (T4) on the piston (1.2).

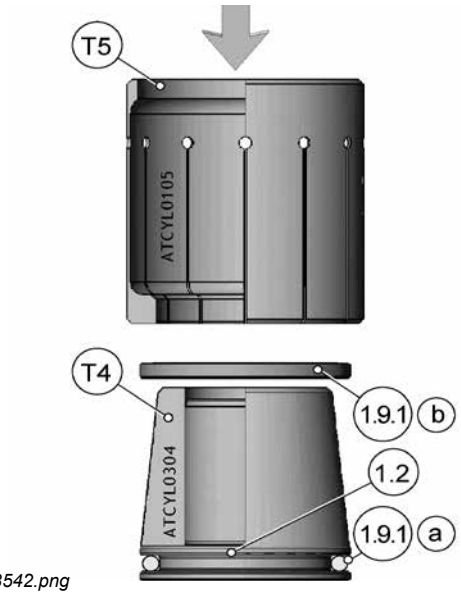
NOTICE

After disassembly of the seal, the original seals should be replaced.



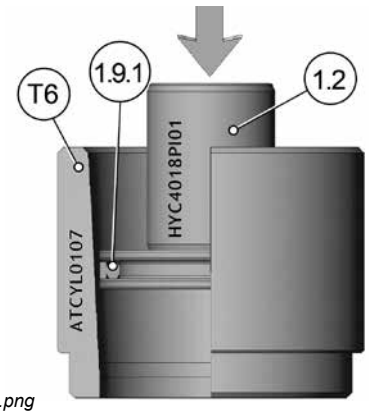
Doc003541.png

2) Lubricate the two elements of the piston seal (1.9.1) with Krytox GPL205.
   - O-ring (1.9.1) (a)
   - Sealing element (1.9.1) (b)
3) Mount the O-ring (1.9.1) (a) into the seal groove of the piston (1.2).
4) Using the spreader sleeve (T5) and the mounting cone (T4), push the sealing element (1.9.1) into the seal groove of the piston (1.2).
5) The sealing element (1.9.1) (b) is placed in the seal groove of the piston (1.2) above the O-ring (1.9.1) (a).



Doc003542.png

6) Insert the piston in the calibration sleeve (T6). This will precisely align the piston seal (1.9.1) with the piston (1.2).



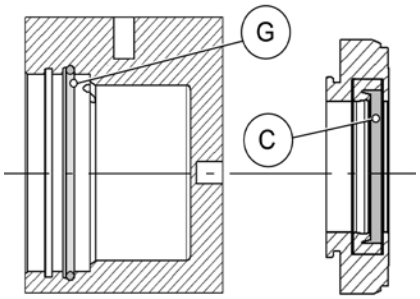
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Reassembly

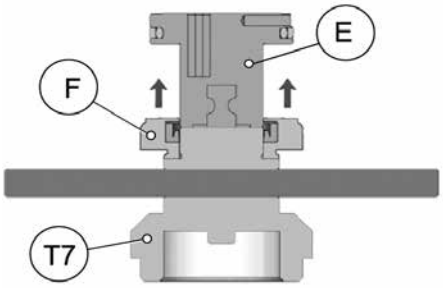
1) Replace Rod Seal (C) and O-Ring (G).

LETTER	PART
A	Snap Ring
B	Piston Seal
C	Rod Seal
D	Valve Piston
E	Piston
F	Piston Cap
G	O-Ring
T7	Piston and Cap Assembly Tool
J	Actuator Housing



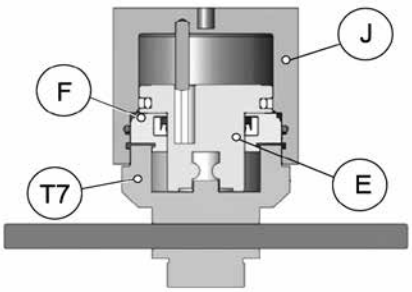
Doc006374.png

2) Assemble piston (E) to cap (F).



Doc006375.png

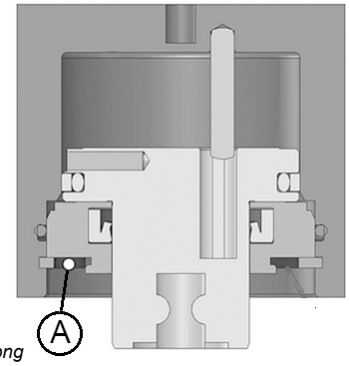
3) Insert piston (E) and cap (F) into Actuator Housing (J).



Doc006376.png

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4) Reinsert Snap Ring (A).



Doc006380.png

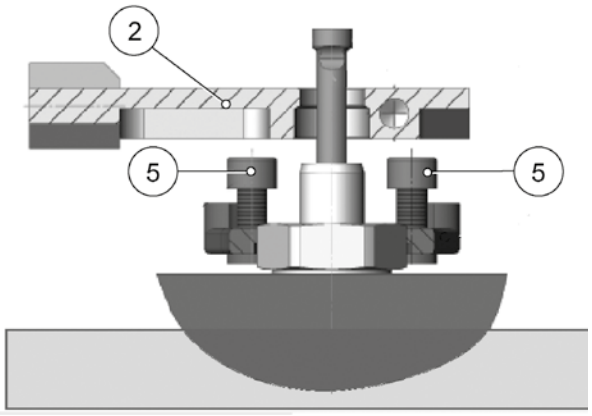
Mounting the Actuator on a Manifold

1) Position the mounting plate on the manifold.
2) Lubricate the thread of the hexagon socket head cap screws (5) with high temperature assembly paste (anti-seize compound).

NOTICE

Anti-seize compound is an important measure to prevent thread corrosion due to aggressive gasses which could be released during plastic processing.

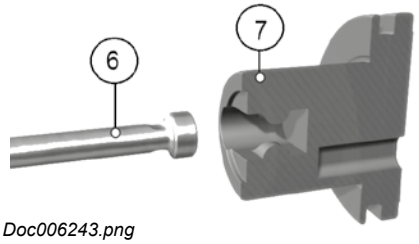
3) Screw the mounting plate (3) onto the manifold with the socket head cap screws (5) M6x14.
4) Place the cooling plate (2) on the mounting plate (3).



Doc006359.png

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5) Insert Valve Pin (6) into bushing (7).



Doc006243.png

6) Slide the Actuator so it engages the pin head slots of the piston.
7) Lubricate the thread of the socket head cap screws (F) with high temperature assembly paste (anti-seize compound).

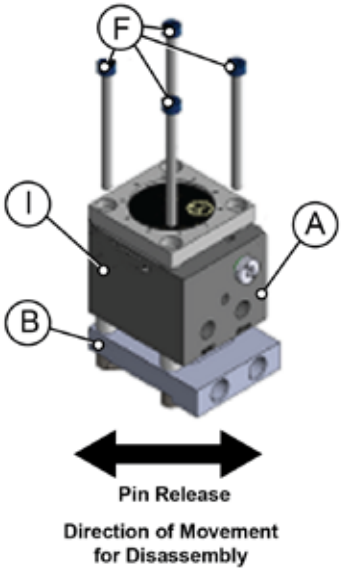
NOTICE

Anti-seize compound is an important measure to prevent thread corrosion due to aggressive gasses which could be released during plastic processing.

8) Secure the Actuator with socket head cap screws (F).
9) Tighten the socket head cap screws (F) in an “X” pattern (a, d, c, and b). Use a torque wrench to torque to specifications listed in the table in section 13.

NOTICE

Do not use cylinder housing as support to get the system into the mold, (no hammering e.g.)



Doc006358.png

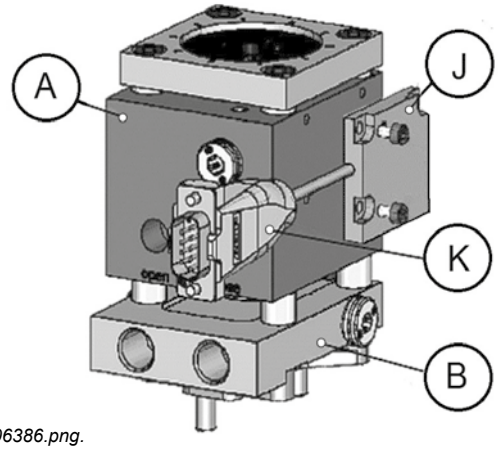


8.2.1.8 Position Sensor

The Position Sensor (J) provides the user with additional information such as if the pins are in the fully open, fully closed or in an intermediate position.

NOTICE

The position sensor (J) has a maximum temperature rating of 150 degrees C and a maximum cable (K) rating of 200 degrees C.



Doc006386.png.

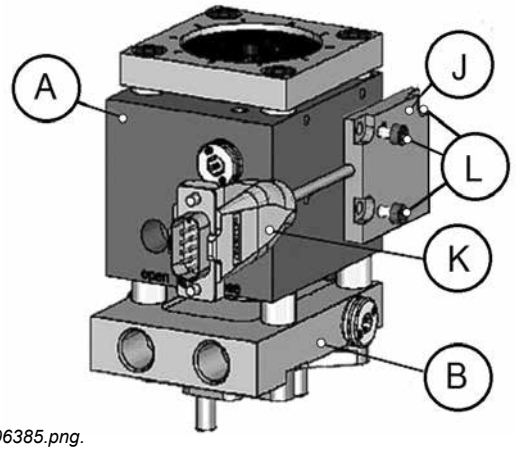
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Removal

NOTICE

Before removal and installation check that the cable (K) is not pinched and is free of tension.

1) Locate and remove the three M3 screws (L) on the side of the actuator housing (A).
2) Gently remove the position sensor (J) and cable (K) making sure not to touch the printed circuit board underneath.



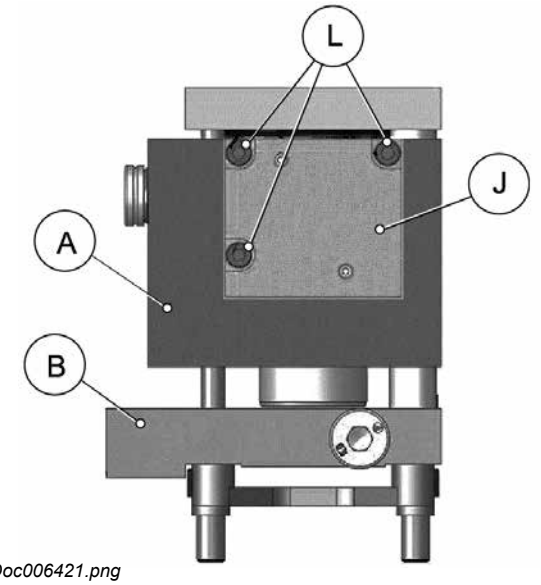
Doc006385.png.

Installation

NOTICE

When reinstalling make sure the mating surface is clean of oil and debris.

1) Place sensor in the correct location and install the three M3 screws (L).
2) Torque M3 screws to 1.5 Nm.



Doc006421.png

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8.2.1.9 Valve Pin Adjustment

WARNING

Hot Surfaces Hazard
Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns. When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

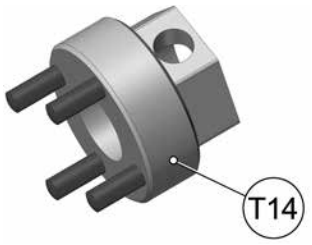
1) Bring the manifold and mold to the operating temperatures for the material to be molded.
2) Insert the adjustment tool (T14), Synventive part number ATA01, on the top of the actuator.
3) Loosen the locking screw (M6).
4) Close the valve gate by applying pneumatic pressure on the closed port.
5) Rotate the adjusting screw (AJS) in a clockwise (forward) direction to pre-set the valve pin position.
   - Conical Gate: Turn the adjusting screw (AJS) clockwise until the valve pin seats firmly in the gate.
     When valve pin position is achieved, then turn adjusting screw clockwise (forward) an additional 1/10th of a turn in order to achieve proper valve pin position during operation. 1/10th increments are provided adjacent to the screw for reference.
   - Cylindrical Gate: Turn the adjusting screw (AJS) clockwise until the valve pin protrudes beyond the gate according to dimension specified on general assembly drawing.

   NOTICE

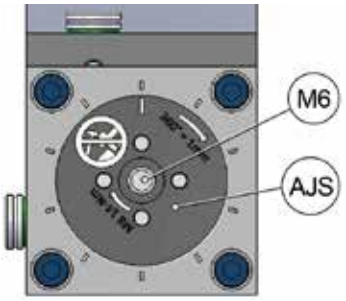
   One full (360 degree) rotation equals one millimeter of adjustment. Stop if heavy resistance is felt.
   Do not overtighten as damage to components may occur.
   Remove pneumatic pressure and loosen the adjusting screw (AJS).
6) Remove adjustment tool (T14) and tighten locking screw (M6) to the specification on the locking screw.

   NOTICE

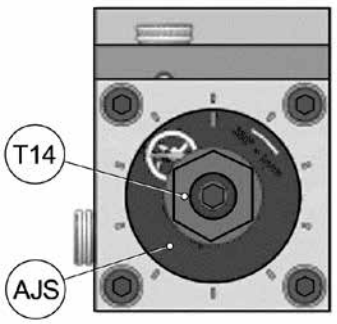
   It is necessary to always adjust the pin position by rotating the adjusting screw (AJS) in a clockwise (forward) direction in order to achieve proper pin position during operation. In the event that the actuator was “over adjusted” or needs re-adjustment, first remove pressure from the “close” port, fully loosen the adjusting screw (AJS) then return to step 4.



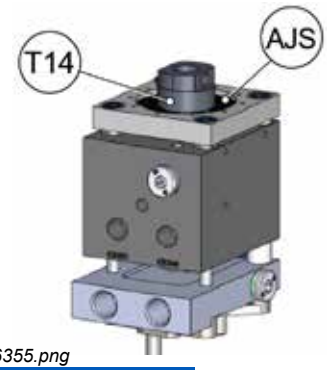
Doc006420.png



Doc006387.png



Doc006354.png



Doc006355.png

NOTICE

Torque Value locking screw (M6) PB series 18 Nm

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8.2.2 Actuator PNC3008B02

8.2.2.1 Technical Data PNC3008B02



Doc003006.png

Actuator, bolted to manifold	
Valve pin operation	
Operation medium	pneumatic
Pressure range	6 - 12 bar (87 - 174 psi)
Pressure max.	14 bar (203 psi)
Flow rate	2 l/min
Valve pin stroke	8 mm
Adjustment	± 1 mm via adjustment threads from topside
Closing force	424 N / 6 bar (87 psi)
Opening force	332 N / 6 bar (87 psi)
Cooling	
The design provides an indirect cooling through the back plate (max. 80 °C / 175 °F), otherwise cooling lines are required.	
Piping	No piping.
Valve pin	
Valve pin diameter	Ø 3 mm
Attachment	T - head Valve pin is not secured against rotation.

NOTICE

To ensure long life and continued flawless operation of the actuator, we recommend using filtered compressed air.

The coolant used should be properly modified, e.g. filtered water with an anti-corrosion and frost-proof agent.

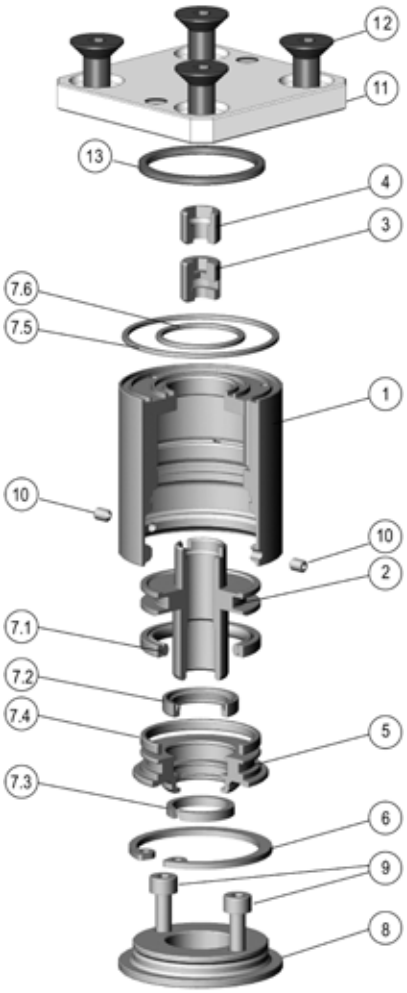
8.2.2.2 Exploded View PNC3008B02

This section describes the disassembly and reassembly process to replace seals.

In this section the actuator parts are identified with the numbers indicated in the following figure, which shows the components.

NOTICE

Always tighten the screws to the torques specified in the respective table (section 13).



Doc006551.png

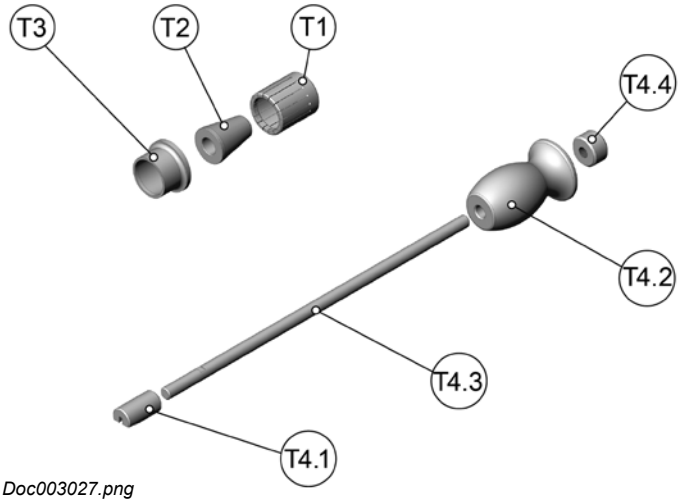
Actuator Parts - PNC3008B02			
No.	Qty.	Description	Item
(1)	1	Cylinder housing	PNC3008CH01
(2)	1	Piston	PNC3008PI02
(3)	1	Hanger screw	PNC3008HS01
(4)	1	Lock screw	PNC3008LS01
(5)	1	Buffer	PNC3008BU01
(6)	1	Retaining ring for bores	DIN472/34X1.5
(7)	1	Seal Kit PNC3008	PNC3008B01SK01
(7.1)	1	Piston seal	K30-30-22.5-3.2-VIOR
(7.2)	1	Rod seal	C1-1039-V3664
(7.3)	1	Guiding element	FB2.3-1.5L41.5
(7.4)	1	O-ring seal	VIOR-26x2-FPM80
(7.5)	1	O-ring seal	VIOR-36x1.5-FPM80
(7.6)	1	O-ring seal	VIOR-19x1.5-FPM80
(8)	1	Holding ring	PNC3008HR01
(9)	2	Hexagon socket cap screw	DIN912-M4X14-12.9
(10)	2	Hexagon socket set screw	DIN914-M3X5-45H
(11)	1	Cover Plate for PNC3008B	PNC3008B-CP-01 (optional)
(12)	4	Hexagon socket countersunk head cap screw	DIN7991-M5X10-10.9 (optional)
(13)	1	Viton O-Ring 20.35 x 1.78 FPM80 green	VIOR-20.35X1.78-FPM-80-G (optional)

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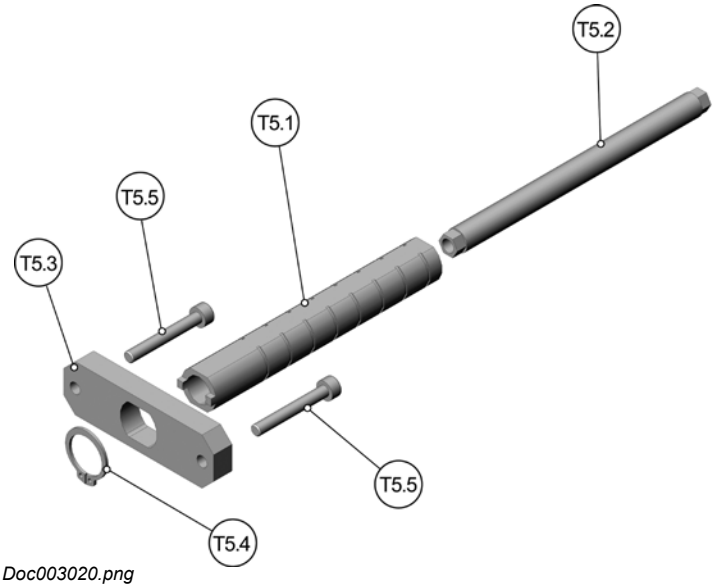
8.2.2.3 Tools for Assembling, Disassembling and Adjusting the Actuator

The following overview contains a list of special tools needed for the assembly and disassembly of the actuator and to replace seals.

The assembly and disassembly tools are identified with the numbers indicated in the following figure, which shows the components in this section.



Doc003027.png



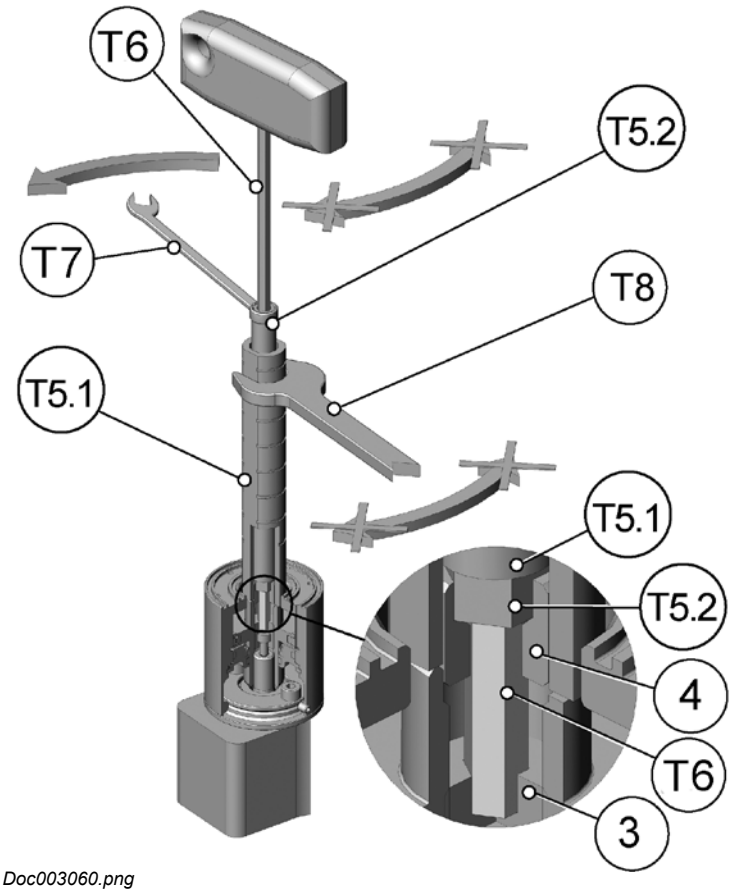
Doc003020.png

Tools to Mount Actuator Seals and the Piston		
No.	Description	Item
(T1)	Spreader sleeve	ATCYL15
(T2)	Mounting cone	ATCYL14
(T3)	Calibration sleeve (cone 30)	ATCYL13
Valve Pin Disassembly Tool ATCYL16		
No.	Description	Item
(T4.1)	Adapter for valve pin ø 3 mm and ø 3,8 mm	ATCYL1601
(T4.2)	Slice hammer	ATCYL0101
(T4.3)	Guid	ATCYL0102
(T4.4)	Stop bolt	ATCYL0104
Assembly Tool ATCYL12		
No.	Description	Item
(T5.1)	Adjustment Tool Typ01	ATCYL1201
(T5.2)	Adjustment Tool Typ02	ATCYL1202
(T5.3)	Adjustment Tool Typ03	ATCYL1203
(T5.4)	Retaining ring	DIN471-15x1
(T5.5)	Socket head cap screws	DIN912-M4x30-12.9

NOTICE

The tools ATCYL13, ATCYL14, ATCYL15 and ATCYL16 are not included with the Hot Runner System and must be ordered from Synventive separately.

8.2.2.4 Disassembling Actuator PNC3008B02

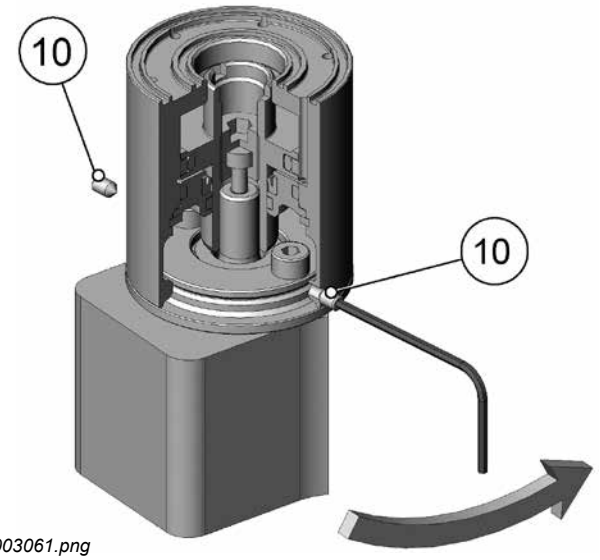


Doc003060.png

NOTICE

For actuator disassembly the lock screw (4) of the hanger screw (3) needs to be loosened.

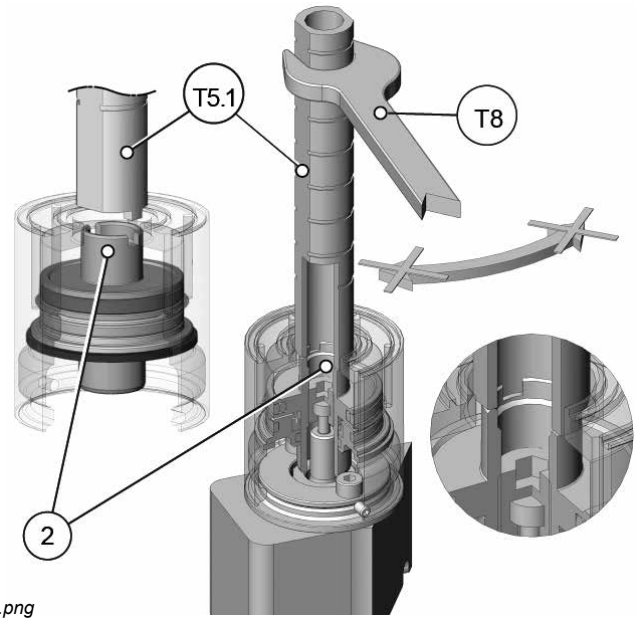
1) Hold against turning:
   - Piston (2) with the adjustment tool (T5.1).
   - Hanger screw (3) with the hexagon socket wrench (T6).
2) At the same time loosen the lock screw (4) with the assembly tool (T5.2) and ring wrench (T7).



Doc003061.png

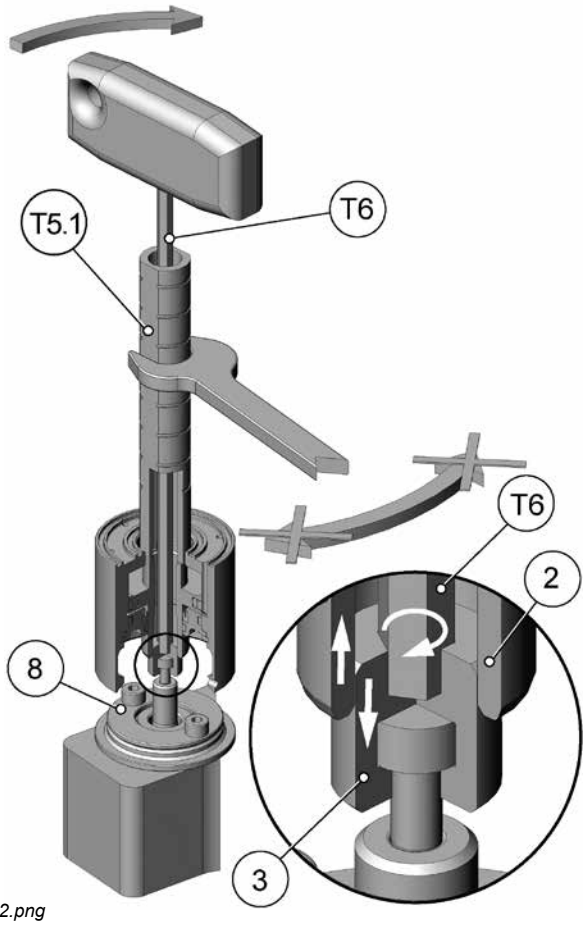
3) Unscrew hexagon socket set screws (10).

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Doc003059.png

4) Slip the lug of the tool ATCYL1201 (T5.1) into the gap of the piston (2).
5) Tighten the piston (2) with tool ATCYL1201 (T5.1) and flat wrench 13 mm (T8).



Doc003062.png

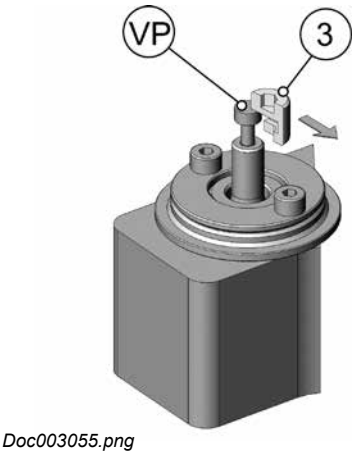
6) With Hexagon socket wrench (T6) turn the hanger screw (3) clockwise until the hanger screw (3) is unscrewed out of the piston (2).

NOTICE

The actuator will be lifted from the holding ring (8) and will be separated from the valve pin and hanger screw (3).

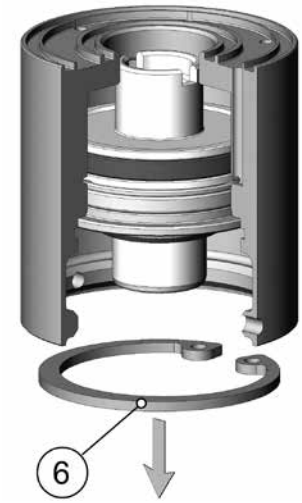
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7) Loosen the hanger screw (3) from the valve gate pin (VP).



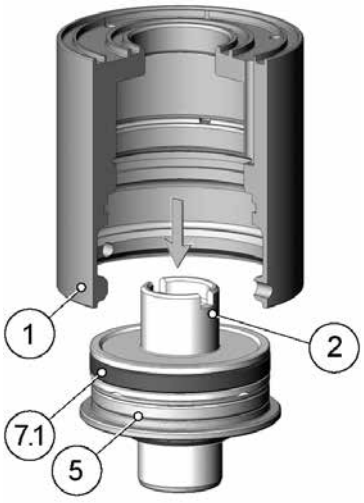
Doc003055.png

8) Remove the retaining ring (6).



Doc003056.png

9) Press the piston (2) and buffer (5) out of the cylinder housing (1).
10) Dismount the two piston seal (7.1) elements.
    - O-ring (7.1) (a)
    - Sealing element (7.1) (b)
11) Dismantling the valve pin (see section 9.1).



Doc003058.png

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8.2.2.5 Assembling the Actuator PNC3008B02

Lubrication of Piston and Ring Seals

NOTICE

For lubrication use Krytox GPL205.

To Lubricate the piston sliding surface is essential for the actuator life time.



Doc003777.png

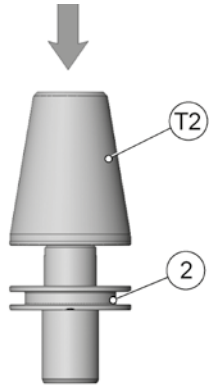
To Lubricate the piston ring seals is helpful to assemble the actuator.



Doc006315.png

Installation of the Sealing Ring on the Piston

1) Put the mounting cone (T2) on the piston (2).



Doc003007.png

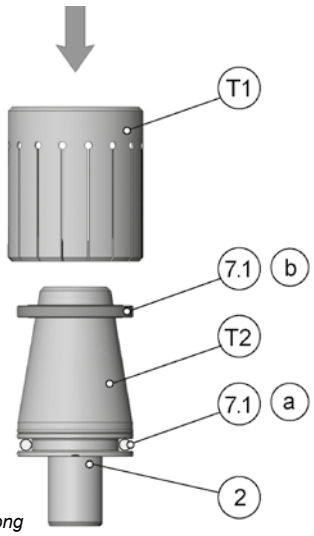
NOTICE

After disassembly of the sealing elements, the original seals should be replaced.

2) Mount the O-ring (7.1) (a) into the seal groove of the piston (2).
3) Using the spreader sleeve (T1) and the mounting cone (T2), push the sealing element (7.1) (b) into the seal groove of the piston (2).

NOTICE

The sealing element (7.1) (b) is placed in the seal grove of the piston (2) above the O-ring (7.1) (a).



Doc003008.png

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Installation of the Piston into the Actuator Housing

1) Degrease the piston sliding surface.
2) Lubricate the piston sliding surface.

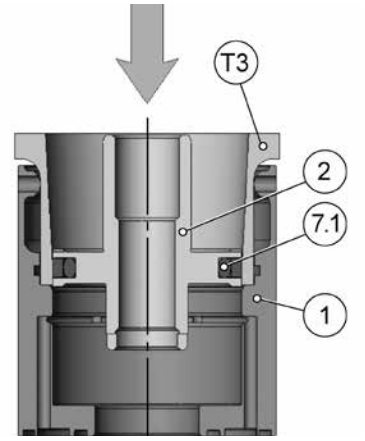


Doc003777.png

3) Insert the piston (2) into the calibration sleeve (T3).
4) Place the calibration sleeve (T3) into the cylinder housing (1).
5) Push the piston (2) into the cylinder housing.

NOTICE

The calibration sleeve (T3) prevents damage to the piston seal (7.1).

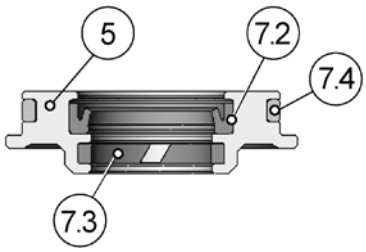


Doc003009.png

NOTICE

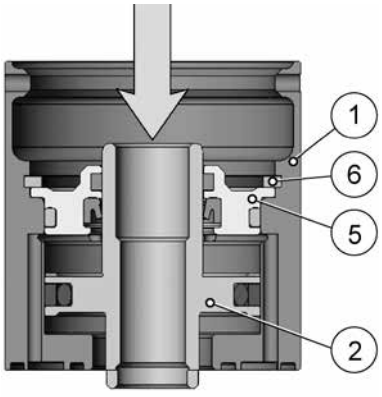
After disassembly of the system, the original seals should be replaced with new seals.

6) Install the following seals at the buffer (5).
   - Rod seal (7.2)
   - Guiding element (7.3)
   - O-ring seal (7.4)



Doc003010.png

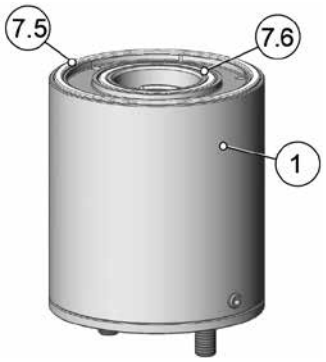
7) Mount buffer (5) into the cylinder housing (1).
8) Lock the buffer with the retaining ring (6).



Doc003011.png

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9) Install the following seals at the actuator housing (1).
   - Viton-ring seal (7.5)
   - Viton-ring seal (7.6)



Doc003185.png

Mounting of the Actuator on the Manifold

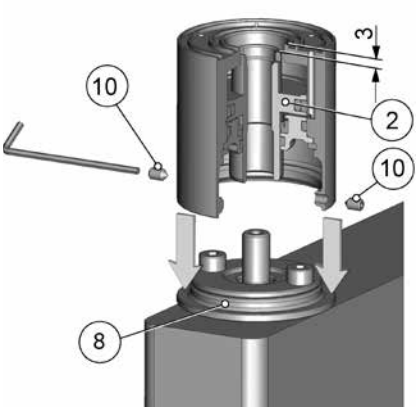
1) Mount actuator to the holding ring (8).
2) Lubricate the thread of the hexagon socket set screws (10) with high-temperature assembly paste (anti-seize compound).

   NOTICE

   This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.
3) Lock the actuator with hexagon socket set screws (10).
4) Push piston (2) in closed position.

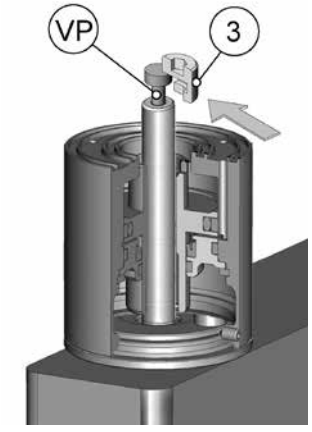
   NOTICE

   Closed position is when the top edge of the piston has a distance of 3 mm to the top edge of the actuator housing.



Doc003013.png

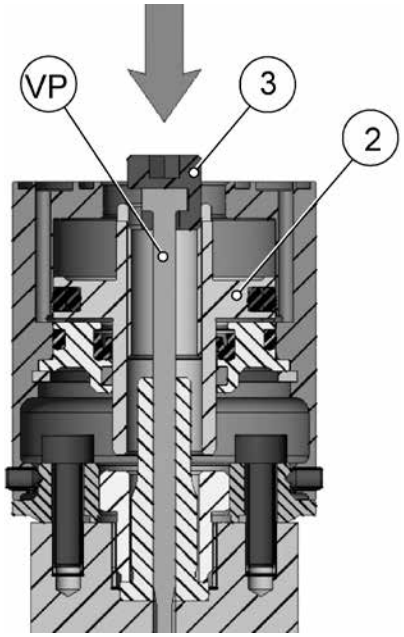
5) Mount the valve pin (VP) into the valve pin guide.
6) Place the hanger screw (3) on the valve pin (VP) head.



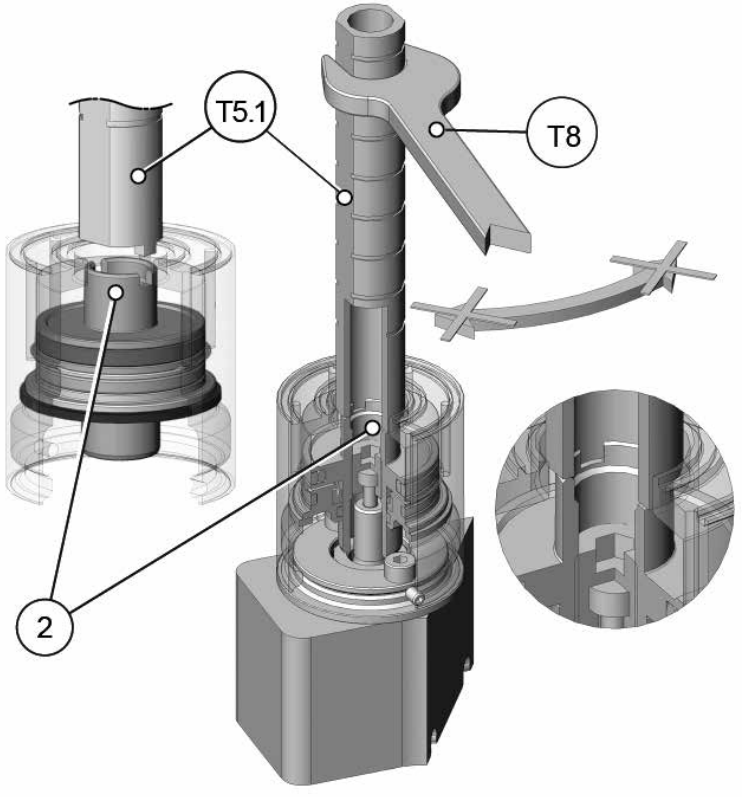
Doc003063.png

8.2.2.6 Adjusting the Valve Pin to the Basic Position

1) Screw the valve gate pin (VP) with the hanger screw (3) into the piston (2).



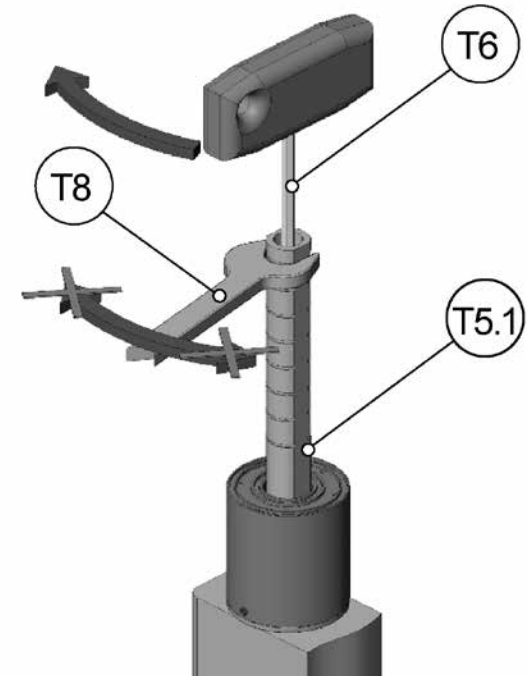
Doc003014.png



Doc003059.png

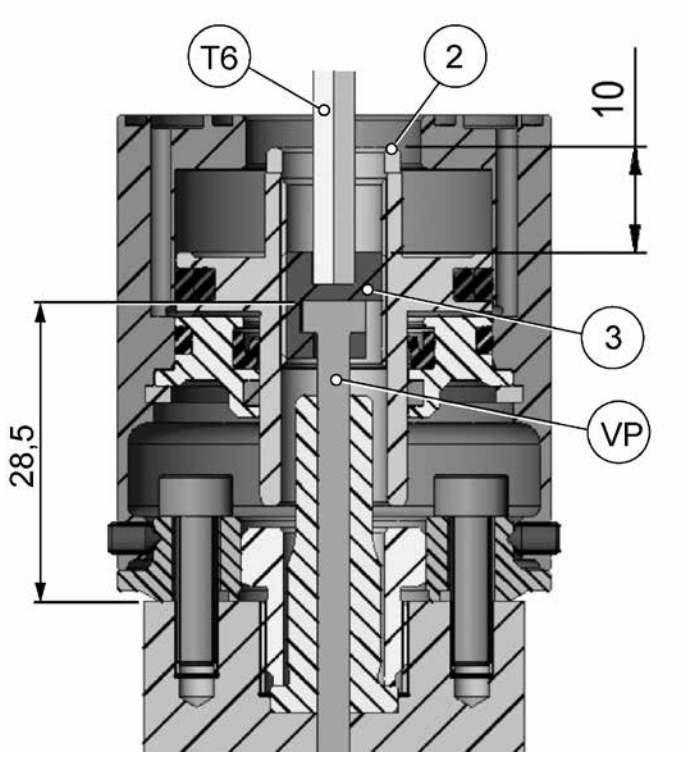
2) Hold the piston (2) against turning with the adjustment tool (T5.1) and a flat wrench 13 mm (T8).

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Doc003015.png

3) Adjust the valve pin with a hexagon socket wrench (T6) as followed.
4) Still hold the piston against turning with the adjustment tool (T5.1).



Doc003016.png

NOTICE

The basic setting for the valve gate pin is 10 mm between the piston (2) top edge and the top edge from the hanger screw (3).

5) Rotate the hanger screw (3) with a hexagon socket wrench (T6) into the piston (2).

NOTICE

The exact position for the valve pin (VP) has to be checked at the front of the valve pin - depends on the nozzle tip.

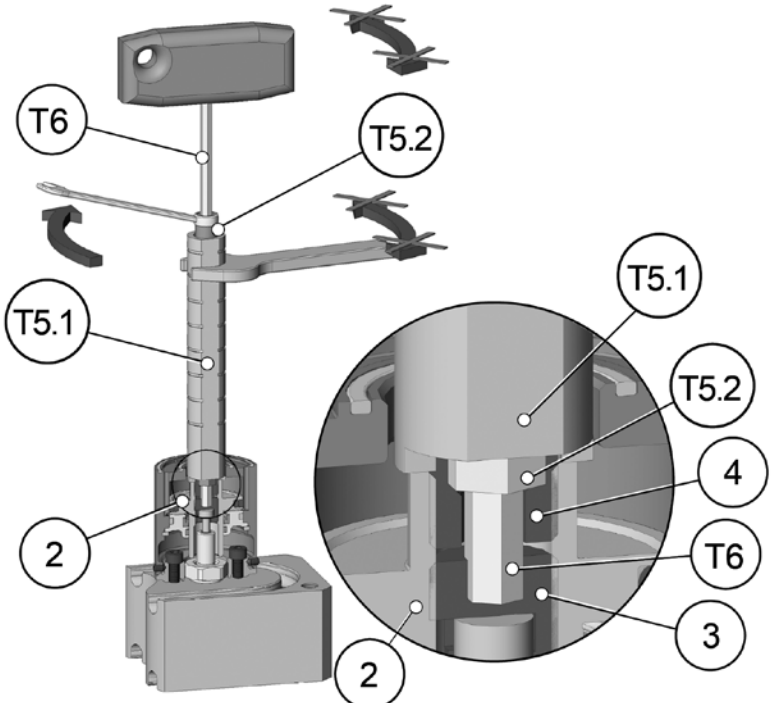
The reason to unscrew the hanger screw (3) would be for valve pin maintenance or replacement.

If the deviation to the basic settings of 10 mm is more than 0,5 mm, the adjustments do not correspond to the parameters of the mold or do not correspond to the Synventive standard.

6) Wrap lock screw (4) with Teflon band (2 layer).
7) Rotate the lock screw (4) with the assembly tool (T5.2) into the piston (2).



Doc003017.tif



Doc003018.png

NOTICE

For actuator assembly the lock screw (4) has to be fastened against the hanger screw (3).

8) Hold against turning:
   - Piston (2) with the adjustment tool Typ01 (T5.1).
   - Hanger screw (3) with the hexagon socket wrench (T6).
9) At the same time tighten the lock screw (4) with the assembly tool (T5.2).

8.2.2.7 Valve Pin Height Adjustment PNC3008B02

Precondition for the following steps are to be performed with the Hot Runner installed in the mold, and the system at operating temperature.

⚠ WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing

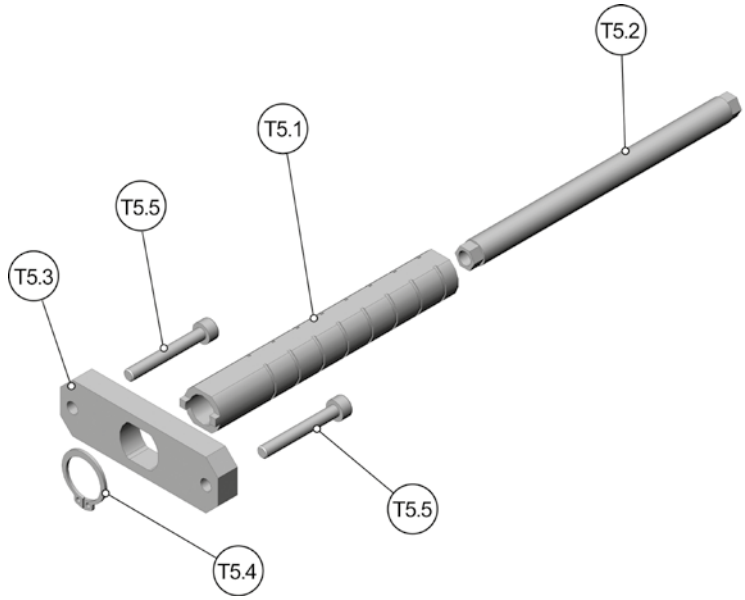








Valve Pin Adjustment Tool Kit



Doc003020.png

No.	Description	Item
(T5.1)	Adjustment Tool Typ01	ATCYL1201
(T5.2)	Adjustment Tool Typ02	ATCYL1202
(T5.3)	Adjustment Tool Typ03	ATCYL1203
(T5.4)	Retaining ring	DIN471-15x1
(T5.5)	Socket head cap screws	DIN912-M4x30-12.9

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Valve Pin Adjustment at mounted Hot Runner System

WARNING

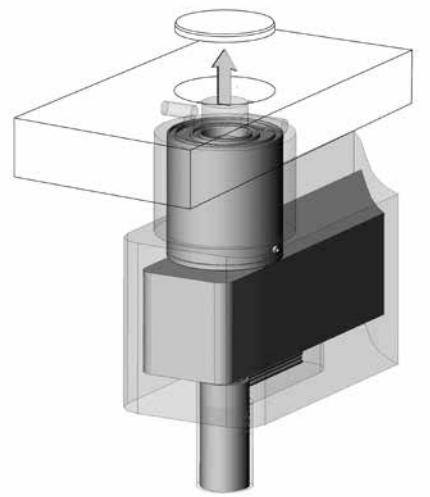
Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

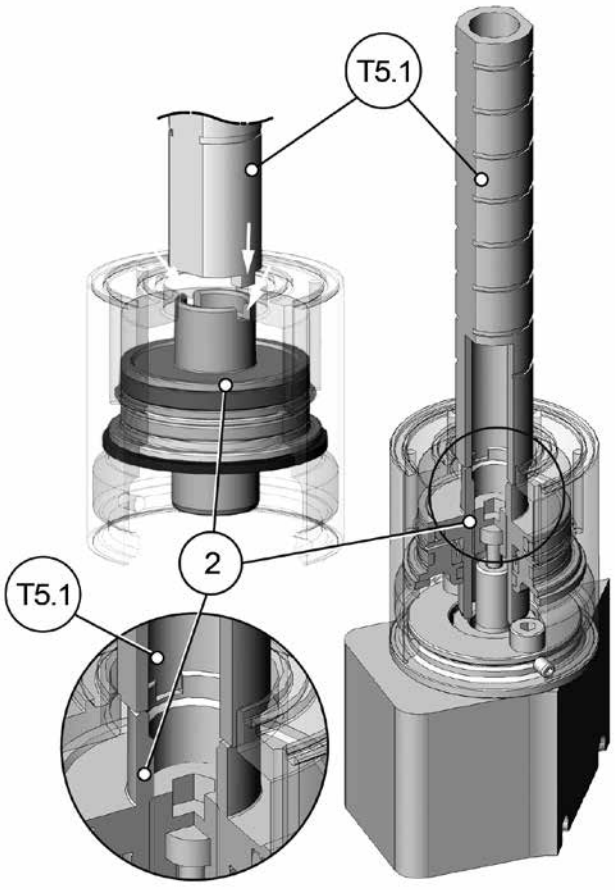
NOTICE

The actuator is covered with a plate, containing the pneumatic access to the actuator.

1) Enable access to the actuator.



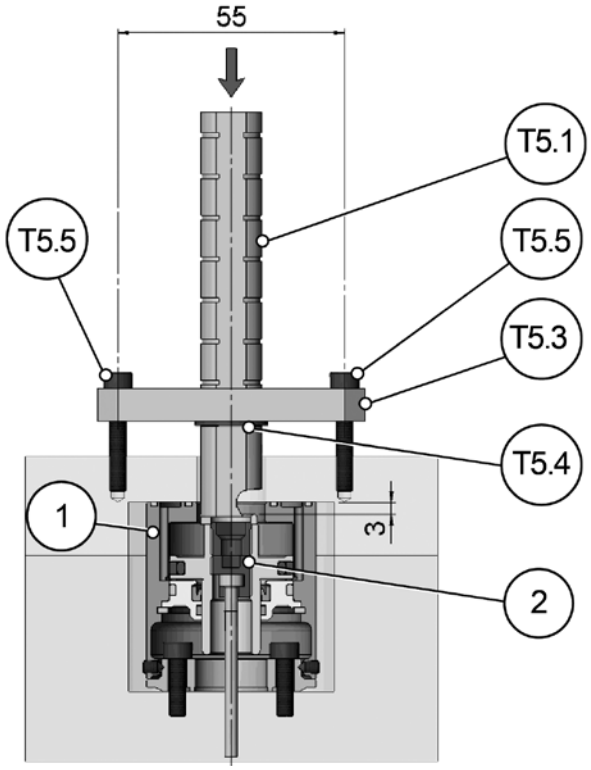
Doc003021.png



Doc003064.png

2) Slip the lug of the tool ATCYL1201 (T5.1) into the gap of the piston.

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Doc003022.png

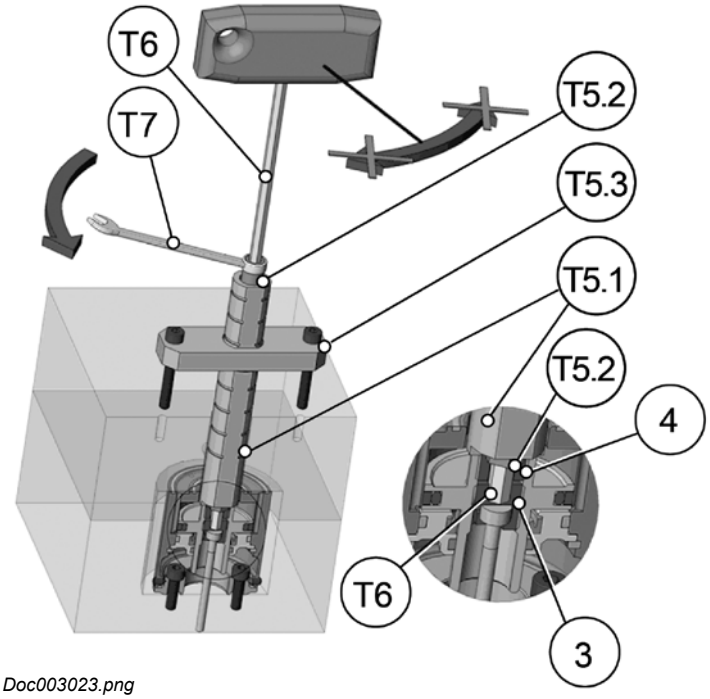
NOTICE

The piston is in the closed position, when the top edge of the piston (2) has a distance of 3 mm to the top edge of the actuator housing (1).

3) Push the fixed piston (2) forward to the close position.
4) Place the retaining ring (T5.4).at the tool ATCYL1201 (T5.1).
5) Place the ATCYL1203 (T5.3) on the retaining ring (T5.4) at the tool ATCYL1201 (T5.1).
6) Fix the piston (2) against upstroke and rotation with the socket head cap screws (T5.5).

NOTICE

Use torque wrench with wrench insert and the torques indicated in the torque table (section 13).



Doc003023.png

7) Fix the hanger screw (3) with the socket wrench (T6).
8) Slacken the lock screw (4) with the adjustment tool ATCYL1202 (T5.2) and ring wrench (T7) attached to it.

Legend to Doc003023.png

(T5.1) Adjustment tool Typ01 - ATCYL1201

(T5.2) Adjustment tool Typ02 - ATCYL1202

(T5.3) Adjustment tool Typ03 - ATCYL1203

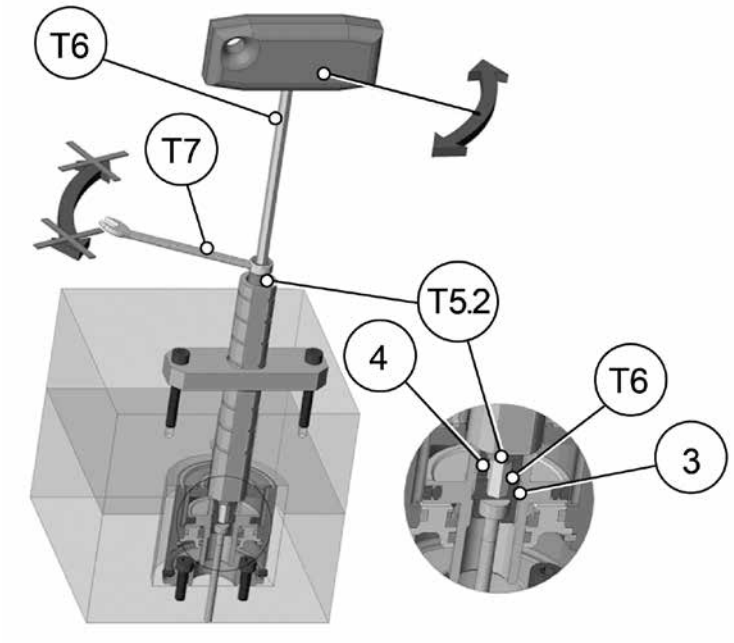
(3) Hanger screw

(4) Lock screw

(T6) Socket wrench HEX 4

(T7) Ring wrench HEX 7

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Doc003024.png

9) To adjust valve pin position:
   - Fix the lock screw (4) with the adjustment tool ATCYL2102 (T5.2) and a ring wrench (T7).
   - Turn the hanger screw (3) with the socket wrench (T6).

NOTICE

The screw pitch is 1 mm (right hand thread).



Doc003017.tif

NOTICE

The lock screw (4) has to be wraped with Teflon tape (2 layer).

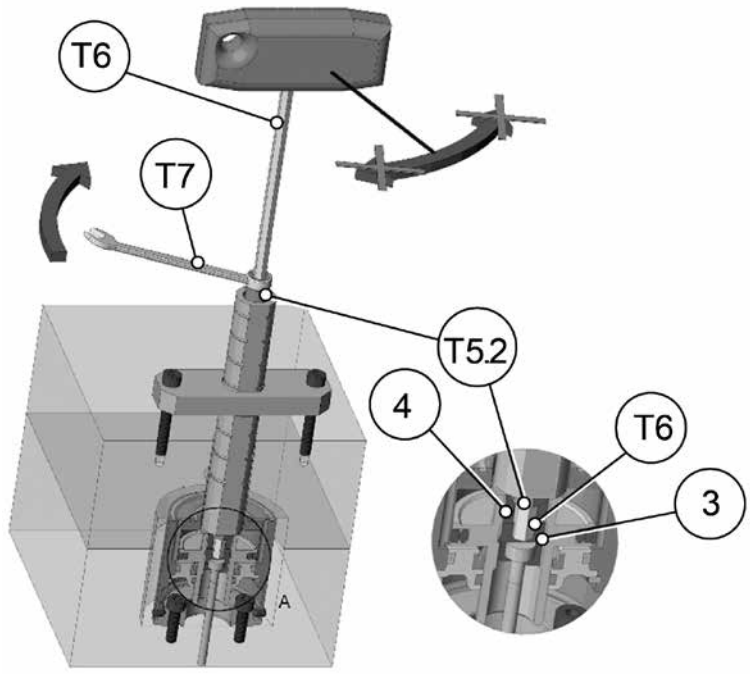
After several adjustments replace the Teflon tape.

To fix the vale pin position:

10) Secure with the hexagon socket wrench (T6) the hanger screw (3) against turning.
11) Tighten the lock screw (4) with the assembly tool ATCYL2102 (T5.2) and a ring wrench (T7).

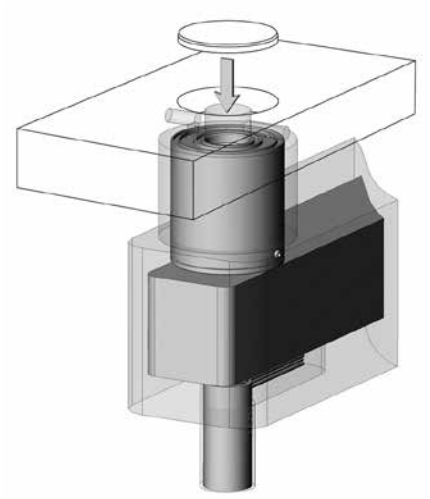
NOTICE

The reason to unscrew the hanger screw (3) would be for valve pin maintenance or replacement.



Doc003025.png

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Doc003026.png

NOTICE

For the control of the valve pins, a pneumatic system is installed.

12) In case where the clamping plate has an opening for the valve pin adjustment, the opening must be capped airtight.

8.2.3 Actuator PNC4508B Series

8.2.3.1 Technical Data PNC4508B-01, PNC4508B-02



Doc003753.png

Actuator, bolted to manifold pneumatic	
Valve pin operation	
Operation medium	pneumatic
Pressure range	6 - 12 bar (87 - 174 psi)
Operation pressure	max. 14 bar (203 psi)
Flow rate	5 l/min
Valve pin stroke	8 mm
Adjustment	± 1 mm via adjustment threads from topside
Closing force	954 N / 6 bar (87 psi) 1272 N / 8 bar (116 psi) 1590 N / 10 bar (145 psi) 1908 N / 12 bar (174 psi)
Opening force	848 N / 6 bar (87 psi) 1131 N / 8 bar (116 psi) 1414 N / 10 bar (145 psi) 1696 N / 12 bar (174 psi)
Cooling	
The design provides an indirect cooling through the back plate (max. 80 °C / 175 °F), otherwise cooling lines are required.	
Piping	No piping.
Valve pin	
Valve pin diameter	Ø 3.8 mm (PNC4508B-01) Ø 3.0 mm (PNC4508B-02)
Attachment	T - head Valve pin is not secured against rotation

NOTICE

To ensure long life and continued flawless operation of the actuator, we recommend using filtered compressed air.

The coolant used should be properly modified, e.g. filtered water with an anti-corrosion and frost-proof agent.

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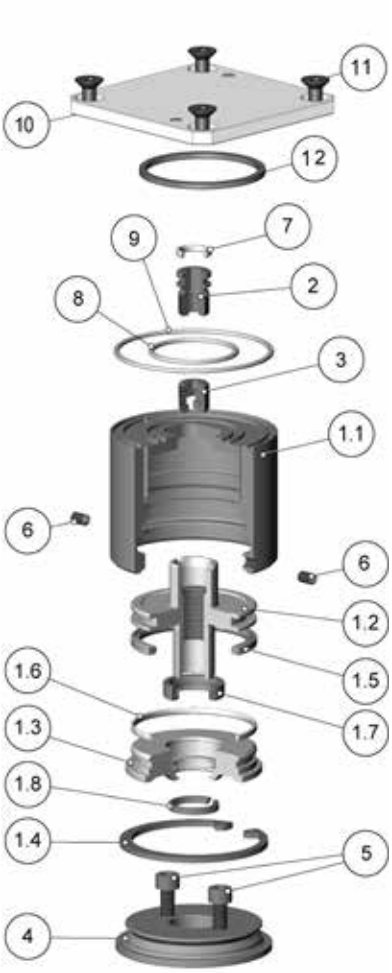
8.2.3.2 Exploded View PNC4508B Series

This section describes the disassembly and reassembly process to replace seals.

In this section the actuator parts are identified with the numbers indicated in the following figure, which shows the components.

NOTICE

Always tighten the screws to the torques specified in the respective table (section 13).



Doc006552.png

Actuator Parts - PNC4508B Series

No.	Qty.	Description	Item
(1)		Cylinder housing complete	PNC4508B-HC-01
(1.1)	1	Cylinder housing	PNC4508B-CH-01
(1.2)	1	Piston	PNC4508B-PI-01
(1.3)	1	Buffer	PNC4508B-BU-01
(1.4)	1	Retaining ring	DIN472-50X2
(*)		PNC4508B Seal Kit Version 01	PNC4508B-SK-01
(1.5)	1	Piston seal	2G2/45-37.5-3.2
(1.6)	1	O-ring seal	VIOR41X1.78FPM75
(1.7)	1	Rod seal	C1-1044-V3664
(1.8)	1	Guiding element	FB2.3-1.5L48.5
(2)	1	Lock screw	PNC4508B-LS-01
(3)	1	Hanger screw	PNC4508B-HS-01
(4)	1	Holding ring	PNC4508B-HR-01
(5)	2	Hexagon socket cap screw	DIN912-M5X16-12.9
(6)	2	Hexagon socket set screw	DIN914-M4X8-45H
(7)	1	Viton-ring seal	VIOR 9.25X1.78-FPM80
(8)	1	Viton-ring seal	VIOR28.30X1.78-FPM-80-G
(9)	1	Viton-ring seal	VIOR53.70X1.78-FPM-80-G
(10)	1	Cover Plate for PNC4508/12B	PNC4508B-CP-01 (optional)
(11)	4	Hexagon socket countersunk head cap screw	DIN7991-M5X10-10.9 (optional)
(12)	1	Viton O-Ring 26.64 x 2.62 FPM80 Black	VIOR-26.64X2.62-FPM-80-BL (optional)

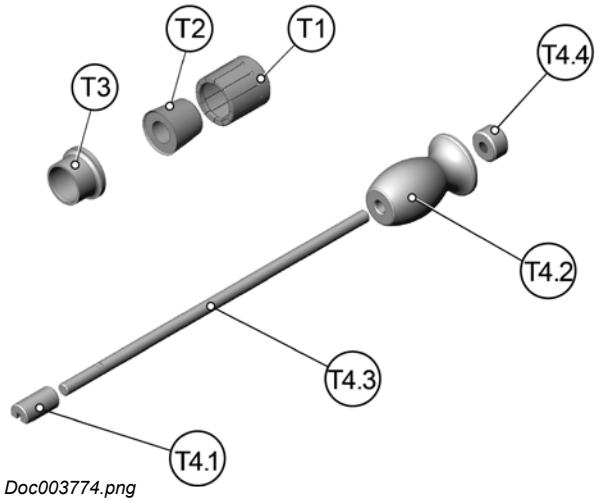
(*) : PNC4508B-SK-01 is seal kit which includes (1.5),(1.6),(1.7),(1.8),(7),(8),(9).

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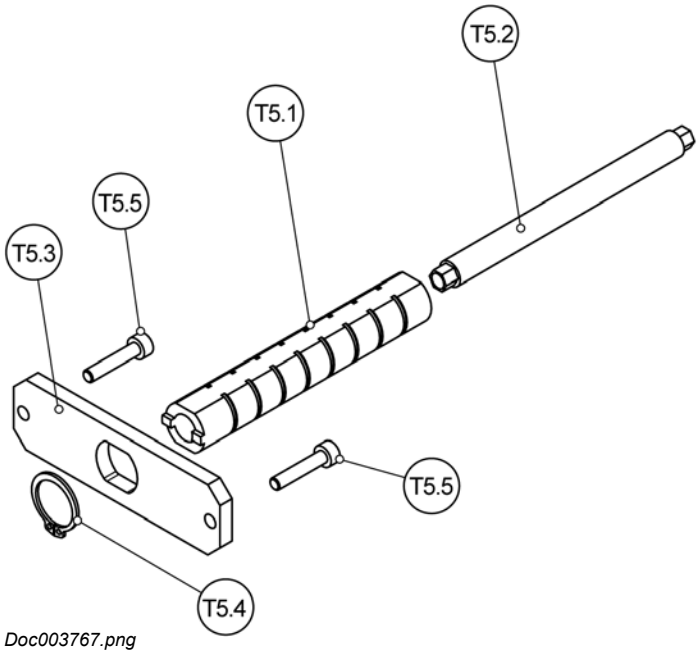
8.2.3.3 Tools for Assembling, Disassembling and Adjusting the Actuator

The following overview contains a list of special tools needed for the assembly and disassembly of the actuator and to replace seals.

The assembly and disassembly tools are identified with the numbers indicated in the following figure, which shows the components in this section.



Doc003774.png



Doc003767.png

Tools to Mount Actuator Seals and the Piston		
No.	Description	Item
(T1)	Spreader sleeve	ATCYL0405
(T2)	Mounting cone	ATCYL20
(T3)	Calibration sleeve (cone 45)	ATCYL19

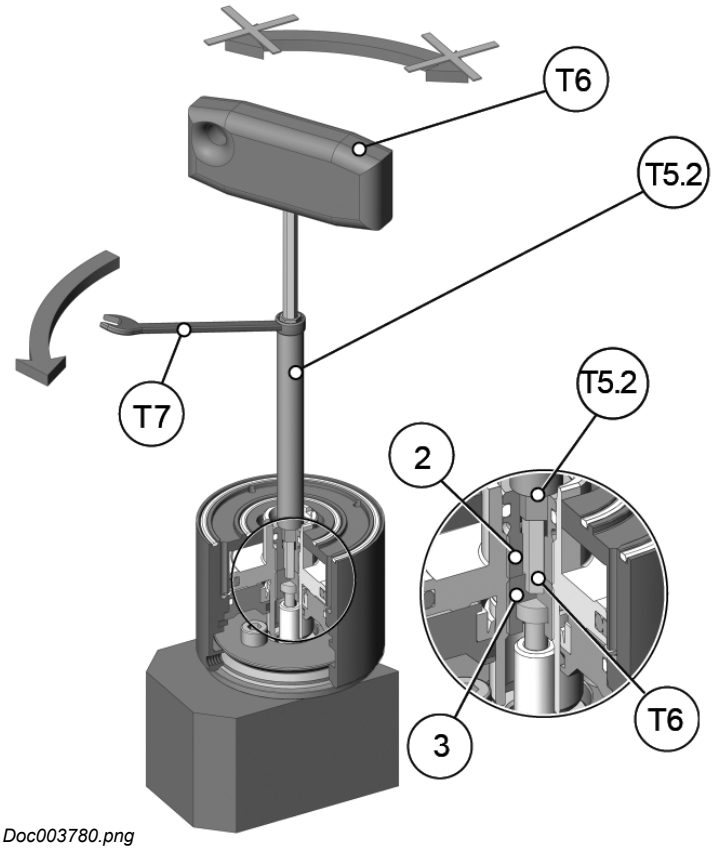
Valve Pin Disassembly Tool ATCYL16		
No.	Description	Item
(T4.1)	Adapter for valve pin ø 3 mm and ø 3,8 mm	ATCYL1601
(T4.2)	Slice hammer	ATCYL0101
(T4.3)	Guid	ATCYL0102
(T4.4)	Stop bolt	ATCYL0104

Assembly Tool ATCYL21		
No.	Description	Item
(T5.1)	Adjustment Tool Typ01	ATCYL2101
(T5.2)	Adjustment Tool Typ02	ATCYL2102
(T5.3)	Adjustment Tool Typ03	ATCYL2103
(T5.4)	Retaining ring	DIN471-16x1
(T5.5)	Socket head cap screws	DIN912-M4x20-12.9

NOTICE

The tools ATCYL16, ATCYL19 and ATCYL20 are not included with the Hot Runner System and must be ordered from Synventive separately.

8.2.3.4 Disassembling Actuator PNC4508B Series

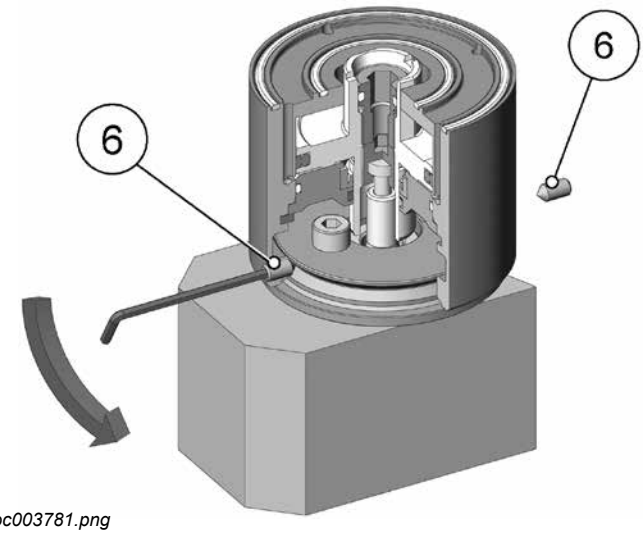


Doc003780.png

NOTICE

For actuator disassembly the lock screw (2) of the hanger screw (3) needs to be loosened.

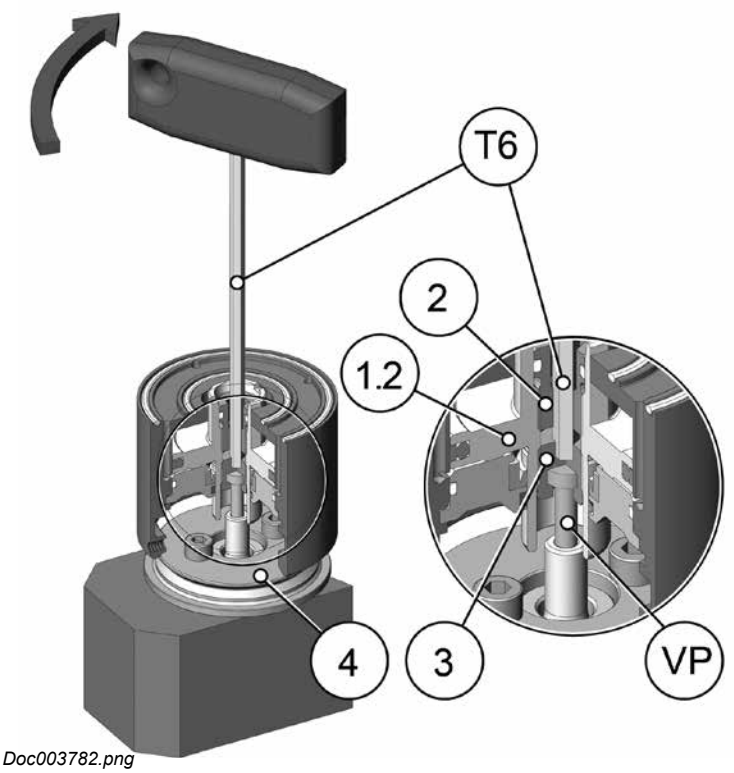
1) Hold against turning the hanger screw (3) with the hexagon socket wrench (T6).
2) At the same time loosen the lock screw (2) with the adjustment tool ATCYL2102 (T5.2) and ring wrench (T7).



Doc003781.png

3) Unscrew hexagon socket set screws (6).

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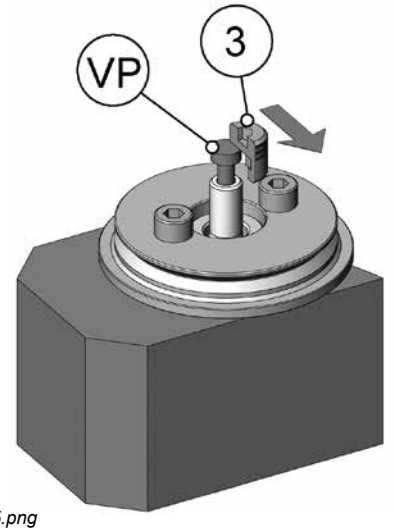


Doc003782.png

4) With Hexagon socket wrench (T6) turn the hanger screw (3) clockwise until the hanger screw (3) is unscrewed out of the piston (1.2).

NOTICE

The actuator will be lifted from the holding ring (4) and will be separated from the valve pin (VP) and hanger screw (3).

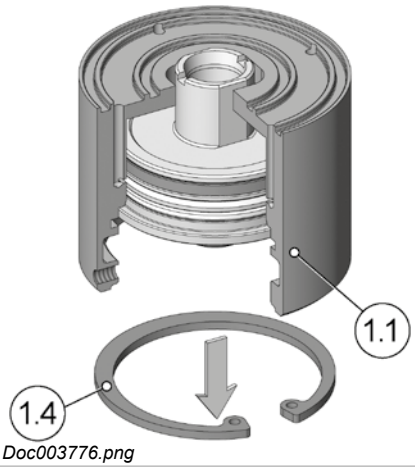


Doc003775.png

5) Loosen the hanger screw (3) from the valve gate pin (VP).

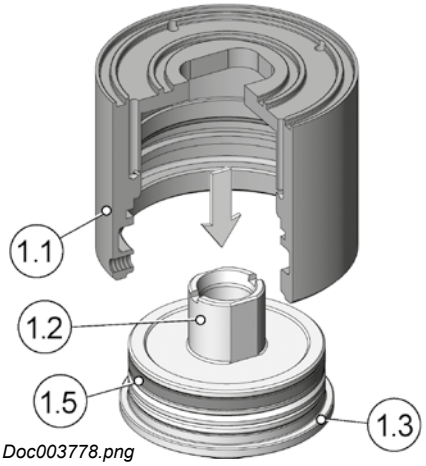
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6) Remove the retaining ring (1.4).



Doc003776.png

7) Press the piston (1.2) and buffer (1.3) out of the cylinder housing (1.1).
8) Dismount the two piston seal (1.5) elements.
   - O-ring (1.5) (a)
   - Sealing element (1.5) (b)



Doc003778.png

9) Dismantling the valve pin (see section 9.1).

8.2.3.5 Assembling the Actuator PNC4508B Series

Lubrication of Piston and Ring Seals

NOTICE

For lubrication use Krytox GPL205.

To Lubricate the piston sliding surface is essential for the actuator life time.


Doc003777.png

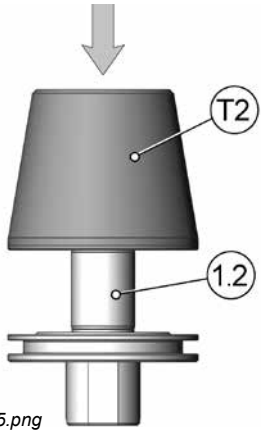
To Lubricate the piston ring seals is helpful to assemble the actuator.



Doc006315.png

Installation of the Sealing Ring on the Piston

1) Put the mounting cone (T2) on the piston (1.2).



Doc003755.png

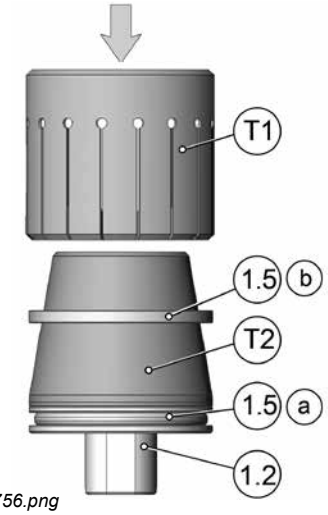
NOTICE

After disassembly of the sealing elements, the original seals should be replaced.

2) Mount the O-ring (1.5) (a) into the seal groove of the piston (1.2).
3) Using the spreader sleeve (T1) and the mounting cone (T2), push the sealing element (1.5) (b) into the seal groove of the piston (1.2).

NOTICE

The sealing element (1.5) (b) is placed in the seal grove of the piston (1.2) above the O-ring (1.5) (a).



Doc003756.png

Installation of the Piston into the Actuator Housing

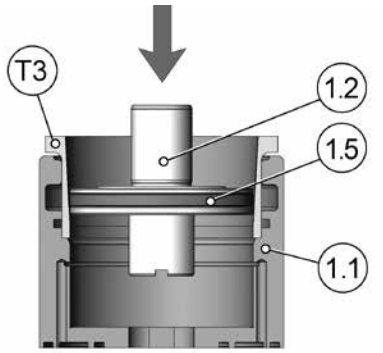
1) Degrease the piston sliding surface.
2) Lubricate the piston sliding surface.


Doc003777.png

3) Insert the piston (1.2) into the calibration sleeve (T3).
4) Place the calibration sleeve (T3) into the cylinder housing (1.1).
5) Push the piston (1.2) into the cylinder housing.

NOTICE

The calibration sleeve (T3) prevents damage to the piston seal (1.5).

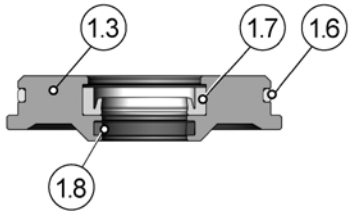


Doc003757.png

NOTICE

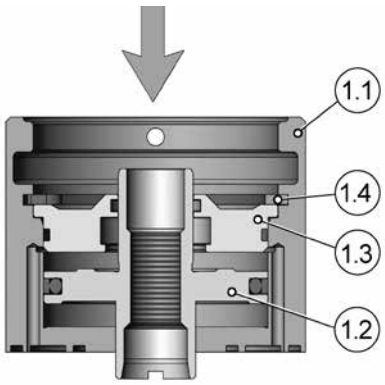
After disassembly of the system, the original seals should be replaced with new seals.

6) Install the following seals at the buffer (1.3).
   - O-ring seal (1.6)
   - Rod seal (1.7)
   - Guiding element (1.8)



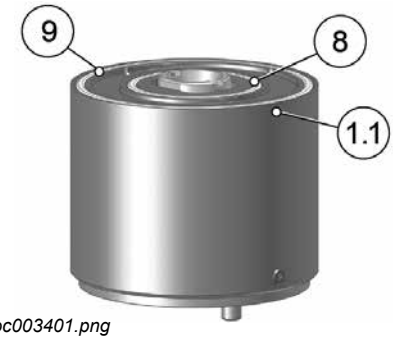
Doc003758.png

7) Mount buffer (1.3) into the cylinder housing (1.1).
8) Lock the buffer with the retaining ring (1.4).



Doc003759.png

9) Install the following seals at the actuator housing (1.1).
   - Viton-ring seal (8)
   - Viton-ring seal (9)



Doc003401.png

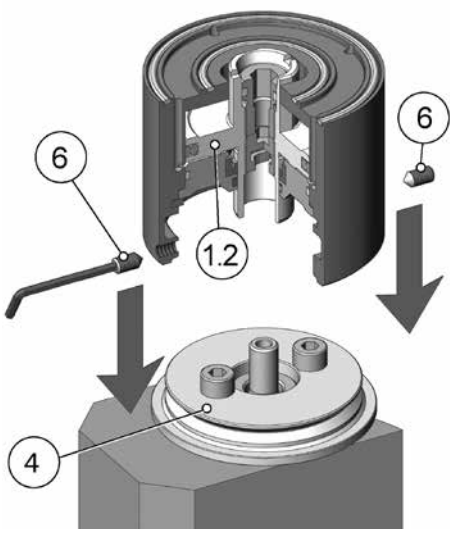
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8.2.3.6 Mounting of the Actuator on the Manifold

1) Mount actuator to the holding ring (4).
2) Lubricate the thread of the hexagon socket set screws (6) with high-temperature assembly paste (anti-seize compound).

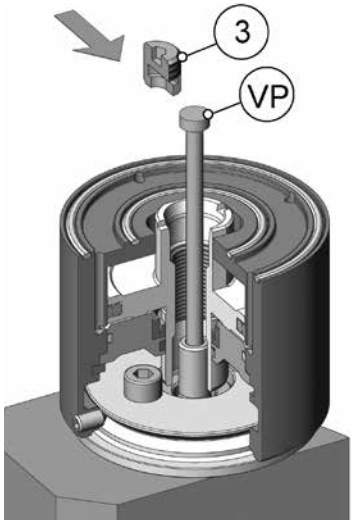
   NOTICE

   This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.
3) Lock the actuator with hexagon socket set screws (6).
4) Push piston (1.2) in closed position.



Doc003761.png

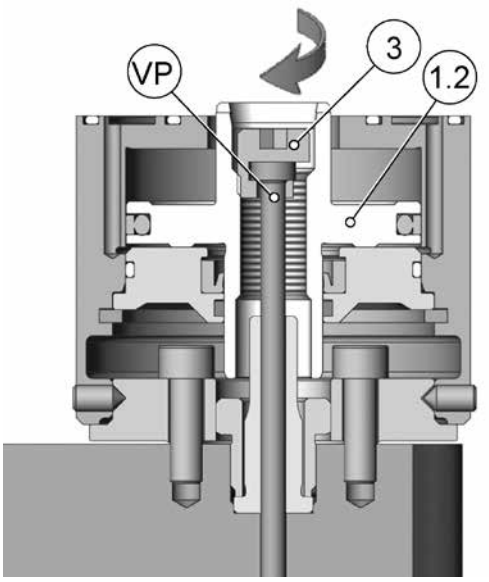
5) Mount the valve pin (VP) into the valve pin guide.
6) Place the hanger screw (3) on the valve pin (VP) head.



Doc003783.png

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8.2.3.7 Adjusting the Valve Pin to the Basic Position



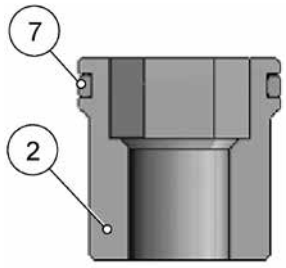
Doc003762.png

1) Screw the valve gate pin (VP) with the hanger screw (3) into the piston (1.2).

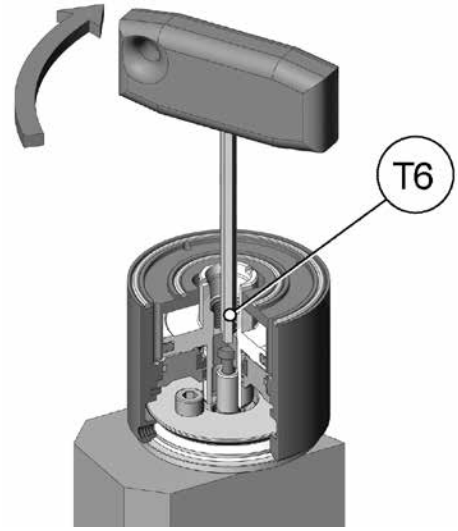
NOTICE

After disassembly of the system, the original seals should be replaced with new seals.

2) Lubricate the viton-ring seal (7) with hydraulic oil or white grease.
3) Install the viton-ring seal (7) at the lock screw (2).



Doc003765.png



Doc003763.png

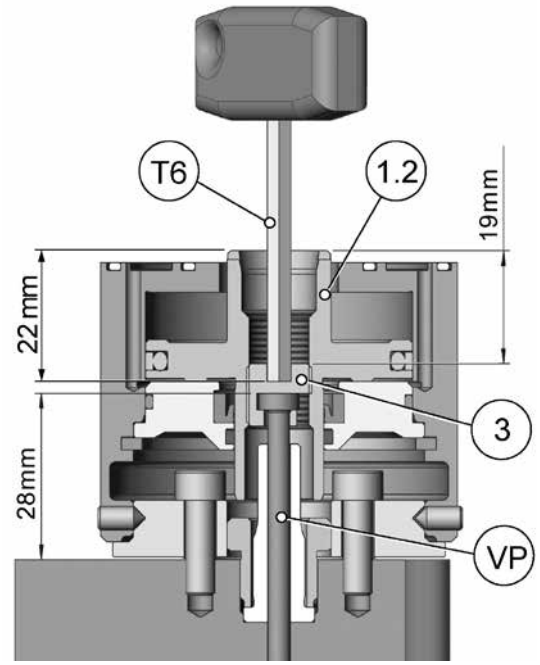
4) Adjust the valve pin with a hexagon socket wrench (T6) as followed.

NOTICE

The basic setting for the valve gate pin is 22 mm between the piston (1.2) top edge and the bottom edge from the hanger screw (3) socket wrench seat.

5) Rotate the hanger screw (3) with a hexagon socket wrench (T6) into the piston (1.2).

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Doc003764.png

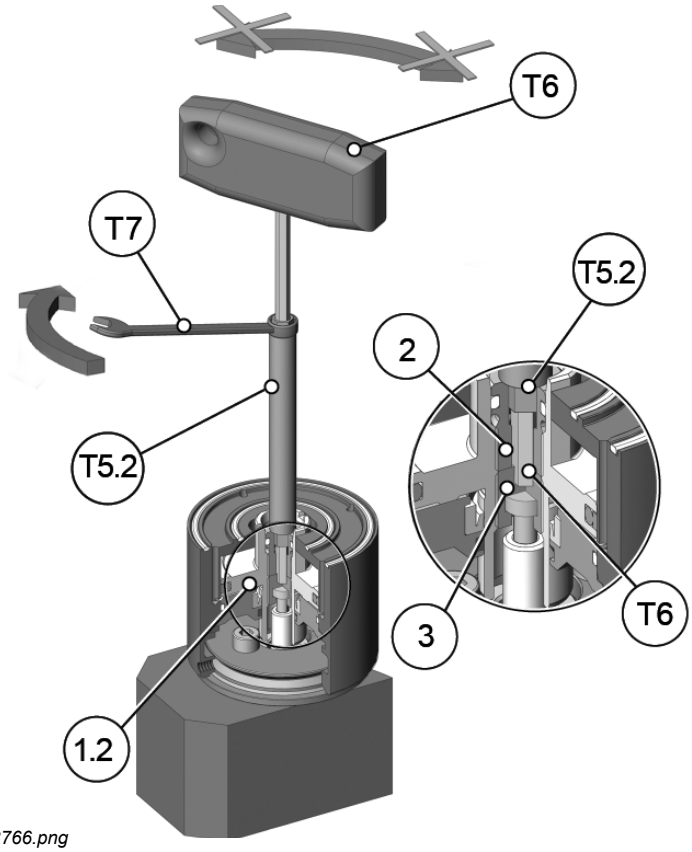
NOTICE

During the fine tuning process it is possible to move the valve pin (VP) in every direction 0.5 mm (1/2 rotation).

The exact position for the valve pin (VP) has to be checked at the front of the valve pin - depends on the nozzle tip.

The reason to unscrew the hanger screw (3) would be for valve pin maintenance or replacement.

If the deviation to the basic settings of 22 mm is more than 0,5 mm, the adjustments do not correspond to the parameters of the mold or do not correspond to the Synventive standard.



Doc003766.png

NOTICE

For actuator assembly the lock screw (2) has to be fastened against the hanger screw (3).

6) Rotate the lock screw (2) with the adjustment tool (T5.2) into the piston (1.2).
7) Hold against turning the hanger screw (3) with the hexagon socket wrench (T6).
8) At the same time tighten the lock screw (2) with the assembly tool (T5.2).

8.2.3.8 Valve Pin Height Adjustment PNC4508B Series

Precondition for the following steps are to be performed with the Hot Runner installed in the mold, and the system at operating temperature.

⚠ WARNING

Hot Surfaces Hazard

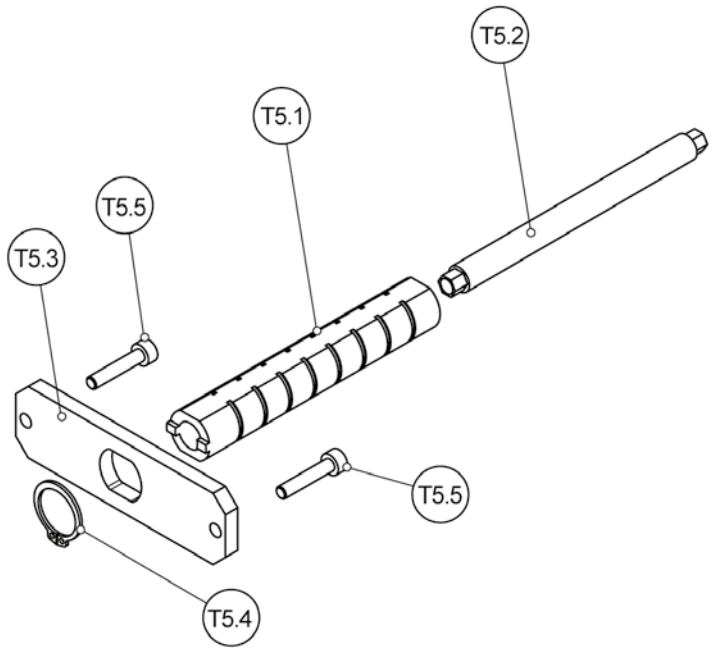
Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing

Valve Pin Adjustment Tool Kit



Doc003767.png

Tool Kit for PNC4508B, ATCYL21		
No.	Description	Item
(T5.1)	Adjustment Tool Typ01	ATCYL2101
(T5.2)	Adjustment Tool Typ02	ATCYL2102
(T5.3)	Adjustment Tool Typ03	ATCYL2103
(T5.4)	Retaining ring	DIN471-16x1
(T5.5)	Socket head cap screws	DIN912-M4x20-12.9

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Valve Pin Adjustment at mounted Hot Runner System

⚠ WARNING

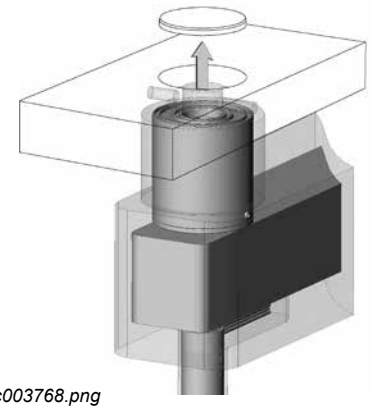
Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

NOTICE

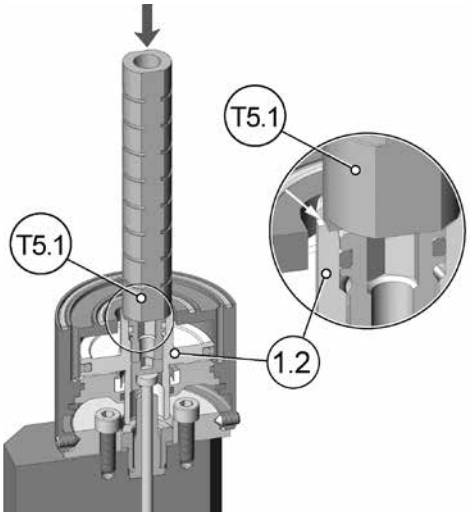
The actuator is covered with a plate, containing the pneumatic access to the actuator.

1) Enable access to the actuator.



Doc003768.png

2) Slip the lug of the adjustment tool Typ01 (T5.1) into the gap of the piston (1.2).

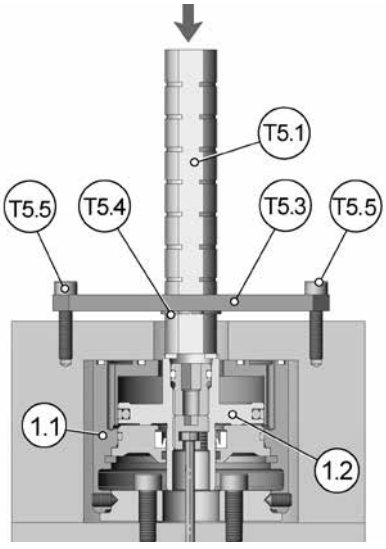


Doc003784.png

3) Push the fixed piston (1.2) forward to the close position.
4) Place the retaining ring (T5.4) at the adjustment tool Typ01 (T5.1).
5) Place the adjustment tool Typ03 (T5.3) on the retaining ring (T5.4) at the adjustment tool Typ01 (T5.1).
6) Fix the piston (1.2) against upstroke with the socket head cap screws (T5.5).

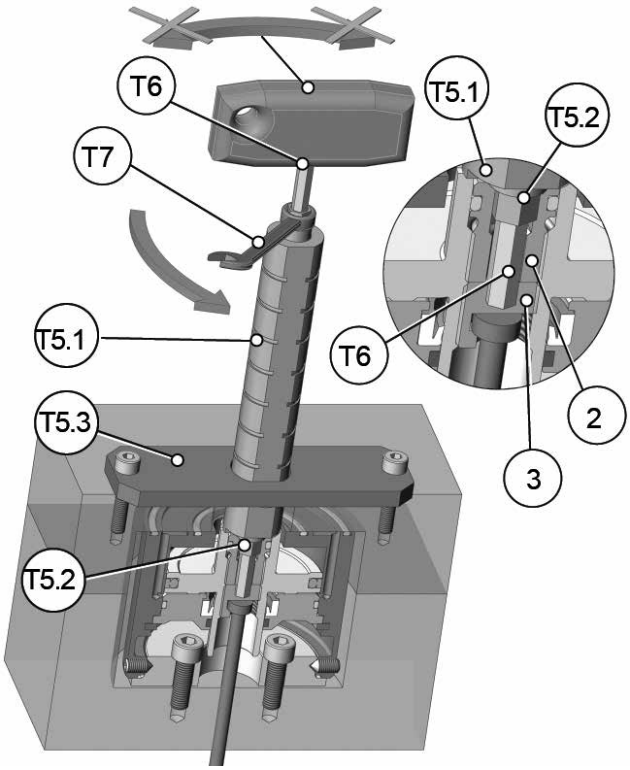
NOTICE

Use torque wrench with wrench insert and the torques indicated in the torque table (section 13).



Doc003769.png

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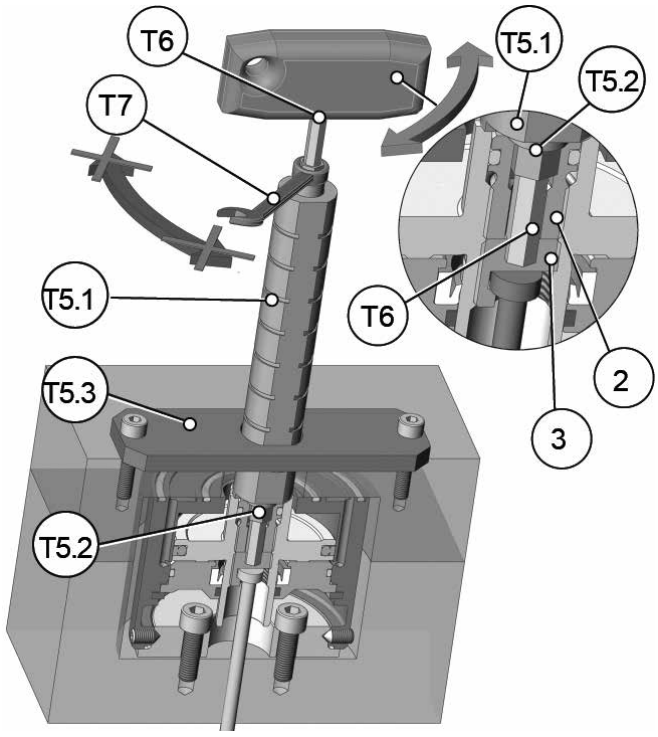


Doc003770.png

7) Fix the hanger screw (3) with the socket wrench (T6).
8) Slacken the lock screw (2) with the adjustment tool Typ02 (T5.2) and ring wrench (T7) attached to it.

Legend to Doc003770.png

(T5.1) Adjustment tool Typ01
(T5.2) Adjustment tool Typ02
(T5.3) Adjustment tool Typ03
(3) Hanger screw
(2) Lock screw
(T6) Socket wrench HEX 4
(T7) Ring wrench HEX 7



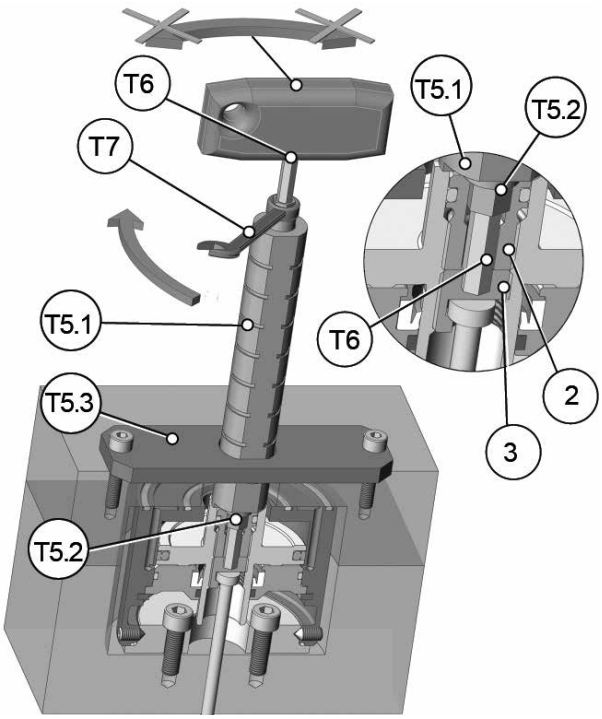
Doc003771.png

9) To adjust valve pin position:
   - Fix the lock screw (2) with the adjustment tool Typ02 (T5.2) and a ring wrench (T7).
   - Turn the hanger screw (3) with the socket wrench (T6).

NOTICE

The screw pitch is 1 mm (right hand thread).

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Doc003772.png

To Fix the Vale Pin Position:

10) Secure with the hexagon socket wrench (T6) the hanger screw (3) against turning
11) Tighten the lock screw (2) with the adjustment tool Typ02 (T5.2) and a ring wrench (T7).

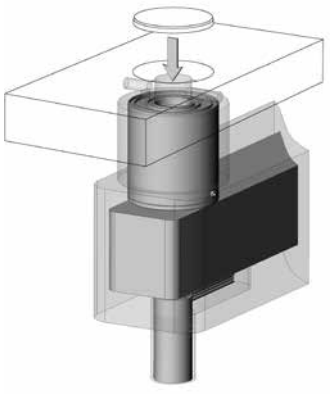
NOTICE

The reason to unscrew the hanger screw (3) would be for valve pin maintenance or replacement.

NOTICE

For the control of the valve pins, a pneumatic system is installed.

12) In case where the clamping plate has an opening for the valve pin adjustment, the opening must be capped airtight.



Doc003773.png

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8.2.4 Actuator PNC6018B-02

8.2.4.1 Technical Data PNC6018B-02



Doc003786.png

Actuator, bolted to manifold pneumatic	
Valve pin operation	
Operation medium	pneumatic
Pressure range	6 - 12 bar (87 - 174 psi)
Operation pressure max.	14 bar (203 psi)
Flow rate	6.5 l/min
Valve pin stroke	18 mm
Adjustment	± 1 mm via adjustment threads from topside
Closing force	1696 N / 6 bar (87 psi) 2261 N / 8 bar (116 psi) 2826 N / 10 bar (145 psi) 3393 N / 12 bar (174 psi)
Opening force	1447 N / 6 bar (87 psi) 1930 N / 8 bar (116 psi) 2412 N / 10 bar (145 psi) 2894 N / 12 bar (174 psi)
Valve pin	
Valve pin diameter	Ø 5 mm, Ø 6 mm
Attachment	T - head Valve pin is secured against rotation.

NOTICE

To ensure long life and continued flawless operation of the actuator, we recommend using filtered compressed air.

The coolant used should be properly modified, e.g. filtered water with an anti-corrosion and frost-proof agent.

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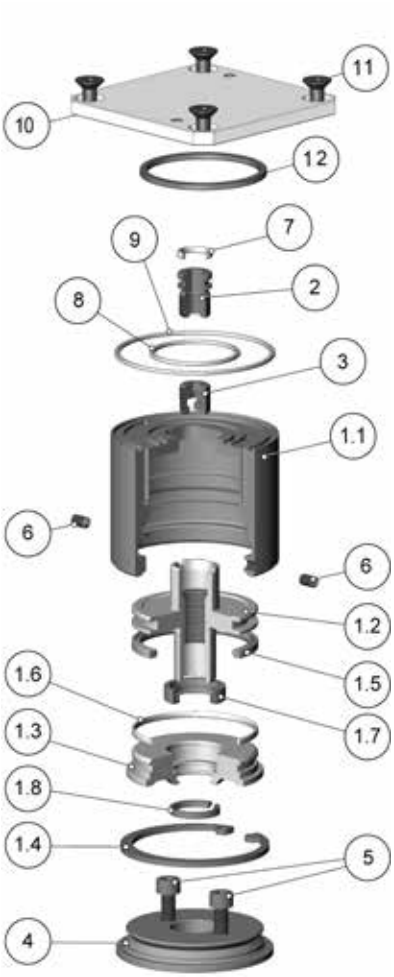
8.2.4.2 Exploded View PNC6018B-02

This section describes the disassembly and reassembly process to replace seals.

In this section the actuator parts are identified with the numbers indicated in the following figure, which shows the components.

NOTICE

Always tighten the screws to the torques specified in the respective table (section 13).



Doc006554.png

Actuator Parts - PNC6018B-02

No.	Qty.	Description	Item
(1)		Cylinder housing complete	PNC6018B-HC-01
(1.1)	1	Cylinder housing	PNC6018B-CH-01
(1.2)	1	Piston	PNC6018B-PI-01
(1.3)	1	Buffer	PNC6018B-BU-01
(1.4)	1	Retaining ring	DIN472-65X2.5
(*)		PNC6018B Seal Kit Version 01	PNC6018B-SK-01
(1.5)	1	Piston seal D60	K30-60-49-4.2
(1.6)	1	O-ring seal	VIOR 56.87X1.78FPM75
(1.7)	1	Rod seal	C1-2038-V3664
(1.8)	1	Guiding element	FB2.3-1.5L70.5
(2)	1	Lock screw	PNC6018B-LS-01
(3)	1	Hanger screw	PNC6018B-HS-02
(4)	1	Holding ring	PNC6018B-HR-01
(5)	2	Hexagon socket cap screw	DIN912-M6X16-12.9
(6)	2	Hexagon socket set screw	DIN914-M4X8-45H
(7)	1	Viton-ring seal	VIOR17.17X1.78 FPM75
(8)	1	Viton-ring seal	VIOR41X1.78 FPM75
(9)	1	Viton-ring seal	VIOR69.57X1.78 FPM75
(10)	1	Cover Plate For PNC6018B	PNC6018B-CP-01 (optional)
(11)	4	Hexagon socket countersunk head cap screw	DIN7991-M5X10-10.9 (optional)
(12)	1	Viton O-Ring 39.34 x 2.62 FPM80 green	VIOR-39.34X2.62-FPM-80-G (optional)

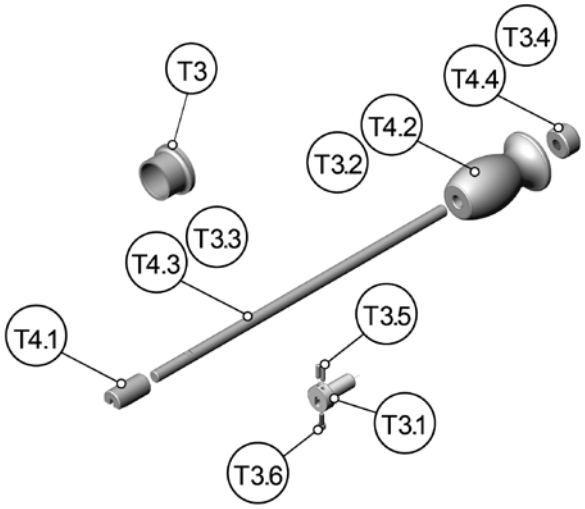
(*) : PNC6018B-SK-01 is seal kit which includes (1.5),(1.6),(1.7),(1.8),(7),(8),(9).

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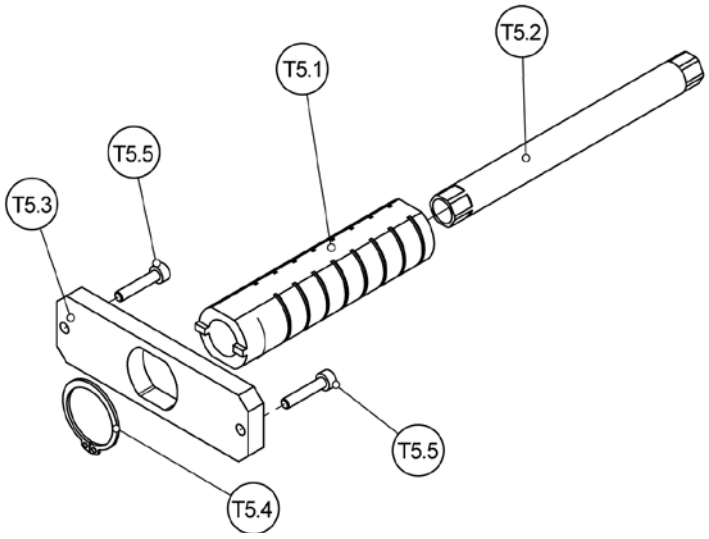
8.2.4.3 Tools for Assembling, Disassembling and Adjusting the Actuator

The following overview contains a list of special tools needed for the assembly and disassembly of the actuator and to replace seals.

The assembly and disassembly tools are identified with the numbers indicated in the following figure, which shows the components in this section.



Doc005225.png



Doc003788.png

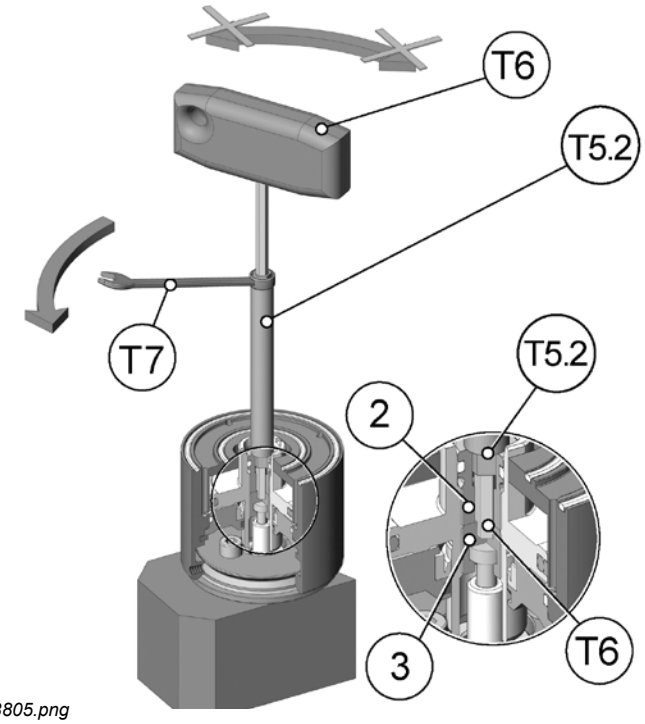
Tool to Mount the Piston ATCYL23		
No.	Description	Item
(T3)	Calibration sleeve	ATCYL23
Valve Pin Disassembly Tool ATCYL24		
No.	Description	Item
(T4.1)	Adapter valve pin ø 6 mm	ATCYL2401
(T4.2)	Slice hammer	ATCYL0101
(T4.3)	Guid	ATCYL0102
(T4.4)	Stop bolt	ATCYL0104
Valve Pin Disassembly Tool ATCYL0303		
(T3.1)	Adapter valve pin ø 5 mm	ATCYL030301
(T3.2)	Slice hammer	ATCYL0101
(T3.3)	Guid	ATCYL0102
(T3.4)	Stop bolt	ATCYL0104
(T3.5)	Paralell pin	DIN6325-5M6X20
(T3.6)	Hexagon socket cap screw	DIN912-M6X16-12.9
Assembly Tool ATCYL22		
No.	Description	Item
(T5.1)	Adjustment Tool Typ01	ATCYL2201
(T5.2)	Adjustment Tool Typ02	ATCYL2202
(T5.3)	Adjustment Tool Typ03	ATCYL2203
(T5.4)	Retaining ring	DIN471-25x1.2
(T5.5)	Socket head cap screws	DIN912-M4x20-12.9

NOTICE

The tools ATCYL23, ATCYL24 and ATCYL0303 are not included with the Hot Runner System and must be ordered from Synventive separately.

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8.2.4.4 Disassembling Actuator PNC6018B-02

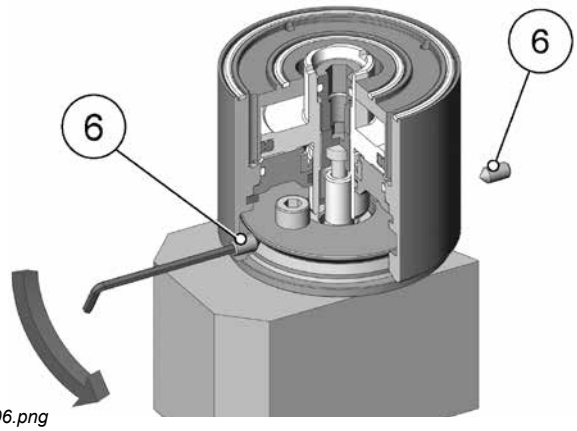


Doc003805.png

NOTICE

For actuator disassembly the lock screw (2) of the hanger screw (3) needs to be loosened.

1) Hold against turning the hanger screw (3) with the hexagon socket wrench (T6).
2) At the same time loosen the lock screw (2) with the adjustment tool ATCYL2202 (T5.2) and ring wrench (T7).



Doc003806.png

3) Unscrew hexagon socket set screws (6).

Worksteps to dissolve the Valve pin

4) Turn the actuator counter clockwise until the hanger screw (3) is unscrewed out of the piston (1.2).

NOTICE

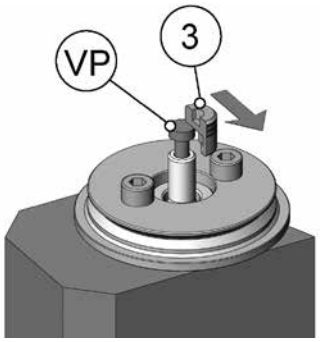
The actuator will be lifted from the holding ring (4) and will be separated from the valve pin (VP) and hanger screw (3).



Doc005224.png

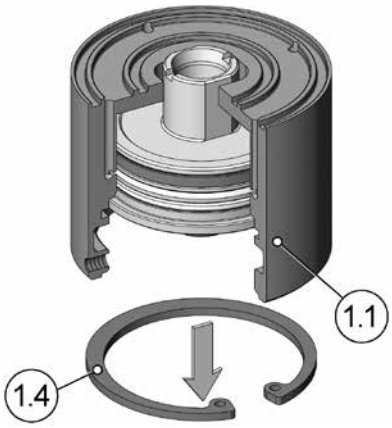
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5) Loosen the hanger screw (3) from the valve gate pin (VP).



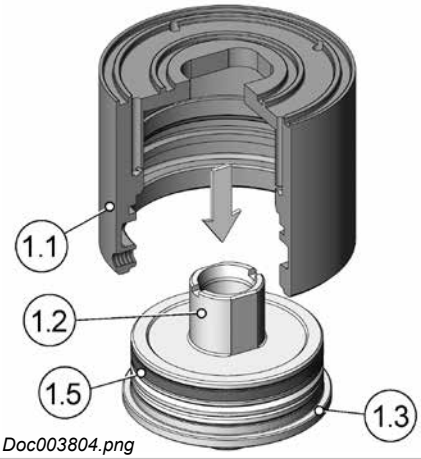
Doc003802.png

6) Remove the retaining ring (1.4).



Doc003803.png

7) Press the piston (1.2) and buffer (1.3) out of the cylinder housing (1.1).
8) Dismount the two piston seal (1.5) elements.
   - O-ring (1.5) (a)
   - Sealing element (1.5) (b)



Doc003804.png

9) Dismantling the valve pin (see section 9.1).

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8.2.4.5 Assembling the Actuator PNC6018B-02

Lubrication of Piston and Ring Seals

NOTICE

For lubrication use Krytox GPL205.

To Lubricate the piston sliding surface is essential for the actuator life time.



Doc003777.png

To Lubricate the piston ring seals is helpful to assemble the actuator.



Doc006315.png

Installation of the Sealing Ring on the Piston

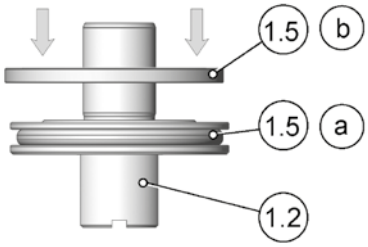
NOTICE

After disassembly of the sealing elements, the original seals should be replaced.

1) Mount the O-ring (1.5) (a) into the seal groove of the piston (1.2).
2) Push the sealing element (1.5) (b) into the seal groove of the piston (1.2).

NOTICE

The sealing element (1.5) (b) is placed in the seal grove of the piston (1.2) above the O-ring (1.5) (a).



Doc003791.png

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Installation of the Piston into the Actuator Housing

1) Degrease the piston sliding surface.
2) Lubricate the piston sliding surface.

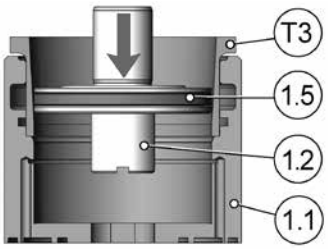


Doc003777.png

3) Insert the piston (1.2) into the calibration sleeve (T3).
4) Place the calibration sleeve (T3) into the cylinder housing (1.1).
5) Push the piston (1.2) into the cylinder housing.

NOTICE

The calibration sleeve (T3) prevents damage to the piston seal (1.5).

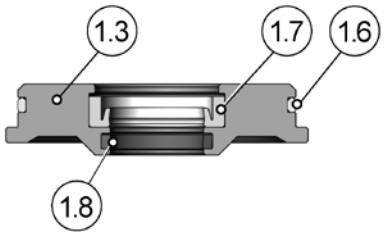


Doc003792.png

NOTICE

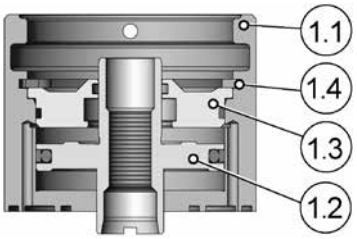
After disassembly of the system, the original seals should be replaced with new seals.

6) Install the following seals at the buffer (1.3).
   - O-ring seal (1.6)
   - Rod seal (1.7)
   - Guiding element (1.8)



Doc003793.png

7) Mount buffer (1.3) into the cylinder housing (1.1).
8) Lock the buffer with the retaining ring (1.4).



Doc003794.png

9) Install the following seals at the actuator housing (1.1).
   - Viton-ring seal (8)
   - Viton-ring seal (9)



Doc003401.png

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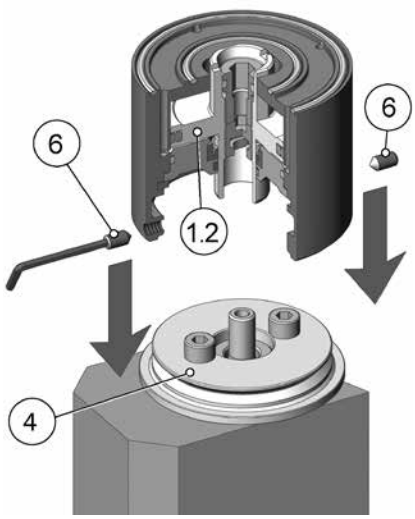
Mounting of the Actuator on the Manifold

1) Mount actuator to the holding ring (4).
2) Lubricate the thread of the hexagon socket set screws (6) with high-temperature assembly paste (anti-seize compound).

NOTICE

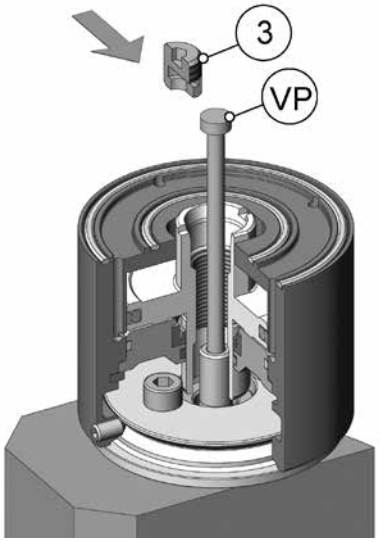
This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

3) Lock the actuator with hexagon socket set screws (6).
4) Push piston (1.2) in closed position.



Doc003796.png

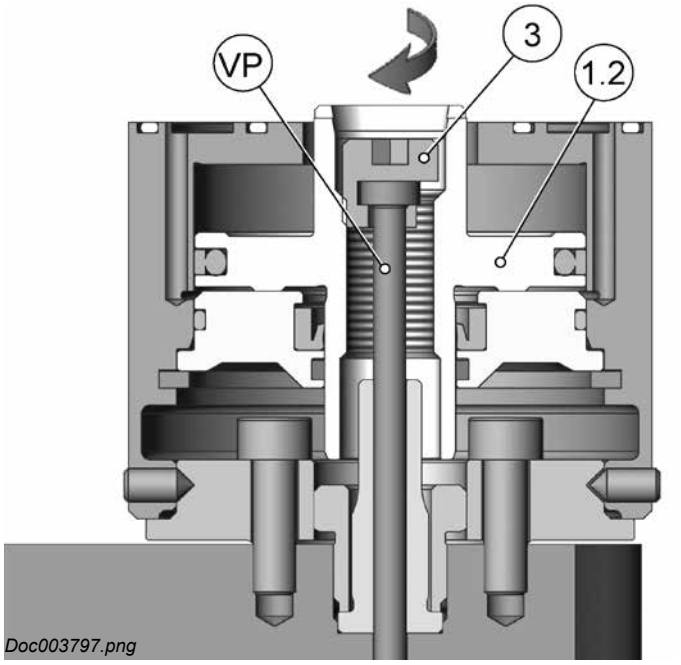
5) Mount the valve pin (VP) into the valve pin guide.
6) Place the hanger screw (3) on the valve pin (VP) head.



Doc003809.png

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Adjusting the Valve Pin to the Basic Position



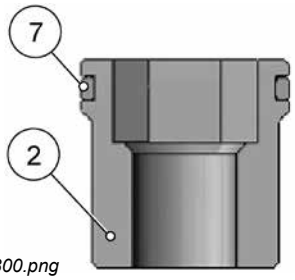
Doc003797.png

1) Screw the valve gate pin (VP) with the hanger screw (3) into the piston (1.2).

NOTICE

After disassembly of the system, the original seals should be replaced with new seals.

2) Lubricate the viton-ring seal (7) with hydraulic oil or white grease.
3) Install the viton-ring seal (7) at the lock screw (2).

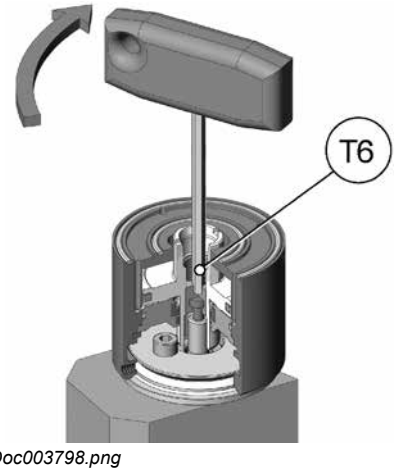


Doc003800.png

4) Adjust the valve pin with a hexagon socket wrench (T6) as followed.

NOTICE

The basic setting for the valve gate pin is 32 mm between the piston (1.2) top edge and the bottom edge from the hanger screw (3) socket wrench seat.



Doc003798.png

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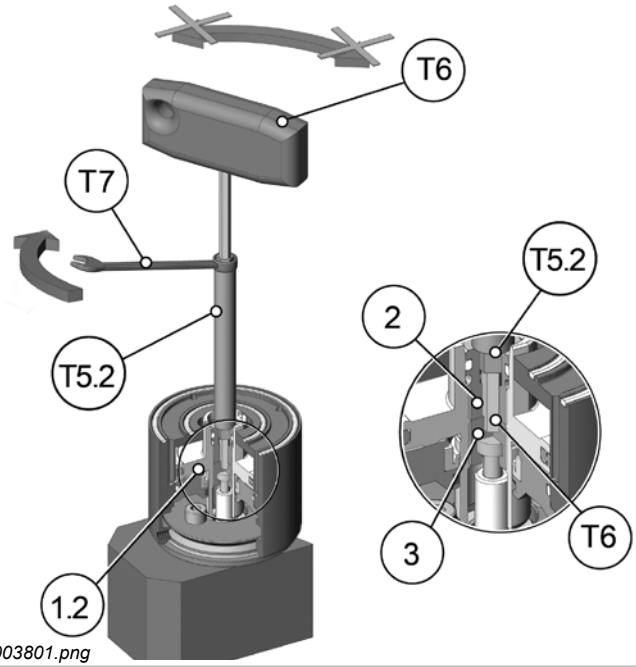
5) Rotate the hanger screw (3) with a hexagon socket wrench (T6) into the piston (1.2).

NOTICE

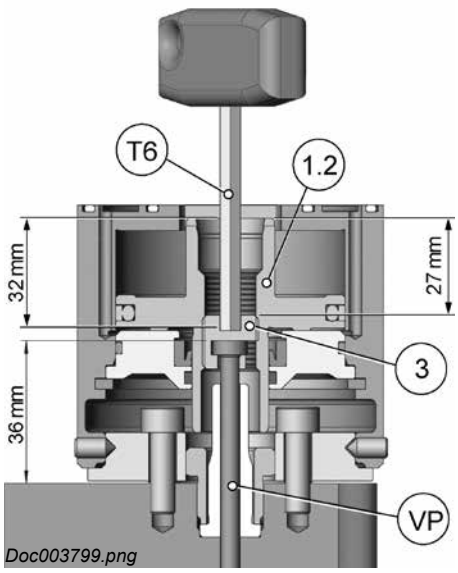
The exact position for the valve pin (VP) has to be checked at the front of the valve pin - depends on the nozzle tip.

The reason to unscrew the hanger screw (3) would be for valve pin maintenance or replacement.

If the deviation to the basic settings of 32 mm is more than 0.5 mm, the adjustments do not correspond to the parameters of the mold or do not correspond to the Synventive standard.



Doc003801.png



Doc003799.png

NOTICE

For actuator assembly the lock screw (2) has to be fastened against the hanger screw (3).

6) Rotate the lock screw (2) with the adjustment tool (T5.2) into the piston (1.2).
7) Hold against turning the hanger screw (3) with the hexagon socket wrench (T6).
8) At the same time tighten the lock screw (2) with the assembly tool (T5.2).

8.2.4.6 Valve Pin Height Adjustment PNC6018B-02

Precondition for the following steps are to be performed with the Hot Runner installed in the mold, and the system at operating temperature.

⚠ WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

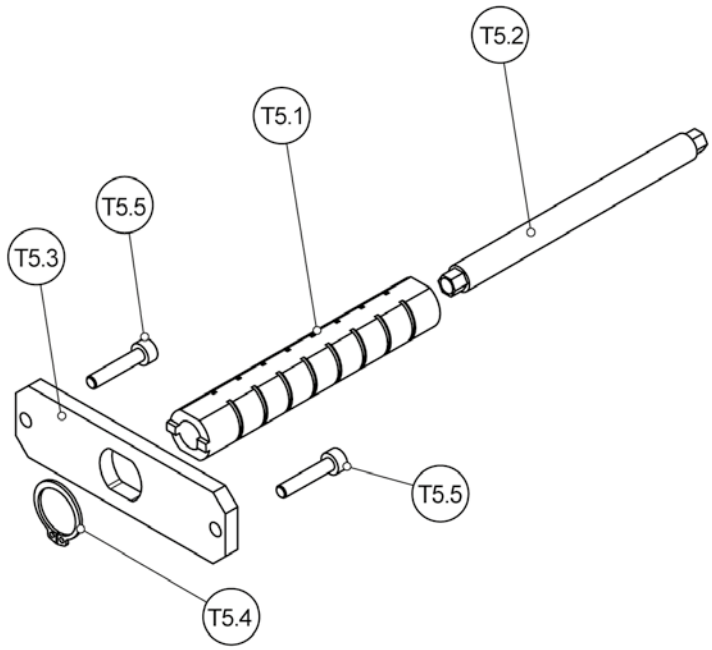
When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing





Valve Pin Adjustment Tool Kit



Doc003767.png

Tool Kit for PNC6018B ATCYL22		
No.	Description	Item
(T5.1)	Adjustment Tool Typ01	ATCYL2201
(T5.2)	Adjustment Tool Typ02	ATCYL2202
(T5.3)	Adjustment Tool Typ03	ATCYL2203
(T5.4)	Retaining ring	DIN471-25x1.2
(T5.5)	Socket head cap screws	DIN912-M4x20-12.9

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Valve Pin Adjustment at mounted Hot Runner System

WARNING

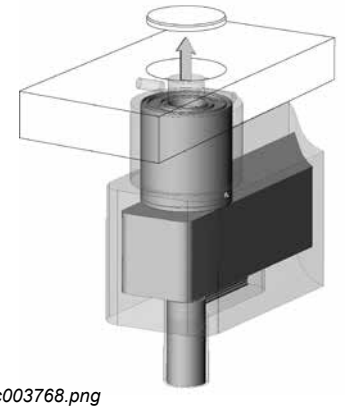
Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

NOTICE

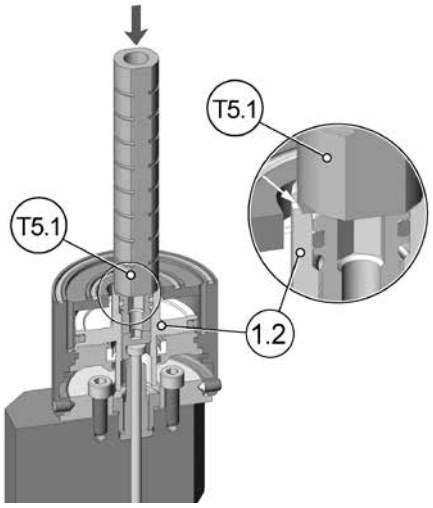
The actuator is covered with a plate, containing the pneumatic access to the actuator.

1) Enable access to the actuator.



Doc003768.png

2) Slip the lug of the adjustment tool Typ01 (T5.1) into the gap of the piston (1.2).

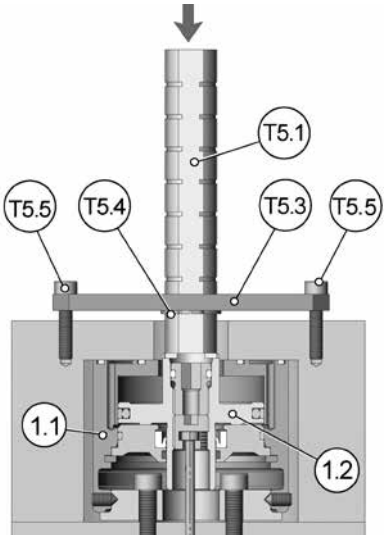


Doc003784.png

3) Push the fixed piston (1.2) forward to the close position.
4) Place the retaining ring (T5.4) at the adjustment tool Typ01 (T5.1).
5) Place the adjustment tool Typ03 (T5.3) on the retaining ring (T5.4) at the adjustment tool Typ01 (T5.1).
6) Fix the piston (1.2) against upstroke with the socket head cap screws (T5.5).

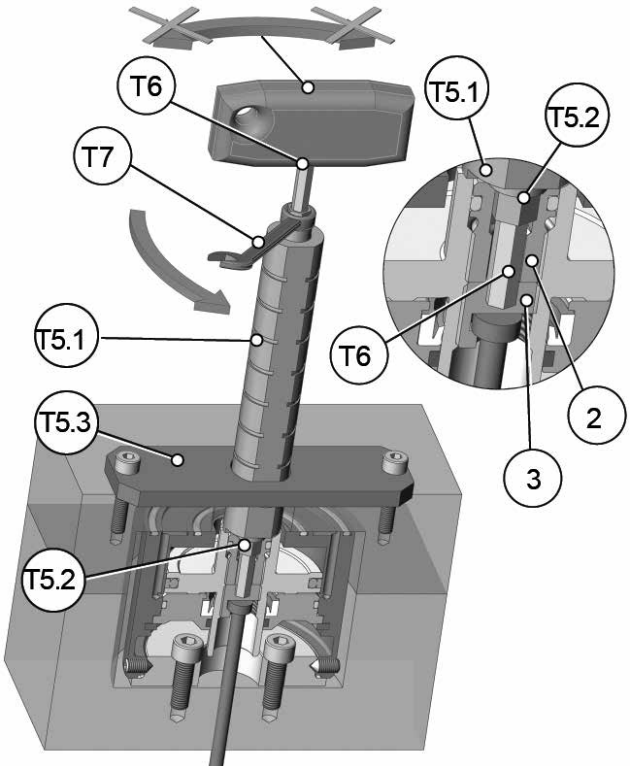
NOTICE

Use torque wrench with wrench insert and the torques indicated in the torque table (section 13).



Doc003769.png

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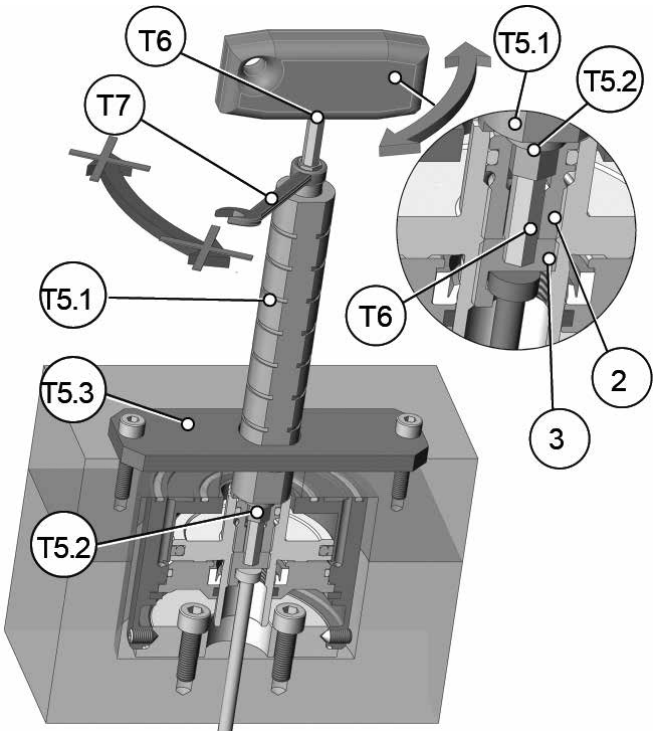


Doc003770.png

7) Fix the hanger screw (3) with the socket wrench (T6).
8) Slacken the lock screw (2) with the adjustment tool Typ02 (T5.2) and ring wrench (T7) attached to it.

Legend to Doc003770.png

(T5.1) Adjustment tool Typ01
(T5.2) Adjustment tool Typ02
(T5.3) Adjustment tool Typ03
(3) Hanger screw
(2) Lock screw
(T6) Socket wrench HEX 4
(T7) Ring wrench HEX 7



Doc003771.png

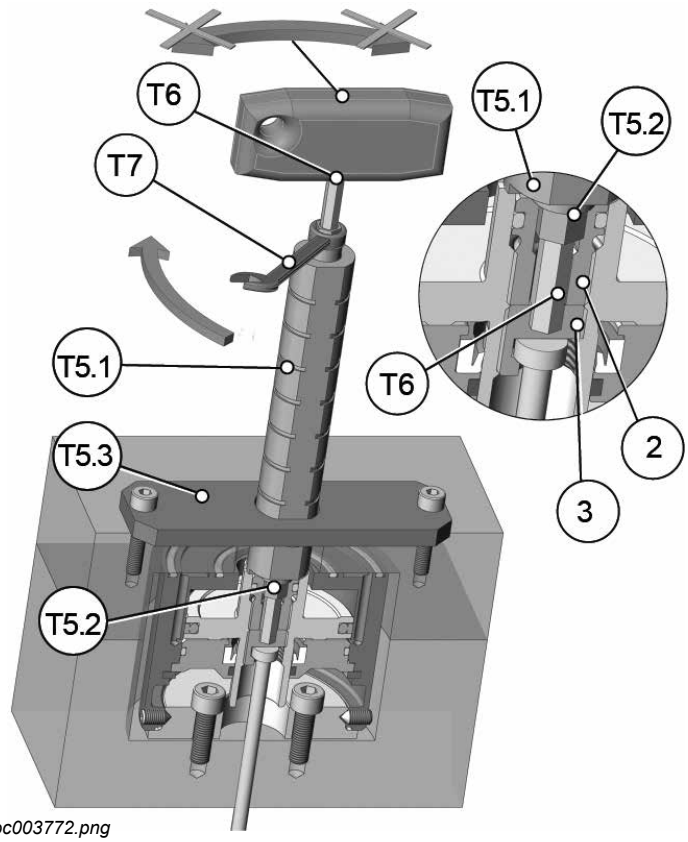
To adjust valve pin position:

9) Fix the lock screw (2) with the adjustment tool Typ02 (T5.2) and a ring wrench (T7).
10) Turn the hanger screw (3) with the socket wrench (T6).

NOTICE

The screw pitch is 1 mm (right hand thread).

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Doc003772.png

To Fix the Vale Pin Position:

11) Secure with the hexagon socket wrench (T6) the hanger screw (3) against turning.
12) Tighten the lock screw (2) with the adjustment tool Typ02 (T5.2) and a ring wrench (T7).

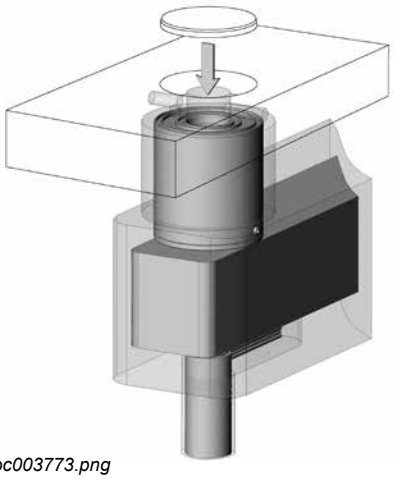
NOTICE

The reason to unscrew the hanger screw (3) would be for valve pin maintenance or replacement.

NOTICE

For the control of the valve pins, a pneumatic system is installed.

13) In case where the clamping plate has an opening for the valve pin adjustment, the opening must be capped airtight.



Doc003773.png

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8.2.5 Actuator PNC4512B Series

8.2.5.1 Technical Data PNC4512B



Doc006061.png

Actuator, bolted to manifold pneumatic	
Valve Pin	
Valve gate pin diameter	Ø 3.8 mm (PNC4512B-02, -04, -06) Ø 3.0 mm (PNC4512B-03, -05, -07)
Attachment	T - head
Valve Pin Operation	
Operation	pneumatic
Operation pressure	max. 14 bar (203 psi)
Flow rate	7 l/min
Valve pin Stroke	12 mm
Closing force	954 N (6 bar) 1272 N (8 bar) 1590 N (10 bar) 1908 N (12 bar)
Opening force	848 N (6 bar) 1131 N (8 bar) 1414 N (10 bar) 1696 N (12 bar)
Actuator Operating Pressure Range	
6 - 12 bar	87 - 174 psi
Cooling	The design provides an indirect cooling through the cooled back plate.
Cooling Temperature	max. 80 °C / 175 °F
Piping	No piping. Pressure provided by back plate

NOTICE

To ensure long life and continued flawless operation of the actuator, we recommend using filtered compressed air.

The coolant used should be properly modified, e.g. filtered water with an anti-corrosion and frost-proof agent.

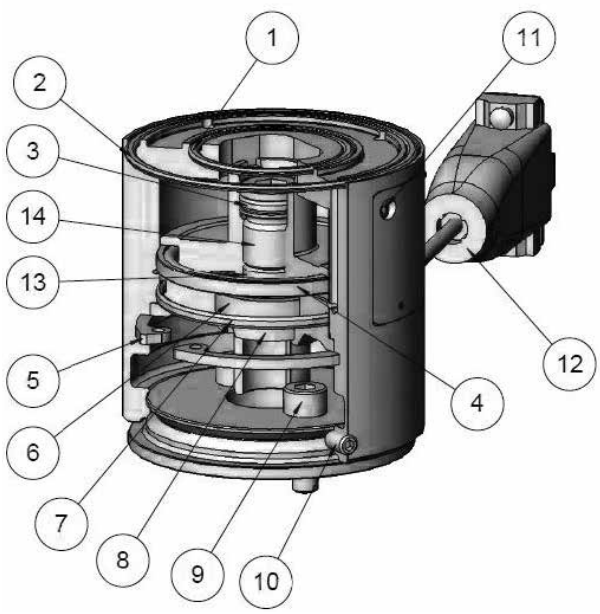
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8.2.5.2 Exploded View PNC4512B

This section describes the disassembly and reassembly process to replace seals.
In this section the actuator parts are identified with the numbers indicated in the following figure, which shows the components.

NOTICE

Always tighten the screws to the torques specified on the table in section “Hot Runner System Installation Guide” on page 545



Doc006519.png

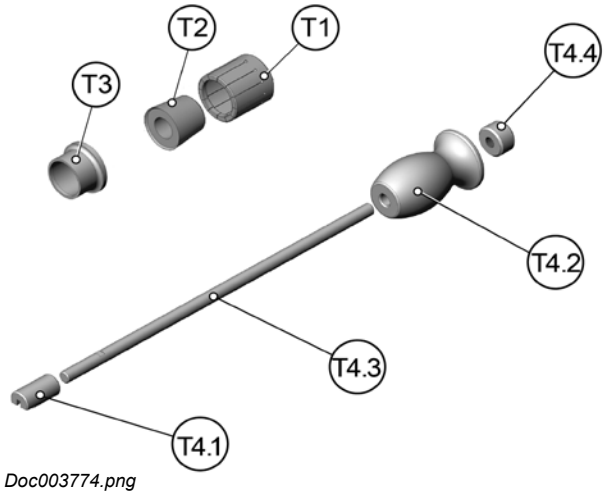
Actuator Parts PNC4512B-02/03/04/05/06/07 Series			
No.	Qty.	Description	Item
(1)	1	Viton-ring seal	VIOR28.30X1.78-FPM-80-G
(2)	1	Viton-ring seal	VIOR53.70X1.78-FPM-80-G
(3)	1	Viton-ring seal	VIOR 9.25X1.78-FPM80
(4)	1	Piston Seal D45	2G2/45-37.5-3.2
(5)	1	Retaining ring	DIN472-50X2
(6)	1	Rod seal	C1-1044-V3664
(7)	1	O-ring seal	VIOR41X1.78FPM75
(8)	1	Guiding element	FB2.3-1.5L48.5
(9)	2	Hexagon socket cap screw	DIN912-M5X0.16-12.9
(10)	2	Hexagon socket set screw	DIN914-M4X8-45H
(11)	2	M2 X2 Pan head screw	DIN7985-M2X2
(12)	1 1	Position Sensor Assembly 1M cable Position Sensor Assembly 3M cable	PNC4512-01 (02,03) PNC4512-03 (06,07)
(13)	1	Hanger screw, 3.8 valve pin Hanger screw, 3.0 valve pin	PNC4508B-HS-01 (PNC4512B-02, -04, -06) PNC4508B-HS-02 (PNC4512B-03, -05, -07)
(14)	1	Lock screw	PNC4512B-LS-01

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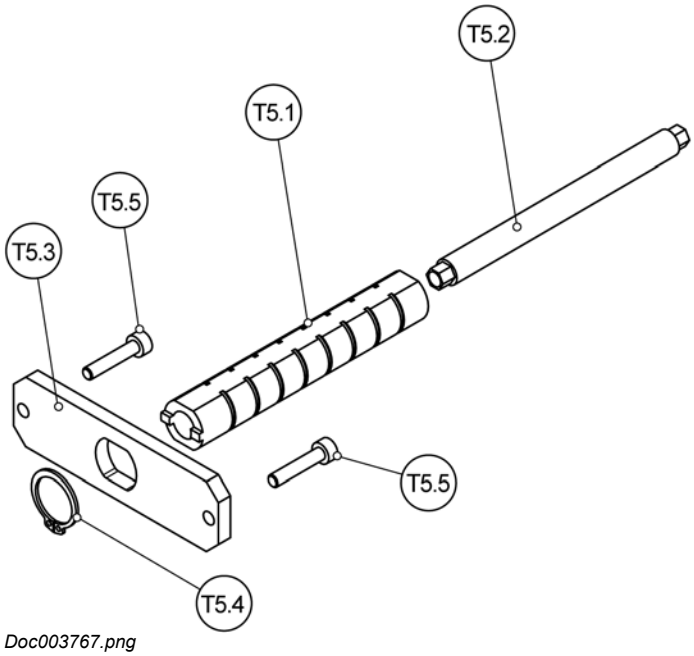
8.2.5.3 Tools for Assembling, Disassembling and Adjusting the Actuator

The following overview contains a list of special tools needed for the assembly and disassembly of the actuator and to replace seals.

The assembly and disassembly tools are identified with the numbers indicated in the following figure, which shows the components in this section.



Doc003774.png



Doc003767.png

Tools to Mount Actuator Seals and the Piston		
No.	Description	Item
(T1)	Spreader sleeve	ATCYL0405
(T2)	Mounting cone	ATCYL20
(T3)	Calibration sleeve (cone 45)	ATCYL19

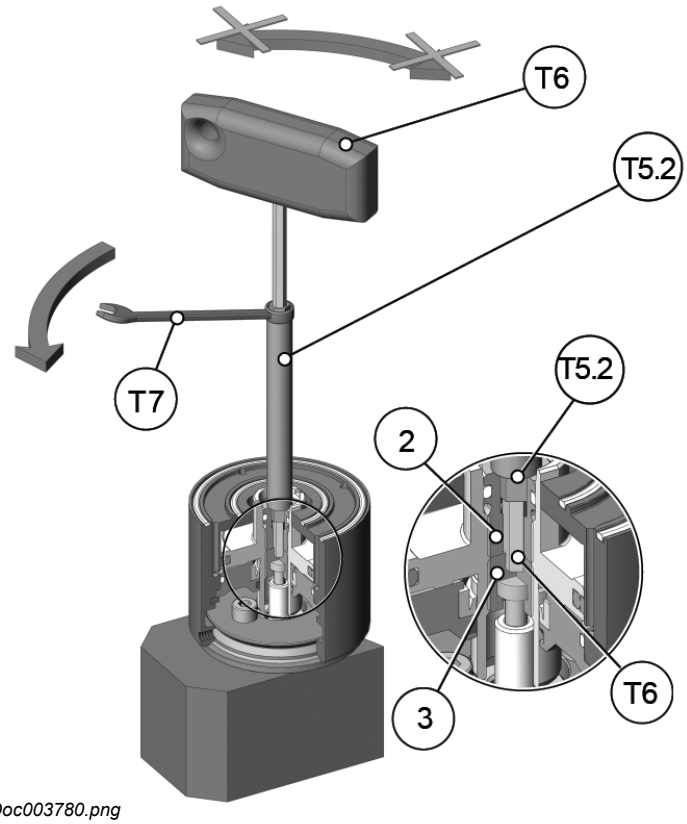
Valve Pin Disassembly Tool ATCYL16		
No.	Description	Item
(T4.1)	Adapter for valve pin ø 3 mm and ø 3.8 mm	ATCYL1601
(T4.2)	Slice hammer	ATCYL0101
(T4.3)	Guide	ATCYL0102
(T4.4)	Stop bolt	ATCYL0104

Assembly Tool ATCYL21		
No.	Description	Item
(T5.1)	Adjustment Tool Typ01	ATCYL2101
(T5.2)	Adjustment Tool Typ02	ATCYL2102
(T5.3)	Adjustment Tool Typ03	ATCYL2103
(T5.4)	Retaining ring	DIN471-16x1
(T5.5)	Socket head cap screws	DIN912-M4x20-12.9

NOTICE

The tools ATCYL16, ATCYL19 and ATCYL20 are not included with the Hot Runner System and must be ordered from Synventive separately.

8.2.5.4 Disassembling Actuator PNC4512B Series

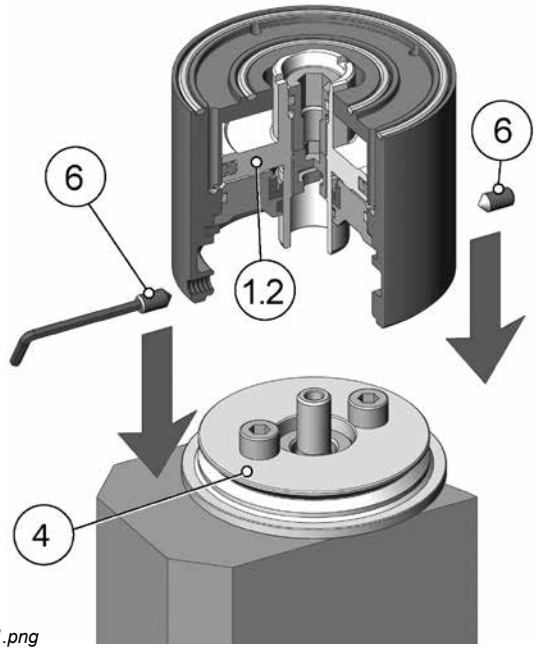


Doc003780.png

NOTICE

For actuator disassembly the lock screw (2) of the hanger screw (3) needs to be loosened.

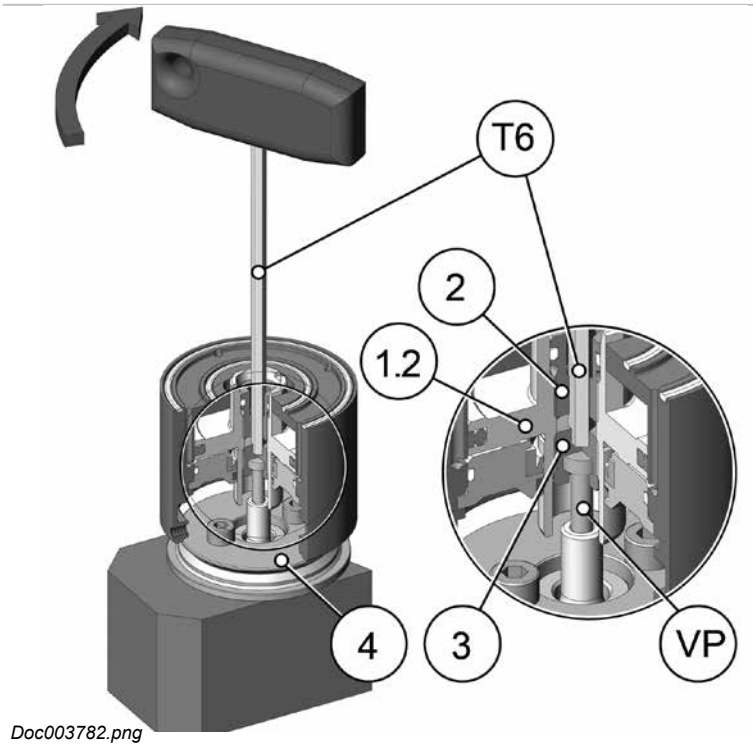
1) Hold against turning the hanger screw (3) with the hexagon socket wrench (T6).
2) At the same time loosen the lock screw (2) with the adjustment tool ATCYL2102 (T5.2) and ring wrench (T7).



Doc003781.png

3) Unscrew hexagon socket set screws (6).

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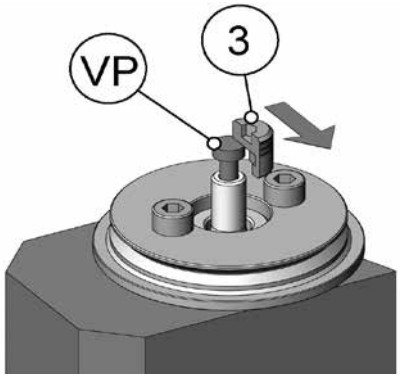


Doc003782.png

4) With Hexagon socket wrench (T6) turn the hanger screw (3) clockwise until the hanger screw (3) is unscrewed out of the piston (1.2).

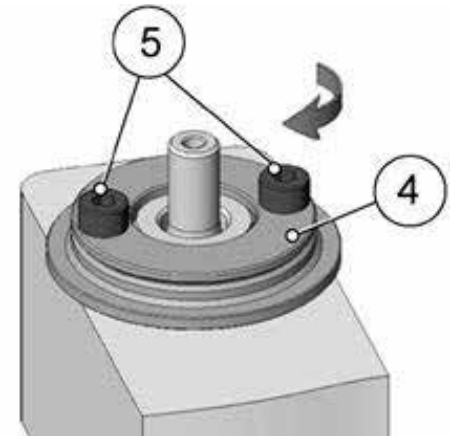
NOTICE

The actuator will be lifted from the holding ring (4) and will be separated from the valve pin (VP) and hanger screw (3).



Doc003775.png

5) Loosen the hanger screw (3) from the valve gate pin (VP).

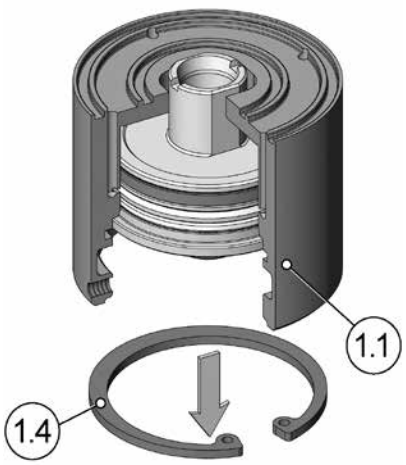


Doc006520.jpg

6) Unscrew the 2 socket head cap screws (5) to release the holding ring (4).

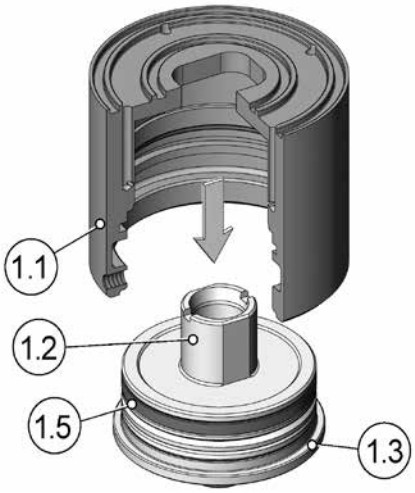
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7) Remove the retaining ring (1.4).



Doc003776.png

8) Press the piston (1.2) and buffer (1.3) out of the cylinder housing (1.1).
9) Dismount the two piston seal (1.5) elements.
   - O-ring (1.5) (a)
   - Sealing element (1.5) (b)



Doc003778.png

10) Dismantling the valve pin (see section 9.1).

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8.2.5.5 Assembling the Actuator PNC4512B Series

Lubrication of Piston and Ring Seals

NOTICE

For lubrication use Krytox GPL205.

To Lubricate the piston sliding surface is essential for the actuator life time.



Doc003777.png

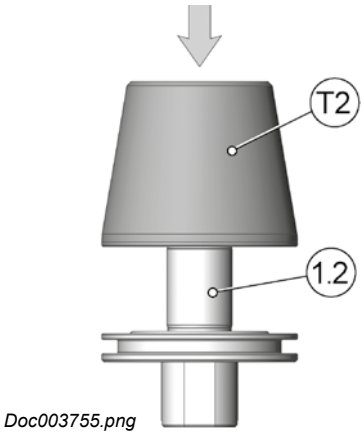
To Lubricate the piston ring seals is helpful to assemble the actuator.



Doc006315.png

Installation of the Sealing Ring on the Piston

1) Put the mounting cone (T2) on the piston (1.2).

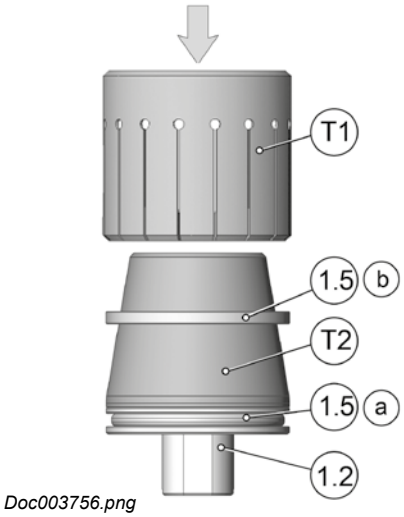


Doc003755.png

NOTICE

After disassembly of the sealing elements, the original seals should be replaced.

2) Mount the O-ring (1.5) (a) into the seal groove of the piston (1.2).
3) Using the spreader sleeve (T1) and the mounting cone (T2), push the sealing element (1.5) (b) into the seal groove of the piston (1.2).
4) The sealing element (1.5) (b) is placed in the seal grove of the piston (1.2) above the O-ring (1.5) (a).



Doc003756.png

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Installation of the Piston into the Actuator Housing

1) Degrease the piston sliding surface.
2) Lubricate the piston sliding surface with Krylox GPL205.

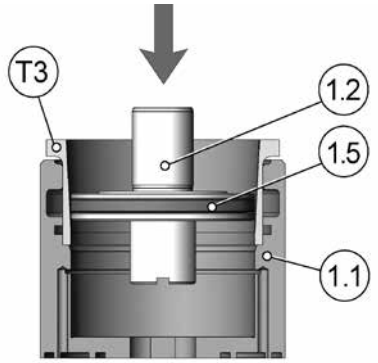


Doc003777.png

3) Insert the piston (1.2) into the calibration sleeve (T3).
4) Place the calibration sleeve (T3) into the cylinder housing (1.1).
5) Push the piston (1.2) into the cylinder housing.

NOTICE

The calibration sleeve (T3) prevents damage to the piston seal (1.5).

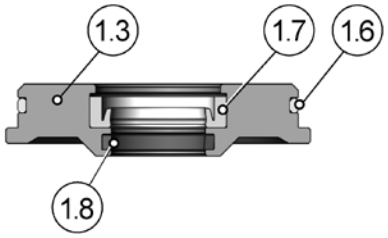


Doc003757.png

NOTICE

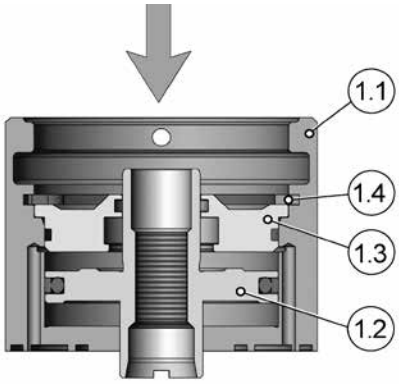
After disassembly of the system, the original seals should be replaced with new seals.

6) Install the following seals at the buffer (1.3).
   - O-ring seal (1.6)
   - Rod seal (1.7)
   - Guiding element (1.8)



Doc003758.png

7) Mount buffer (1.3) into the cylinder housing (1.1).
8) Lock the buffer with the retaining ring (1.4).



Doc003759.png

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9) Install the following seals at the actuator housing (1.1).
   - Viton-ring seal (8)
   - Viton-ring seal (9)



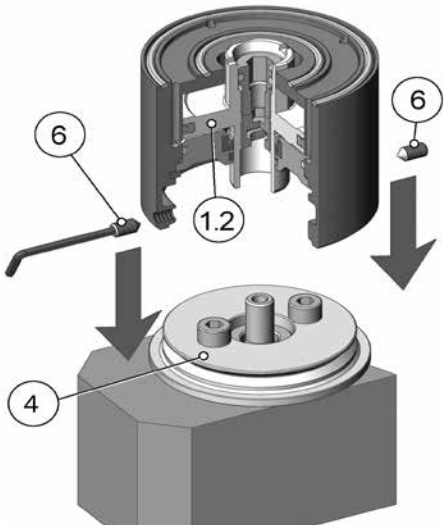
Doc003401.png

Mounting of the Actuator on the Manifold

1) Mount actuator to the holding ring (4).
2) Lubricate the thread of the hexagon socket set screws (6) with high-temperature assembly paste (anti-seize compound).

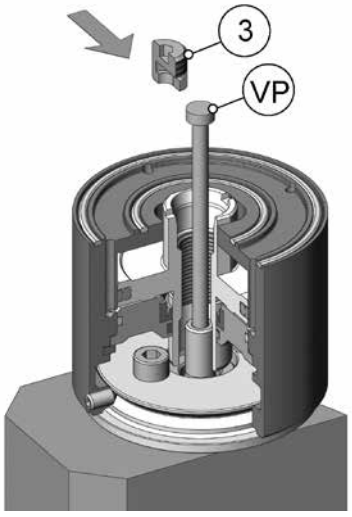
   NOTICE

   This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.
3) Lock the actuator with hexagon socket set screws (6).
4) Push piston (1.2) in closed position.



Doc003761.png

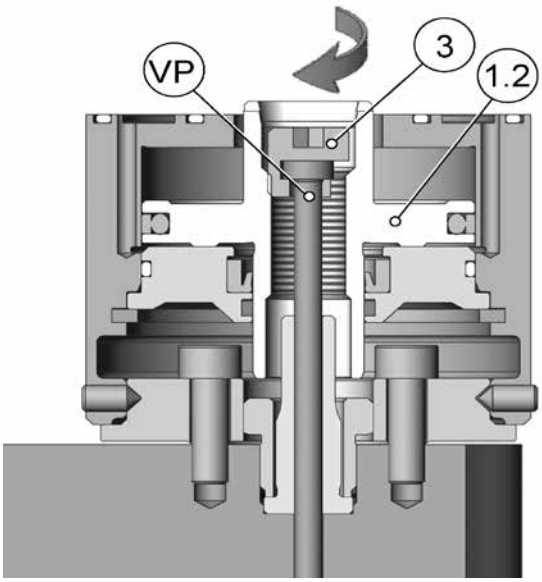
5) Mount the valve pin (VP) into the valve pin guide.
6) Place the hanger screw (3) on the valve pin (VP) head.



Doc003783.png

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8.2.5.6 Adjusting the Valve Pin to the Basic Position



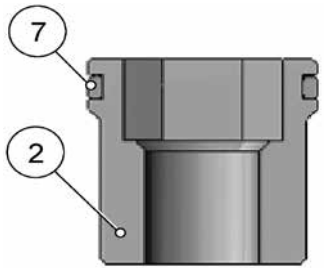
Doc003762.png

1) Screw the valve gate pin (VP) with the hanger screw (3) into the piston (1.2).

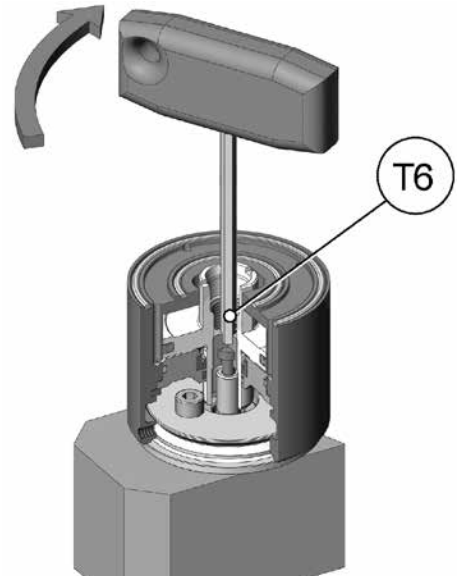
NOTICE

After disassembly of the system, the original seals should be replaced with new seals.

2) Lubricate the viton-ring seal (7) with Krytox GPL205, hydraulic oil, or white grease.
3) Install the viton-ring seal (7) at the lock screw (2).



Doc003765.png



Doc003763.png

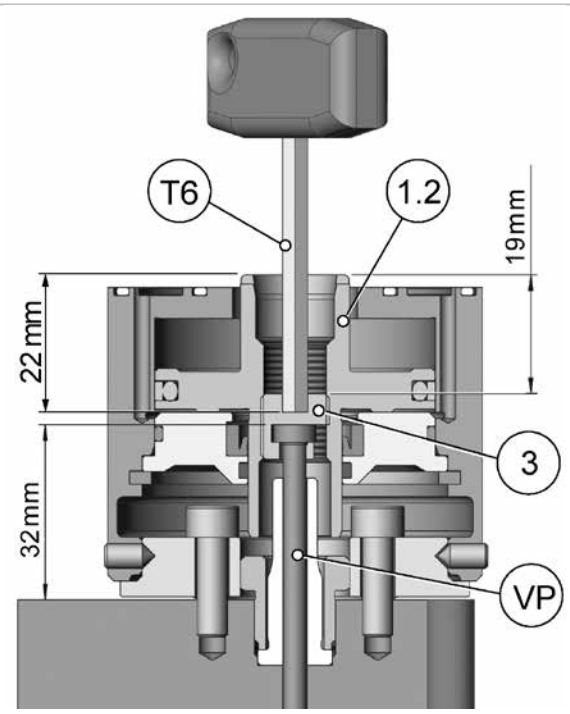
4) Adjust the valve pin with a hexagon socket wrench (T6) as followed.

NOTICE

The basic setting for the valve gate pin is 22 mm between the piston (1.2) top edge and the bottom edge from the hanger screw (3) socket wrench seat.

5) Rotate the hanger screw (3) with a hexagon socket wrench (T6) into the piston (1.2).

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Doc006599.png

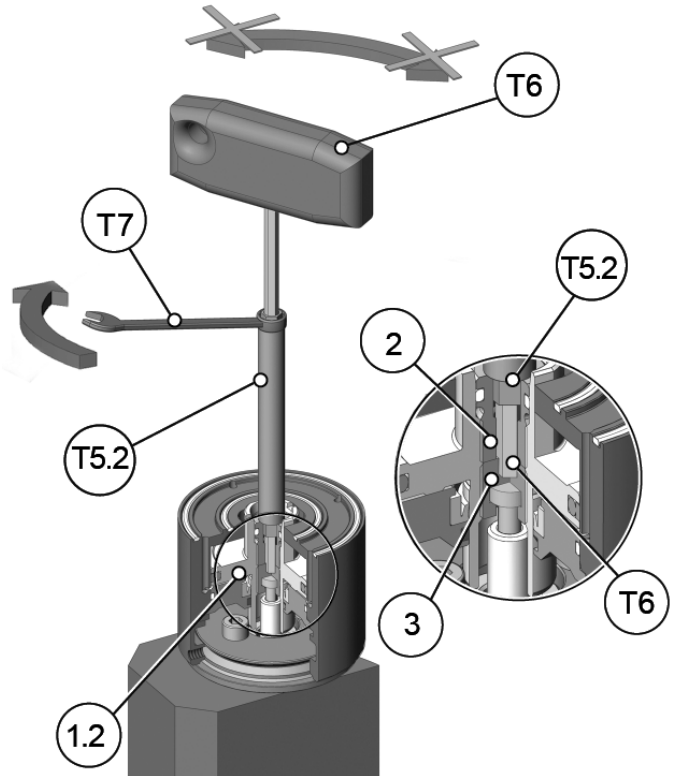
NOTICE

During the fine tuning process it is possible to move the valve pin (VP) in every direction 0.5 mm (1/2 rotation).

The exact position for the valve pin (VP) has to be checked at the front of the valve pin - depends on the nozzle tip.

The reason to unscrew the hanger screw (3) would be for valve pin maintenance or replacement.

If the deviation to the basic settings of 22 mm is more than 0.5 mm, the adjustments do not correspond to the parameters of the mold or do not correspond to the Synventive standard.



Doc003766.png

NOTICE

For actuator assembly the lock screw (2) has to be fastened against the hanger screw (3).

6) Rotate the lock screw (2) with the adjustment tool (T5.2) into the piston (1.2).
7) Hold against turning the hanger screw (3) with the hexagon socket wrench (T6).
8) At the same time tighten the lock screw (2) with the assembly tool (T5.2).

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8.2.5.7 Valve Pin Height Adjustment PNC4512B Series

Precondition for the following steps are to be performed with the Hot Runner installed in the mold, and the system at operating temperature.

⚠ WARNING

Hot Surfaces Hazard

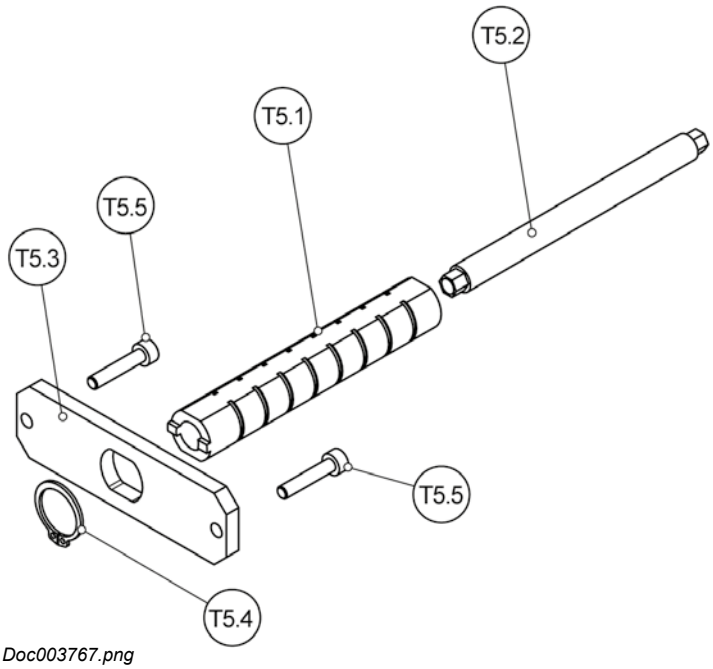
Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing

Valve Pin Adjustment Tool Kit



Doc003767.png

Tool Kit for PNC4512B ATCYL21		
No.	Description	Item
(T5.1)	Adjustment Tool Typ01	ATCYL2101
(T5.2)	Adjustment Tool Typ02	ATCYL2102
(T5.3)	Adjustment Tool Typ03	ATCYL2103
(T5.4)	Retaining ring	DIN471-16x1
(T5.5)	Socket head cap screws	DIN912-M4x20-12.9

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Valve Pin Adjustment at mounted Hot Runner System

WARNING

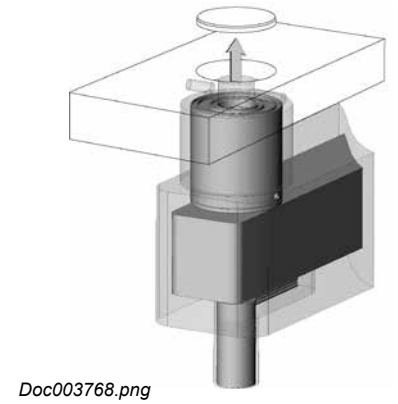
Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

NOTICE

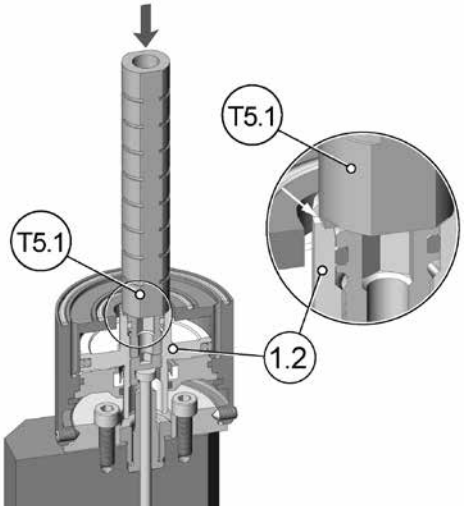
The actuator is covered with a plate, containing the pneumatic access to the actuator.

1) Enable access to the actuator.



Doc003768.png

2) Slip the lug of the adjustment tool Typ01 (T5.1) into the gap of the piston (1.2).

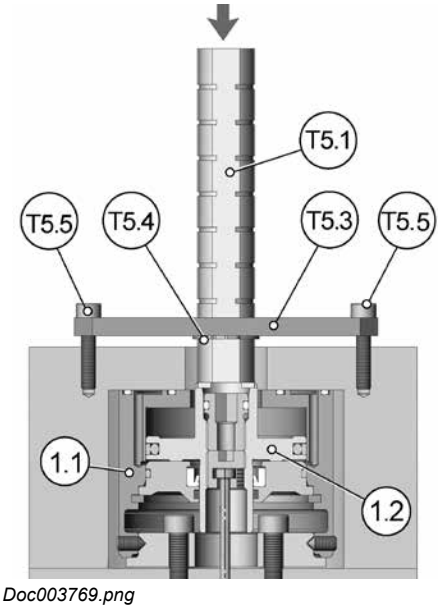


Doc003784.png

3) Push the fixed piston (1.2) forward to the close position.
4) Place the retaining ring (T5.4) at the adjustment tool Typ01 (T5.1).
5) Place the adjustment tool Typ03 (T5.3) on the retaining ring (T5.4) at the adjustment tool Typ01 (T5.1).
6) Fix the piston (1.2) against upstroke with the socket head cap screws (T5.5).

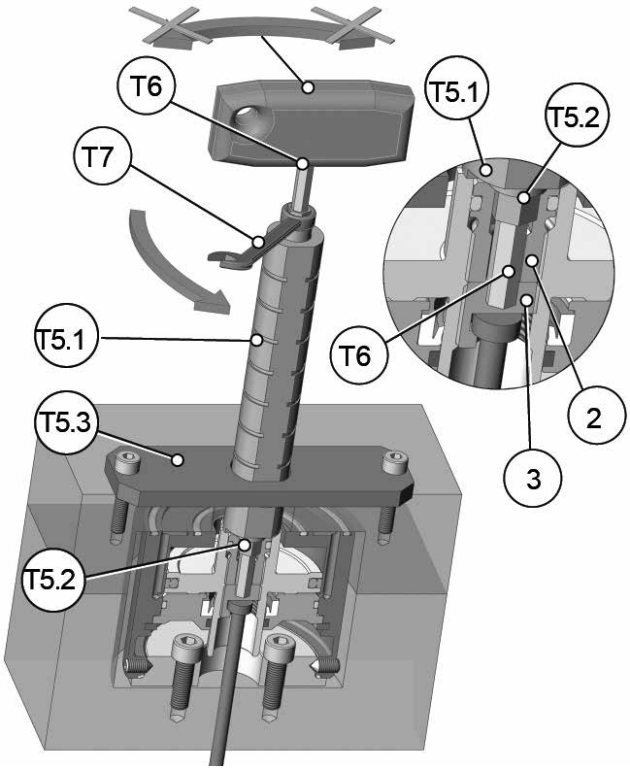
NOTICE

Use torque wrench with wrench insert and the torques indicated in the torque table (section 13).



Doc003769.png

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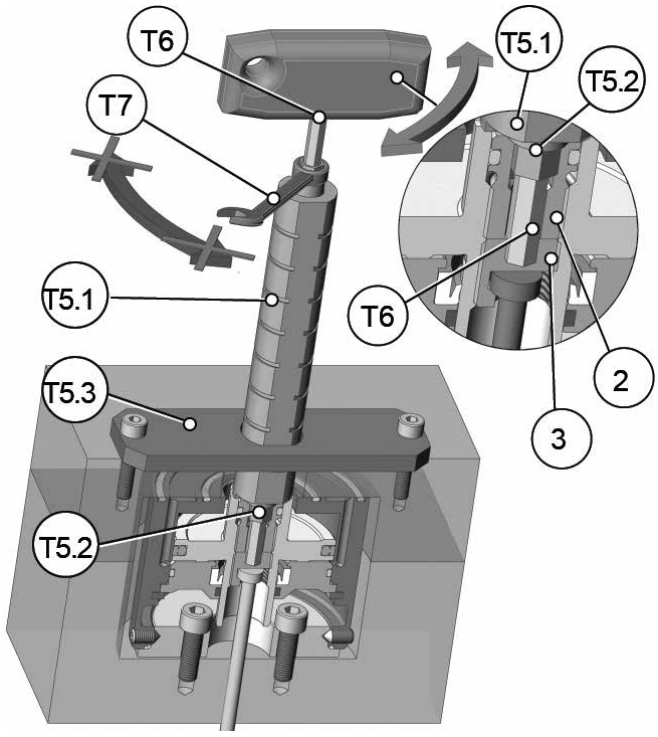


Doc003770.png

7) Fix the hanger screw (3) with the socket wrench (T6).
8) Slacken the lock screw (2) with the adjustment tool Typ02 (T5.2) and ring wrench (T7) attached to it.

Legend to Doc003770.png

(T5.1) Adjustment tool Typ01
(T5.2) Adjustment tool Typ02
(T5.3) Adjustment tool Typ03
(3) Hanger screw
(2) Lock screw
(T6) Socket wrench HEX 4
(T7) Ring wrench HEX 7



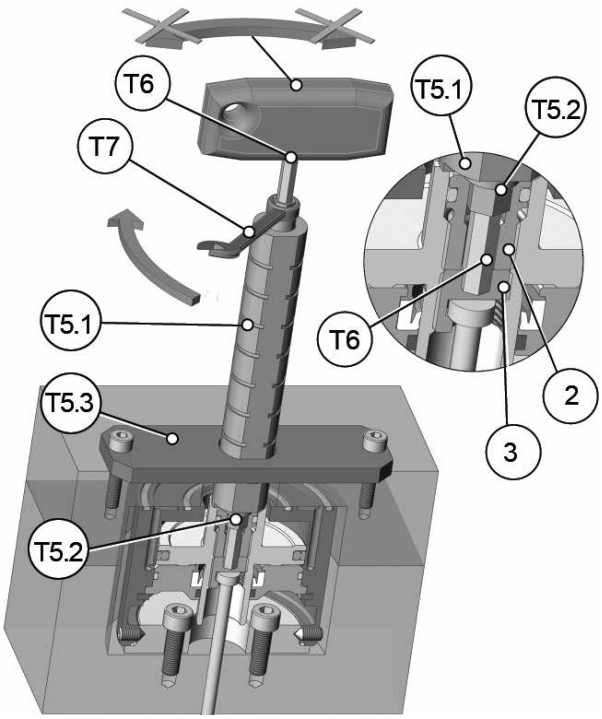
Doc003771.png

9) To adjust valve pin position:
   - Fix the lock screw (2) with the adjustment tool Typ02 (T5.2) and a ring wrench (T7).
   - Turn the hanger screw (3) with the socket wrench (T6).

NOTICE

The screw pitch is 1 mm (right hand thread).

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Doc003772.png

To Fix the Vale Pin Position:

10) Secure with the hexagon socket wrench (T6) the hanger screw (3) against turning.
11) Tighten the lock screw (2) with the adjustment tool Typ02 (T5.2) and a ring wrench (T7).

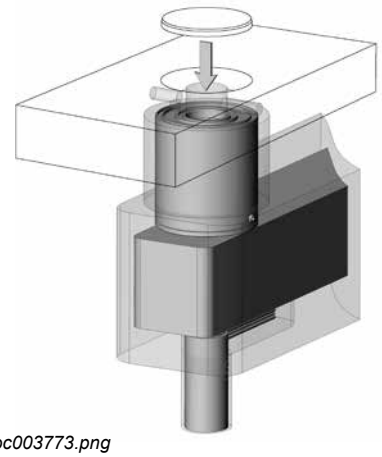
NOTICE

The reason to unscrew the hanger screw (3) would be for valve pin maintenance or replacement.

NOTICE

For the control of the valve pins, a pneumatic system is installed.

12) In case where the clamping plate has an opening for the valve pin adjustment, the opening must be capped airtight.

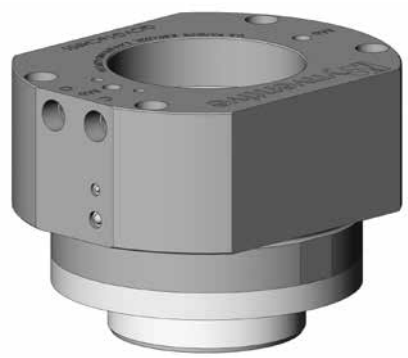


Doc003773.png

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8.2.6 Actuator QCVG16M04/-MF04/-M06/-M07

8.2.6.1 Technical Data QCVG16 Series



Doc003005.png

Actuator for Hot Runner Systems, in mold plate, hydraulic.	
Valve pin operation	
Operation medium	Hydraulic
Pressure range	35 - 100 bar (500 - 1500 psi)
Pressure max.	103 bar (1500 psi)
Operating flow rate - Instantaneous	1.8 l/min
Operating flow rate - Continuous	0.3 l/min At full open position only
Valve pin response time	Application dependent
Valve pin stroke	16 mm
Adjustment	± 1 mm via adjustment nut from top
Connections	1/8 NPT
Cooling	
Medium	Clamping Plate Cooling (max. 100°C / 210 °F)
Valve pin	
Valve pin diameter	Ø 5 mm, Ø 6 mm, Ø 8 mm
Attachment	Quick coupling, antirotation

NOTICE

To ensure long life and continued flawless operation of the actuator, we recommend using a service medium that complies with the requirements of classification 21/18/13 pursuant to ISO 4406.

The coolant used should be properly modified, e.g. filtered water with an anti-corrosion and frost-proof agent. After switch off the hot runner heater, the cooling for the actuator have to be turned on for at least 15 minutes, to avoid damages of the actuator sealing.

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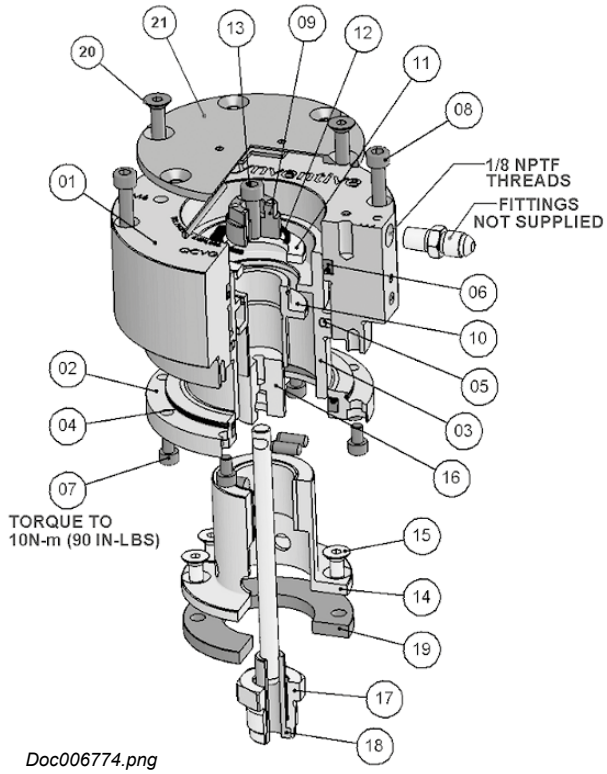
8.2.6.2 Exploded View QCVG16 Series

This section describes the disassembly and reassembly process to replace seals.

In this section the actuator parts are identified with the numbers indicated in the following figure.

NOTICE

Always tighten the screws to the torques specified in the respective table (section 13).



Doc006774.png

QCVG16M04 Series Parts w/Position Sensor			
No.	Qty.	Description	Item
(09)	1	Adjusting screw assembly with magnets	QCVG16ASMAG01
(13)	1	M6 Titanium Socket cap screw 17 mm long	209220
(20)	2	Hexagon Socket countersunk head cap screw DIN7991	DIN 7991-M6X20-10.9
(21)	1	QCVG16 P/S assy 3 m cable	QCVGHESASSY03
(22)	1	QCVG16 P/S assy 5 m cable	QCVGHESASSY05

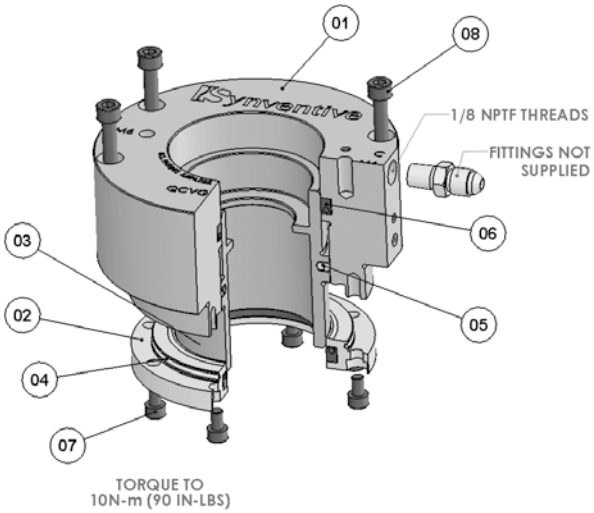
The actuator support spacer is only used if the bottom airgap is greater than 22 mm with a maximum of 28 mm. When using spacers, use DIN7991-M6x20-10.9 flat head screws (qty4) instead of DIN7991-M6x12-10.9 to bolt down actuator support.

Actuator Parts QCVG16M04 Series			
No.	Qty.	Description	Item
(01)	1	Cylinder housing for QCVG16M04	QCVG16HA04
(01)	1	Cylinder housing with flats for use when pitch is less than 126 mm	QCVG16HAF04
(02)	1	Cylinder cap	QCVG16CC01
(03)	1	Piston	QCVG16PI03
(04)	1	O-ring	47-98-041
(05)	1	Seal	OE070005200212C
(06)	2	Poly-Pack	47-98-9001
(07)	8	Socket head cap screw	DIN912-M5x12-12.9
(08)	4	Socket head cap screw	DIN912-M6x50-12.9
(09)	1	Adjusting screw	QCVG16AS01
(10)	1	Actuator coupling	QCVG16AC01
(11)	1	Actuator disk	QCVG16AD01
(12)	1	Snap ring	73-011-5100-118
(13)	1	M6 x 18 long cap screw	DIN912-M6x18-12.9
(14)	1	Actuator support	QCVG16SU01
	1	Actuator support with flats (when required)	QCVG16SUF01
(15)	4	Flat head screw	DIN7991-M6x12-10.9
	4	Flat head screw use with 47-30-130-06 or 47-30-132-06-F	DIN7991-M6x20-10.9
(16)	1	Pin head adapter Ø 8.0	QCVG16PH0801
(17)	1	Valve pin bushing nut	see BOM
(18)	1	ø 8.0 Valve pin bushing	see BOM
	1	ø 6.0 Valve pin bushing	see BOM
	1	ø 5.0 Valve pin bushing	see BOM
(19)	1	Support spacer (when required)	47-30-130-06
	1	Support spacer with flats (when required)	47-30-132-06-F

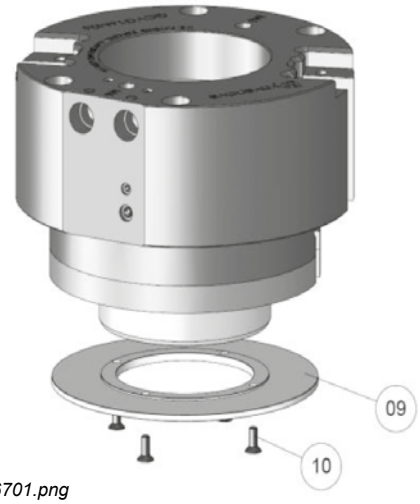
Kit Name	Number	Includes
Seal Kit	QCVG16SK02	04, 05, 06
Coupling Assembly	QCVG16CA01	09,10,11,12,13

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Service and Maintenance / Actuator QCVG16M04/-MF04/-M06/-M07



DOC006708.png



DOC006701.png

Actuator Parts QCVG16M04/M06/M07

No.	Qty.	Description	Item
(01)	1	Cylinder housing for: QCVG16M04 QCVG16M06 QCVG16M07	 QCVG16HA04 QCVG16HA06 QCVG16HA07
(01)	1	Cylinder housing with flats for use when pitch is less than 126 mm	QCVG16HAF04
(02)	1	Cylinder cap QCVG16M04 / M07 QCVG16M06	 QCVG16CC01 QCVG16CC02
(03)	1	Piston	QCVG16PI03
(04)	1	O-ring	47-98-041
(05)	1	Seal	OE070005200212C
(06)	2	Poly-Pack	47-98-9001
(07)	8	Socket head cap screw	DIN912-M5x12-12.9
(08)	4	Socket head cap screw	DIN912-M6x50-12.9
(09)	1	Sensor Plate (Used on QCVG16M06)	47-30-400
(10)	4	M3x8 Flat head screws Torque 1 Nm (Used on QCVG16M06)	DIN7991-M3x8-10.9

QCVG16M04/M06/M07 Series Parts (Self Bleeding)

No.	Qty.	Description	Item
(01)	1	Cylinder housing for: QCVG16M04 QCVG16M06 QCVG16M07	 QCVG16HA04 QCVG16HA06 QCVG16HA07
	3	CV Plug Ø 3.9 mm	09-156-00
	1	CV Plug Ø 5.5 mm	09-218-00
	1	Restrictor Plug	EIS-RE-040-010

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8.2.6.3 Disassembling the Actuator QCVG16 Series

DANGER

Hydraulic

Danger to Life by Hydraulic

Serious personal injury or death can result from connecting or disconnecting hydraulic hoses under pressure.

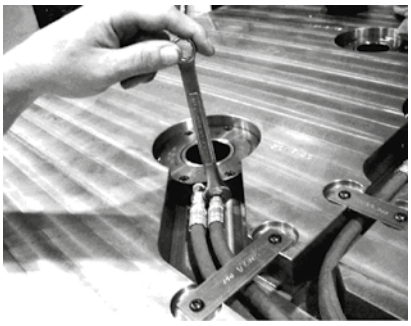
Hydraulic works must be carried out by qualified persons.

Use personal protective equipment, face protection, headgear, anti oil gloves.

The hoses in the Hot Runner System and in the injection mold are under high pressure and high temperatures.

Before disconnecting or connecting any hydraulic hoses:

- The injection machine/hydraulic pump must be shut down.
- The electrical disconnect - properly locked out.
- Pressure from the hoses must be removed.

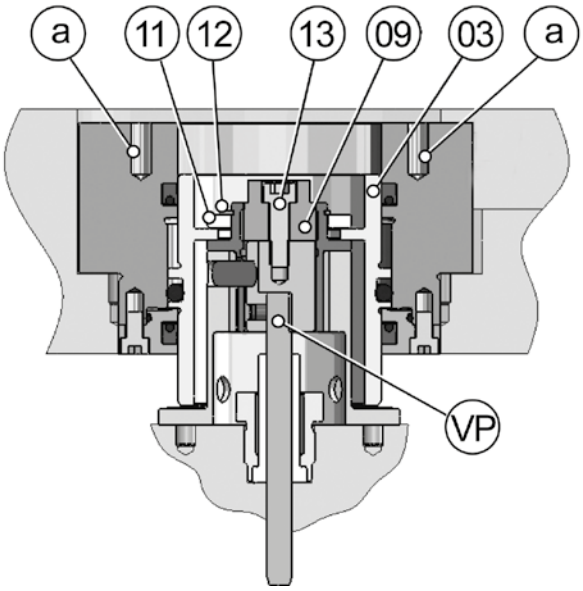


Doc003171.png

1) Disconnect the hydraulic lines from the actuator.

NOTICE

Ensure connections are labelled.

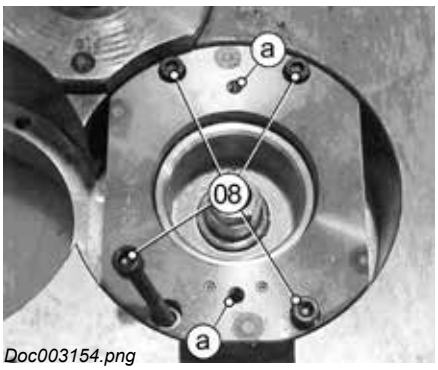


Doc003153.png

2) Remove the snap ring (12).

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3) Unscrew and remove the four socket head cap screws M6x50 (08).
4) Remove the actuator housing (01) with 2 long M6 screws in the two threaded holes (a) out of the clamping plate.



Doc003154.png

Disassembly of the Actuator and the Seal

1) Remove the socket head cap screws (07) from the actuator cap (02).

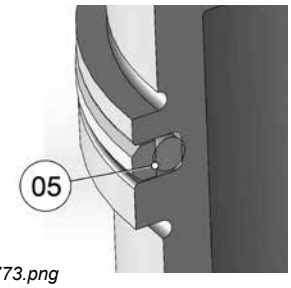
2) Remove the piston (03) from the actuator housing (01) with a soft face hammer, clamp, or small press..


Doc003155.png

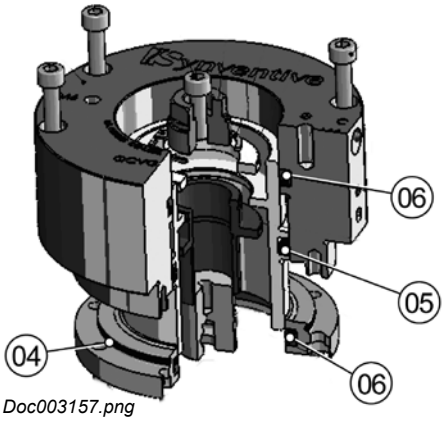
3) Carefully remove the seals and O-rings:
   - (04) O-ring
   - (05) O-ring
   - (06) Poly-Pack (x2)

   NOTICE

   The piston seal will need to be cut for removal.



Doc006773.png



Doc003157.png

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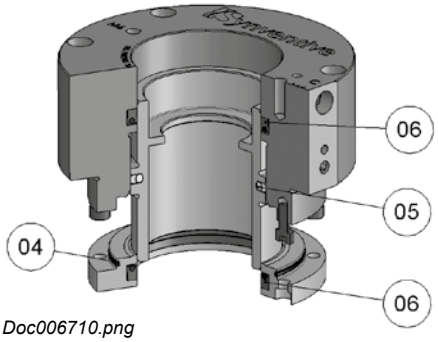
8.2.6.4 Assembling the Actuator QCVG16M04/MF04/M06/M07

Installation of the Piston Seal

1) Clean the seal groove and ensure that there are no scratches.

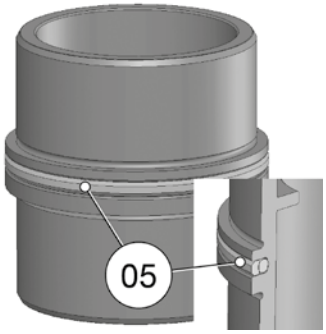
NOTICE

After disassembly of the sealing elements, the original seals should be replaced.



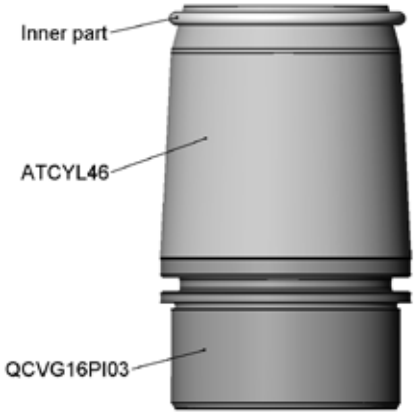
Doc006710.png

2) Install two-piece seal (05). Install inner, rubber portion first. The outer (Teflon) ring will need modest stretching before installation. This may be done by hand. Exercise restraint as over-stretching will make final assembly more difficult. The correct stretch is just enough to allow installation of outer seal by hand.



Doc006432.png

3) Lubricate the inner seal (05).
4) Install outer, PTFE portion with the support of the tool ATCYL46 to push it into the groove of QCVG16M04.
5) Alternately, the outer (PTFE) ring can be installed by hand; it will need modest stretching before installation. Exercise restraint as over-stretching will make final assembly more difficult. The correct stretch is just enough to allow installation of outer seal by hand.



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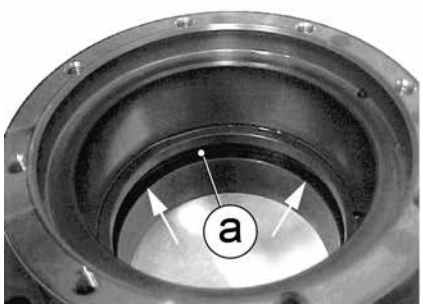
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Installation of the Actuator Housing Poly-Pack

1) Clean the seal groove (a).

NOTICE

Ensure that the groove (a) has no scratches.



Doc003160.png



Doc003161.png

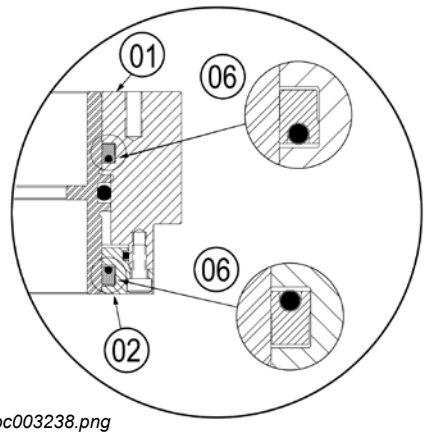
2) Lubricate the seal Poly-Pack (06) with hydraulic oil or white grease.
3) Install the seal Poly-Pack (06) into the groove of the actuator housing (01).

NOTICE

Pay attention to correct seal orientation.

The lip of the seal Poly-Pack (06) has to be inward facing to the center of the actuator housing (01).

4) Make certain the seal Poly-Pack (06) is completely seated in the groove.



Doc003238.png

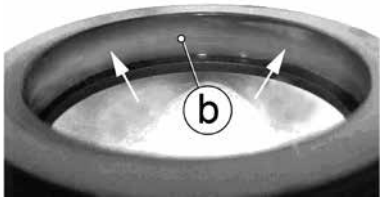
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Installation of the Actuator Cap Inner Seal

1) Clean the seal groove (b).

NOTICE

Ensure that the groove (b) has no scratches.



Doc003162.png


Doc003163.png

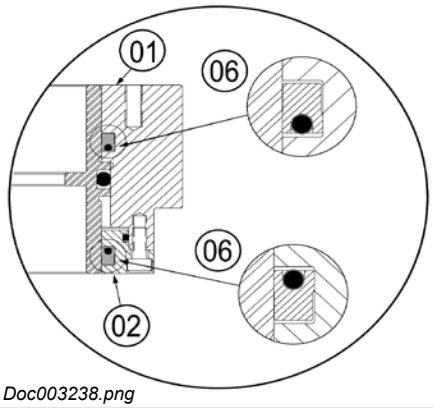
2) Lubricate the seal Poly-Pack (06) with hydraulic oil or white grease.
3) Install the seal Poly-Pack (06) into the groove of the actuator cap (02).

NOTICE

Pay attention to correct seal orientation.

The lip of the seal Poly-Pack (06) has to be toward facing to the contact surface of the actuator housing (01).

4) Make certain the seal Poly-Pack (06) is completely seated in the groove.



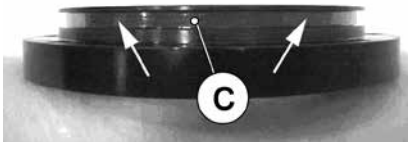
Doc003238.png

Installation of the Actuator Cap outside O-ring Seal

1) Clean the O-ring groove (c).

NOTICE

Ensure that the groove has no scratches.



Doc003164.png

NOTICE

After disassembly of the sealing elements, the seals should be replaced with original seals.

2) Lubricate the O-ring (04) with hydraulic oil or white grease.
3) Install the O-ring (04) into the groove of the actuator cap (02).

NOTICE

Make certain the seal is completely seated in the groove.


Doc003165.png

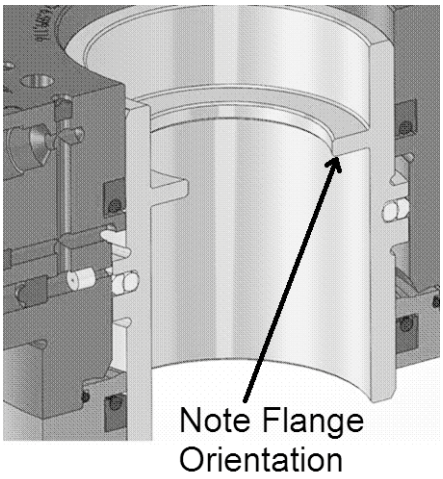
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Installation of the Piston in the Actuator Housing

1) Lubricate all seals with hydraulic oil or white grease.
2) Use a soft face hammer or a small press to fully seat the piston (03) into the actuator housing (01). Insert as shown in figure at right.

NOTICE

Resistance will be felt as the seals are compressed. Be careful not to pinch or otherwise damage the new seals during piston (03) insertion into the actuator housing (01).

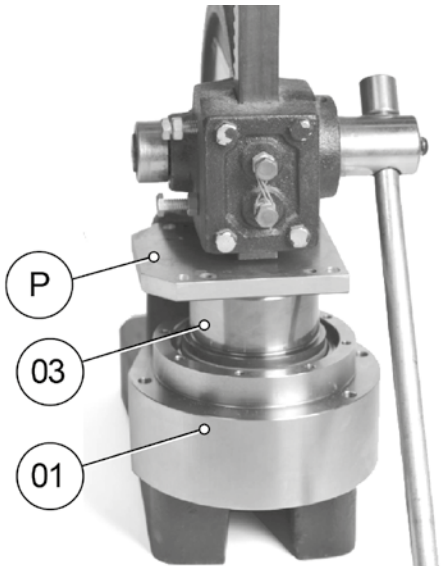


Doc006775.png

NOTICE

Use a small press to slowly install the piston (03).

3) Place a flat plate (P) on piston (03).
4) Install piston (03) into housing with the flange near the Synventive logo side as shown. So not pinch or damage the Teflon Seal (piston).



Doc006437.png

NOTICE

After disassembly of the sealing elements, the original seals should be replaced.

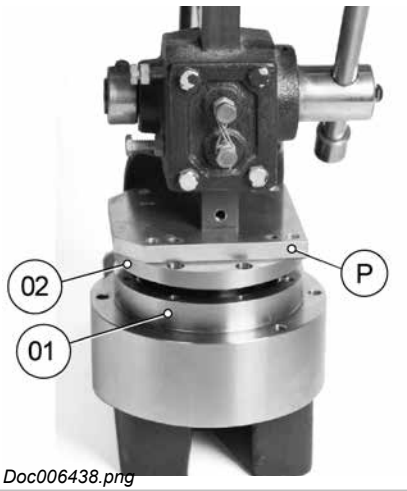
5) Lubricate the O-ring (04) of the cylinder cap (02) with hydraulic oil or white grease.
6) Place the cylinder cap (02) over the actuator housing (01).

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NOTICE

Use a small press to slowly install the cylinder cap (02).

7) Place a flat plate (P) on cylinder cap (02).
8) Align the screw holes before installing cap.
9) Install cylinder cap (02) along with seal to cylinder housing (01) using a light press as shown.



Doc006438.png

10) Lubricate the thread of the socket head cap screws (07) with high-temperature assembly paste (anti-seize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

11) Tighten the socket head cap screws (07) M5x12.

NOTICE

Torque per specification engraved on the actuator cap.


Doc003168.png

Installation of the Actuator on the Clamping Plate

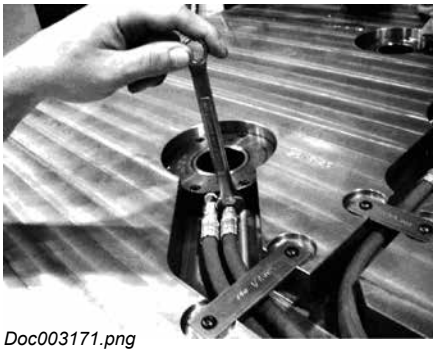
1) Install the actuator housing (01) with 4 mounted M6 socket head cap screws (08) into the clamping plate pocket.

NOTICE

Use torque wrench with wrench insert and the torques indicated in the torque table.


Doc003170.png

2) Connect the hydraulic hoses to the actuator.


Doc003171.png

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8.2.6.5 Actuator Bleeding QCVG16

Actuator Auto Bleeding (QCVG16M04 / M06 / M07)

Bleeding of the actuator is not necessary due to the “auto-bleed” feature.

When the cylinder is in the open position, a small amount of oil is allowed to pass from the pressure side to the tank side. At all other positions, valves prevent hydraulic fluid from bleeding.

The amount of oil is small enough to maintain full pressure while allowing enough oil to carry any air from the lines to the tank.

It is only necessary to apply pressure for about 2 minutes with the actuators in the open position to complete the bleeding process.

8.2.6.6 Assembling and Disassembling the Position Sensor to QCVG16M04/MF04

1) Assembly: Fix the Position Sensor Assembly (21) onto the hydraulic actuator QCVG16M04 / MF04 with screws DIN7991-M6X20-10.9 (20).
2) Disassembly: Remove the screws DIN7991 M6x20 (20) and then remove the Position Sensor Assembly (21) from the hydraulic actuator QVCG16M04.



Doc006444.png

NOTICE

Adjusting screw (09) protrusion above the back of the piston will result in Position Sensor damage.

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8.2.6.7 Valve Pin Height Adjustment QCVG Actuator

Precondition for the following steps are to be performed with the QCVG actuator installed in the mold, and the system at operating temperature.

⚠ WARNING



Heavy Weight Hazard

Transport and lifting equipment should be operated only by trained personnel.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.

For first aid contact your medical / safety representing





Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing



NOTICE



Hazard of Material Damage

The highest operating pressure is 103 bar (1500 psi), the typical operating pressure is between 41 bar and 82 bar (600 psi and 1200 psi). A lower operating pressure increases the seal life.

The following steps are to be performed with the system at operating temperature.

Clamping plate cooling (max. 100 °C / 210 °F) must be on to prevent damage to the actuator seals.

After switch off the hot runner heater, the cooling for the actuator have to be turned on for at least 15 minutes, to avoid damages of the actuator sealing.

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Height Adjustment of shut-off Valve Gate Pins with QCVG Actuator

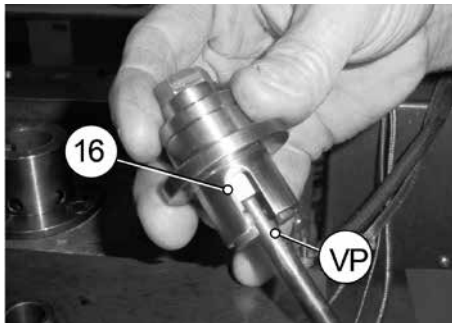
Installation and valve pin adjustment

1) Slide the valve pin (VP) into pin head adapter (16).

NOTICE

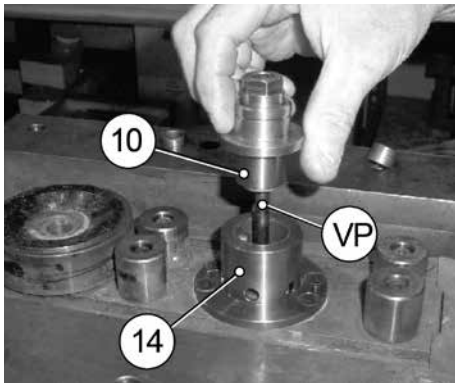
If the pin has previously been contoured, note the orientation.

The pin head adapter (16) is keyed to the actuator support (14), found on the manifold.



Doc003179.png

2) Place the actuator coupling (10) with the valve pin (VP) and pin head adapter (16) on the actuator support (14).



Doc003180.png

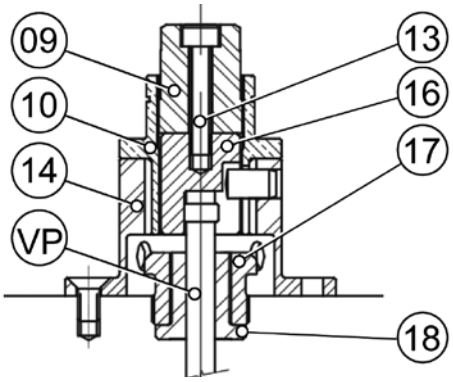
3) If the Hot Runner System is using a tapered shut-off, make sure the valve pin (VP) is not seated in the gate at this time.
4) Verify that the flange of the actuator coupling (10) is resting on the actuator support (14).

If a gap is present:

NOTICE

This indicates the valve pin is making contact in the gate.

- Rotate the adjusting screw (09) to lift the valve pin until the gap is eliminated.



Doc003212.png

5) Tighten the set with the socket head cap screw (13).

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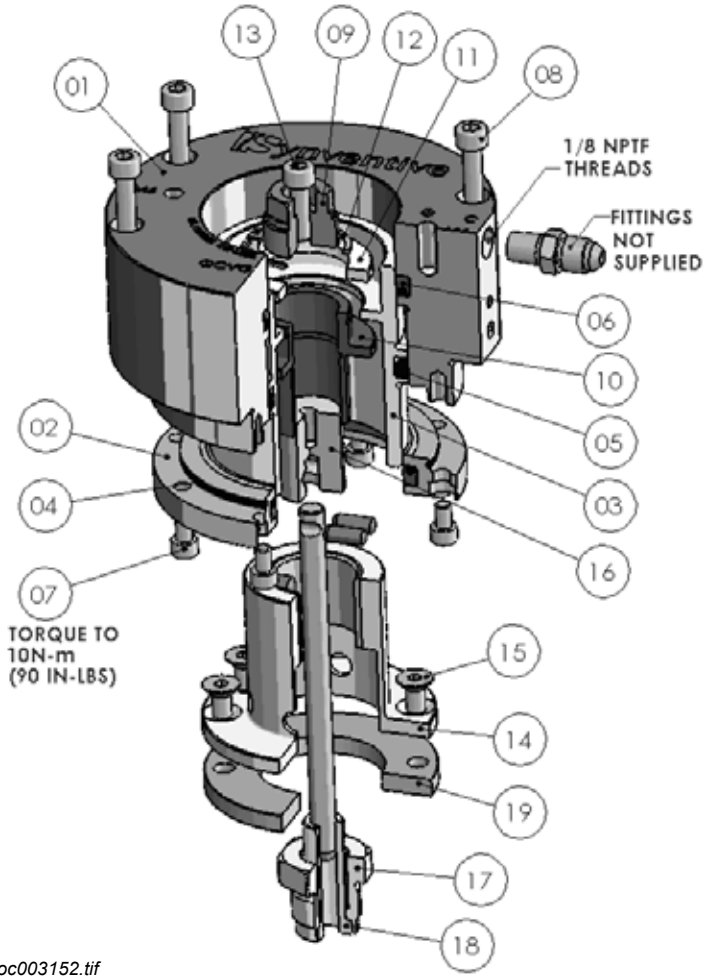
WARNING

Heavy Weight Hazard

6) Install the clamping plate (with the actuator housing already installed in them).



Doc003119.png



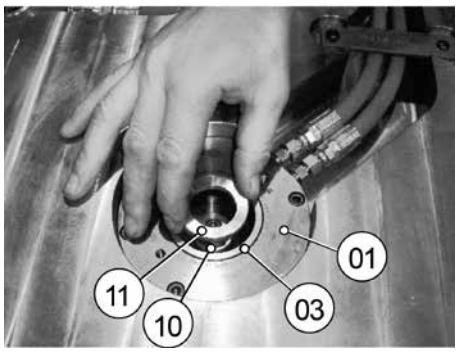
Doc003152.tif

Actuator parts

(01) Actuator housing
(02) Actuator cap
(03) Piston
(04) O-ring
(05) O-ring
(06) Poly-Pack
(07) Socket head cap screw M5x12
(08) Socket head cap screw M6x50
(09) Adjusting screw
(10) Actuator coupling
(11) Actuator disk
(12) Retaining ring for shafts
(13) Socket head cap screw M6x18
(14) Actuator support
(15) Flat head screw M6x12
(15) Flat head screw M6x 20
(16) Pin head adapter ø8.0
(17) Valve pin bushing nut
(18) Valve pin bushing
(19) Support spacer (when required)

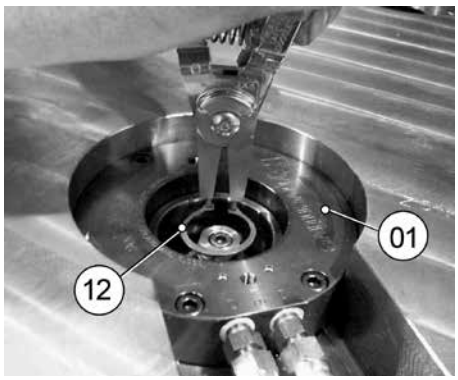
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7) Install the actuator disk (11) over the actuator coupling (10) in the piston (03).



Doc003181.png

8) Ensure that the retaining ring (12) is correctly positioned in groove of actuator coupling (10).



Doc003182.png

⚠ WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

9) Heat the mold up to operating temperature.

NOTICE

Wait additional 30 minutes until the system is entirely heated up.

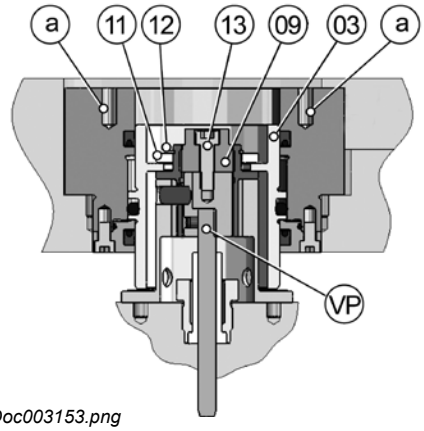
10) Close the actuator with a hydraulic pressure of 2.75 bar (36 psi).

Height adjustment of straight shut-off valve gate pins

- Turn the adjusting screw (09) until the face of the valve pin (VP) is in the desired location for molding (typically 0.13 mm (005") protrusion through the gate).
- To take up the play in the valve pin (VP) and coupling assembly, access the parting-line side of the valve pin (VP) and push against it before locking the socket head cap screw (13).

NOTICE

The adjusting Screw (09) has a 1 mm pitch to facilitate fine adjustment.



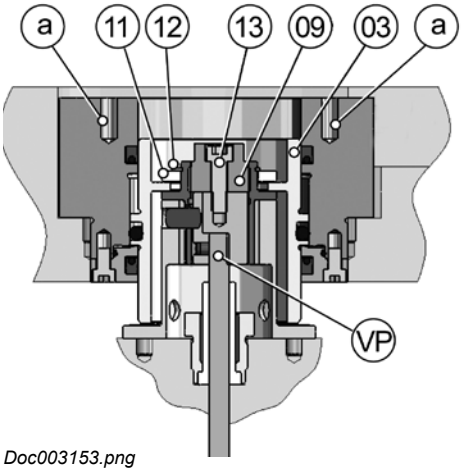
Doc003153.png

Height adjustment of conical shut-off valve gate pins

- Turn the adjusting screw (09) clockwise until the valve pin (VP) seats in the gate.
- Then turn off the hydraulics and turn the adjustment screw (09) an additional 1/8 turn clockwise to preload the valve pin (VP) 0.13 mm (005").

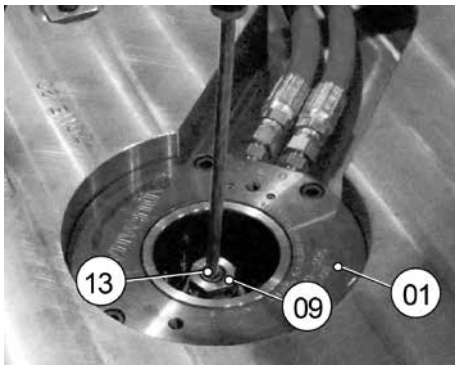
NOTICE

The adjusting Screw (09) has a 1 mm pitch to facilitate fine adjustment.



Doc003153.png

11) Holding the adjustment screw (09) in place.
12) Tighten the socket head cap screw (13).



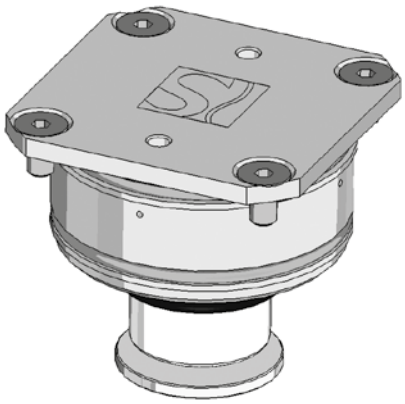
Doc003183.png

13) Actuate the valve gate several time and check for correct valve pin seating.

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8.2.7 Actuator VP4008P Series

8.2.7.1 Technical Data VP4008P01, VP4008P0301



Doc003511.png

Actuator for hot runner systems, bolted to mold plate, pneumatic	
Valve pin operation	
Operation medium	pneumatic
Pressure range	6 - 10 bar (87 - 145 psi)
Pressure max.	11 bar (160 psi)
Valve pin stroke	8 mm
Adjustment	By machining the adjustment plug
Opening force	754 N / 6 bar (87 psi)
Closing force	686 N / 6 bar (87 psi)
Flow rate	4 l/min
Connections	1/8 NPT or M 10x1 (Goodridge 6-L / Parker 8-L) Connecting in clamping plate
Cooling	
Medium	Clamping Plate Cooling (max. 100°C / 210 °F) Cooling lines are required in clamping plate.
Valve pin	
Valve pin diameter	Ø 3.8 mm (VP4008P01)
	Ø 3.0 mm (VP4008P0301)
Attachment	Valve pin head within the piston
Miscellaneous Information	
Minimum clamping plate thickness	32 mm
Minimum pitch of the actuators	55 mm
Maximum distance from center support	650 mm

NOTICE

To ensure long life and continued, flawless operation, the use of filtered, dry, lubricated air is required.

The coolant used should be properly modified, e.g. filtered water with an anti-corrosion and frost-proof agent.

After switch off the hot runner heater, the cooling for the actuator have to be turned on for at least 15 minutes, to avoid damages of the actuator sealing.

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8.2.7.2 Explosion view of the VP4008P Series

VP4008P01 - for valve pin Ø 3,8 mm

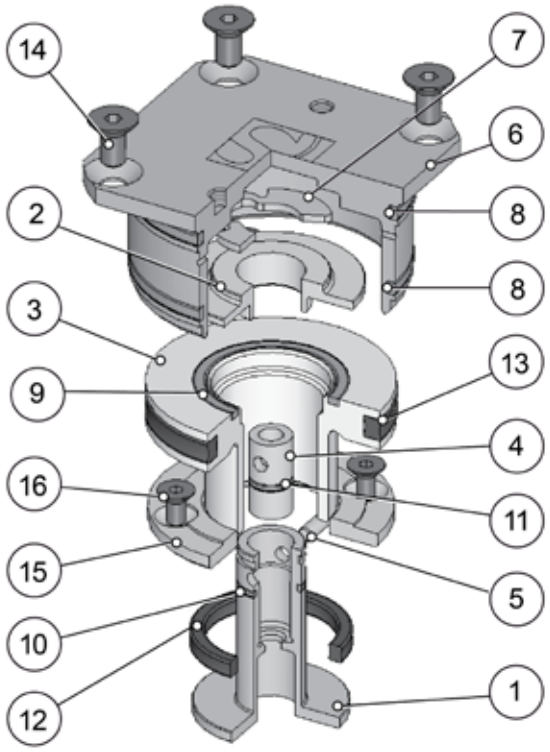
VP4008P0301 - for valve pin Ø 3,0 mm

This section describes the disassembly and assembly process of the actuator to replace seals.

In this section the actuator parts are identified with the numbers indicated in the following figure, which shows the components.

NOTICE

Always tighten the screws to the torques specified in the respective table, see section 13.



Doc003512.png

Actuator parts VP4008P Series

No.	Qty.	Description	Item
(1)	1	Valve pin coupling (for valve pin Ø 3,8 mm)	VP4008PC01
(1)	1	Valve pin coupling (for valve pin Ø 3 mm)	VP4008PC0301
(2)	1	Retainer	VP4008RT01
(3)	1	Piston	VP4008PI01
(4)	1	Adjustment plug	VP4008AP01
(5)	1	Cross pin	VP4008CP01
(6)	1	Cylinder cap	VP4008CC01
(7)	1	Snap ring	VP4008C-K-01
(8)	2	Viton O-ring	VIOR-41.28X1.8-FPM-75-BR
(9)	1	Viton O-ring	VIOR-20.64X1.8-FPM-75-BR
(10)	1	Viton O-ring	VIOR-9.13X1.0-FPM-75-BR
(11)	1	Viton O-ring	VIOR-5.15X1.0-FPM-75-BR
(12)	1	Viton quad ring	VIQR-20.64X2.6-FPM-75-BL
(13)	1	Viton quad ring	VIQR-33.34X3.5-FPM-75-BL
(14)	4	Countersunk head screw	DIN7991-M4x8-10.9
(15)	1	Retainer	VP4008RT02
(16)	4	Countersunk head screw	DIN7991-M3x6-10.9

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8.2.7.3 Basic Dimensions in Mold

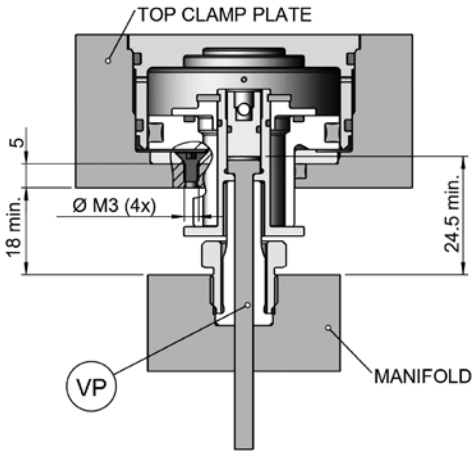
Minimum Distance between Manifold and Clamping plate

The gap between the top of the manifold and the bottom of the top clamp plate should be 18 mm.

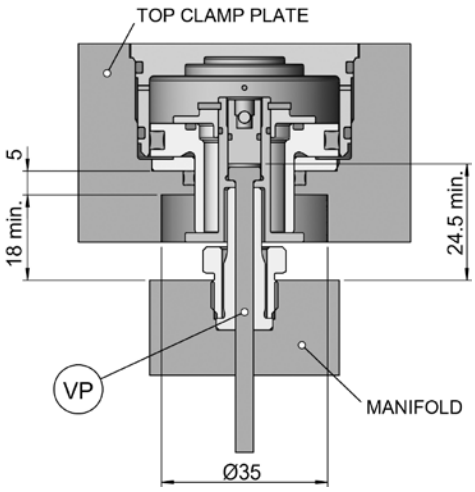
(see Doc003739.png)

This gap may be smaller due to customer plate thickness which will require a 35 diameter counterbore in the bottom of the top clamp plate to achieve the 18 mm gap.

(see Doc003516.png)



Doc003739.png



Doc003516.png

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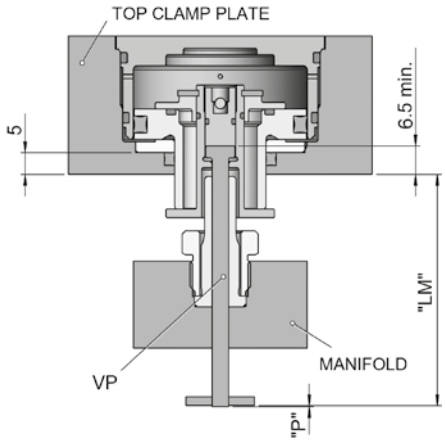
Valve pin length Calculation

The length of the valve pin in the cold condition is calculated with the formula:

(LM + 6.5 + Valve Pin Protrusion) / 1.002

“LM” is the distance between “0” extension of the gate to the top of the top air gap.

“P” is the Valve Pin Protrusion.



Doc003743.png

⚠ WARNING

Danger by Pneumatic



Pneumatic

Personal injury can result from connecting or disconnecting pneumatic hoses.

Pneumatic works must be carried out by qualified persons.

Use protective goggles or face protection or protective goggles, hearing protection (PPE)



Heavy Weight Hazard



Transport and lifting equipment should be operated only by trained personnel.

Use personal protective equipment, such as head gear, safety shoes and work gloves.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.



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Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as work gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.



8.2.7.4 First mounting of Actuator VP4008P

NOTICE

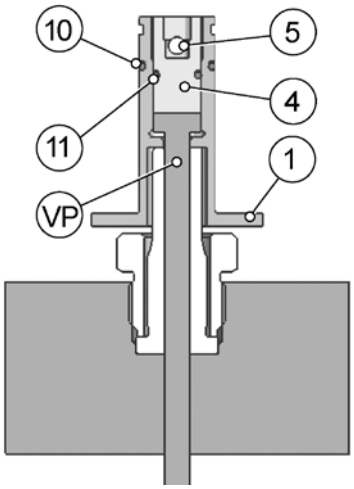
After disassembly of the sealing elements the original seals should be replaced.

1) Lubricate the VITON O-ring (10) with hydraulic oil or white grease.
2) Install the VITON O-ring (10) into the valve pin coupling (1) seal groove.
3) Lead the valve pin (VP) into the valve pin coupling (1).

NOTICE

When you lead the valve pin (VP) into the valve pin guide - the valve pin coupling (1) is settling down on the valve pin guide.

4) Install the VITON O-ring (11) into the adjustment plug (4) seal groove.
5) Place the adjustment plug (4) into the valve pin coupling (1).
6) Secure the adjustment plug (4) with the cross pin (5) in the valve pin coupling (1).



Doc003527.png

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NOTICE

After disassembly of the sealing elements the original seals should be replaced.

7) Install the VITON quad ring (12) into the clamping plate (a) seal groove.
8) Install the retainer (15) with 4 screws (16) into the clamping plate (a).

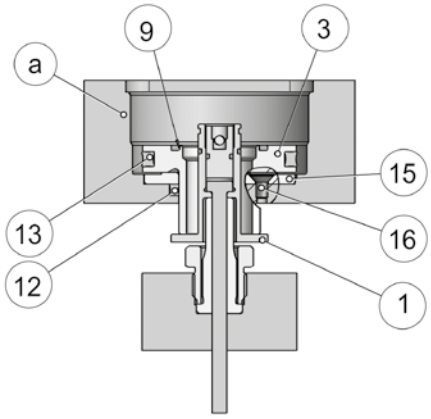
NOTICE

Apply Loctite 272 on the thread of the 4 socket counter sunk head cap screws (20).



WARNING

Heavy Weight Hazard



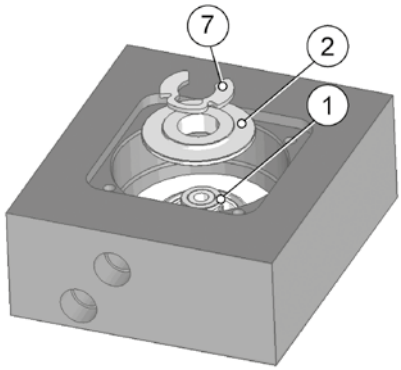
Doc003515.png

9) Place the clamping plate (a) on the destined position on the mold.
10) Install the VITON quad ring (13) into the piston (3) seal groove.
11) Install the VITON O-ring (9) into the piston (3) seal groove.
12) Place the piston (3) into the cutout in the clamping plate.

NOTICE

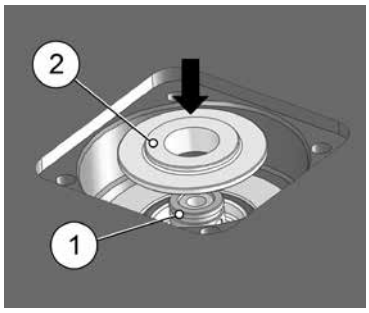
The piston (3) will be placed on the flange of the valve pin coupling (1).

13) Place the retainer (2) on the piston.
14) Secure the retainer (2) with the snap ring (7) at the valve pin coupling (1).

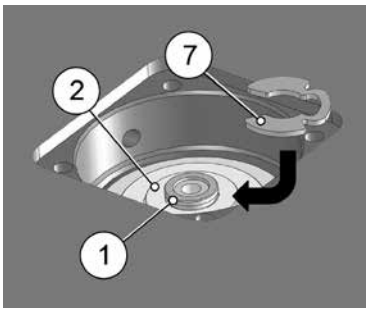


Doc003514.png

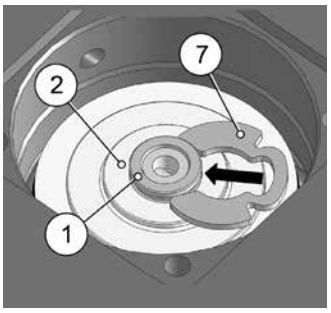
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Doc005170.png



Doc005171.png



Doc005172.png

15) Install the two VITON O-rings (8) into the cylinder cap (6) seal grooves.

16) Place the cylinder cap (6) on the piston (3).

17) Lubricate the thread of the countersunk head screws (14) with high-temperature assembly paste (anti-seize compound).

NOTICE

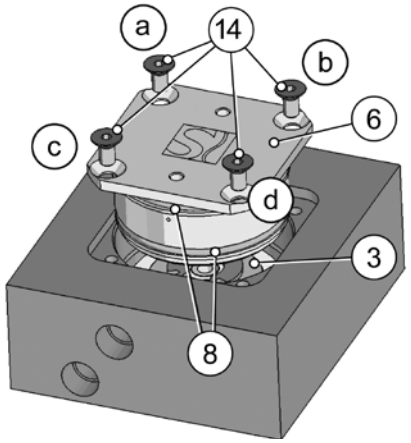
This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

18) Attach the cylinder cap (6) at the clamping plate with the four countersunk head screws (14).

NOTICE

Tighten the countersunk head screws (14) in an X pattern (a, d, c, b).

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

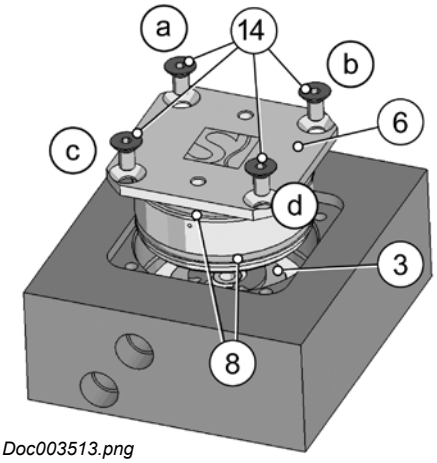


Doc003513.png

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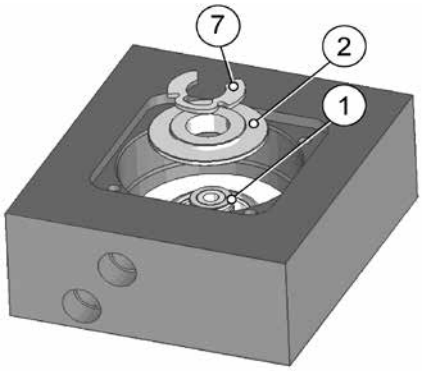
8.2.7.5 Dismounting the Actuator VP4008P

1) Unscrew and remove the four countersunk head screw (14).
2) Remove the cylinder cap (6).
3) Remove the O-ring seals (8) out of the cylinder cap (6) seal grooves.

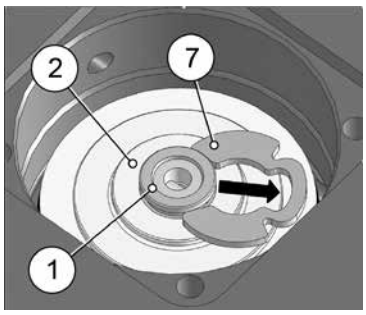


Doc003513.png

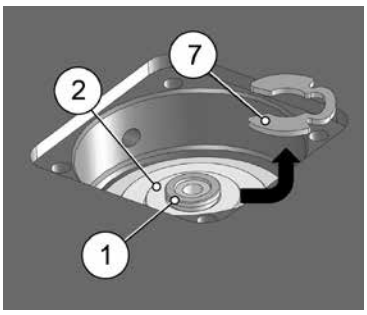
4) Remove the snap ring (7).
5) Remove the retainer (2).



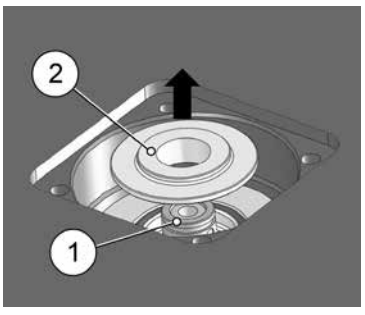
Doc003514.png



Doc005173.png



Doc005174.png



Doc005175.png

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WARNING

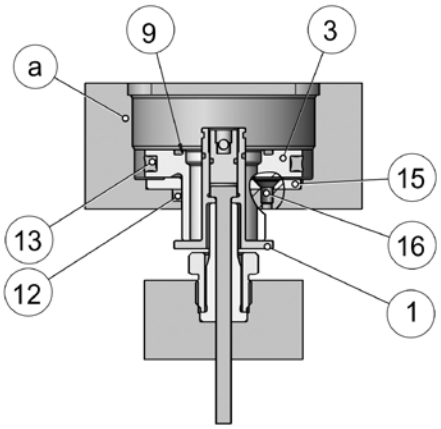
Heavy Weight Hazard

6) Lift the clamping plate (a) from the mold.

NOTICE

During lifting the clamping plate (a) from the mold, the piston (3) will be elevated up from of the valve pin coupling (1) flange.

7) Remove the retainer (15) with 4 screws (16) out of the clamping plate.
8) Remove the VITON quad ring (12) out of the clamping plate (a) seal groove.
9) Remove the VITON quad ring (13) out of the piston (3) seal groove.
10) Remove the O-ring (9) out of the piston (3) seal groove.



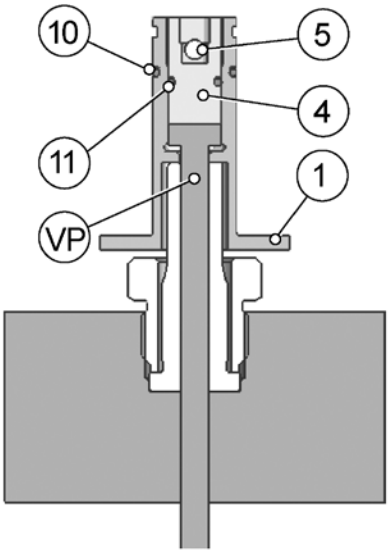
Doc003515.png

11) Remove the cross pin (5) out of the valve pin coupling (1) and the adjustment plug (4).
12) Remove the adjustment plug (4).
13) Remove the O-ring (11) out of the adjustment plug (4) seal groove.
14) Lift the valve pin coupling (1) from the valve pin guide.

NOTICE

During lifting the valve pin coupling (1) the valve pin (VP) will be pulled out of the valve pin guide.

15) Remove the O-ring seal (10) out of the valve pin coupling (1) seal groove.



Doc003527.png

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8.2.7.6 Valve Pin Height Adjustment VP4008P Series

Precondition for the following steps are to be performed with the actuator installed in the mold.

For optimal gate performance and appearance, this dimension must be established fully assembled, at operating temperatures and at each location.

⚠ WARNING



Heavy Weight Hazard

Transport and lifting equipment should be operated only by trained personnel.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.

For first aid contact your medical / safety representing





Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment such as gloves, apron, sleeves and face protection to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing



NOTICE



Hazard of Material Damage

The following steps are to be performed with the actuator installed in the mold, and the system at operating temperature.

Clamping plate cooling (max. 100 °C / 210 °F) **must be on to prevent damage to the actuator seals.**

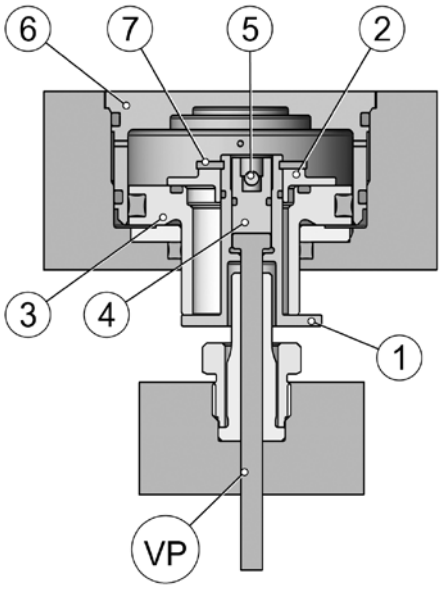
After switch off the hot runner heater, the cooling for the cylinder have to be turned on for at least 15 minutes, to avoid damages of the actuator sealing.

Thermal Expansion Calculation

In Cold Condition

the following parts are off center from the cylinder cap (6) and piston (3).

- Valve gate pin (VP)
- Valve pin coupling (1)
- Adjustment plug (4)
- Cross pin (5)
- Retainer (2)
- Snap ring (7)



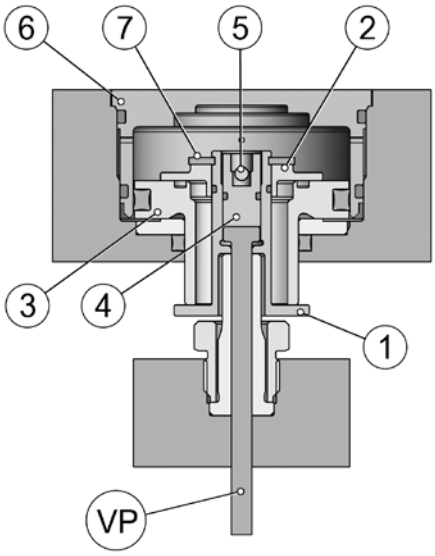
Doc003529.png

At operating temperature of the hot runner system

the following parts are centric to cylinder cap (6) and piston (3).

- Valve gate pin (VP)
- Valve pin coupling (1)
- Adjustment plug (4)
- Cross pin (5)
- Retainer (2)
- Snap ring (7)

The hot runner system has been developed so that the valve gate pin is centered below the piston at operating temperature.



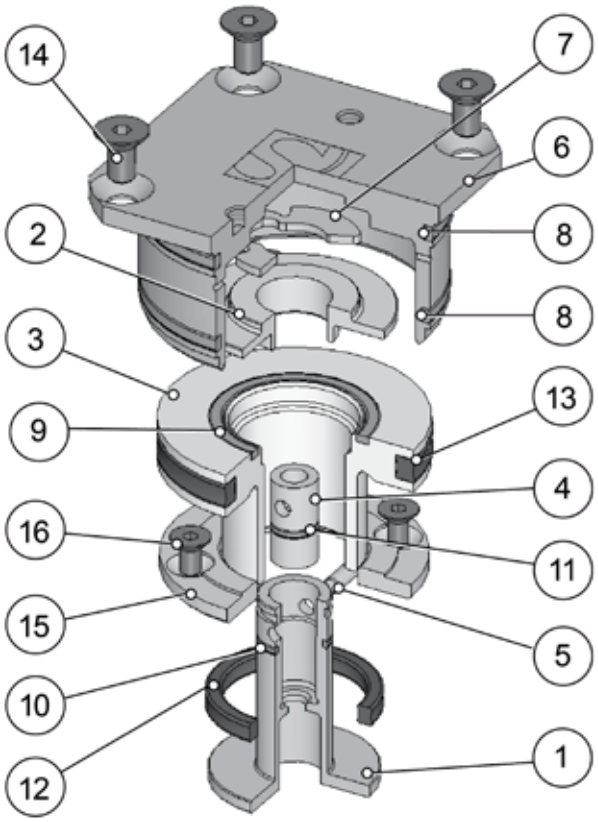
Doc003530.png

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Height Adjustment of Cylindrical shut-off Valve pin

Valve pin height adjustment of cylindrical shut-off valve pins, found by machining the adjustment plug (4). This dimension is a function of the build-up of tolerances of many parts.

In this section the actuator parts are identified with the numbers indicated in the following figure, which shows the components.



Doc003512.png

Actuator parts VP4008P

No.	Qty.	Description	Item
(1)	1	Valve pin coupling	VP4008PC01
(1)	1	Valve pin coupling	VP4008PC0301
(2)	1	Retainer	VP4008RT01
(3)	1	Piston	VP4008PI01
(4)	1	Adjustment plug	VP4008AP01
(5)	1	Cross pin	VP4008CP01
(6)	1	Cylinder cap	VP4008CC01
(7)	1	Snap ring	VP4008C-K-01
(8)	2	Viton O-ring	VIOR-41.28X1.8-FPM-75-BR
(9)	1	Viton O-ring	VIOR-20.64X1.8-FPM-75-BR
(10)	1	Viton O-ring	VIOR-9.13X1.0-FPM-75-BR
(11)	1	Viton O-ring	VIOR-5.15X1.0-FPM-75-BR
(12)	1	Viton quad ring	VIQR-20.64X2.6-FPM-75-BL
(13)	1	Viton quad ring	VIQR-33.34X3.5-FPM-75-BL
(14)	4	countersunk head screw	DIN7991-M4x8-10.9
(15)	1	Retainer	VP4008RT02
(16)	4	Countersunk head screw	DIN7991-M3x6-10.9

1) Bring system to operating temperature and allow to soak for 60 minutes.
2) Loosen and remove:
   - Countersunk head screw (14)
   - Cylinder cap (6)
   - Cross pin (5)
   - Adjustment plug (4)

WARNING

Hot Surfaces Hazard

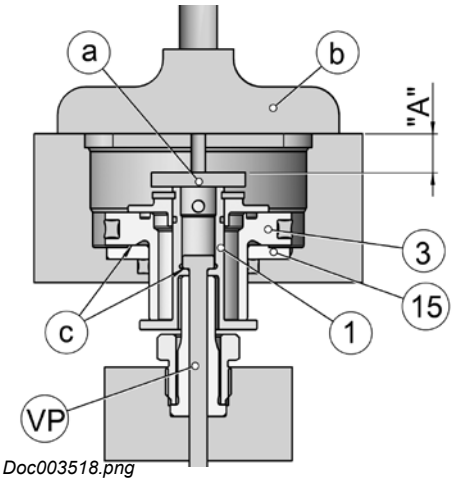
Contact between the skin and hot surfaces could result in burns.

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3) Place a spacer block (b) over the valve pin coupling (1).
4) Measure dimension “A” with a micrometer (a) and record data.

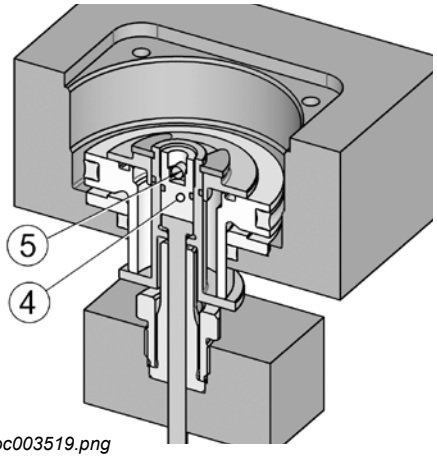
NOTICE

Note contact (c) between
valve gate pin (VP) / valve pin coupling (1)
and
piston (3) / retainer (15).



Doc003518.png

5) Install the adjustment plug (4) and cross pin (5).



Doc003519.png

6) Place the spacer block (b) over the valve pin coupling (1) again.
7) Provide a means of holding the Valve Pin flush with the surrounding gate area.

NOTICE

Any required valve pin protrusion will be added via calculation.

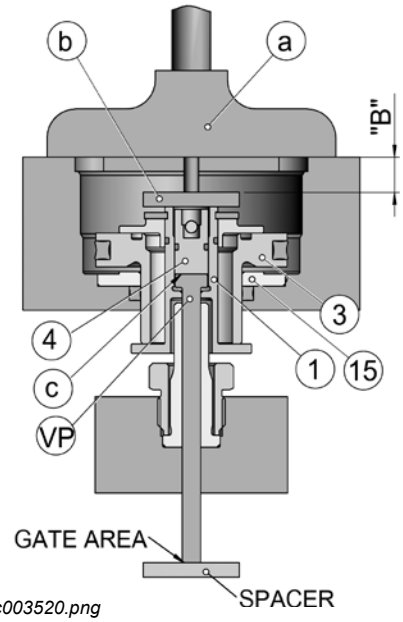
NOTICE

Note contact (c) between
valve pin (VP) / valve pin coupling (1)
and a gap (d) between
piston (3) / retainer (15).

8) Measure dimension “B” with a micrometer (a) and record data.

NOTICE

The required machining to the adjustment plug (4) can now be calculated.



Doc003520.png

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NOTICE

"C" is the length of material to be removed from the adjustment plug (as shown in Doc003521.png)

"A" and "B" are the dimensions recorded from the previous steps.

"P" is the protrusion of the Valve Pin. The protrusion is typically 0,13 mm (.005").

9) The quantity of material "C" to be removed from the adjustment plug (4) is given by the equation:

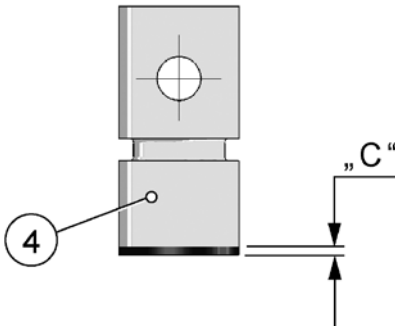
"C" = ("A" – "B") – "P"

10) Remove the cross pin (5).
11) Take the adjustment plug (4) out of the valve pin coupling (1).
12) Mark on the adjustment plug (4) the position "C"
13) Machine "C" from the valve pin head adapter (4).

NOTICE

The quantity "C" was determined in the preceding step.

14) Remove any burrs that may alter the adjustment.
15) Install the machined adjustment plug (4) in the corresponding location.
16) Install the cross pin (5).



Doc003521.png

17) Have an assistant press down (x) on the valve pin coupling (1).

NOTICE

Do not press down on the adjustment plug (4).

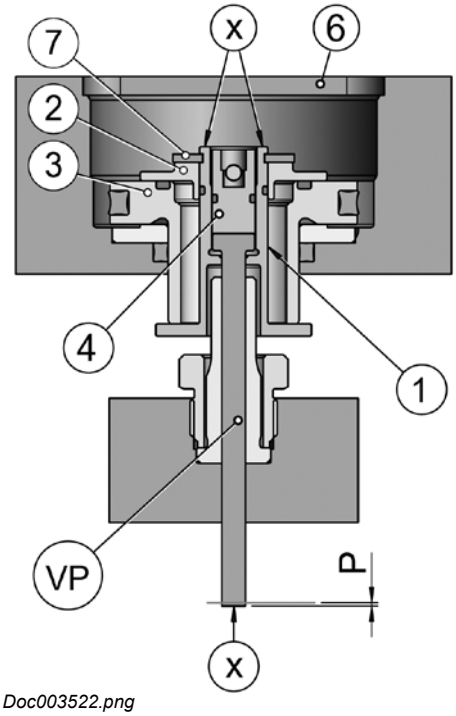
Taking care to not damage the surface of the valve pin (VP).

18) Apply pressure (x) to the gate end of the valve pin (VP) to take up any play in the system.
19) Check the protrusion (P) of the valve gate pin (VP) at the valve gate.

NOTICE

The protrusion is typically 0.13 mm (.005").

20) Assemble the piston (3), retainer (2), snap ring (7) and cylinder cap (6) as described in section 8.2.6.4.



Doc003522.png

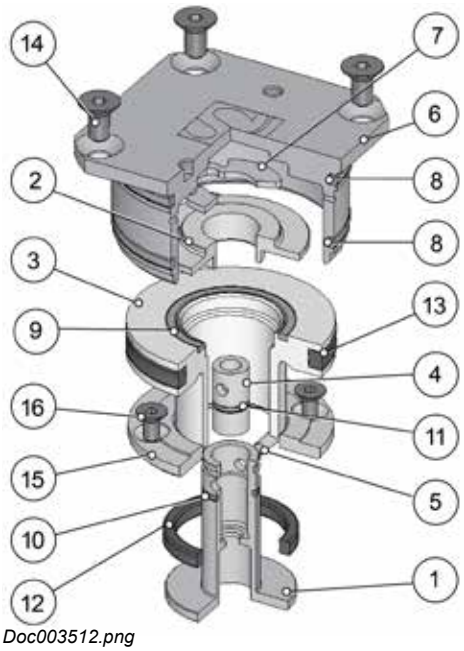
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Height Adjustment of Conical shut-off Valve pin

Valve Pin adjustment is found by machining the adjustment plug (4). This dimension is a function of the build-up of tolerances of many parts.

For optimal gate performance and appearance, this dimension must be established fully assembled, at operating temperatures and at each location.

In this section the actuator parts are identified with the numbers indicated in the following figure, which shows the components.



Doc003512.png

WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

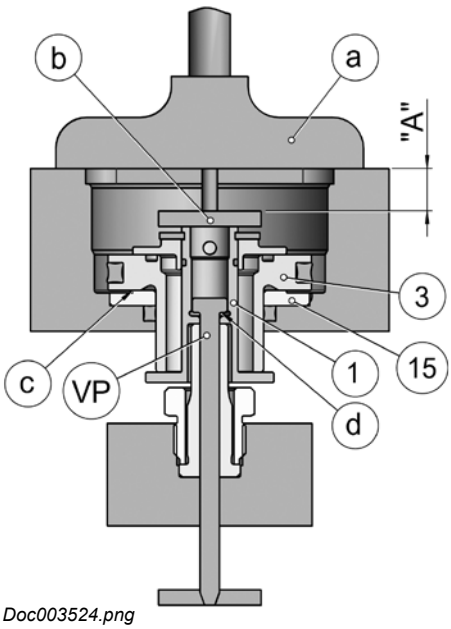
1) Bring system to operating temperature and allow to soak for 60 minutes.
2) Loosen and remove:
   - Countersunk head screw (14)
   - Cylinder cap (6)
   - Cross pin (5)
   - Adjustment plug (4)

3) Place a spacer block (b) over the valve pin coupling (1).

NOTICE

Note a gap (d) between
valve pin (VP) / valve pin coupling (1)
and contact (c) between
piston (3) / retainer (15).

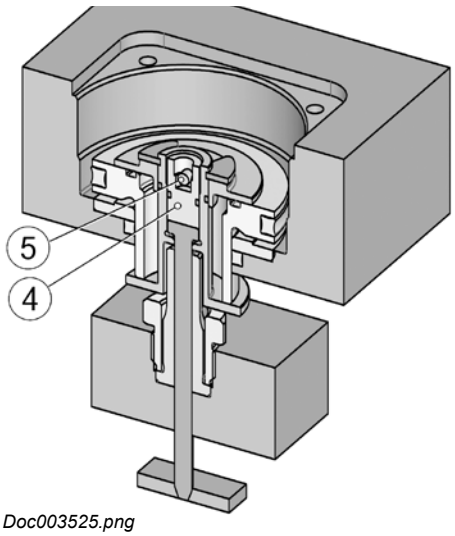
4) Measure dimension “A” with a micrometer (a) and record data.



Doc003524.png

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5) Install the adjustment plug (4) and cross pin (5).



Doc003525.png

6) Place the spacer block (b) over the valve pin coupling (1) again.

NOTICE

The valve pin will rest in the tapered gate (f).

NOTICE

Note contact (c) between
valve pin (VP) / valve pin coupling (1)
and a gap (d) between
piston (3) / retainer (15).

7) Measure dimension “B” with a micrometer (a) and record data.

NOTICE

The required machining to the adjustment plug (4) can now be calculated.

NOTICE

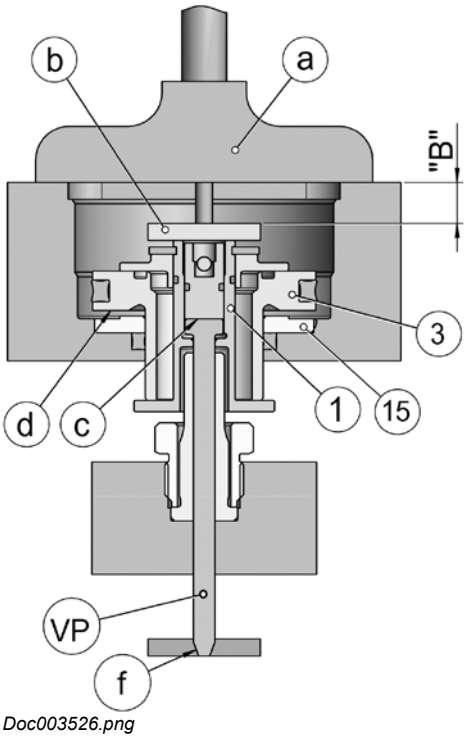
“C” is the length of material to be removed from the adjustment plug (as shown in Doc003521.png)

“A” and “B” are the dimensions recorded from the previous steps.

“P” is the protrusion of the Valve Pin. The protrusion is typically 0.13 mm (.005”).

8) The quantity of material “C” to be removed from the adjustment plug (4) is given by the equation:

“C” = (“A” – “B”) – “P”



Doc003526.png

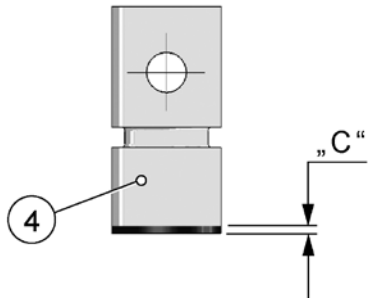
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9) Remove the cross pin (5).
10) Take the adjustment plug (4) out of the valve pin coupling (1).
11) Mark on the adjustment plug (4) the position "C"
12) Machine "C" from the adjustment plug (4).

NOTICE

The quantity “C” was determined in the preceding step.

13) Remove any burrs that may alter the adjustment.
14) Install the machined adjustment plug (4) in the corresponding location.
15) Install the cross pin (5).



Doc003521.png

16) Apply pressure (x) to the valve pin coupling (1).

NOTICE

Do not press down on the adjustment plug (4).

NOTICE

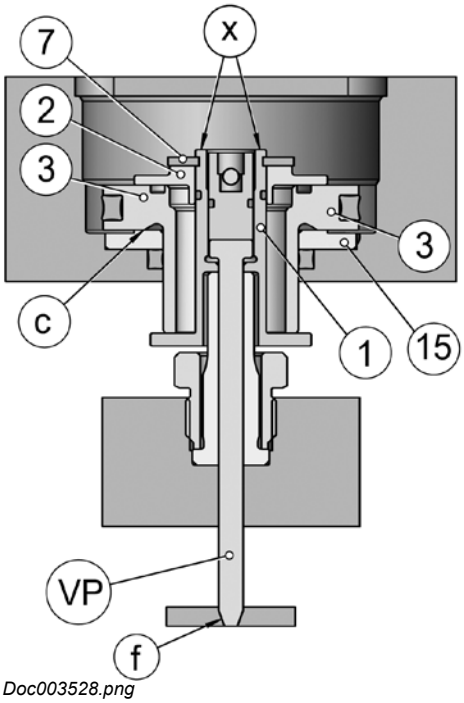
Note a gap (d) between
pin head (VP) / valve pin coupling (1)
and contact (c) between
piston (3) / retainer (15).

17) Check the contact between valve gate pin (VP) and valve gate (f).
18) Check the protrusion (P) of the valve gate pin (VP) at the valve gate.

NOTICE

The protrusion is typically 0.13 mm (.005”).

19) Assemble the piston (3), retainer (2), snap ring (7) and cylinder cap (6) as described in section 8.2.6.4

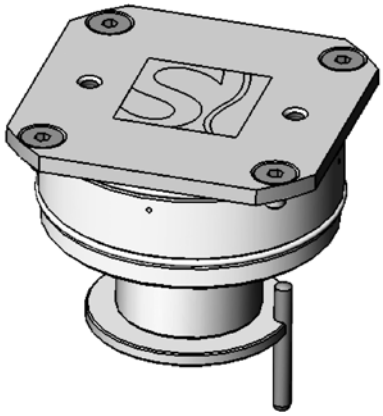


Doc003528.png

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8.2.8 Actuator VP8016P Series

8.2.8.1 Technical Data VP8016P0501, VP8016P0601, VP8016P0801



Doc003489.png

Actuator for hot runner systems, bolted to mold plate, pneumatic	
Valve pin operation	
Operation medium	pneumatic
Pressure range	6 - 10 bar (87 - 145 psi)
Pressure max.	11 bar (160 psi)
Valve pin stroke	16 mm
Adjustment	By machining the adjustment plug
Opening force	2788 N / 6 bar (87 psi)
Closing force	3016 N / 6 bar (87 psi)
Flow rate Instantaneous	10 l/min / 6 bar (87 psi)
Valve pin response time	~0.5 s / 6 bar (87 psi)
Connections	1/4 NPT or M 12x1.5 (8-L) Connecting in clamping plate
Cooling	
Medium	Clamping Plate Cooling (max. 100 °C / 210 °F) Cooling lines are required in clamping plate.
Valve pin	
Valve pin diameter	Ø 5 mm (VP8016P0501)
	Ø 6 mm (VP8016P0601)
	Ø 8 mm (VP8016P0801)
Attachment	Valve pin head within the piston
Miscellaneous Information	
Minimum clamping plate thickness	50 mm
Minimum pitch of the actuators	97 mm
Maximum distance from center support	650 mm

NOTICE

To ensure long life and continued, flawless operation, the use of filtered, dry, lubricated air is required.

The coolant used should be properly modified, e.g. filtered water with an anti-corrosion and frost-proof agent.

After switch off the hot runner heater, the cooling for the actuator have to be turned on for at least 15 minutes, to avoid damages of the actuator sealing.

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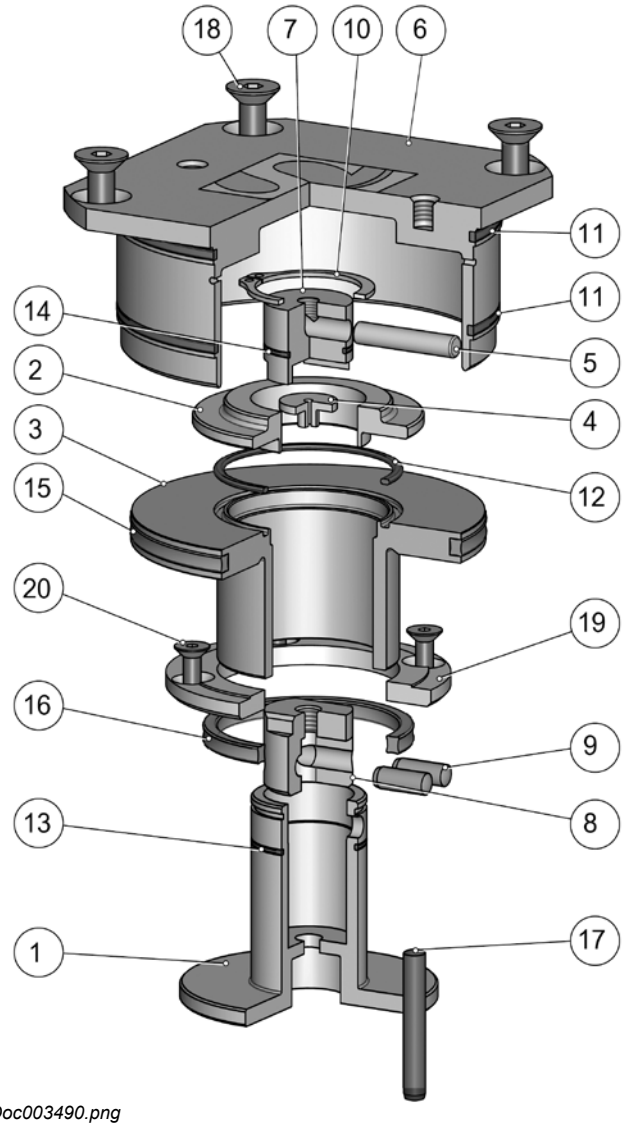
8.2.8.2 Explosion view of the VP8016P Series

This section describes the disassembly and assembly process of the actuator to replace seals.

In this section the actuator parts are identified with the numbers indicated in the following figure, which shows the components.

NOTICE

Always tighten the screws to the torques specified in the respective table, see section 13.



Doc003490.png

Actuator parts VP8016P Series

No.	Qty.	Description	Item
(1)	1	Valve pin coupling (for valve pin Ø 5 mm)	VP8016PC0501
(1)	1	Valve pin coupling (for valve pin Ø 6 mm)	VP8016PC0601
(1)	1	Valve pin coupling (for valve pin Ø 8 mm)	VP8016PC0801
(2)	1	Retainer	VP8016RT01
(3)	1	Piston	VP8016PI01
(4)	1	Adjustment plug	VP8016AP01
(5)	1	Cross pin	VP8016CP01
(6)	1	Cylinder cap	VP8016CC01
(7)	1	Anti rotation plug	VP8016AR01
(8)	1	Pin head	VP8016PH01
(9)	2	Dowel pin	DIN6325-5M6x14
(10)	1	Snap ring	VP8016N5100-102
(11)	2	Viton O-ring	VIOR-82.55x1.8-FPM-75-BR
(12)	1	Viton O-ring	VIOR-38.10x1.8-FPM-75-BR
(13)	1	Viton O-ring	VIOR-24.00x1.0-FPM-75-BR
(14)	1	Viton O-ring	VIOR-18.10x1.0-FPM-75-BR
(15)	1	Viton quad ring	VIQR-73.02x3.18-FPM-75-BL
(16)	1	Viton quad ring	VIQR-41.28x3.18-FPM-75-BL
(17)	1	Dowel pin	DIN6325-5M6x40
(18)	4	Countersunk head screw	DIN7991-M6x12-10.9
(19)	1	Retainer	VP8016RT02
(20)	4	Countersunk head screw	DIN7991-M4x10-10.9

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8.2.8.3 Basic Dimensions in Mold

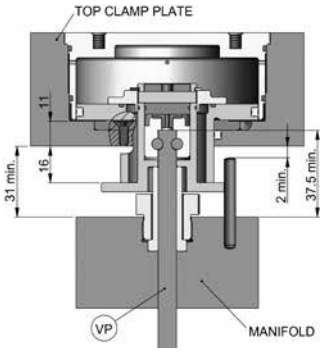
Minimum Distance between Manifold and Clamping plate

The gap between the top of the manifold and the bottom of the clamping plate should be 31 mm.

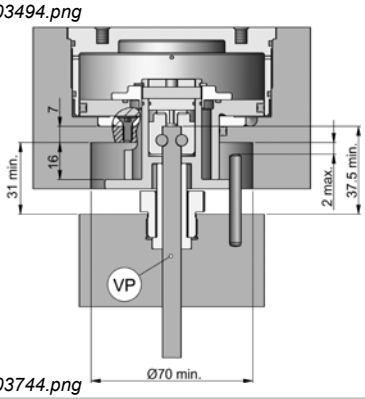
(see figure Doc003494.png)

The 31 mm gap may be smaller due to customer plate thicknesses which will require a 70 diameter counterbore in the bottom of the clamping plate to achieve the 31 mm gap.

(see figure Doc003744.png).

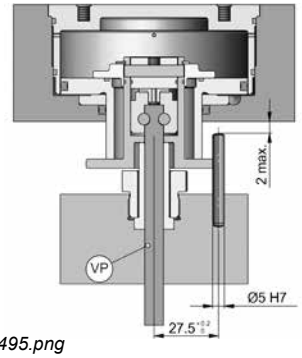


Doc003494.png



Doc003744.png

Dowel Hole Dimension and Location



Doc003495.png

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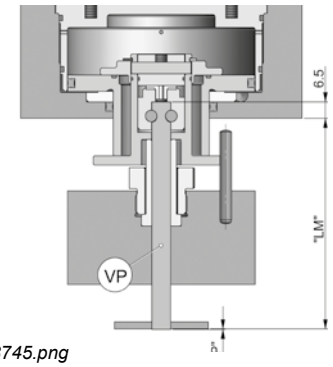
Valve Pin Length Calculation

The length of the valve pin in the cold condition is calculated with the formula:

(LM + 6.5 + Valve Pin Protrusion) / 1.002

“LM” is the distance between “0” extension of the gate to the top of the top air gap.

“P” is the Valve Pin Protrusion.



Doc003745.png

⚠ WARNING

Danger by Pneumatic

Pneumatic

Personal injury can result from connecting or disconnecting pneumatic hoses.

Pneumatic works must be carried out by qualified persons.

Use protective goggles or face protection or protective goggles, hearing protection (PPE)



Heavy Weight Hazard

Transport and lifting equipment should be operated only by trained personnel.

Use personal protective equipment, such as head gear, safety shoes and work gloves.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.



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Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as work gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

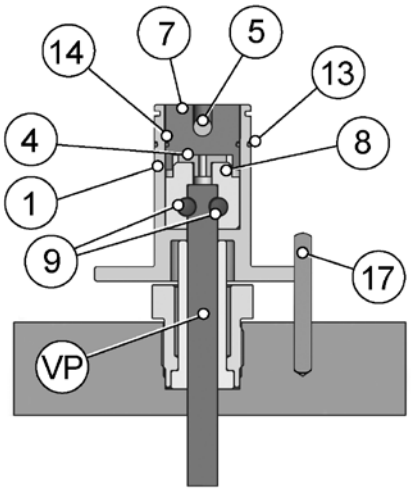


8.2.8.4 First mounting of Actuator VP8016P

NOTICE

After disassembly of the sealing elements the original seals should be replaced.

1) Lubricate the VITON O-ring (13) with hydraulic oil or white grease.
2) Install the VITON O-ring (13) into the valve pin coupling (1) seal groove.
3) Lead the valve pin (VP) into the valve pin guide (1).
4) Place the valve pin coupling (1) on the valve pin guide.
5) Place the pin head (8) on the valve pin (VP).
6) Fix with the dowel pins (9) the pin head (8) on the valve pin (VP).
7) Place the adjustment plug (4) on the pin head (8).
8) Lubricate the VITON O-ring (14) with hydraulic oil or white grease.
9) Install the VITON O-ring (14) into the anti rotation plug (7) seal groove.
10) Place the anti rotation plug (7) on the adjustment plug (4).
11) Secure the anti rotation plug (7) with the cross pin (5) in the valve pin coupling (1).



Doc003507.png

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NOTICE

After disassembly of the sealing elements the original seals should be replaced.

12) Install the VITON quad ring (16) into the clamping plate (a) seal groove.

13) Install the retainer (19) with 4 screws (20) into the clamping plate (a).

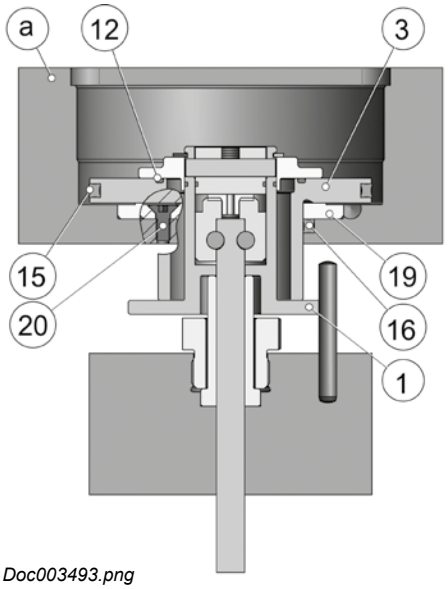
NOTICE

Apply Loctite 272 on the thread of the 4 socket counter sunk head cap screws (20).



WARNING

Heavy Weight Hazard



Doc003493.png

14) Place the clamping plate (a) on the destined position on the mold.

15) Install the VITON quad ring (15) into the piston (3) seal groove.

16) Install the VITON O-ring (12) into the piston (3) seal groove.

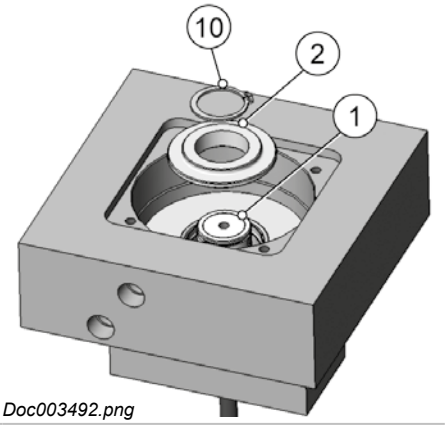
17) Place the piston (3) into the cutout of the clamping plate.

NOTICE

The piston (3) will be placed on the flange of the valve pin coupling (1).

18) Place the retainer (2) on the piston (3).

19) Secure the retainer (2) with the snap ring (10) at the valve pin coupling (1).



Doc003492.png

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20) Install the two VITON O-rings (11) into the cylinder cap (6) seal grooves.
21) Place the cylinder cap (6) on the clamping plate.
22) Lubricate the thread of the countersunk head screws (18) with high-temperature assembly paste (anti-seize compound).

NOTICE

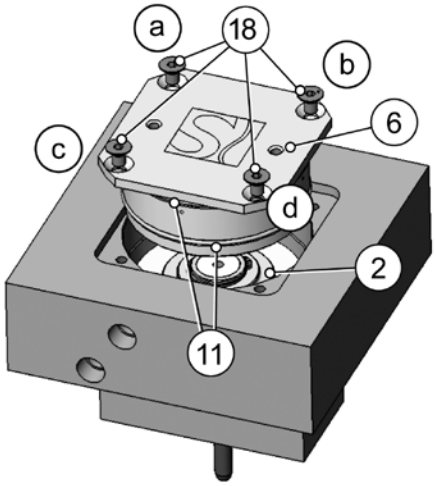
This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

23) Attach the cylinder cap (6) at the clamping plate with the four countersunk head screws (18).

NOTICE

Tighten the countersunk head screws (18) in an X pattern (a, d, c, b).

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

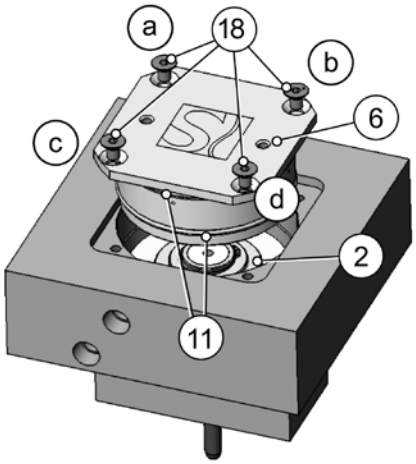


Doc003491.png

For valve pin height adjustment of the actuator VP8016P see section 8.2.8.6

8.2.8.5 Dismounting the Actuator VP8016P

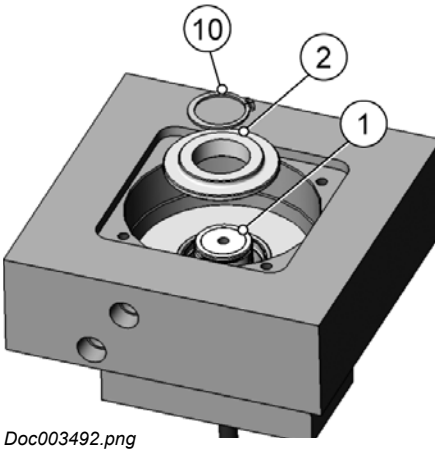
1) Unscrew and remove the four countersunk head screw (18).
2) Remove the cylinder cap (6).
3) Remove the O-ring seals (11) out of the cylinder cap (6) seal grooves.



Doc003491.png

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4) Remove the snap ring (10).
5) Remove the retainer (2).



Doc003492.png

WARNING

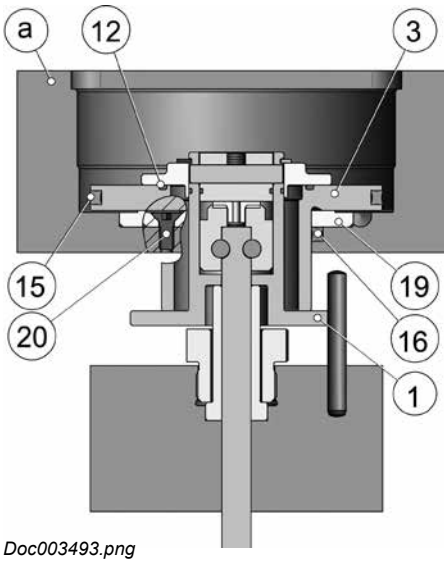
Heavy Weight Hazard

6) Lift the clamping plate (a) from the mold.

NOTICE

During lifting the clamping plate (a) from the mold, the piston (3) will be elevated up from of the valve pin coupling (1) flange.

7) Remove the retainer (19) with 4 screws (20) out of the clamping plate.
8) Remove the VITON quad ring (16) out of the clamping plate (a) seal groove.
9) Remove the VITON quad ring (15) out of the piston (3) seal groove.
10) Remove the O-ring (12) out of the piston (3) seal groove.



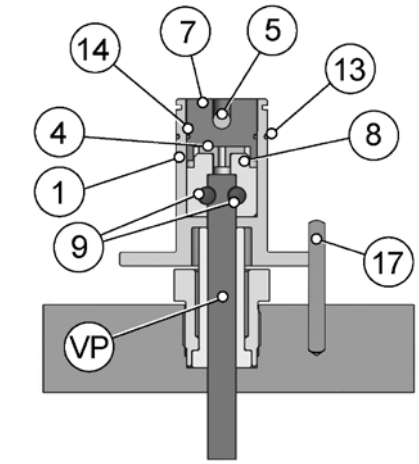
Doc003493.png

11) Lift the valve pin coupling (1) from the valve pin guide.

NOTICE

During lifting the valve pin coupling (1) the valve pin (VP) will be lifted up from the valve pin guide.

12) Remove the cross pin (5) out of the valve pin coupling (1) and anti rotation plug (7).
13) Push the valve pin (VP) with the pin head (8), adjustment plug (4) and anti rotation plug (7) out of the valve pin coupling (1).
14) Remove the O-ring (14) out of the anti rotation plug (7) seal groove.
15) Remove the dowel pins (9) out of the pin head (8).
16) Lift the pin head (8) from the valve pin (VP).
17) Remove the O-ring seal (13) out of the valve pin coupling (1) seal groove.



Doc003507.png

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8.2.8.6 Valve Pin Height Adjustment VP8016P Series

Precondition for the following steps are to be performed with the actuator installed in the mold.

For optimal gate performance and appearance, this dimension must be established fully assembled, at operating temperatures and at each location.

⚠ WARNING



Heavy Weight Hazard

Transport and lifting equipment should be operated only by trained personnel.

Use personal protective equipment, such as head gear, safety shoes and work gloves.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.

For first aid contact your medical / safety representing





Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment such as gloves, apron, sleeves and face protection to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing



NOTICE



Hazard of Material Damage

The following steps are to be performed with the actuator installed in the mold, and the system at operating temperature.

Clamping plate cooling (max. 100 °C / 210 °F) must be on to prevent damage to the actuator seals.

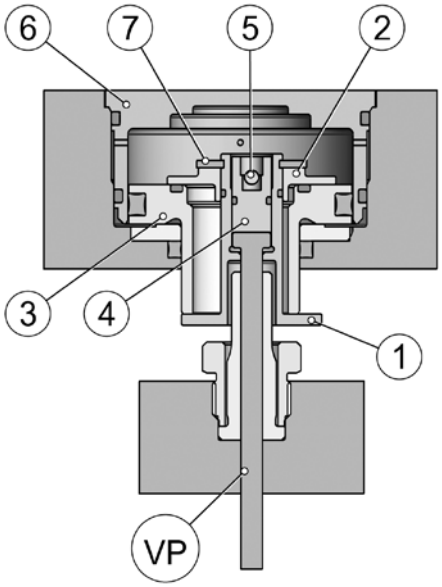
After switch off the hot runner heater, the cooling for the cylinder have to be turned on for at least 15 minutes, to avoid damages of the actuator sealing.

Thermal Expansion Calculation

In cold condition

the following parts are off center from the cylinder cap (6) and piston (3).

- Valve gate pin (VP)
- Valve pin coupling (1)
- Adjustment plug (4)
- Cross pin (5)
- Retainer (2)
- Snap ring (7)



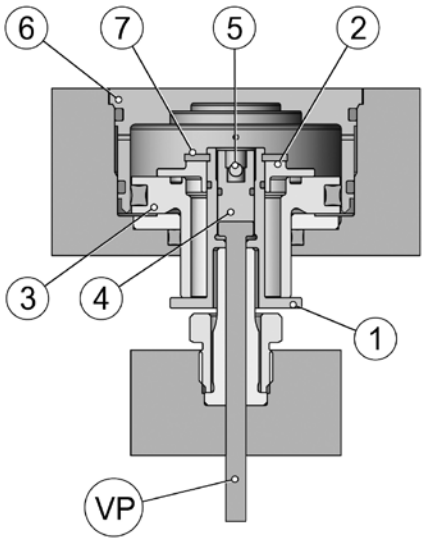
Doc003529.png

At operating temperature of the hot runner system

the following parts are centric to cylinder cap (6) and piston (3).

- Valve gate pin (VP)
- Valve pin coupling (1)
- Adjustment plug (4)
- Cross pin (5)
- Retainer (2)
- Snap ring (7)

The hot runner system has been developed so that the valve gate pin centered below the piston at operating temperature.



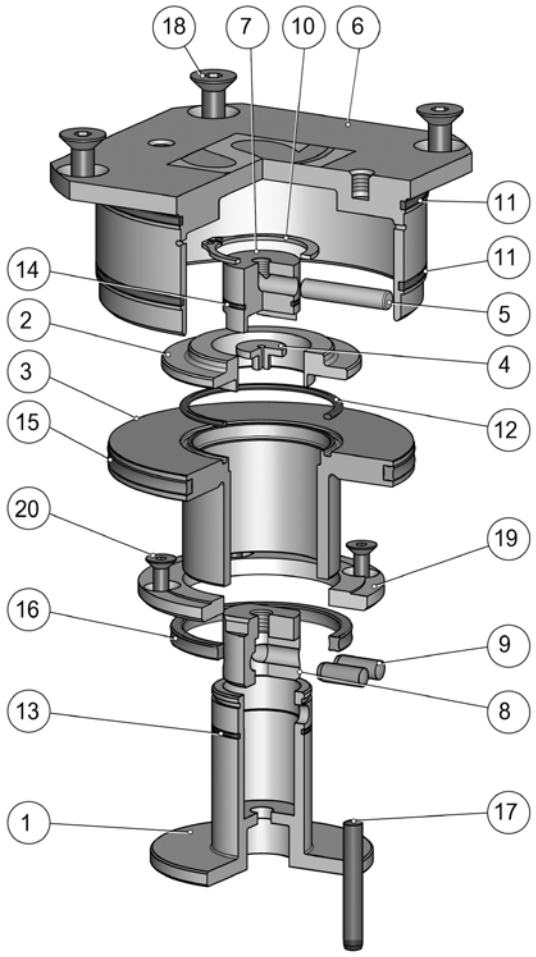
Doc003530.png

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Height Adjustment of Cylindrical shut-off Valve pin

Valve pin height adjustment of cylindrical shut-off valve pins, found by machining the adjustment plug (4). This dimension is a function of the build-up of tolerances of many parts.

In this section the actuator parts are identified with the numbers indicated in the following figure, which shows the components.



Doc003490.png

Actuator parts VP8016P

No.	Qty.	Description	Item
(1)	1	Valve pin coupling (for valve pin Ø 5 mm)	VP8016PC0501
(1)	1	Valve pin coupling (for valve pin Ø 6 mm)	VP8016PC0601
(1)	1	Valve pin coupling (for valve pin Ø 8 mm)	VP8016PC0801
(2)	1	Retainer	VP8016RT01
(3)	1	Piston	VP8016PI01
(4)	1	Adjustment plug	VP8016AP01
(5)	1	Cross pin	VP8016CP01
(6)	1	Cylinder cap	VP8016CC01
(7)	1	Anti rotation plug	VP8016AR01
(8)	1	Pin head	VP8016PH01
(9)	2	Dowel pin	DIN6325-5M6x14
(10)	1	Snap ring	VP8016N5100-102
(11)	2	Viton O-ring	VIOR-82.55x1.8-FPM-75-BR
(12)	1	Viton O-ring	VIOR-38.10x1.8-FPM-75-BR
(13)	1	Viton O-ring	VIOR-24.00x1.0-FPM-75-BR
(14)	1	Viton O-ring	VIOR-18.10x1.0-FPM-75-BR
(15)	1	Viton quad ring	VIQR-73.02x3.18-FPM-75-BL
(16)	1	Viton quad ring	VIQR-41.28x3.18-FPM-75-BL
(17)	1	Dowel pin	DIN6325-5M6x40
(18)	4	Countersunk head screw	DIN7991-M6x12-10.9
(19)	1	Retainer	VP8016RT02
(20)	4	Countersunk head screw	DIN7991-M4x10-10.9

1) Bring system to operating temperature and allow to soak for 60 minutes.
2) Loosen and remove:
   - Countersunk head screw (18)
   - Cylinder cap (6)
   - Cross pin (5)
   - Anti rotation plug (7)

WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

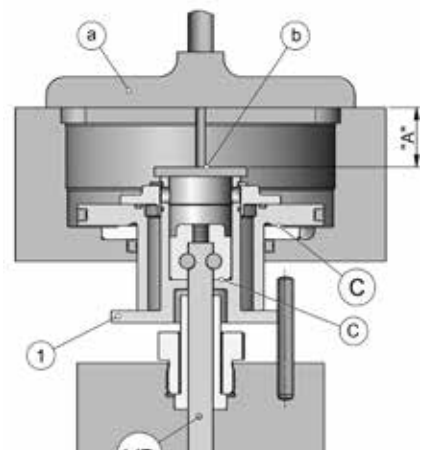
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3) Place a spacer block (b) over the valve pin coupling (1).

NOTICE

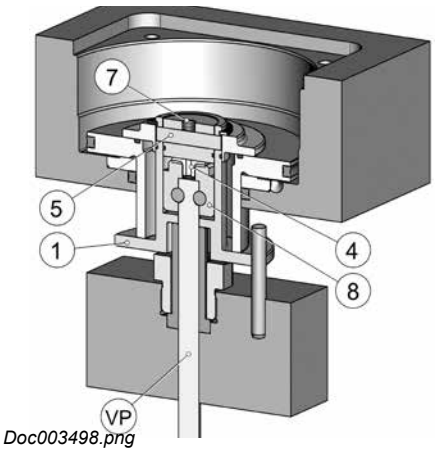
Note contact (c) between
pin head (8) / valve pin coupling (1)
and
piston (3) / retainer (19).

4) Measure dimension “A” with a micrometer (a) and record data.



Doc003497.png

5) Place the adjustment plug (4) on the pin head (8).
6) Place the anti rotation plug (7) on the adjustment plug (4).
7) Secure the anti rotation plug (7) with the cross pin (5) in the valve pin coupling (1).



Doc003498.png

8) Place the spacer block (b) over the valve pin coupling (1) again.
9) Provide a means of holding the valve pin flush with the surrounding gate area.

NOTICE

Any required valve pin protrusion will be added via calculation.

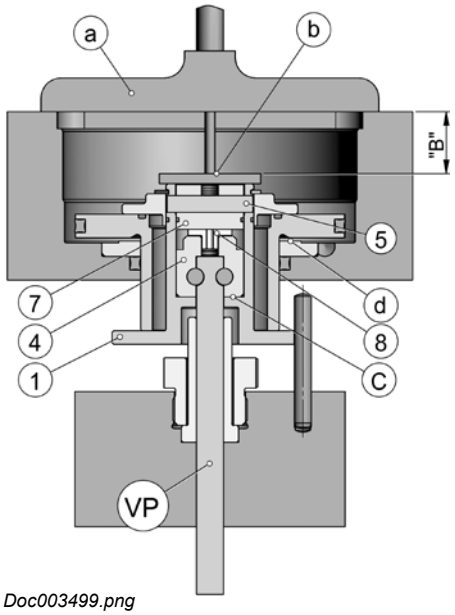
NOTICE

Note contact (c) between
pin head (8) / valve pin coupling (1)
and a gap (d) between
piston (3) / retainer (19).

10) Measure dimension “B” with a micrometer (a) and record data.

NOTICE

The required machining to the adjustment plug (4) can now be calculated.



Doc003499.png

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NOTICE

"C" is the length of material to be removed from the adjustment plug (as shown in Doc003500.png).

"A" and "B" are the dimensions recorded from the previous steps.

"P" is the protrusion of the Valve Pin. The protrusion is typically 0.13 mm (.005").

11) The quantity of material "C" to be removed from the adjustment plug (4) is given by the equation:

"C" = ("A" – "B") – "P"

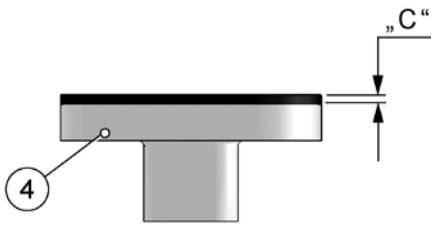
---

12) Take the adjustment plug (4) out of the valve pin coupling (1).
13) Mark on the adjustment plug (4) the position "C"
14) Machine "C" from the adjustment plug (4).

NOTICE

The quantity "C" was determined in the preceding step.

15) Remove any burrs that may alter the adjustment.
16) Install the machined adjustment plug (4), the anti rotation plug (7) and cross pin (5) as described in section 8.2.8.4.



Doc003500.png

---

17) Have an assistant press down (x) on the valve pin coupling (1).

NOTICE

Do not press down on the adjustment plug (4).

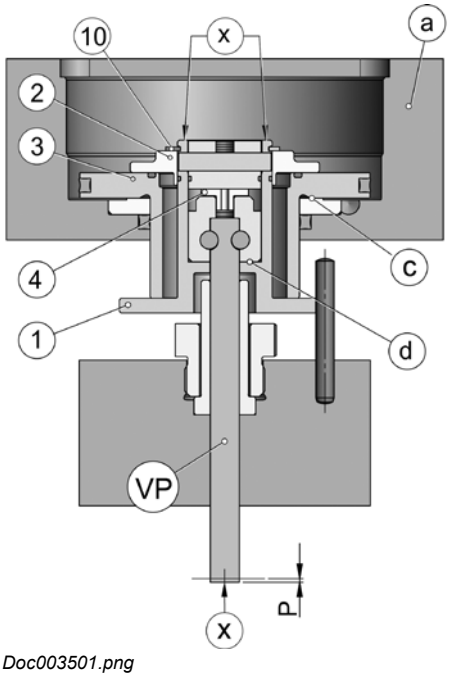
Taking care to not damage the surface of the valve pin (VP).

18) Apply pressure (x) to the gate end of the valve pin (VP) to take up any play in the system.
19) Check the protrusion (P) of the valve gate pin (VP) at the valve gate (f).

NOTICE

The protrusion is typically 0,13 mm (.005").

20) Assemble the piston (3), retainer (2), snap ring (7) and cylinder cap (6) as described in section 8.2.8.4.



Doc003501.png

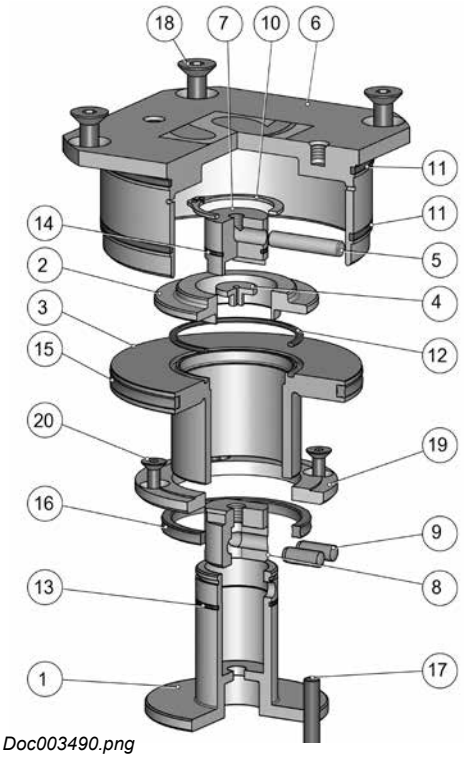
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Height Adjustment of Conical shut-off Valve pin

Valve Pin adjustment is found by machining the adjustment plug (4). This dimension is a function of the build-up of tolerances of many parts.

For optimal gate performance and appearance, this dimension must be established fully assembled, at operating temperatures and at each location.

In this section the actuator parts are identified with the numbers indicated in the following figure, which shows the components.



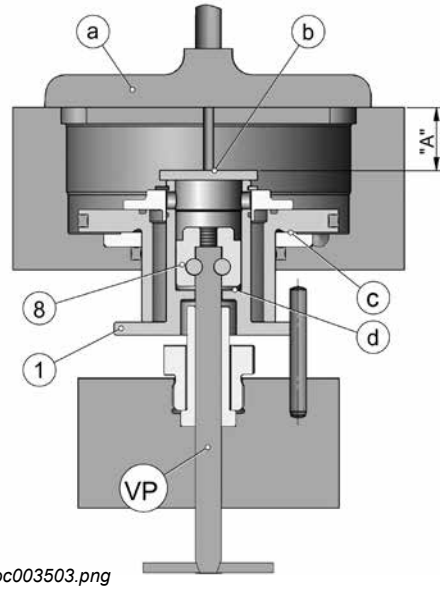
Doc003490.png

WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

1) Bring system to operating temperature and allow to soak for 60 minutes.
2) Loosen and remove:
   - Four countersunk head screws (18)
   - Cylinder cap (6)
   - Cross pin (5)
   - Anti rotation plug (7)



Doc003503.png

3) Place the spacer block (b) over the valve pin coupling (1) again.

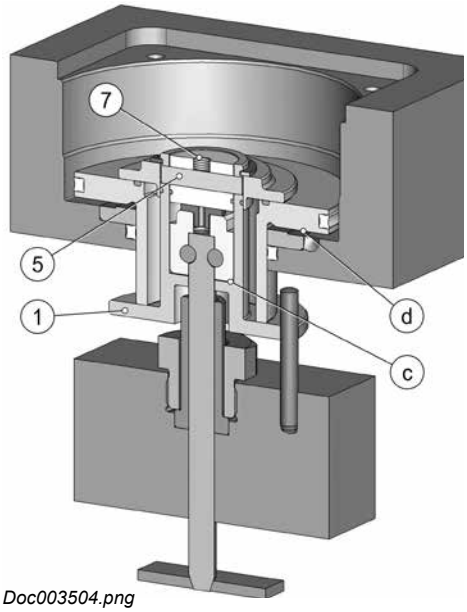
NOTICE

Note a gap (d) between
pin head (8) / valve pin coupling (1)
and contact (c) between
piston (3) / retainer (19).

4) Measure dimension “A” with a micrometer (a) and record data.

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5) Install the anti rotation plug (7) and cross pin (5).



Doc003504.png

6) Place a spacer block (b) over the valve pin coupling (1).

NOTICE

The valve pin will rest in the tapered gate (f).

NOTICE

Note contact (c) between
pin head (8) / valve pin coupling (1)
and a gap (d) between
piston (3) / retainer (19).

7) Measure dimension “B” with a micrometer (a) and record data.

NOTICE

The required machining to the adjustment plug (4) can now be calculated.

NOTICE

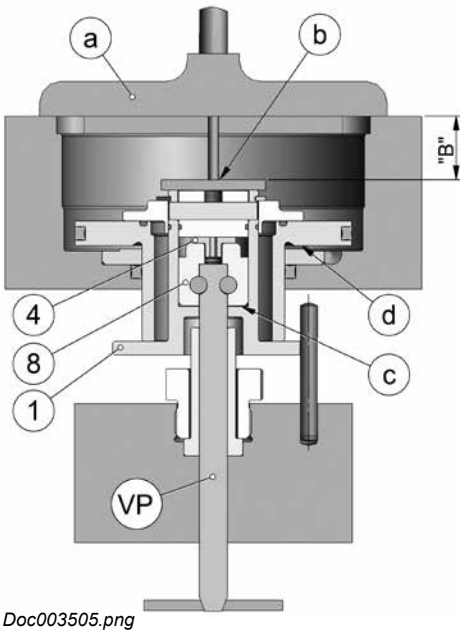
“C” is the length of material to be removed from the adjustment plug (4).
(as shown in Doc003500.png)

“A” and “B” are the dimensions recorded from the previous steps.

“P” is the protrusion of the Valve Pin. The protrusion is typically 0,13 mm (.005”).

8) The quantity of material “C” to be removed from the adjustment plug (4) is given by the equation:

“C” = (“A” – “B”) – “P”



Doc003505.png

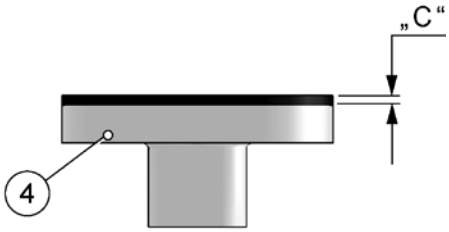
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9) Disassemble the adjustment plug (4) out of the valve pin coupling (1).
10) Mark on the adjustment plug (4) the position "C"
11) Machine "C" from the adjustment plug (4).

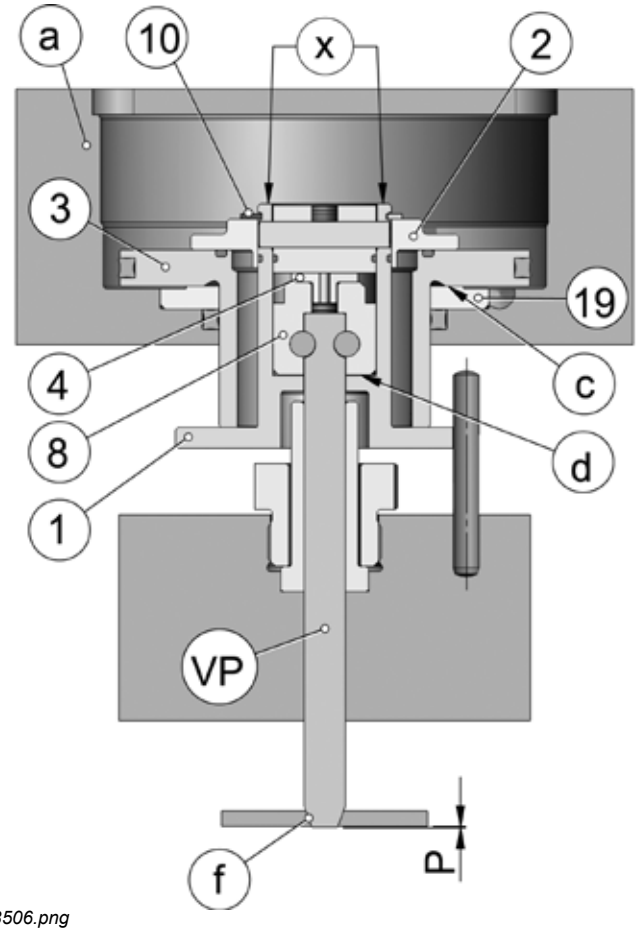
NOTICE

The quantity “C” was determined in the preceding step.

12) Remove any burrs that may alter the adjustment.



Doc003500.png



Doc003506.png

13) Install the machined adjustment plug (4), the anti rotation plug (7) and cross pin (5) as described in section 8.19.4.
14) Apply pressure (x) to the valve pin coupling (1).

NOTICE

Do not press down on the anti rotation plug (4).

Note a gap (d) between pin head (8) / valve pin coupling (1) and contact (c) between piston (3) / retainer (19).

15) Check the contact between valve gate pin (VP) and valve gate (f).
16) Check the protrusion (P) of the valve gate pin (VP) at the valve gate (f).

NOTICE

The protrusion is typically 0,.3 mm (.005”).

17) Assemble the piston (3), retainer (2), snap ring (7) and cylinder cap (6) as described in section 8.19.4

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9 Valve Pins

9.1 Valve Pin Dismantling

for HYC-, PNC-, VP- and QCVG series (variable adapters)

⚠ WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.



1) Disassembling the actuator.

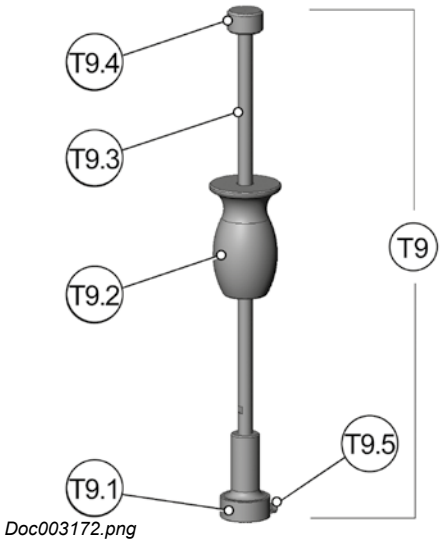
⚠ WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

2) Heat the hot runner system to operating temperature.

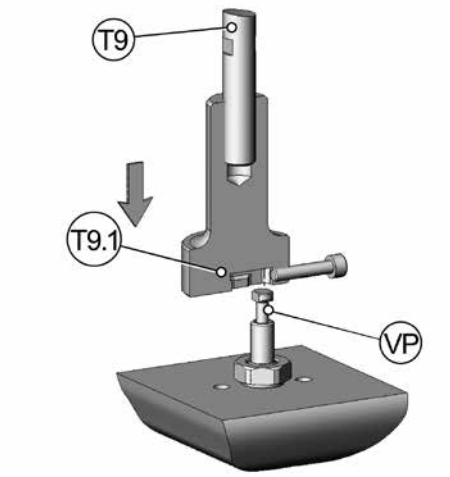
3) Assemble the valve pin slide hammer tool (T9).
   - (T9.1) Adapter
   - (T9.2) Hammer
   - (T9.3) Guide pillar
   - (T9.4) Stop position
   - (T9.5) Socket head cap screw



Doc003172.png

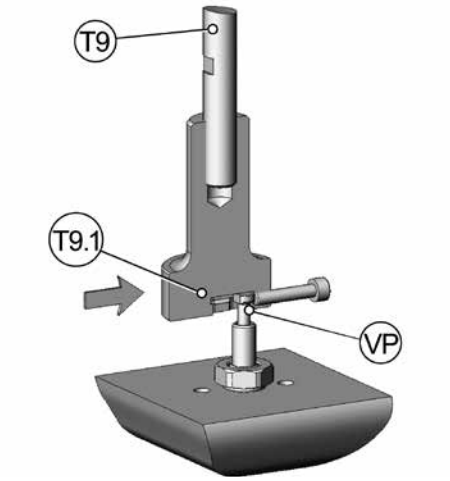
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4) Shift the valve pin slide hammer tool (T9) to make sure that the valve pin head (VP) locks in the adapter (T9.1).



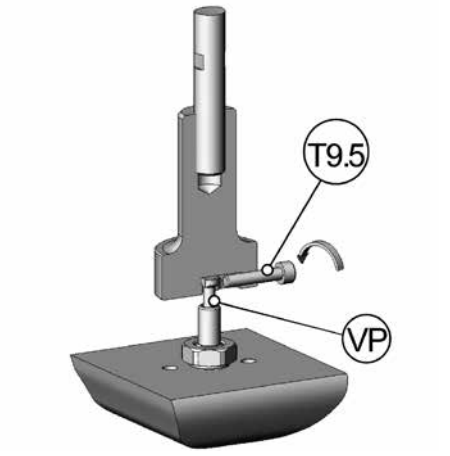
Doc003173.png

5) Fit the valve pin slide hammer tool (T9) adapter (T9.1) on the valve pin head (VP).



Doc003174.png

6) Tighten the socket head cap screw (T9.5) firmly to make sure the valve pin (VP) is secured.



Doc003175.png

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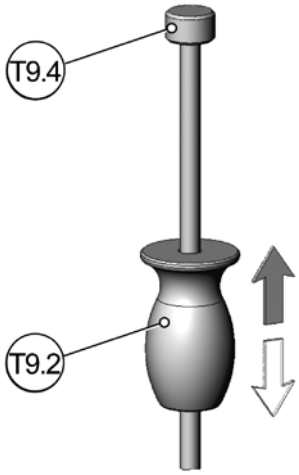
WARNING

Danger of injuries to hands.

Wear work gloves..



7) Slide the hammer (T9.2) against the stop position (T9.4) repeatedly until the valve pin is released.



Doc003176.png

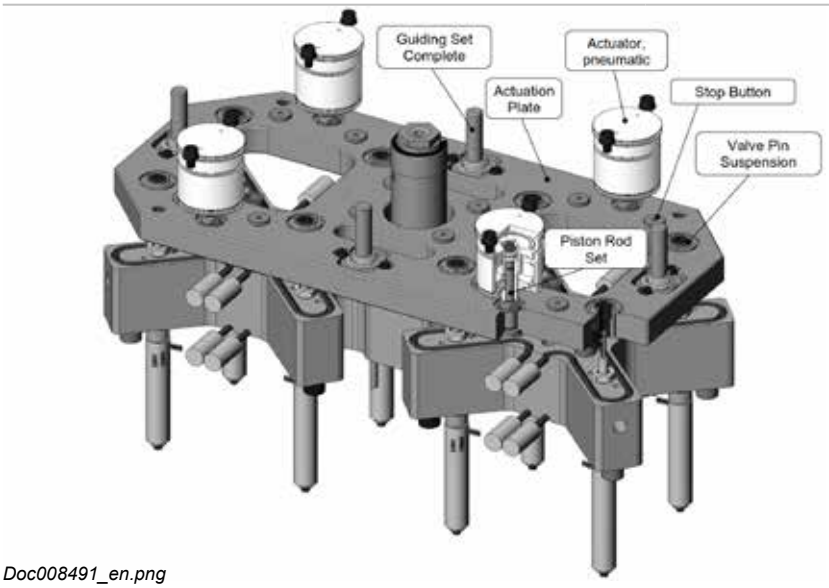
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9.2 Plate Actuation

9.2.1 Plate Actuation, Actuators above Plate

Plate actuation is ideal for synchronized filling of high cavitation molds

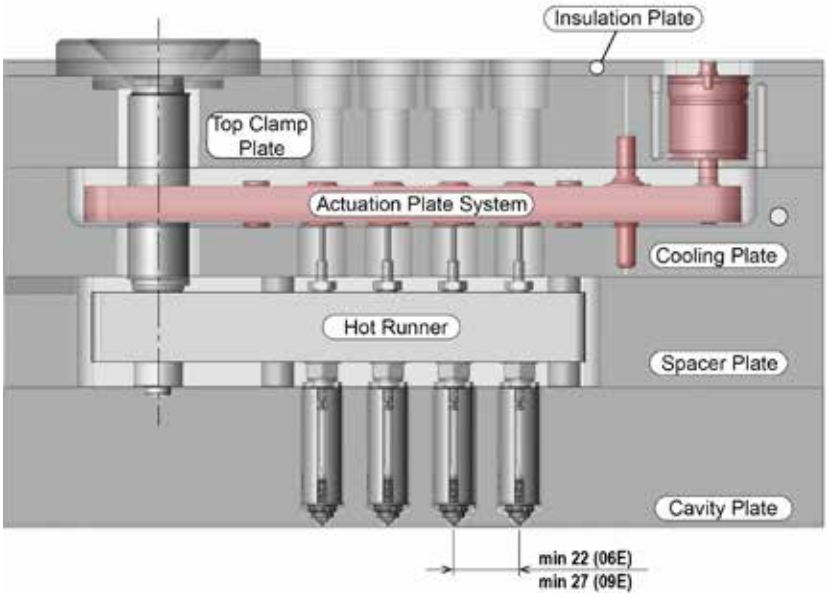
- High cavitation synchronized needle opening
- Consistent part filling (weight)
- Low service costs



Doc008491_en.png

Basic Elements of the Plate Actuation System:

- Actuation plate
- Stop buttons
- Actuators (pneumatic)
- Piston rod set
- Guiding set complete
- Valve pin suspension assemblies with anti rotation screws



Doc007518.png

Pitch Dimensions

Nozzle 06E = min. 22 mm

Nozzle 09E = min. 27 mm

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9.2.1.1 Mounting the Plate Actuation System

WARNING





Heavy Weight Hazard

Transport and lifting equipment should be operated only by trained personnel.

Use personal protective equipment, such as head gear, safety shoes and work gloves.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.

When unpacking the Plate Actuation Hot Runner System, there is a risk of injury due to falling parts and sharp edges. Maintain a minimum distance of 1 m from the Hot Runner System.

For first aid contact your medical / safety representing.







NOTICE



Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

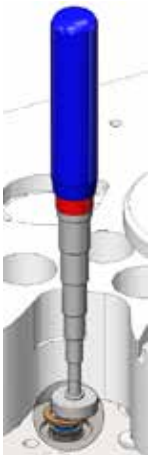
Never install or remove the hot runner when the manifold or nozzles are hot, this may cause damage to the nozzles.

Move the Hot Runner System only up or down at room temperature 20 °C (68 °F).

Always tighten the screws to the torque specified in the respective table in section 4.

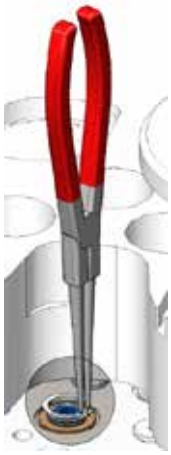
Tools for Assembling, Disassembling and Adjusting the Valve Pins

Magnetic Rod



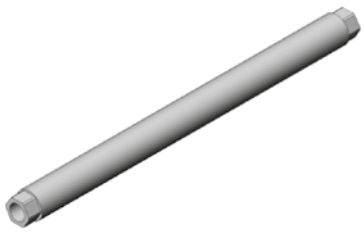
Doc007527.png

Snap Ring Plier (Extra long)



Doc007526.png

To adjust the valve pins, the tool ATCYL2102 and a commercially Hexagon Socket Wrench is required

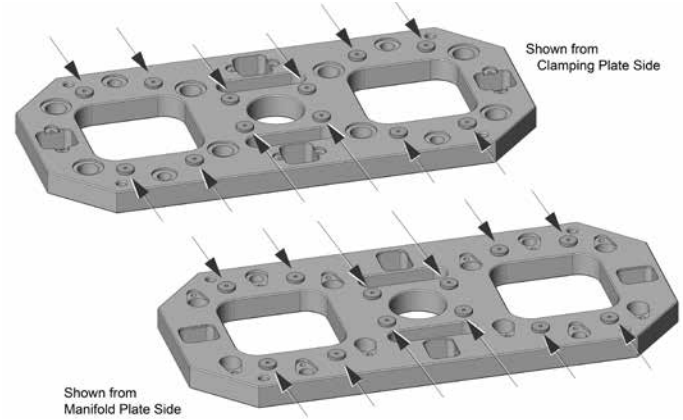


Doc007519.png

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9.2.1.2 Assemble the Actuation Plate

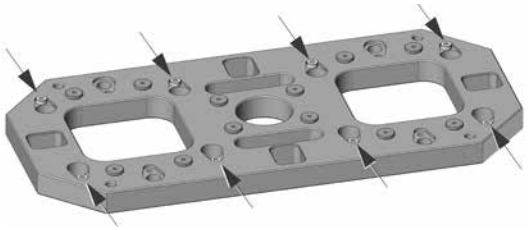
Assemble the Stop Buttons on both Side



Doc007520.png

1) Assemble the stop buttons on both side (Manifold Side / Clamping Plate Side).
2) Fix the stop buttons with screws.

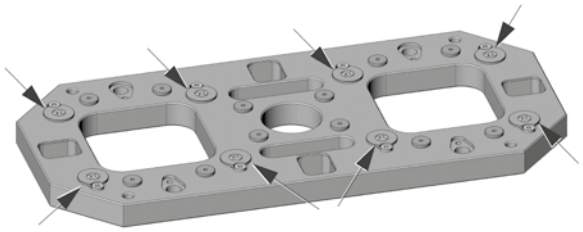
Assemble the Anti-rotation Screws on the Manifold Side



Doc007521.png

1) Assemble the anti-rotation screws (DIN7984-M6X8) on the manifold side.

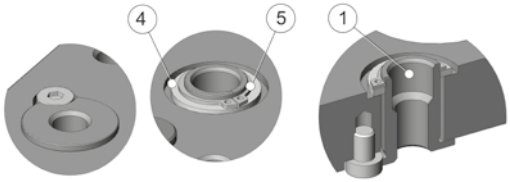
Assemble the Valve Pin Suspension Sleeve (VPSS-0x) on the Manifold Side



Doc007522.png

1) Assemble the valve pin suspension sleeves (1) at the actuation plate from the manifold side.
2) Fix the valve pin suspension sleeves (1) with washer (4) and heavy duty retaining ring for shafts (5) from the clamping plate side.

Details Valve Pin Suspension



Doc007523.png

Valve Pin Suspension Assembly Version 04 for:

Valve pin (VP) ø3.0 mm → **VPS-30-04**
Valve pin (VP) ø3.8 mm → **VPS-38-04**

Pos.	Part No.	Description
01	VPSS-03	Valve Pin Suspension Sleeve
02	PNC4508B-HS-02 PNC4508B-HS-01	Hanger screw M11x1, Valve pin Ø 3.0 Hanger screw M11x1, Valve pin Ø 3.8
03	PNC4508B-LS-01	Lock Screw M11x1
04	W-17-24-2-01	Washer; 17x24x2
05	DIN471-AS17X1.5	Heavy duty Retaining ring for shafts
06	DIN7984-M6X8-10.9	Hexagon socket cap screw DIN7984



Doc008492.png

Valve Pin Suspension Assembly Version 05 for:

Valve pin (VP) ø3.0 mm → **VPS-30-05**
Valve pin (VP) ø3.8 mm → **VPS-38-05**

Pos.	Part No.	Description
01	VPSS-04	Valve Pin Suspension Sleeve
02	PNC4508B-HS-02 PNC4508B-HS-01	Hanger screw M11x1, Valve pin Ø 3.0 Hanger screw M11x1, Valve pin Ø 3.8
03	PNC4508B-LS-01	Lock Screw M11x1
04	W-17-24-2-02	Washer; 17x24x2
05	DIN471-AS17X1.5	Heavy duty Retaining ring for shafts
06	DIN7984-M6X8-10.9	Hexagon socket cap screw DIN7984



Doc008493.png

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Valve Pin Suspension Assembly Version 06 for:

Valve pin (VP) ø3.0 mm → **VPS-30-06**
Valve pin (VP) ø3.8 mm → **VPS-38-06**

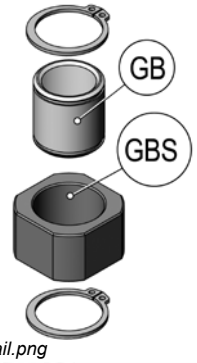
Pos.	Part No.	Description
01	VPSS-04	Valve Pin Suspension Sleeve
02	PNC4508B-HS-02 PNC4508B-HS-01	Hanger screw M11x1, Valve pin Ø 3.0 Hanger screw M11x1, Valve pin Ø 3.8
03	PNC4508B-LS-01	Lock Screw M11x1
04	W-17-24-2-01	Washer; 17x24x2
05	DIN471-AS17X1.5	Heavy duty Retaining ring for shafts
06	DIN7984-M6X8-10.9	Hexagon socket cap screw DIN7984



Doc008494.png

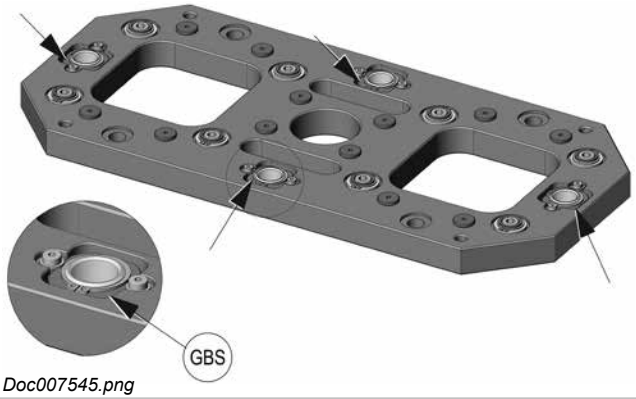
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Assemble the Guiding Bushings in the Actuation Plate



Doc007549_detail.png

1) Assemble the guiding bushings (GB) in the guiding bush seat (GBS).
2) Fix the guiding bushings with retaining rings for shafts DIN471 (RB)

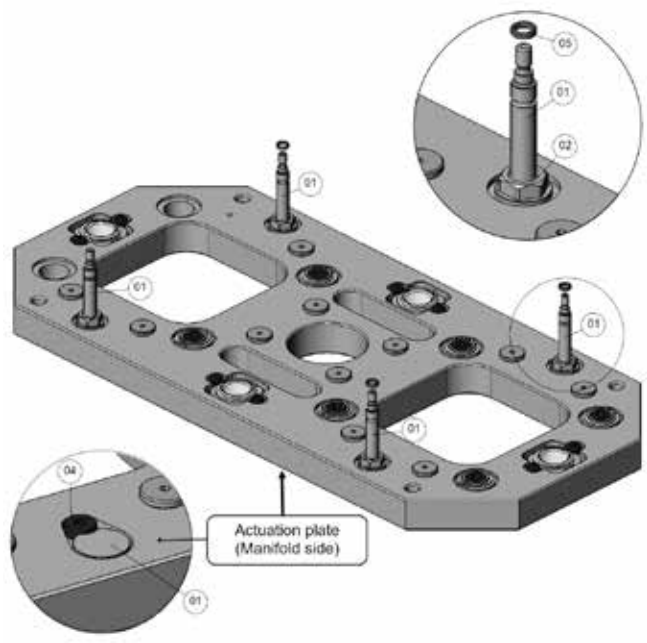


Doc007545.png

3) Screw the guiding bush seat (GBS) into the actuation plate.

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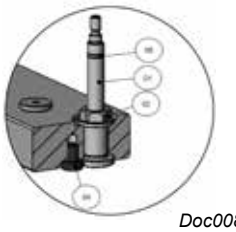
Assemble the Piston Rod Set on the Actuation Plate



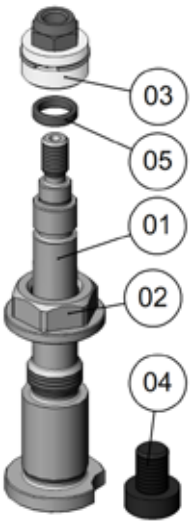
Doc008495_en.png

1) Install the seals (05) at the Piston Rods (01).
2) Assemble the Anti-rotation screws DIN7984-M6X8 (04) for the piston rod (01) on the manifold side of the actuation plate.
3) Assemble the piston rods (01) at the actuation plate from the manifold side.
4) Tighten (HEX14/Nm20) the piston rod nuts (02) on the piston rods (01).
5) Assemble the fixing unit (03), see (FU) “Assemble the actuator”.

Details Piston Rod



Doc008496.png



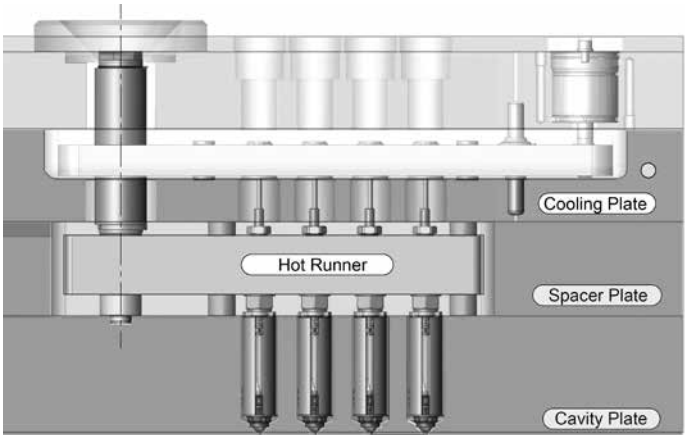
Doc008497.png

Assembly of Piston Rod Set PRS-12-73-02

Pos.	Part No.	Description
01	PR-12-73-03	Piston Rod; D12; L73
02	PRN-M10-14-07-01	Piston Rod Nut
03	00530084	Fixing Unit
04	DIN7984-M6X8-10.9	Hexagon socket cap screw DIN7984
05	VIOR-5.00x1.50-FPM-75-G	O-Ring Seal

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9.2.1.3 Assemble the Hot Runner System



Doc007528.png

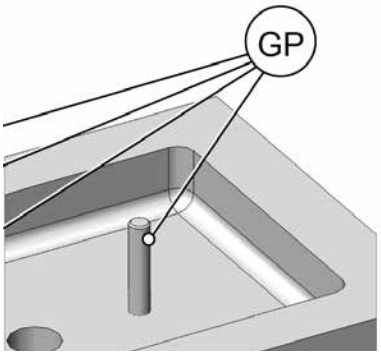
WARNING

Heavy Weight Hazard

1) Assemble the Hot Runner on the Cavity Plate.
2) Mount the Cooling Plate.

Mount the Guide Set Complete

1) Assemble all Guide Pillars (GP).

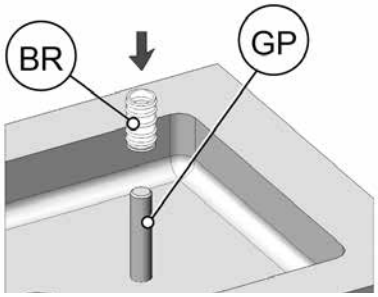


Doc007455.png

NOTICE

For lubrication use high-pressure long therm lubricant Strack Z9080

2) Assemble the Ball Retainers (BR) on the Guide Pillars (GP).

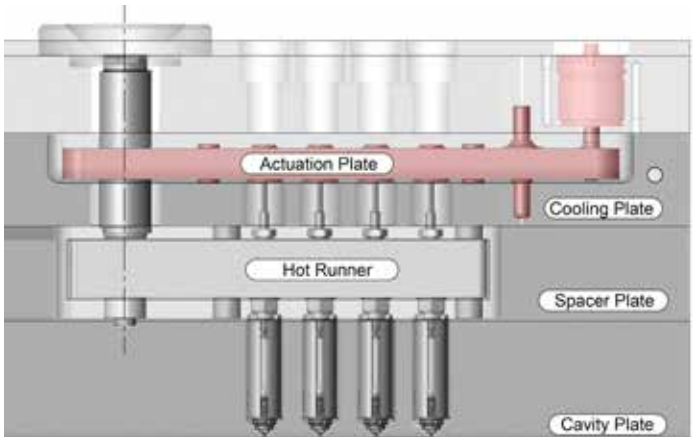


Doc007456.png

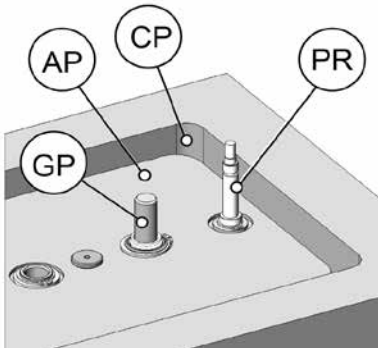
WARNING

Heavy Weight Hazard

3) Mount the Actuation Plate (AP) into the Cooling Plate (CP).

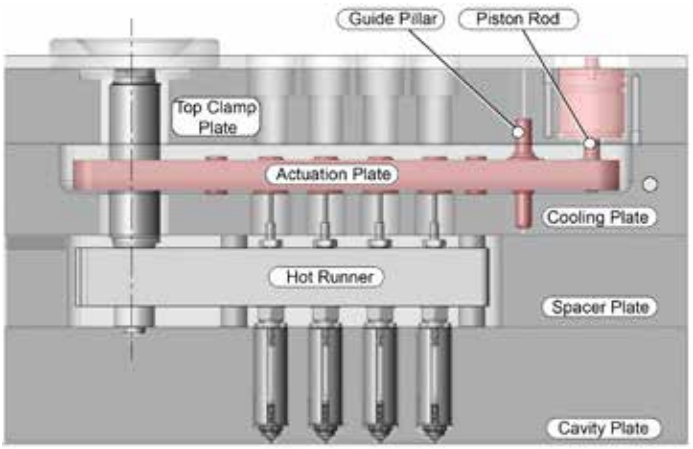


Doc007529.png



Doc007457.png

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Doc007530.png

WARNING

Heavy Weight Hazard

4) Assemble Top Clamp Plate (TCP).

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9.2.1.4 Assemble the Actuator

NOTICE

For lubrication use Krytox GPL205.

To lubricate the piston sliding surface is essential for the actuator life time.



Doc003777.png

To lubricate the piston ring seals is helpful to assemble the actuator.

NOTICE

The seals are already mounted on the actuators.

1) Insert the actuator Housing Cover 1 (HC) into the cutout of the Top Clamping Plate (TCP).

NOTICE

The seal on bottom of the Housing Cover 1 (HC) has to be directed against the cutout bottom.

2) Insert the Actuator (A) into the cutout.
3) Assemble the Fixing Unit (FU) on the Piston Rod (PR).

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 4.

4) Assemble the upper Housing Cover (HCT).

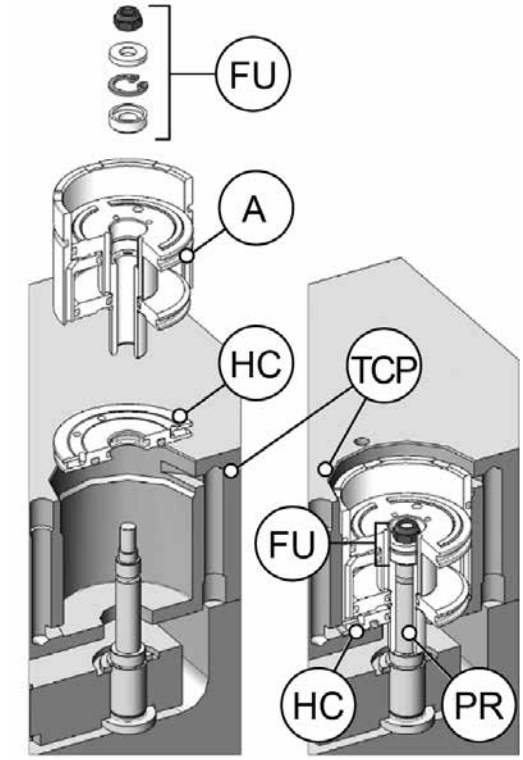
NOTICE

The two threaded holes (x) must face upwards.

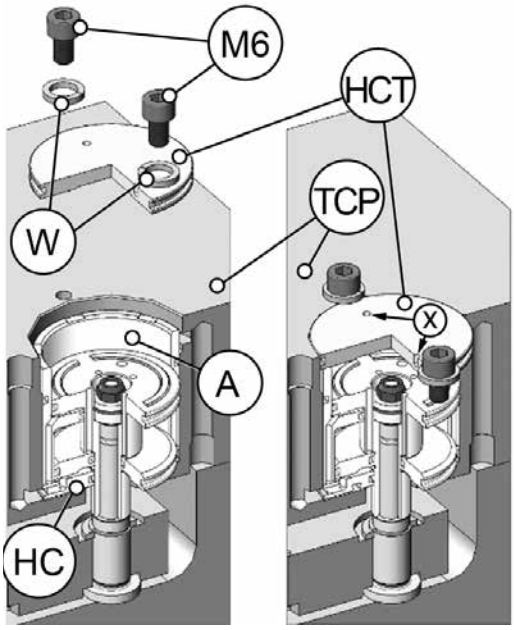
5) Fix the Housing Cover (HCT) with two Hexagon Socket Set Screws DIN912-M6X10-12.9 (M6) and Washers DIN125 A (W).

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 4.



Doc007462.png



Doc007463.png

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9.2.1.5 Assemble and Adjust the Valve Pins

Precondition for the following steps are to be performed with the Hot Runner installed in the mold, and the system at operating temperature.

⚠ WARNING



Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.



NOTICE



Hazard of Material Damage

The following steps are to be performed with the HR installed in the mold, and the system at operating temperature.

Cooling must be on to prevent damage to the actuator seals.

The design provides an indirect cooling through the top clamp plate (max. 80 °C / 175 °F), otherwise cooling lines are required.

NOTICE

The hot runner system must be at operation temperature. The cooling in the mold must be turned on to prevent damaging of sealings in the actuator.

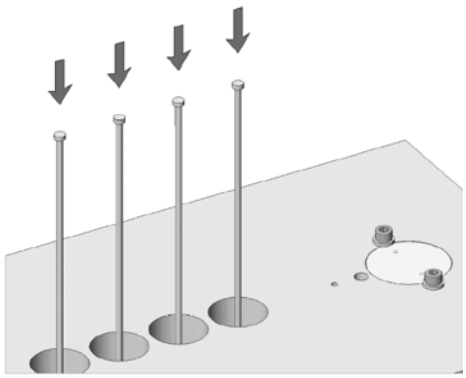
To adjust the valve pin, the actuation plate has to be on close position. In order to ensure this, we recommend fixing it with compressed air on the actuator.

The actuator must be under pneumatic pressure the whole time the valve pin adjustment operation is performed.

1) Move and fixing the actuation plate to close position use compressed pneumatic pressure on the actuator.
2) Fit in the valve pins.

NOTICE

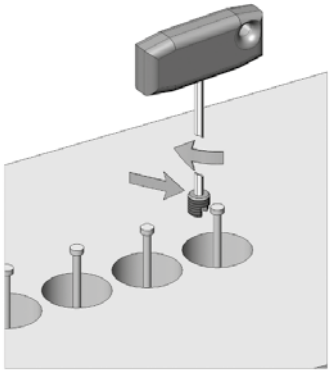
In order to ensure this, we recommend fixing it with compressed air on the actuator.



Doc007465.png

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3) Hang the valve pin into the hanger screw.
4) Push the valve pin via the hanger screw up to the suspension sleeve.
5) Screw the hanger screw with the attached valve pin into the valve pin suspension sleeve.



Doc007458.png

6) Adjust the valve pin with a hexagon Socket Wrench (SW) as followed.

NOTICE

The basic setting for the valve gate pin is 16 mm between the Valve pin Suspension (VS) top edge and the top edge from the Hanger Screw (HS).

7) Rotate the Hanger Screw (HS) with a hexagon socket wrench into the Valve pin Suspension sleeve (VS).

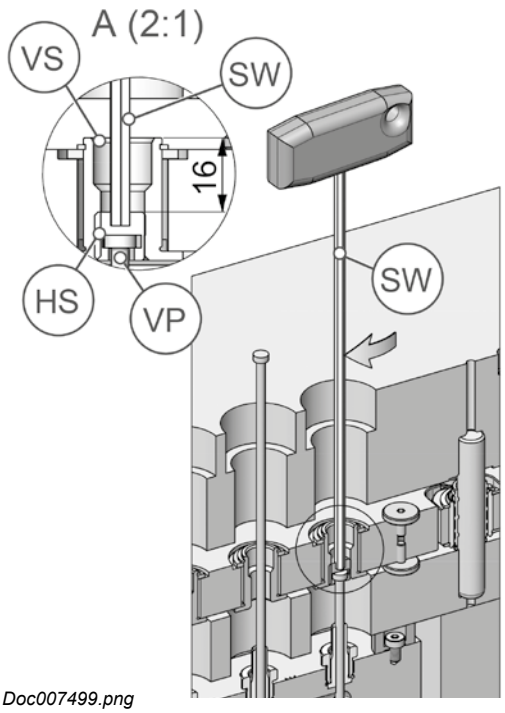
NOTICE

During the fine tuning process it is possible to move the Valve Pin (VP) in every direction 0.5 mm (1/2 rotation).

The exact position for the valve pin has to be checked at the front of the valve pin - depends on the nozzle tip.

The reason to unscrew the Hanger Screw (HS) would be for valve pin maintenance or replacement.

If the deviation to the basic settings of 16 mm is more than 0,5 mm, the adjustments do not correspond to the parameters of the mold or do not correspond to the Synventive standard.



Doc007499.png

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8) Heat the hot runner system to the working temperature.
9) Turn the Locking Screw (LS) up to the Hanger Screw (HS).

NOTICE

For actuator assembly the Lock Screw (LS) has to be fastened against the Hanger Screw (HS).

10) Rotate the Lock Screw (LS) with the Adjustment Tool ATCY2102 (AT) into the Valve pin Suspension sleeve (VS).
11) Apply pressure to pneumatic actuator to move the plate in close position. The actuators must be under pneumatic pressure the whole time the valve pin adjustment operation is performed.

NOTICE

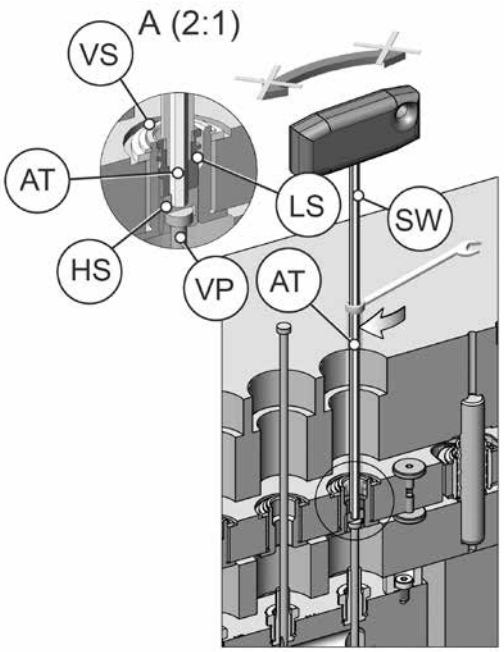
The recommended air pressure is 87 psi (6 bars).

12) Push from the front (cavity side) the valve pin in order to compensate the axial play of the valve pin. And keep a slight pressure on the valve pin.
13) Adjust the valve pin and measure the valve pin position at the front (cavity) until in desired position.
14) Hold against turning the Hanger Screw (HS) with the hexagon Socket Wrench (SW).
15) At the same time tighten the Lock Screw (LS) with the Adjustment Tool ATCY2102 (AT) and a ring wrench (size 6 mm).
16) Repeat steps 11 - 15 for all valve pins.
17) Move the plate using pneumatic cylinders a few times in open and close position. Keep the plate in close position using pneumatic pressure.
18) Push from the front (cavity side) the valve pin in order to compensate the axial play of the needle.
19) Measure the valve pin position at the front (cavity). Readjust valve pin if necessary.

WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.



Doc007459.png

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9.2.1.6 Tool Service without Plate Actuation System Disassembly



Hot Surfaces Hazard

This operation has to be done with the tool cooled down to room temperature.



It's possible to disassemble the actuation plate system and valve pins can remain in manifold without changing settings.

This opperation is only possible when the top clamping plate and cooling plate are separately screwed together.

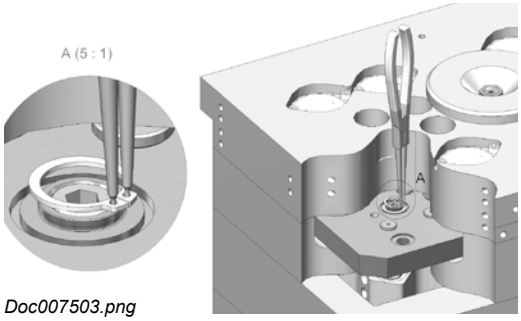
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9.2.1.7 Lift up the upper Half of the Tool

1) Remove the heavy duty retaining ring DIN471-17X1.5 at the valve pin suspension.

NOTICE

Extra long snap ring plier is required for this. It is not necessary to remove the clamping plate.

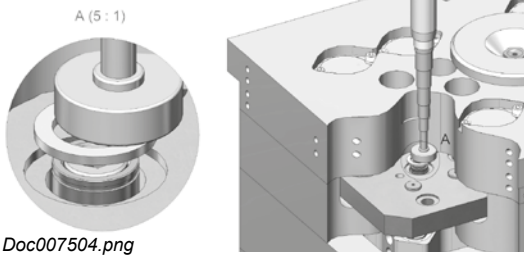


Doc007503.png

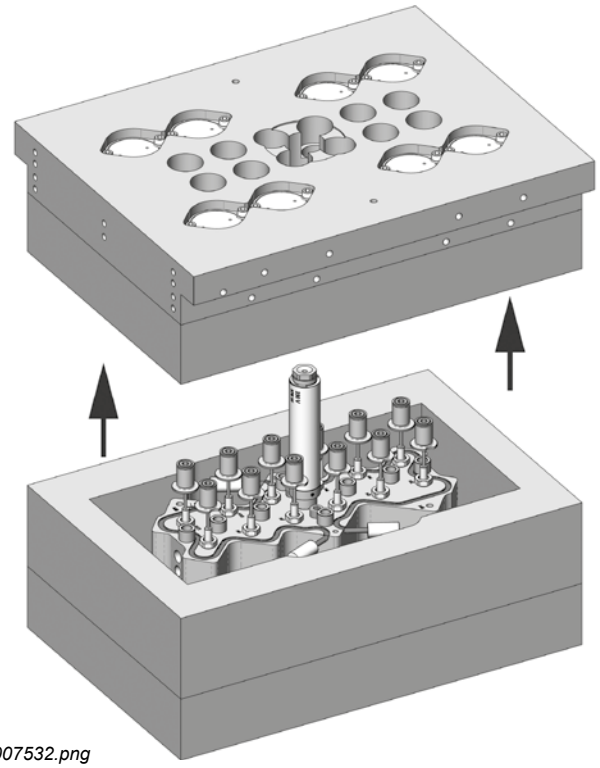
2) Remove the washer W-17-24-2-02 with a magnetic Pick-Up tool.

NOTICE

Extra long snap ring plier is required for this. It is not necessary to remove the clamping plate.



Doc007504.png



Doc007532.png

WARNING

Heavy Weight Hazard

3) Unscrew the srews to disconnect the top package from the rest of the mold.

NOTICE

Refer to the mold assembly drawings

4) After removing the retaining rings and washersat the valve pin suspension, the upper half of the tool can be lifted together with the actuation plate

NOTICE

The valve pin suspension is not loosened, so valve pin position is not changed. It's possible to make a tool service without adjusting the valve pins again

In case the screws have to be opened, the valve pins have to be adjusted again.

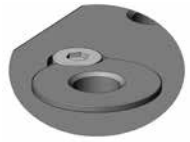
The complete valve pin suspension with hanger and lock screw is rotatable (without loosen the screws)

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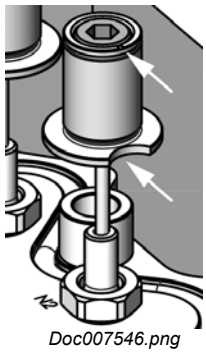
9.2.1.8 Assemble the upper Half of the Tool after Service

NOTICE

At all single valve pin suspension sets at the manifold side of the actuation plate are screws (Doc007523.png).



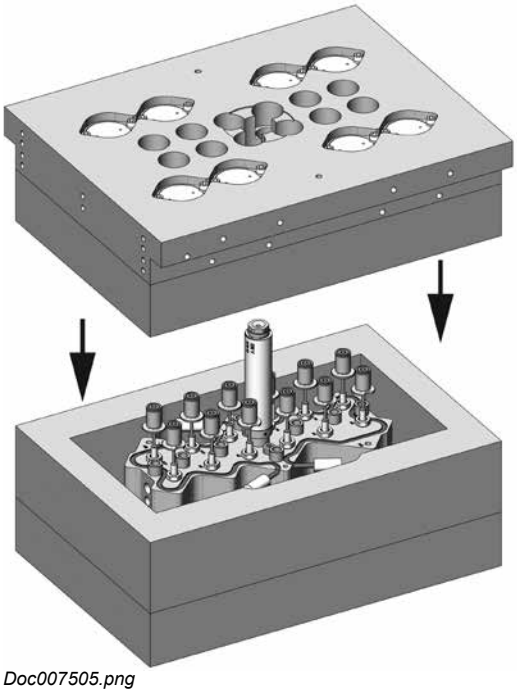
Doc007523.png



Doc007546.png

With this screws (DIN912-M6x10-12.9) it is not possible to rotate the suspension sleeve and the valve pin will be secured against anti-rotation. If the upper half of the tool (containing the actuation plate) will be assembled on the lower half of the tool (containing the hot runner system) then it is likely the recess at the suspension sleeve (see Doc007546.png) will not match with the screws (DIN912-M6x10-12.9).

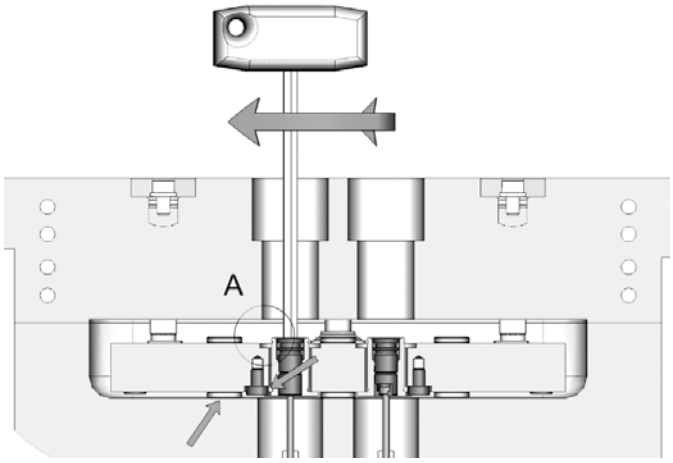
1) Pre position the valve pin suspension sets to match the anti-rotation screws in the plate.
2) Place the upper half of the tool (containing the actuation plate) on the lower half of the tool.



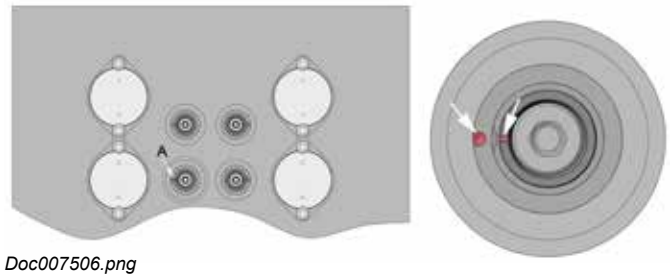
Doc007505.png

NOTICE

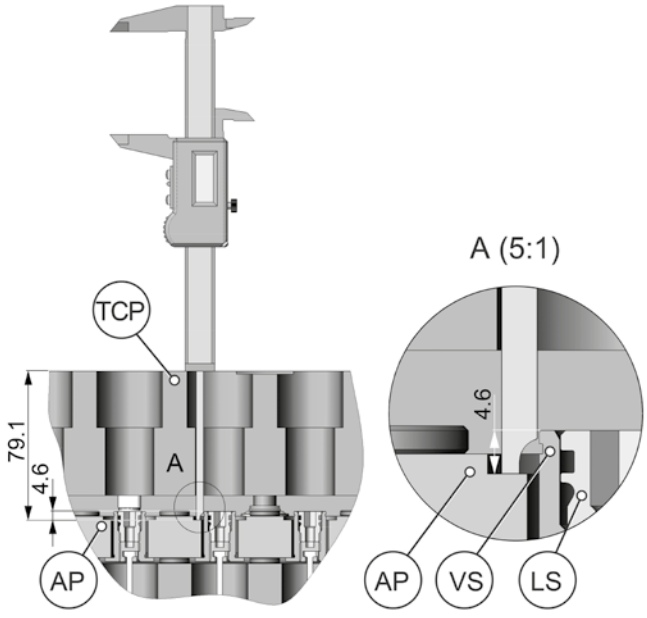
As long as the guide is not in the correct position in the actuation plate, it can be rotated easily.



Doc007508.png



Doc007506.png



Doc007516.png

NOTICE

In the hole of the actuation plate is a marker (bore) it has to be aligned with the marker on the suspension sleeve.

3) Rotate clockwise all valve pin suspension sleeves to match the markers on the actuation plate (bore) with the markers on the suspension sleeves.

CAUTION

If you try to bring the suspension bushing in the correct position by turning it to the left, it is possible that the lock of the valve pin suspension will be loosened.

NOTICE

When rotated against a resistance the valve pin position will get adjusted - the reference suspension sleeve - anti-rotation screw is provided.

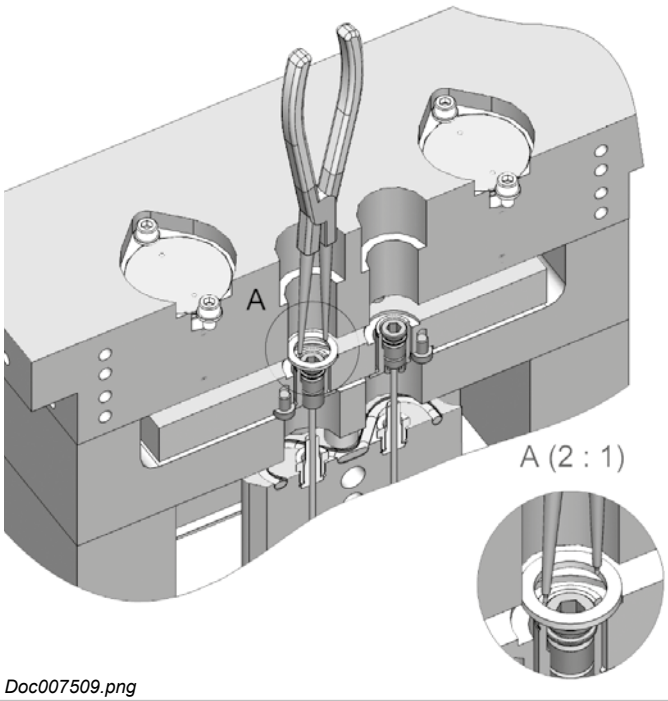
4) Check for all suspension sleeves with a calliper the dimension from upper surface of the Top Clamp Plate (TCP) to the seat for the washer at the Actuation Plate (AP). The dimension has to be 79.1 mm.

NOTICE

A distance of 79.1 mm from upper surface of the Top Clamp Plate (TCP) to the seat for the washer at the Actuation Plate (AP) means the distance of 4.6 mm from upper surface of the Valve pin Suspension Sleeve (VS) to the seat of the washer at the Actuation Plate.

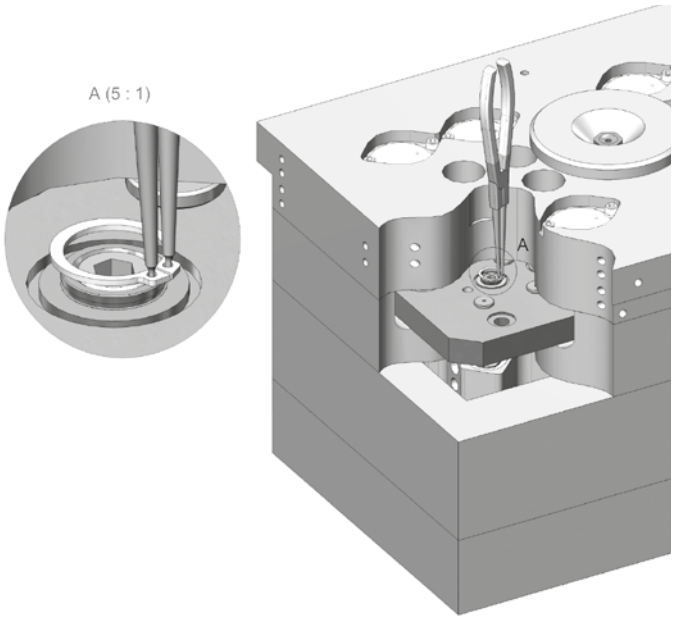
The 4.6 mm gauge on all valve pin mounting bushings (VS) is necessary for the valve pin suspension bushings to be fixed.

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Doc007509.png

5) Place the washers W-17-24-2-02 on the seats at the valve pin suspension positions.



Doc007503.png

6) Assemble the heavy duty retaining ring DIN471-17X1.5 at the valve pin suspensions.

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9.2.1.9 Nozzle Deactivating

If necessary, each nozzle can be deactivated independently.

NOTICE

This is a fast solution when using the remaining nozzles.

WARNING

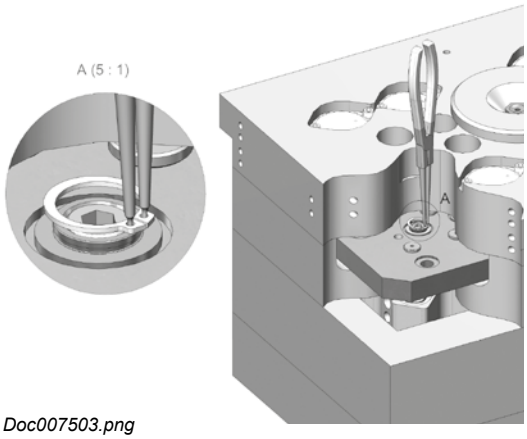
Hot Surfaces Hazard

This operation has to be done with the system cooled down to room temperature.

1) Apply compressed air to the pneumatic tool connection CLOSED, to bring the actuation plate to the valve gates closed position.
2) Remove the retaining ring DIN471-17X1.5 from the valve pin suspension.

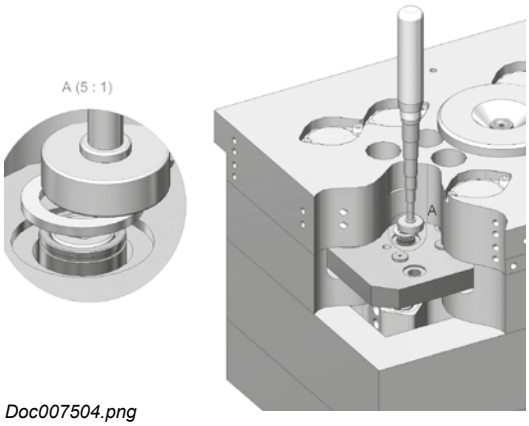
NOTICE

To remove the retaining ring, without dismounting the clamping plate, an extra long snap ring plier is required.



Doc007503.png

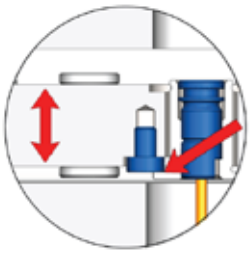
3) Remove the washer W-17-24-2-02 with a Magnetic Rod / Pick-Up tool.



Doc007504.png

CAUTION

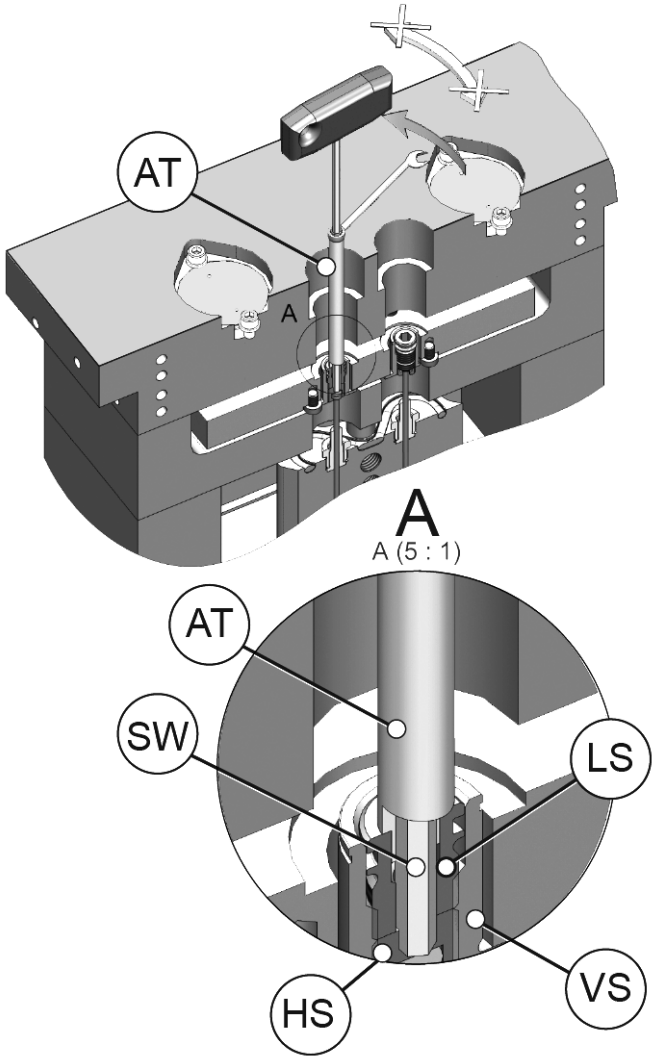
The valve pin can get damaged. To avoid this, the valve pin suspension must be adjusted to the front.



Valve pin suspension crash together with the anti-rotation screw.

Doc007507.png

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Doc007510.png

4) Hold against turning the Hanger Screw (HS) with the hexagon Socket Wrench (SW).
5) At the same time loosen the Lock Screw (LS) with the adjustment tool ATCY2102 (AT) and a ring wrench (size 6 mm).
6) Turn the Lock Screw (LS) three complete turns counterclockwise.

NOTICE

After one and a half turns, the valve pin suspension (VS) is released from the anti-rotation screw and thus no longer secured against rotation.

7) Fix the new position by turning the Hanger Screw (HS) counter clockwise and the Lock Screw (LS) clockwise.

NOTICE

Before the system is put back into operation after the nozzles have been deactivated, the heating of the out of service nozzles must also be deactivated.

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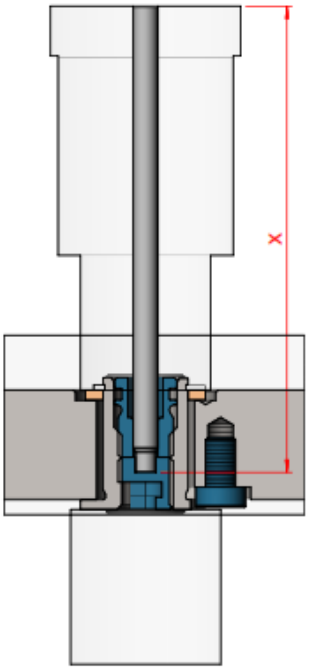
9.2.1.10 Blocking Pin

NOTICE

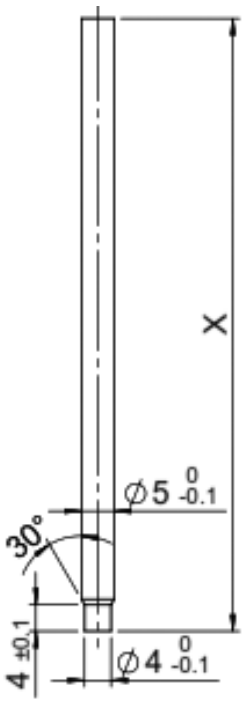
After the unit “Valve Pin Suspension” has been detached from the actuation plate, the position of the valve pin has to be locked with a blocking pin.

When this pin is not mounted, the valve pin could be pushed back by the injection pressure and open the nozzle.

1) The length X must be measured.
2) The blocking pin should be manufactured according to the dimensions in image Doc007744.png
3) The blocking pin has to have contact to the machine plate.



Doc007743.png



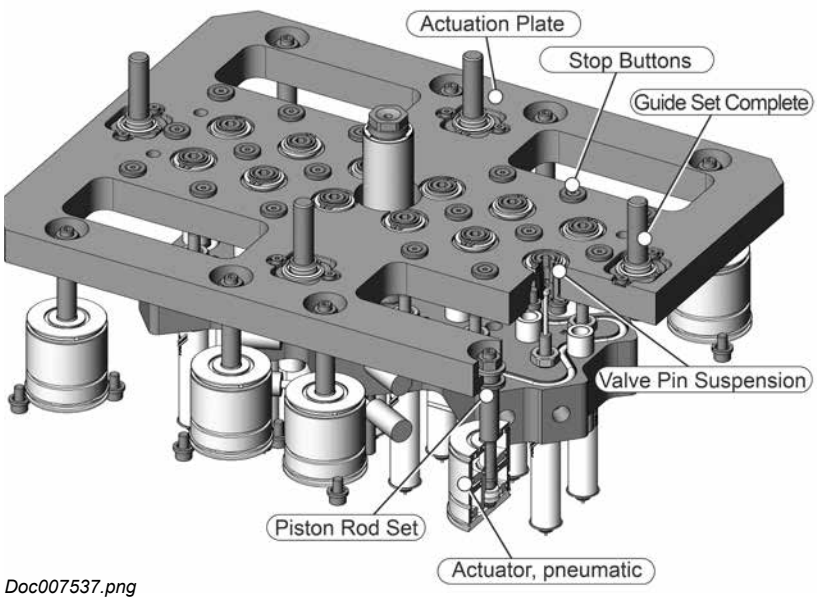
Doc007744.png

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9.2.2 Plate Actuation, Actuators below Plate

Plate actuation is ideal for synchronized filling of high cavitation molds

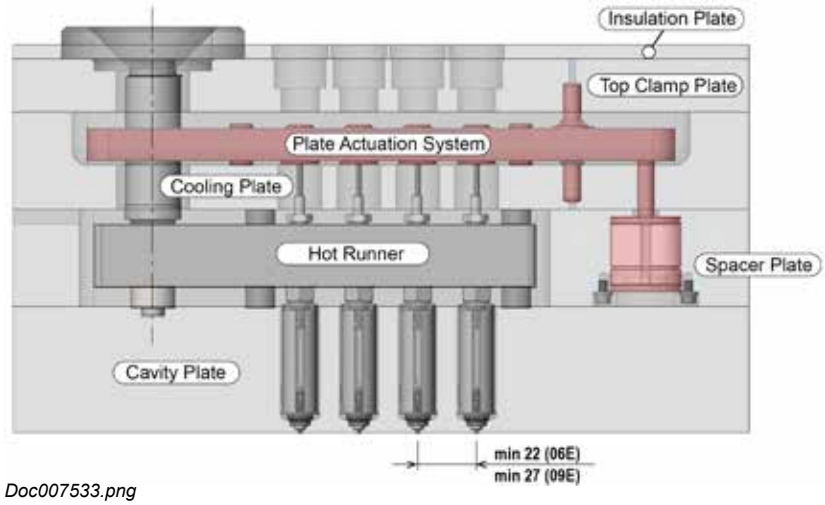
- High cavitation synchronized needle opening
- Consistent part filling (weight)
- Low service costs



Doc007537.png

Basic Elements of the Plate Actuation System:

- Actuation plate
- Stop buttons
- Actuators (pneumatic)
- Piston rod set
- Guiding set complete
- Valve pin suspension assemblies with anti rotation screws



Doc007533.png

Pitch Dimensions

Nozzle 06E = min. 22 mm

Nozzle 09E = min. 27 mm

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9.2.2.1 Mounting the Plate Actuation System

⚠ WARNING




Heavy Weight Hazard

Transport and lifting equipment should be operated only by trained personnel.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.

When unpacking the Plate Actuation Hot Runner System, there is a risk of injury due to falling parts and sharp edges. Maintain a minimum distance of 1 m from the Hot Runner System.

Use personal protective equipment, such as head gear, safety shoes and work gloves.

For first aid contact your medical / safety representing.





NOTICE



Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

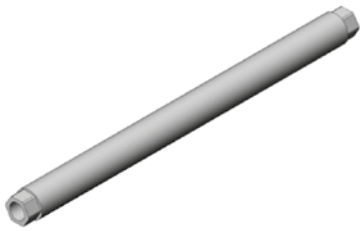
Never install or remove the hot runner when the manifold or nozzles are hot, this may cause damage to the nozzles.

Move the Hot Runner System only up or down at room temperature 20 °C (68 °F).

Always tighten the screws to the torque specified in the respective table in section 4.

Tools for Assembling, Disassembling and Adjusting the Valve Pins

Adjusting tool ATCYL2102



Doc007519.png

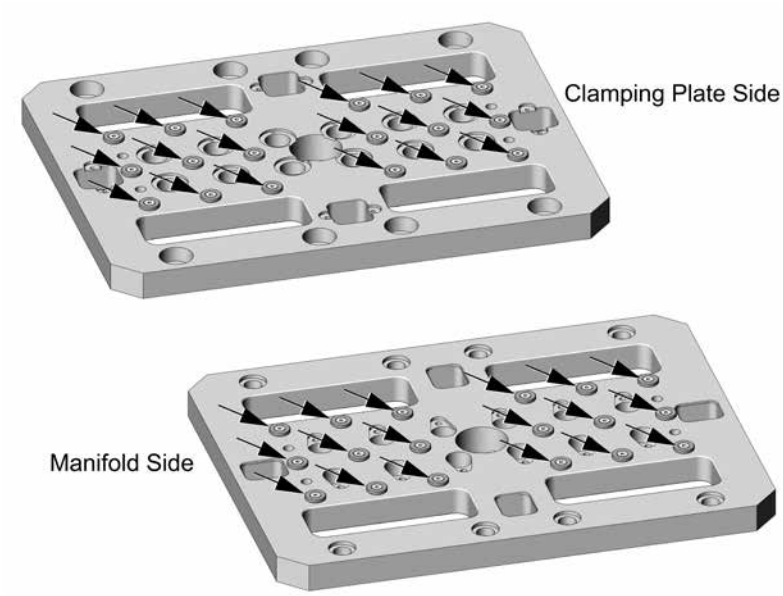
Double Tube Wrench



Doc007552.png

9.2.2.2 Assembly of the Actuation Plate

Assembly of the Stop Buttons on both Sides

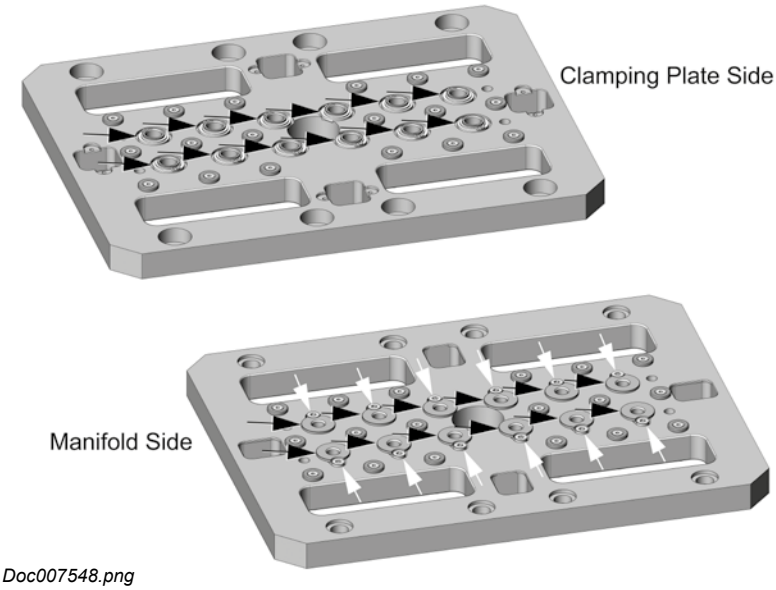


Doc007547.png

1) Assemble the stop buttons on both side (Manifold Side / Clamping Plate Side).
2) Fix them with screws.

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Assembly of the Valve Pin Suspension Sleeves and Anti-rotation Screws



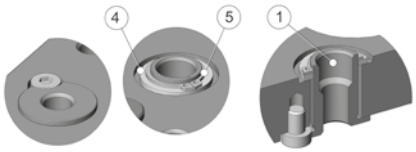
Doc007548.png

Valve Pin suspension sleeves (black arrow)

Anti-rotation screws (white arrow)

1) Assemble the valve pin suspension sleeves (1) at the actuation plate from the manifold side.
2) Fix them against turning with the anti-rotation screws from the manifold side.
3) Fix the valve pin suspension sleeves (1) with washers (4) and heavy duty retaining rings for shafts DIN471 (5) from the clamping plate side.

Details
Valve pin suspension assembly



Doc007523.png

Valve Pin Suspension Assembly Version 04 for:

Valve pin (VP) ø3.0 mm → **VPS-30-04**
Valve pin (VP) ø3.8 mm → **VPS-38-04**

Pos.	Part No.	Description
01	VPSS-03	Valve Pin Suspension Sleeve
02	PNC4508B-HS-02 PNC4508B-HS-01	Hanger screw M11x1, Valve pin Ø 3.0 Hanger screw M11x1, Valve pin Ø 3.8
03	PNC4508B-LS-01	Lock Screw M11x1
04	W-17-24-2-01	Washer; 17x24x2
05	DIN471-AS17X1.5	Heavy duty Retaining ring for shafts
06	DIN7984-M6X8-10.9	Hexagon socket cap screw DIN7984



Doc008492.png

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Valve Pin Suspension Assembly Version 05 for:

Valve pin (VP) ø3.0 mm → **VPS-30-05**
Valve pin (VP) ø3.8 mm → **VPS-38-05**

Pos.	Part No.	Description
01	VPSS-04	Valve Pin Suspension Sleeve
02	PNC4508B-HS-02 PNC4508B-HS-01	Hanger screw M11x1, Valve pin Ø 3.0 Hanger screw M11x1, Valve pin Ø 3.8
03	PNC4508B-LS-01	Lock Screw M11x1
04	W-17-24-2-02	Washer; 17x24x2
05	DIN471-AS17X1.5	Heavy duty Retaining ring for shafts
06	DIN7984-M6X8-10.9	Hexagon socket cap screw DIN7984



Doc008493.png

Valve Pin Suspension Assembly Version 06 for:

Valve pin (VP) ø3.0 mm → **VPS-30-06**
Valve pin (VP) ø3.8 mm → **VPS-38-06**

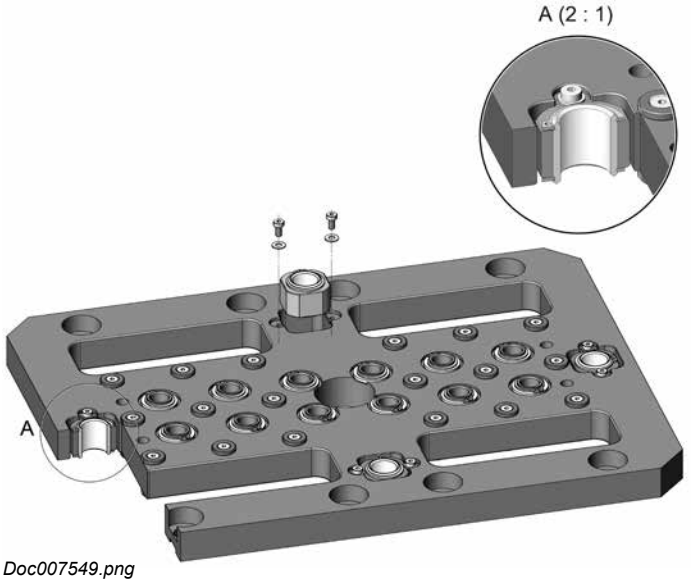
Pos.	Part No.	Description
01	VPSS-04	Valve Pin Suspension Sleeve
02	PNC4508B-HS-02 PNC4508B-HS-01	Hanger screw M11x1, Valve pin Ø 3.0 Hanger screw M11x1, Valve pin Ø 3.8
03	PNC4508B-LS-01	Lock Screw M11x1
04	W-17-24-2-01	Washer; 17x24x2
05	DIN471-AS17X1.5	Heavy duty Retaining ring for shafts
06	DIN7984-M6X8-10.9	Hexagon socket cap screw DIN7984



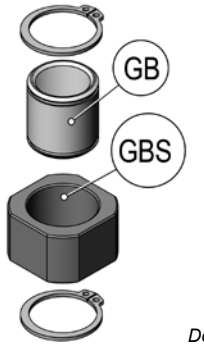
Doc008494png

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Assembly of the Guiding Bushings at the Actuation Plate



Doc007549.png

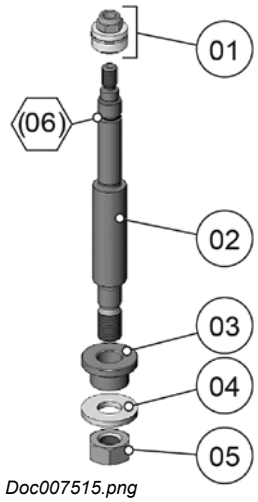


Doc007549_Detail

1) Assemble the Guiding Bushings (GB) in the Guiding Bush Seat (GBS).
2) Fix them with Retaining Rings for shafts DIN471 (RR).
3) Screw the Guiding Bushing Seat (GBS) into the actuation plate (Doc007549.png).

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Assembly of the Piston Rod and Actuator



Doc007515.png

	Piston Rod Set PRS-11-105-02	
Pos.	Part No.	Description
01	00530084	Fixing Unit
02	PR-11-105-02	Piston Rod; D11.5; L105;
03	PRB-08-19-10-01	Piston Rod Bush
04	W-08-19-2-01	Washer; 8.5x19x2
05	DIN934-M8	Hexagon nut DIN934 / ISO4032
06	VIOR-5.00x1.50-FPM-75-G	This seal ring is included in actuator 00215485, not a part of the Piston Rod Set

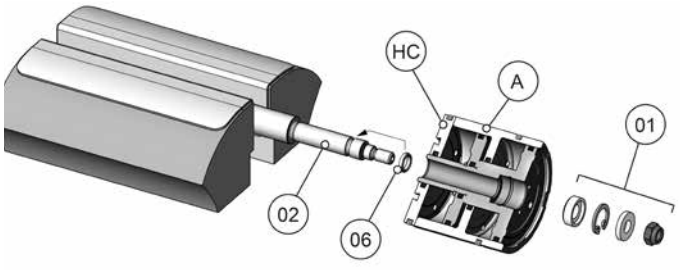
NOTICE

For lubrication use Krytox GPL205. To lubricate the piston sliding surface is essential for the actuator life time.



Doc003777.png

To lubricate the piston ring seals is helpful to assemble the actuator.



Doc007536.png

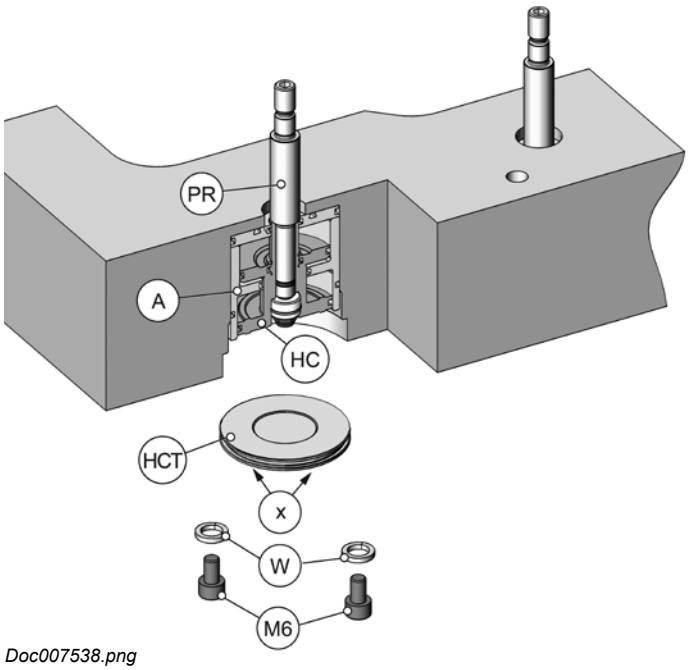
1) Install the seal (06) at the piston rod (02).
2) Assemble the piston rod (02) at the Actuator (A).
3) Assemble the Fixing Unit (01) on the piston rod (02).

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 4.

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Service and Maintenance / Plate Actuation, Actuators below Plate



Doc007538.png

4) Insert the actuator Housing Cover 1 (HC).

NOTICE

The seal has to be directed against the cutout bottom

5) Insert the actuators (A) into the Actuation Spacer Plate.

6) Assemble the upper housing cover (HCT).

NOTICE

The two threaded bores (x) must face outwards.

7) Fix the housing cover (HCT) with two hexagon socket set screws (M6) DIN912-M6X10-12.9 and two Washers DIN125 A (W)

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 4.

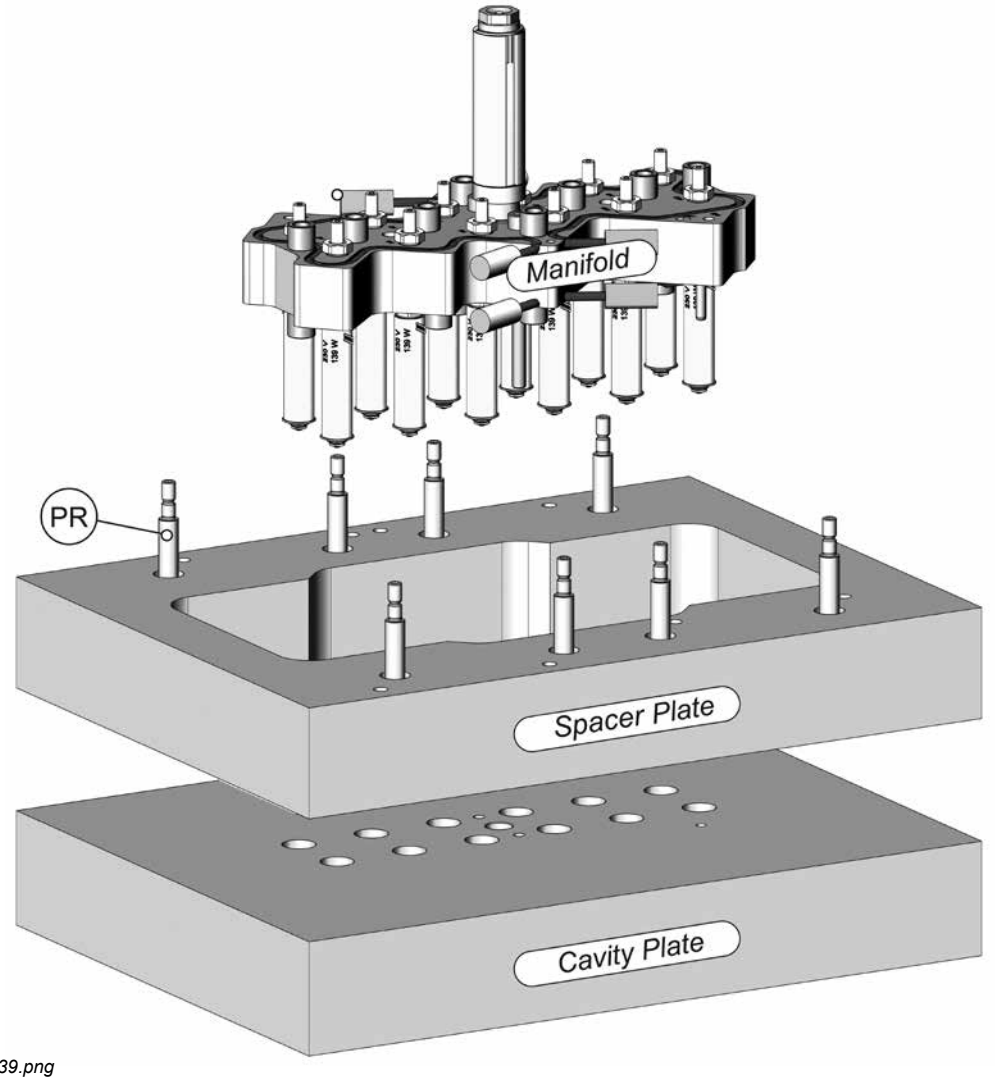
9.2.2.3 Mounting of the Hot Runner System

The Control percentages and Control distances are edited in the Control Variables Screen.

WARNING

Heavy Weight Hazard

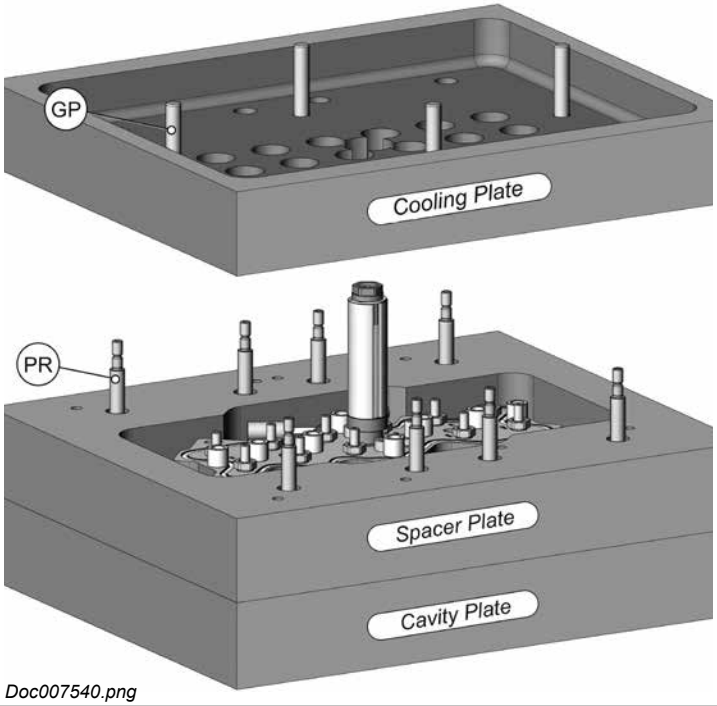
1) Place the Spacer Plate onto the Cavity Plate.
2) Place the Manifold into the Cooling Plate / Cavity Plate.



Doc007539.png

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Service and Maintenance / Plate Actuation, Actuators below Plate



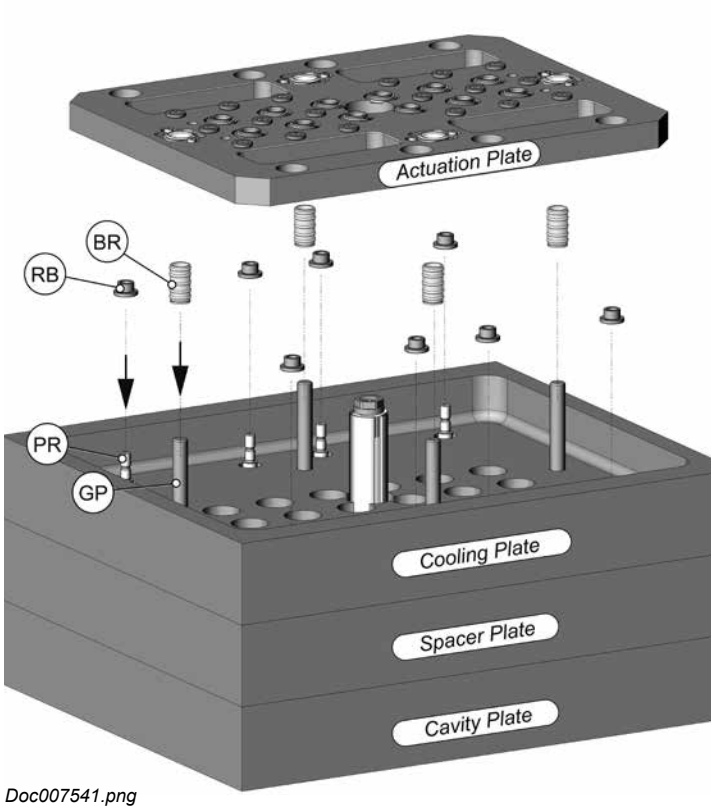
Doc007540.png

3) Assemble the Guide Pillars (GP) into the Cooling Plate.

WARNING

Heavy Weight Hazard

4) Place the Cooling plate on the Spacer Plate.



Doc007541.png

NOTICE

For lubrication use high-pressure long therm lubricant Strack Z9080

5) Assemble the Ball Retainers (BR) on the Guide Pillars (GP).

6) Assemble the Piston Rod Bushes (RB) on the Piston Rods (PR).

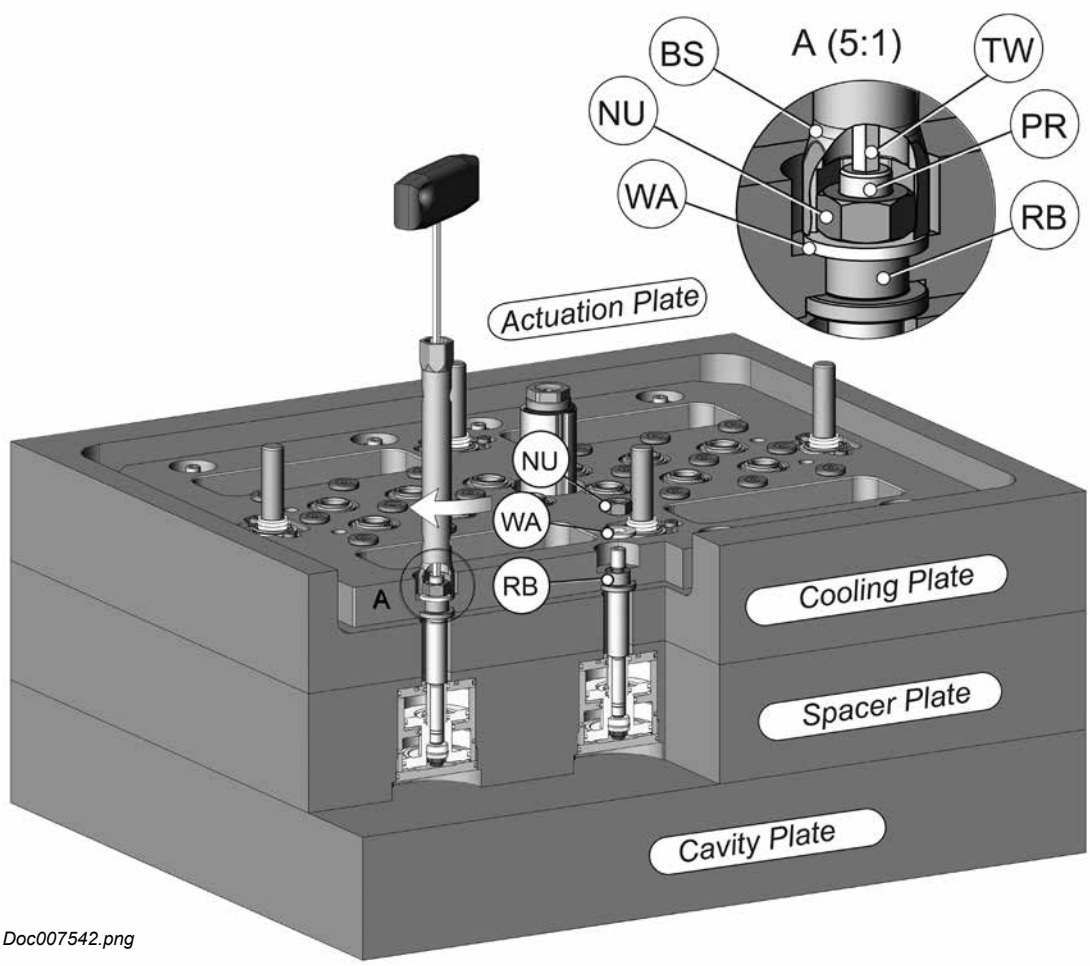
WARNING

Heavy Weight Hazard

7) Place the Actuation Plate into the Cooling Plate.

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8) Attach the Actuator with a Washer (WA) and a Nut DIN934 (NU) by fixing the Piston Rod (PR) with the T Wrench allen key (TW) and fasten the nut with the Box Spanner (BS) and spanner wrench.



Doc007542.png

WARNING

Heavy Weight Hazard

9) Assemble Top Clamp Plate (TCP).

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9.2.2.4 Assembly and Adjust the Valve Pins

Precondition for the following steps are to be performed with the Hot Runner installed in the mold, and the system at operating temperature.

WARNING

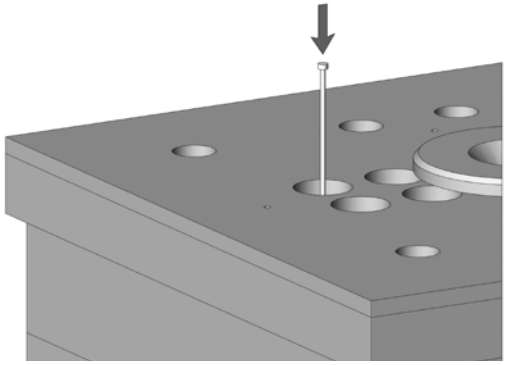
Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

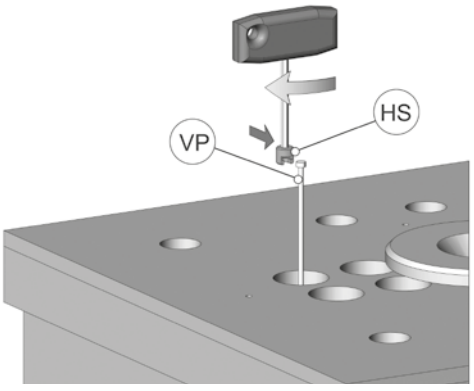
When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

1) Fit in the valve pins via the top clamp plate into the cutout.



Doc007550.png

2) Hang the head of the valve pin (VP) into the Hanger Screw (HS).
3) Screw the Valve Pin (VP) with the Hanger Screw (HS), by using a T-wrench allen key, into the Valve pin Suspension sleeve.



Doc007551.png

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Adjust the valve pins with a hexagon socket wrench as followed:

NOTICE

To adjust the valve pin, the Actuation Plate has to be stay on close position.

In order to ensure this, we recommend fixing it with compressed air on the actuator.

The basic setting for the valve gate pin is 16 mm between the Valve pin Suspension (VS) top edge and the top edge from the Hanger Screw (HS).

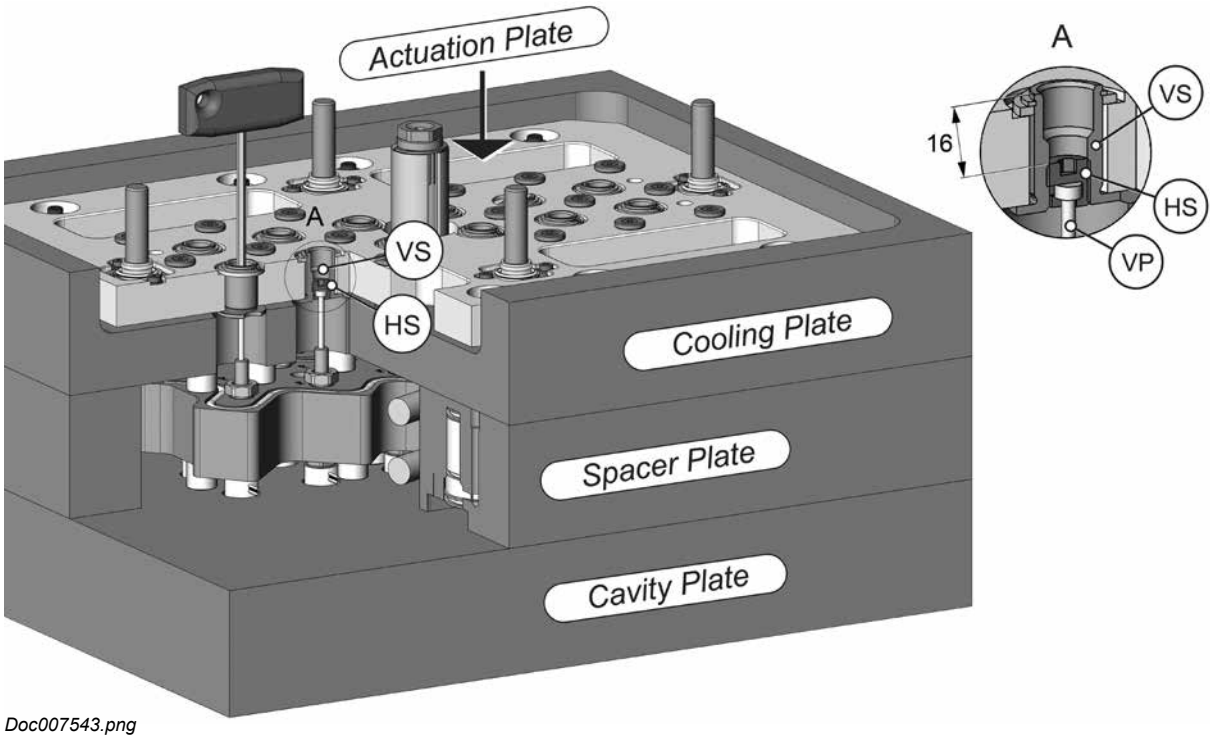
NOTICE

During the fine tuning process it is possible to move the Valve Pin (VP) in every direction 0.5 mm (1/2 rotation).

The exact position for the valve pin has to be checked at the front of the valve pin - depends on the nozzle tip.

The reason to unscrew the Hanger Screw (HS) would be for valve pin maintenance or replacement.

If the deviation to the basic settings of 16 mm is more than 0.5 mm, the adjustments do not correspond to the parameters of the mold or do not correspond to the Synventive standard.



Doc007543.png

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WARNING

Hot Surfaces Hazard

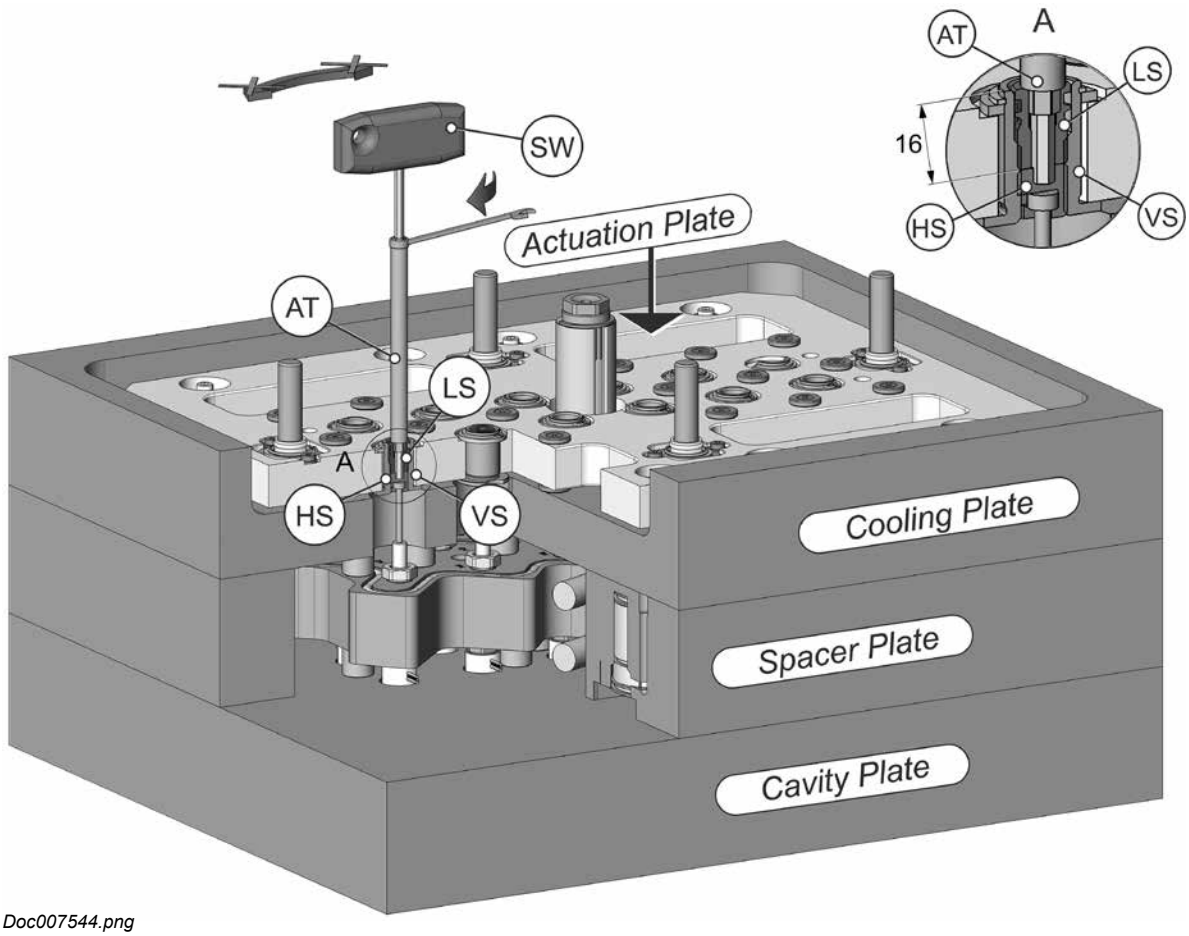
Contact between the skin and hot surfaces could result in burns.

4) Heat up the system to the working temperature.
5) Turn with the Adjustment Tool ATCYL2102 (AT) the Locking Screw (LS) up to the Hanger Screw (HS).

NOTICE

For actuator assembly the Lock Screw (LS) has to be fastened against the Hanger Screw (HS).

6) Rotate the Lock Screw (LS) with the Adjustment Tool ATCY2102 (AT) into the Valve pin Suspension sleeve (VS).
7) Hold against turning the Hanger Screw (HS) with the hexagon Socket Wrench (SW).
8) At the same time tighten the Locking Screw (LS) with the Adjustment Tool ATCY2102 (AT) and a ring wrench (size 6 mm).
9) Repeat these steps of adjustment for all valve pins.



Doc007544.png

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9.2.2.5 Nozzle Deactivating

If necessary, each nozzle can be deactivated independently.

NOTICE

This is a fast solution when using the remaining nozzles.

WARNING

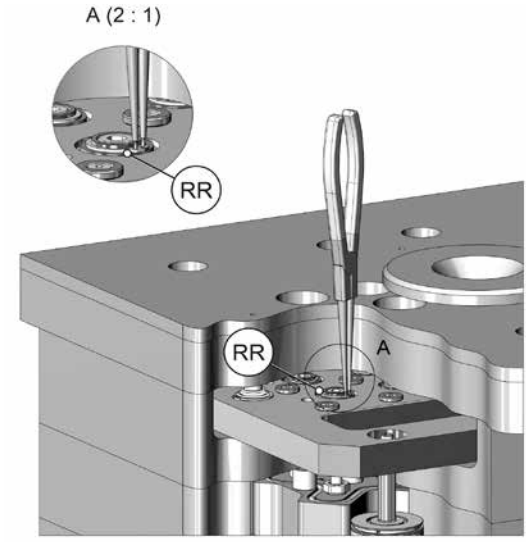
Hot Surfaces Hazard

This operation has to be done with the system cooled down to room temperature.

1) Apply compressed air to the pneumatic tool connection CLOSED, to bring the actuation plate to the valve gates closed position.
2) Remove the Retaining Ring DIN471-17X1 (RR) from the valve pin suspension.

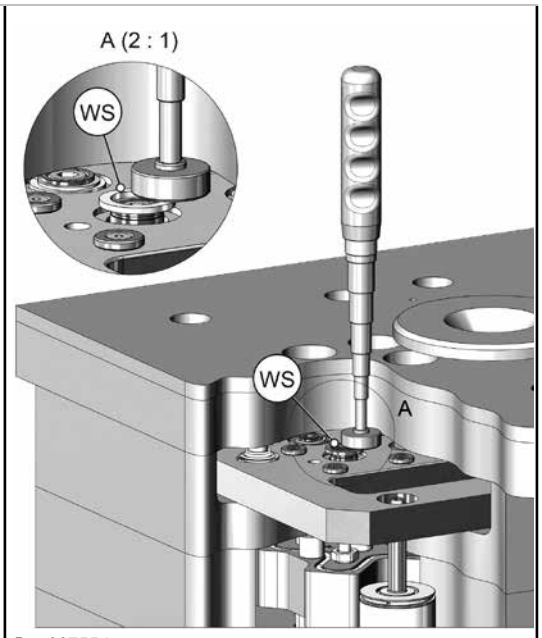
NOTICE

To remove the retaining ring, without dismounting the clamping plate, an extra long snap ring plier is required.



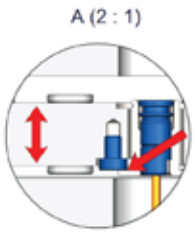
Doc007553.png

3) Remove the Washer W-17-24-2-02 (WS) with a Magnetic Rod / Pick-Up tool.



Doc007554.png

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Doc007507.png

NOTICE

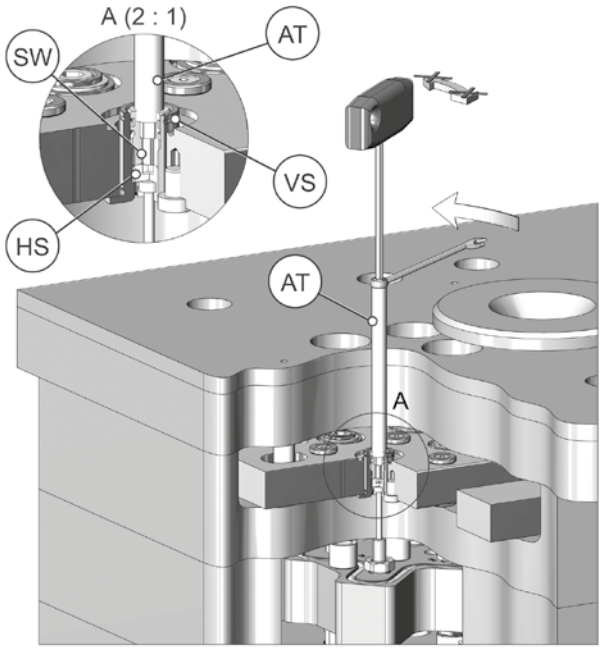
The valve pin can get damaged. To avoid this, the valve pin suspension must be adjusted to the front.

4) Hold against turning the Hanger Screw (HS) with the hexagon Socket Wrench (SW).
5) At the same time loosen the Lock Screw (LS) with the adjustment tool ATCY2102 (AT) and a ring wrench (size 6 mm).
6) Turn the Lock Screw (LS) with the adjustment tool ATCY2102 (AT) three complete turns counter clockwise.

NOTICE

After one and a half turns, the Valve pin Suspension sleeve (VS) is lower than the anti-rotation screw and it may rotate also.

7) Fix the new position by turning the Hanger Screw (HS) counter clockwise and the Lock Screw (LS) clockwise.



Doc007555.png

NOTICE

Before the system is put back into operation after the nozzles have been deactivated, the heating of the “out of service nozzles” must also be deactivated.

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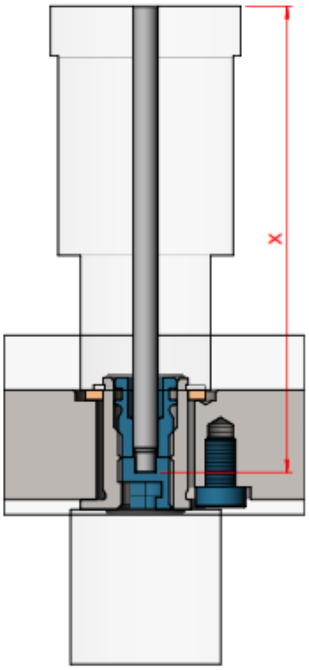
9.2.2.6 Blocking Pin

NOTICE

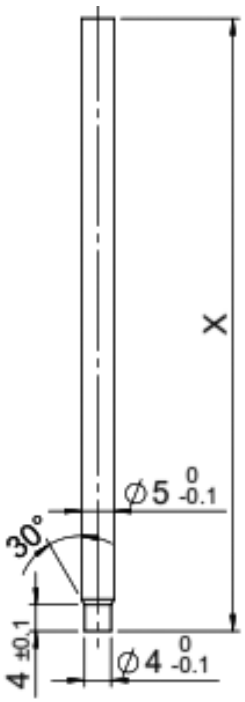
After the unit “Valve Pin Suspension” has been detached from the actuation plate, the position of the valve pin has to be locked with a blocking pin.

When this pin is not mounted, the valve pin could be pushed back by the injection pressure and open the nozzle.

1) The length X must be measured.
2) The blocking pin should be manufactured according to the dimensions in image Doc007744.png
3) The blocking pin has to have contact to the machine plate.



Doc007743.png



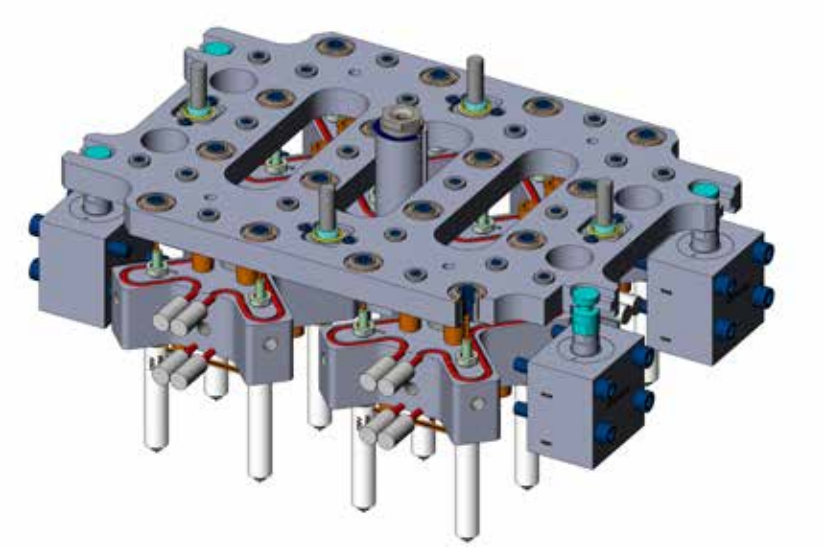
Doc007744.png

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9.2.3 Plate Actuation, Actuators below Plate

Plate actuation is ideal for synchronized filling of high cavitation molds

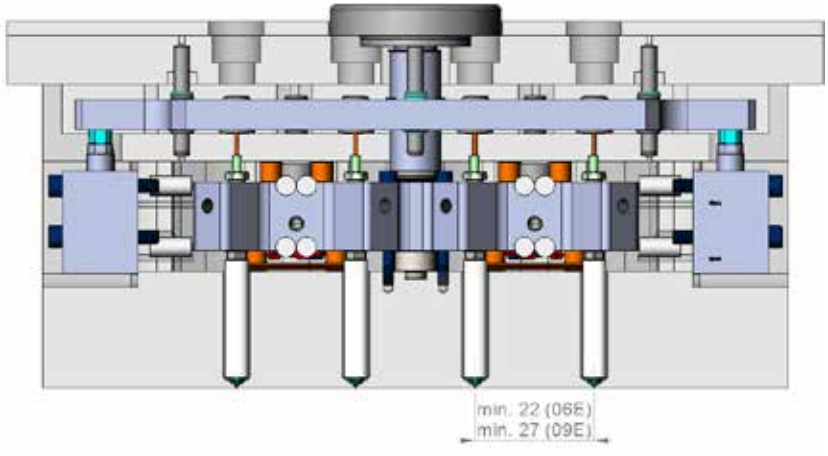
- High cavitation synchronized needle opening
- Consistent part filling (weight)
- Low service costs



Doc007991.png

Basic Elements of the Plate Actuation System:

- Actuation plate
- Stop buttons
- Actuators (hydraulic)
- Guiding set complete
- Valve pin suspension assemblies with anti rotation screws



Doc007992.png

Pitch Dimensions

Nozzle 06E = min. 22 mm

Nozzle 09E = min. 27 mm

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9.2.3.1 Mounting the Plate Actuation System

⚠ WARNING





Heavy Weight Hazard

Transport and lifting equipment should be operated only by trained personnel.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.

When unpacking the Plate Actuation Hot Runner System, there is a risk of injury due to falling parts and sharp edges. Maintain a minimum distance of 1 m from the Hot Runner System.

Use personal protective equipment, such as head gear, safety shoes and work gloves.

For first aid contact your medical / safety representing.







NOTICE



Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

Never install or remove the hot runner when the manifold or nozzles are hot, this may cause damage to the nozzles.

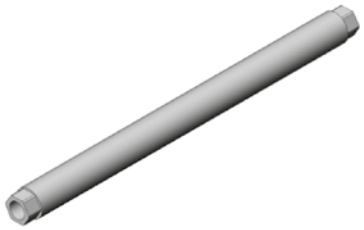
Move the Hot Runner System only up or down at room temperature 20 °C (68 °F).

Always tighten the screws to the torque specified in the respective table in section 13.

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Tools for Assembling, Disassembling and Adjusting the Valve Pins

Adjusting tool ATCYL2102



Doc007519.png

Double Tube Wrench



Doc007552.png

9.2.3.2 Assembly of the Actuation Plate

Assembly of the Stop Buttons on both Sides



Doc007993.png

1) Assemble the stop buttons on both sides (Manifold Side / Clamping Plate Side).
2) Fix them with screws.

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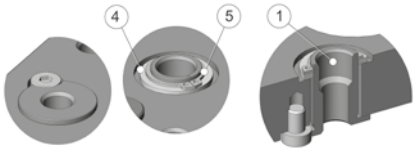
Assembly of the Valve Pin Suspension Sleeves and Anti-rotation Screws



Doc007994.png

1) Assemble the valve pin suspension sleeves (1) at the actuation plate from the manifold side.
2) Fix them against turning with the anti-rotation screws from the manifold side.
3) Fix the valve pin suspension sleeves (1) with washers (4) and heavy duty retaining rings for shafts DIN471 (5) from the clamping plate side.

Details
Valve pin suspension assembly



Doc007523.png

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Valve Pin Suspension Assembly Version 04 for:

Valve pin (VP) ø3.0 mm → **VPS-30-04**
Valve pin (VP) ø3.8 mm → **VPS-38-04**

Pos.	Part No.	Description
01	VPSS-03	Valve Pin Suspension Sleeve
02	PNC4508B-HS-02 PNC4508B-HS-01	Hanger screw M11x1, Valve pin Ø 3.0 Hanger screw M11x1, Valve pin Ø 3.8
03	PNC4508B-LS-01	Lock Screw M11x1
04	W-17-24-2-01	Washer; 17x24x2
05	DIN471-AS17X1.5	Heavy duty Retaining ring for shafts
06	DIN7984-M6X8-10.9	Hexagon socket cap screw DIN7984



Doc008492.png

Valve Pin Suspension Assembly Version 05 for:

Valve pin (VP) ø3.0 mm → **VPS-30-05**
Valve pin (VP) ø3.8 mm → **VPS-38-05**

Pos.	Part No.	Description
01	VPSS-04	Valve Pin Suspension Sleeve
02	PNC4508B-HS-02 PNC4508B-HS-01	Hanger screw M11x1, Valve pin Ø 3.0 Hanger screw M11x1, Valve pin Ø 3.8
03	PNC4508B-LS-01	Lock Screw M11x1
04	W-17-24-2-02	Washer; 17x24x2
05	DIN471-AS17X1.5	Heavy duty Retaining ring for shafts
06	DIN7984-M6X8-10.9	Hexagon socket cap screw DIN7984



Doc008493.png

Valve Pin Suspension Assembly Version 06 for:

Valve pin (VP) ø3.0 mm → **VPS-30-06**
Valve pin (VP) ø3.8 mm → **VPS-38-06**

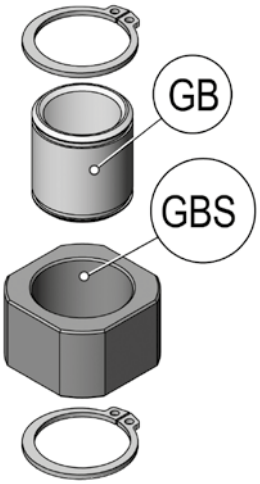
Pos.	Part No.	Description
01	VPSS-04	Valve Pin Suspension Sleeve
02	PNC4508B-HS-02 PNC4508B-HS-01	Hanger screw M11x1, Valve pin Ø 3.0 Hanger screw M11x1, Valve pin Ø 3.8
03	PNC4508B-LS-01	Lock Screw M11x1
04	W-17-24-2-01	Washer; 17x24x2
05	DIN471-AS17X1.5	Heavy duty Retaining ring for shafts
06	DIN7984-M6X8-10.9	Hexagon socket cap screw DIN7984



Doc008494png

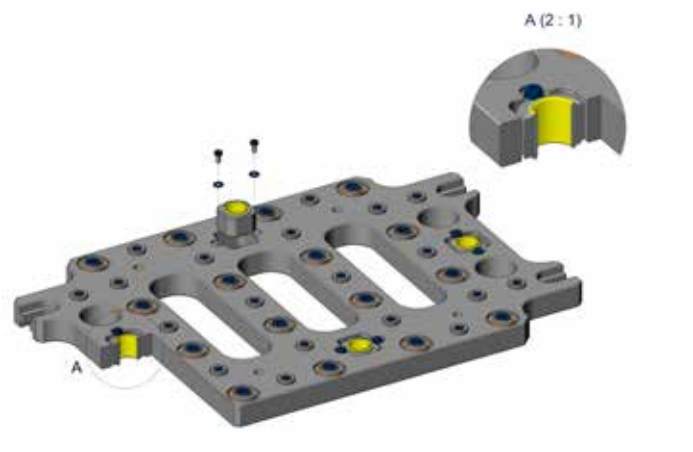
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Assembly of the Guiding Bushings at the Actuation Plate



Doc007549_detail.png

1) Assemble the Guiding Bushings (GB) in the Guiding Bush Seat (GBS).
2) Fix them with Retaining Rings for shafts DIN471 (RR).



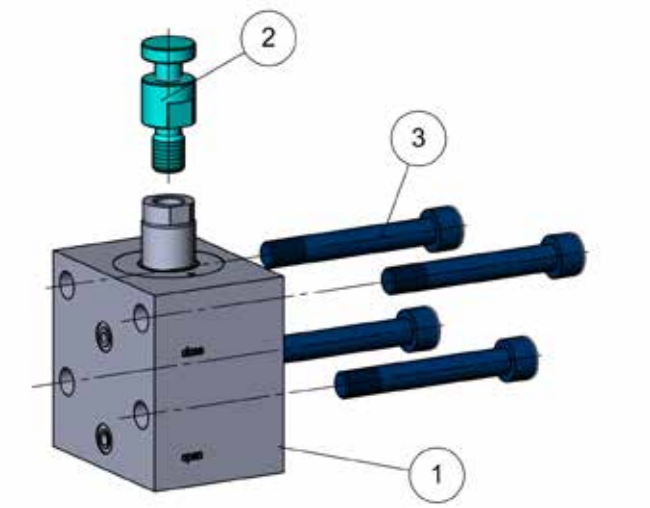
Doc007995.png

3) Screw the Guiding Bush Seat (GBS) into the actuation plate.

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Mounting the coupling pin on the block actuator

Components of the block actuator HYC-603-032-025-V-01			
No.	Qty.	Item	Description
01	1	603-032-025-V	Block actuator; type 603
02	1	AC-020-305-01	Actuator coupling
03	4	DIN912-M10X70-12.9	Hexagon socket cap screw

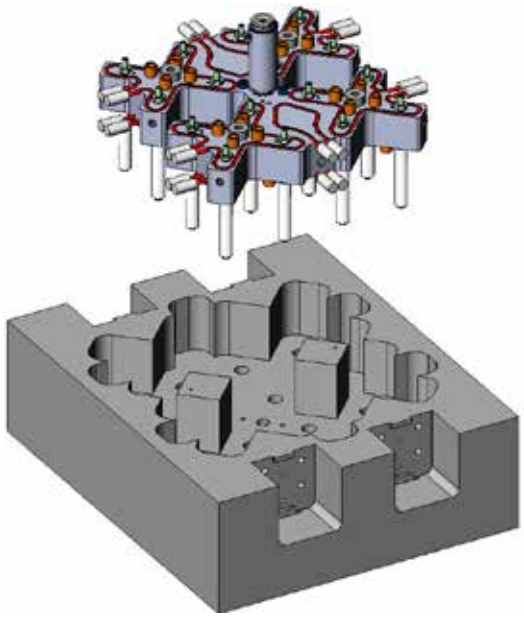


Doc007996.png

1) Screw the coupling pin (02) to the block actuator (01).

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9.2.3.3 Mounting of the Hot Runner System



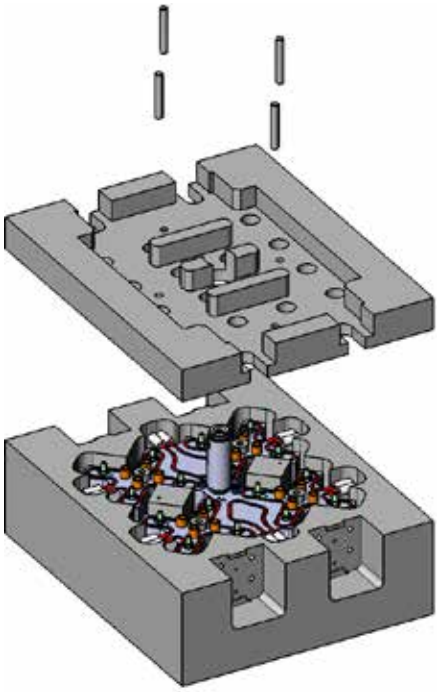
Doc007997.png

WARNING

Heavy Weight Hazard

1) Place the Manifold into the Cooling Plate / Cavity Plate.

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Doc007998.png

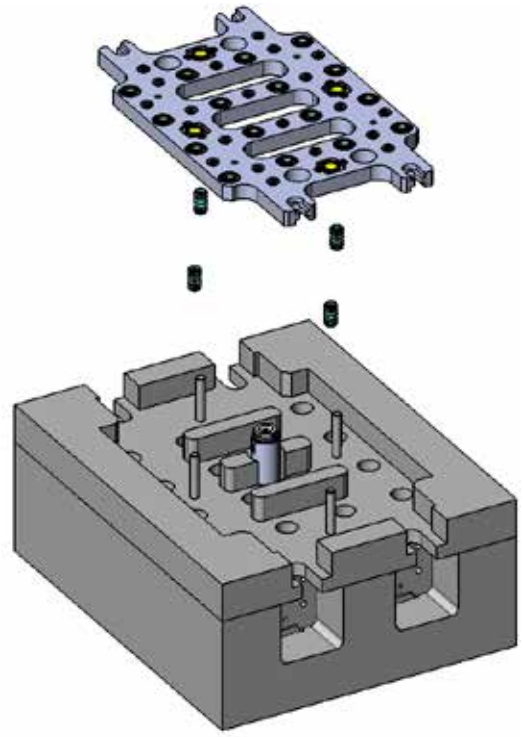
2) Assemble the Guide Pillars into the Spacer Plate.

WARNING

Heavy Weight Hazard

3) Place the Spacer Plate on the Cavity Plate.

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Doc007999.png

NOTICE

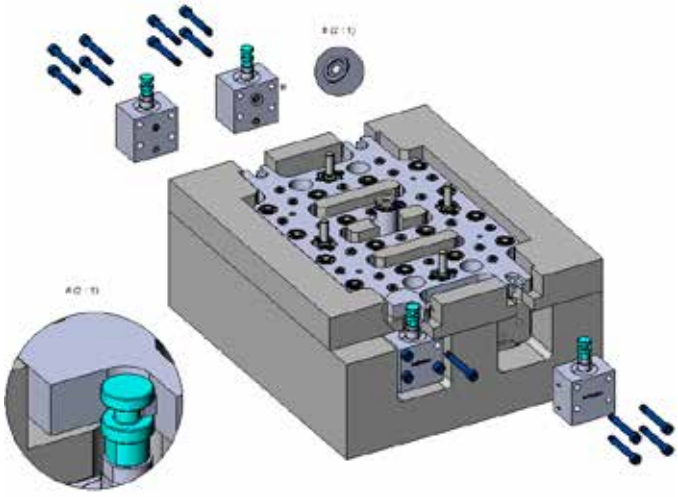
For lubrication use high-pressure long therm lubricant Strack Z9080.

4) Assemble the Ball Retainers on the Guide Pillars.

WARNING

Heavy Weight Hazard

5) Place the Actuation Plate into the Spacer Plate.



Doc008000.png

NOTICE

Make sure that the seals are inserted in the block actuator.

6) Fasten the block actuator with the cylinder head screws.

WARNING

Heavy Weight Hazard

7) Assemble Top Clamp Plate.

9.2.3.4 Assembly and adjustment of the Valve Pins

Precondition for the following steps are to be performed with the Hot Runner installed in the mold, and the system at operating temperature.

WARNING

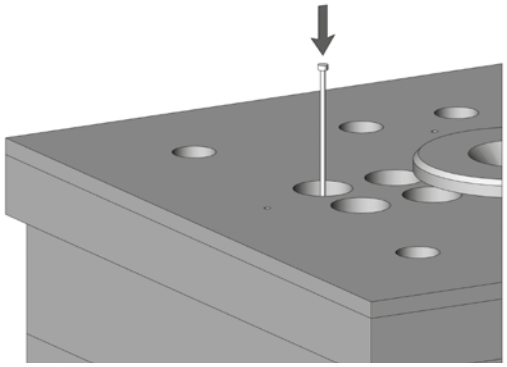
Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

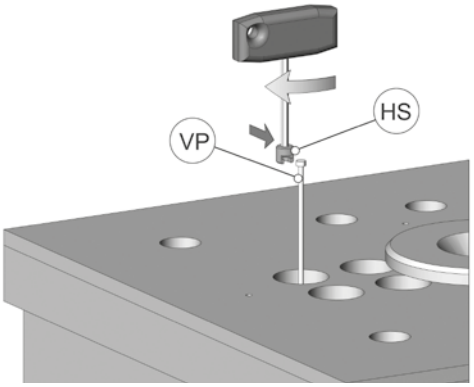
When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

1) Fit in the valve pins via the top clamp plate into the cutout.



Doc007550.png

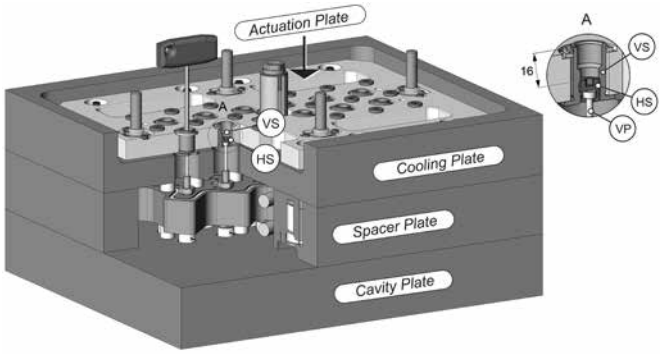
2) Hang the head of the valve pin (VP) into the Hanger Screw (HS).
3) Screw the Valve Pin (VP) with the Hanger Screw (HS), by using a T-wrench allen key, into the Valve pin Suspension sleeve.



Doc007551.png

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Service and Maintenance / Plate Actuation, Actuators below Plate



Doc007543.png

Adjust the valve pins with a hexagon socket wrench as followed:

NOTICE

To adjust the valve pin, the Actuation Plate has to be stay on close position.

In order to ensure this, we recommend fixing it with compressed air on the actuator.

The basic setting for the valve gate pin is 16 mm between the Valve pin Suspension (VS) top edge and the top edge from the Hanger Screw (HS).

NOTICE

During the fine tuning process it is possible to move the Valve Pin (VP) in every direction 0.5 mm (1/2 rotation).

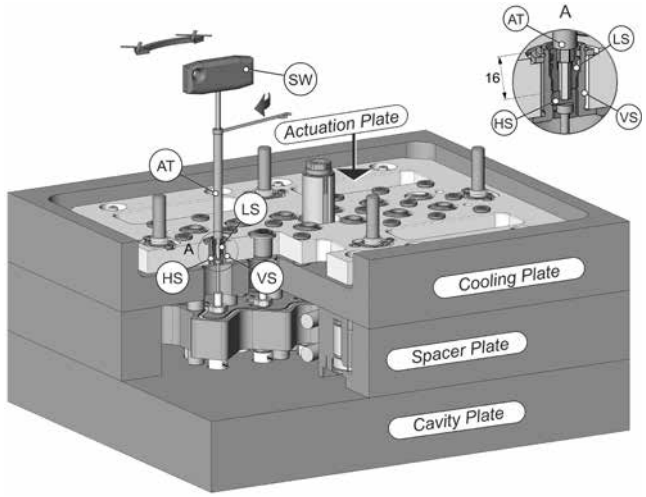
The exact position for the valve pin has to be checked at the front of the valve pin - depends on the nozzle tip.

The reason to unscrew the Hanger Screw (HS) would be for valve pin maintenance or replacement.

If the deviation to the basic settings of 16 mm is more than 0.5 mm, the adjustments do not correspond to the parameters of the mold or do not correspond to the Synventive standard.

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Service and Maintenance / Plate Actuation, Actuators below Plate



Doc007544.png

WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

4) Heat up the system to the working temperature.
5) Turn with the Adjustment Tool ATCYL2102 (AT) the Locking Screw (LS) up to the Hanger Screw (HS).

NOTICE

For actuator assembly the Lock Screw (LS) has to be fastened against the Hanger Screw (HS).

6) Rotate the Lock Screw (LS) with the Adjustment Tool ATCY2102 (AT) into the Valve pin Suspension sleeve (VS).
7) Hold against turning the Hanger Screw (HS) with the hexagon Socket Wrench (SW).
8) At the same time tighten the Locking Screw (LS) with the Adjustment Tool ATCY2102 (AT) and a ring wrench (size 6 mm).
9) Repeat these steps of adjustment for all valve pins.

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9.2.3.5 Nozzle Deactivating

If necessary, each nozzle can be deactivated independently.

This is a fast solution when using the remaining nozzles.

WARNING

Hot Surfaces Hazard

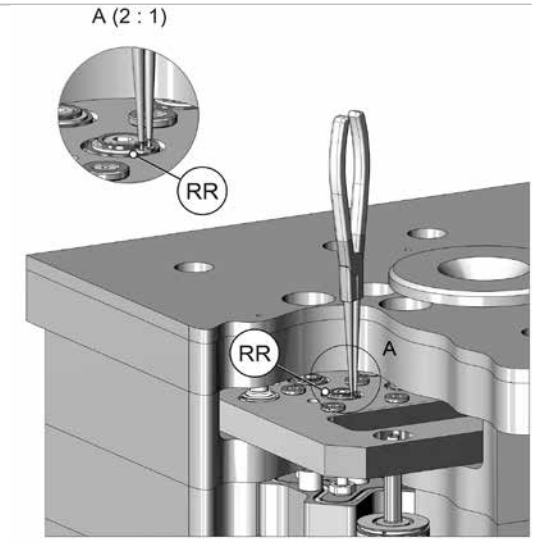
Contact between the skin and hot surfaces could result in burns.

This operation has to be done with the system cooled down to room temperature.

1) Apply compressed air to the pneumatic tool connection CLOSED, to bring the actuation plate to the valve gates closed position.
2) Remove the heavy duty retaining ring DIN471-17X1.5 (RR) from the valve pin suspension.

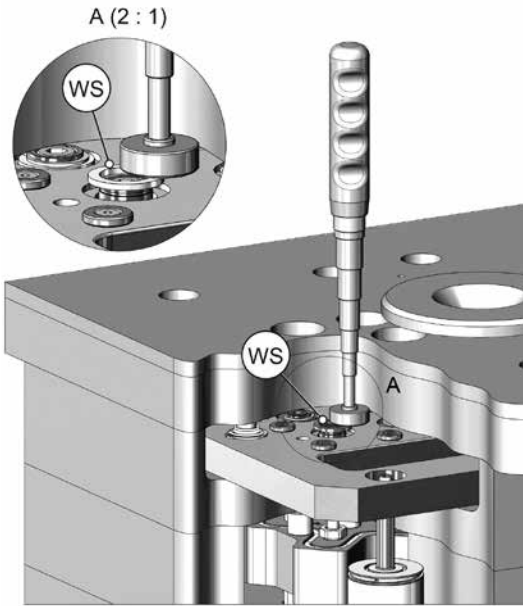
NOTICE

To remove the retaining ring, without dismounting the clamping plate, an extra long snap ring plier is required.



Doc007553.png

3) Remove the Washer W-17-24-2-02 (WS) with a Magnetic Rod / Pick-Up tool.

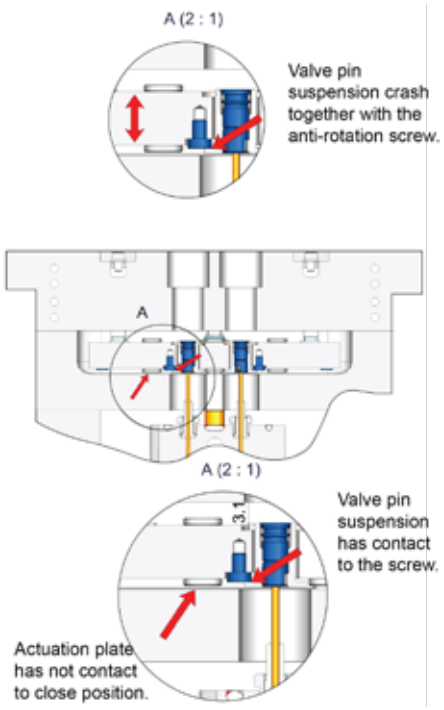


Doc007554.png

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CAUTION

The valve pin can get damaged. To avoid this, the valve pin suspension must be adjusted to the front.



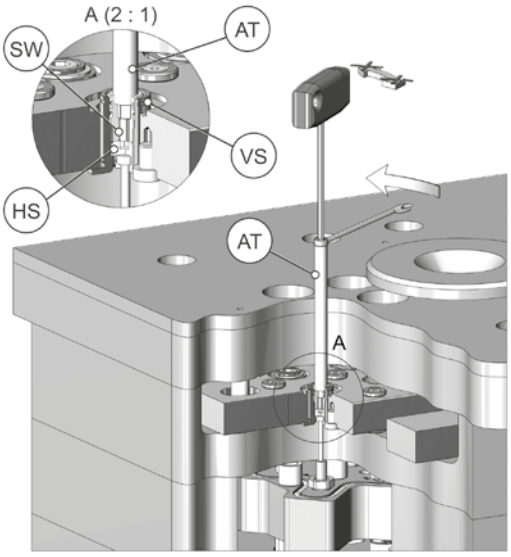
Doc007507.png

4) Hold against turning the Hanger Screw (HS) with the hexagon Socket Wrench (SW).
5) At the same time loosen the Lock Screw (LS) with the adjustment tool ATCY2102 (AT) and a ring wrench (size 6 mm).
6) Turn the Lock Screw (LS) with the adjustment tool ATCY2102 (AT) three complete turns counter clockwise.

NOTICE

After one and a half turns, the Valve pin Suspension sleeve (VS) is lower than the anti-rotation screw and it may rotate also.

7) Fix the new position by turning the Hanger Screw (HS) counter clockwise and the Lock Screw (LS) clockwise.



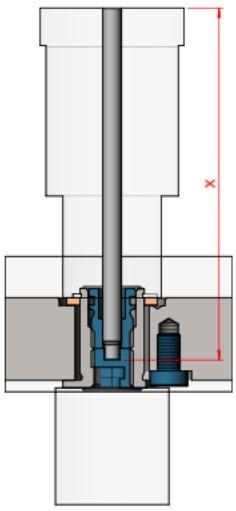
Doc007555.png

NOTICE

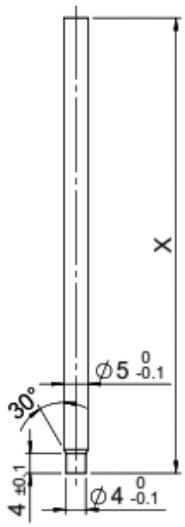
Before the system is put back into operation after the nozzles have been deactivated, the heating of the out of service nozzles must also be deactivated.

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9.2.3.6 Blocking Pin



Doc007743.png



Doc007744.png

NOTICE

After the unit “Valve Pin Suspension” has been detached from the actuation plate, the position of the valve pin has to be locked with a blocking pin.

When this pin is not mounted, the valve pin could be pushed back by the injection pressure and open the nozzle.

1) The length X must be measured.
2) The blocking pin should be manufactured according to the dimensions in image Doc007744.png.
3) The blocking pin has to have contact to the machine plate.

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10 Nozzles

This section describes the disassembly and assembly process to replace nozzles for the following production series:

Threaded Nozzles 06E / 09E / 12E
API



Doc003239.png

Nozzle Series	Flow Bore Ø
06E	6 mm
09E	9 mm
12E	12 mm

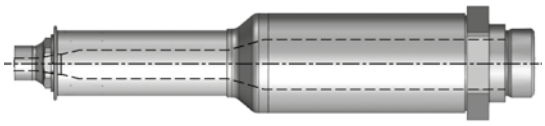
Threaded Nozzles 16E / 22E
API



Doc006840.tif

Nozzle Series	Flow Bore Ø
16E	16 mm
22E	22 mm

Threaded Nozzles 12EX16 / 16EX22
API



Doc006998.png

Nozzle Series	Flow Bore Ø Front side	Flow Bore Ø Rear side
12EX16	12 mm	16 mm (18 mm)
16EX22	16 mm	22 mm (20 mm, 24 mm)

Support Ring Nozzles
APT



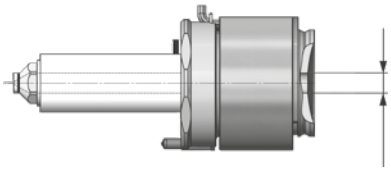
Doc003240.eps

Nozzle Series	Flow Bore Ø
SR16	8 - 16 mm
SR20	8 - 20 mm
SR24	13 - 25 mm

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Service and Maintenance / Nozzles

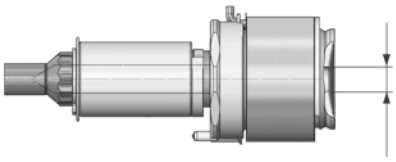
Sprue Bushing 06S



Doc004799.tif

Nozzle Series	Flow Bore Ø
06S	6 mm

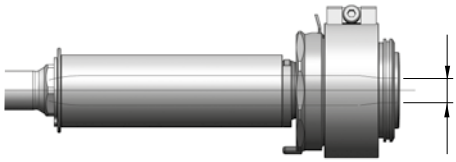
Sprue Bushing 09S



Doc004800.tif

Nozzle Series	Flow Bore Ø
09S	9 mm

Sprue Bushing 12S



Doc005218.tif

Nozzle Series	Flow Bore Ø
12S	12 mm

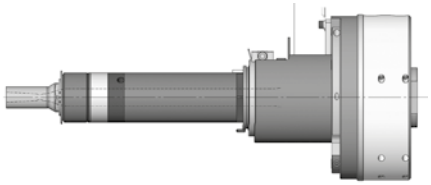
Sprue Bushing 16S / 22S



Doc006883.tif

Nozzle Series	Flow Bore Ø
16S	16 mm
22S	22 mm

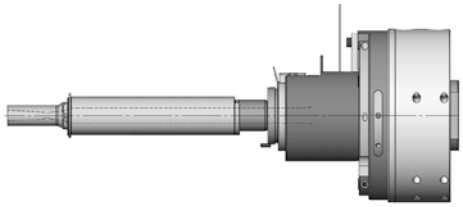
Single Axis Valve Gate Nozzles (hydraulic) 12SVH / 16SVH



Doc007461.png

Nozzle Series	Flow Bore Ø
12SVH	12 mm
16SVH	16 mm

Single Axis Valve Gate Nozzles (pneumatic) 09SVP / 12SVP / 16SVP



Doc007460.png

Nozzle Series	Flow Bore Ø
09SVP	9 mm
12SVP	12 mm
16SVP	16 mm

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10.1 Threaded Nozzles

10.1.1 Nozzle 06E Series

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.

WARNING

Hot Surfaces Hazard



Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.



Hazard of Pressurized Air



Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.



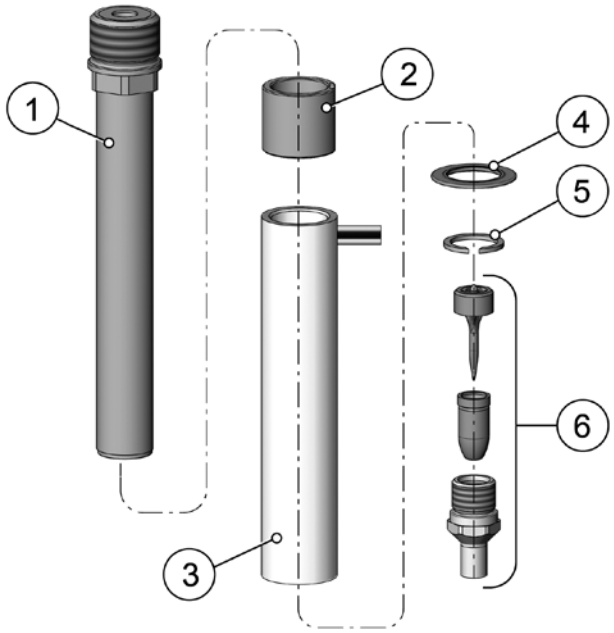
NOTICE

Hazard of Material Damage



Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

In this section the nozzle parts are identified with the numbers indicated in the following figure.

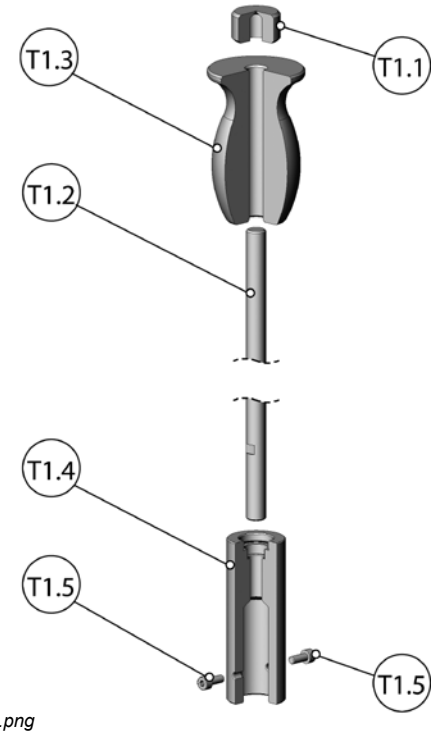


Doc006483.png

Parts of the Nozzle Nozzle 06E

(1) Nozzle body
(2) Component Ring Version 01
(3) Heating Element
(4) Component Ring Version 02
(5) Nozzle circlip
(6) Tip
(7) Wear Insert (Not shown)

In this section the Stripping and Mounting Tool parts are identified with the numbers indicated in the following figure.



Doc003038.png

Parts of the Heater Stripping and Mounting Tool AT06E01

(T1.1)	Stop bolt	ATCYL0104
(T1.2)	Guide	ATCYL0102
(T1.3)	Slide hammer	ATCYL0101
(T1.4)	Adapter	AT06E0101
(T1.5)	Socket head cap screw M4	

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10.1.1.1 Dismounting and Mounting Thermocouple

Dismounting Thermocouple

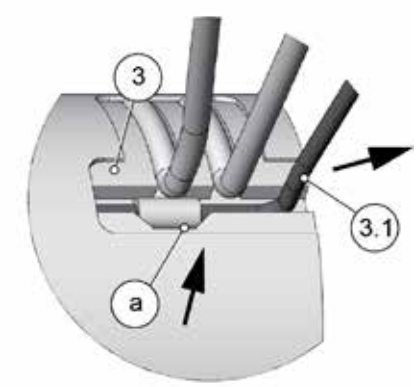
NOTICE

For dismounting of the thermocouple from the nozzle heater, the nozzle heater must be dismantled from the nozzle.

1) Lift the thermocouple (3.1) at the retainer clip (a) out of the heating element (3) slot and pull it off the heating element.

NOTICE

The thermocouple (3.1) is clamped at the top of the heater element (3).



Doc006486.png

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Mounting Thermocouple

NOTICE

For mounting of the thermocouple to the nozzle heater, the nozzle heater must be dismantled from the nozzle.

Color coding of Thermocouples

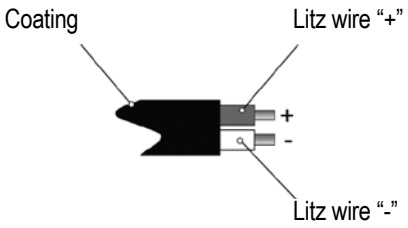
NOTICE

Take notice of the production and color identification of thermocouple cables.

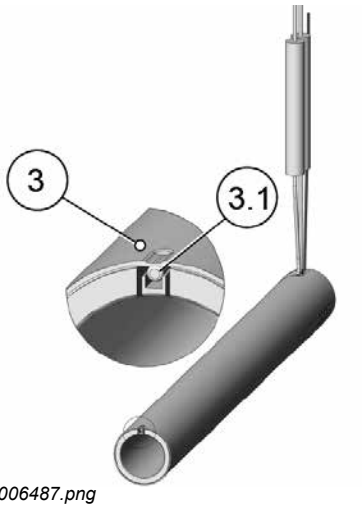
Synventive uses J and K type thermocouples Their color coding is given in the following table.

Table 1: International color coding for temperature sensors

Type	International standard IEC 584-3	
J	Black	+ Black
		- White
K	Green	+ Green
		- White

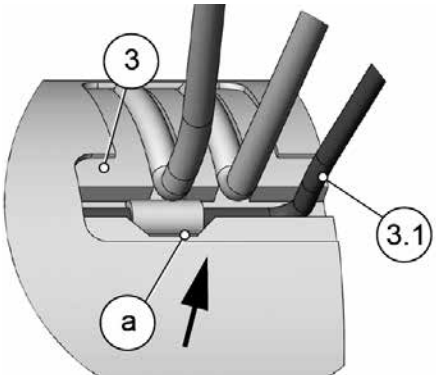


1) Slide the thermocouple (3.1) in leadership of the heating element (3) until it stops.
2) Increase the pressure until the top of the thermocouple (3.1) completely is clamped in to the final position.
3) Check the position of the thermocouple (3.1).



Doc006487.png

4) Press the retainer clip (a) into the slot at the heating element (3).



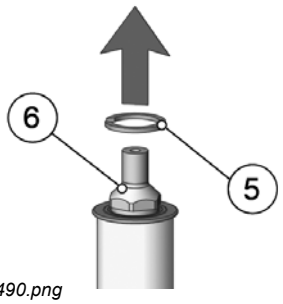
Doc006488.png

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10.1.1.2 Disassembly the Nozzle 06E

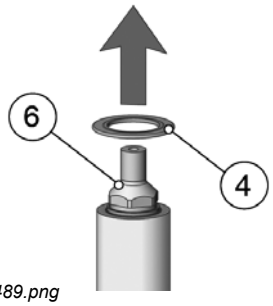
Disassembling the Nozzle Tip

1) Remove the circlip (5) from the nozzle tip (6).



Doc006490.png

2) Remove the component ring version 02(4).



Doc006489.png

WARNING

Hot Surfaces Hazard

Following works must be carried out by qualified persons.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns

Contact between the skin and the hot nozzle could result in burns.

NOTICE

To dismount the nozzle tip from the nozzle, if there is plastic material in the nozzle, the tip must be heated-up.

Never use an acetylene or welding torch, as severe nozzle damage can occur from over-heating.

3) Heat the nozzle tip (2) using a heat gun to the maximum temperature of 200 °C (392 °F).

WARNING

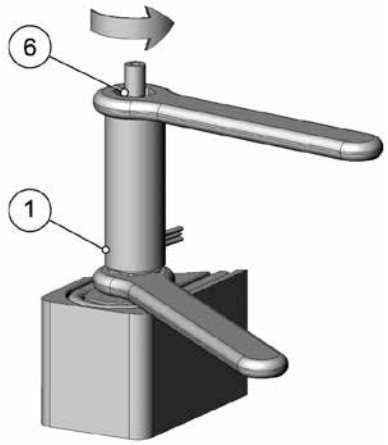
Hot Surfaces Hazard

The nozzle is still hot.

NOTICE

Unscrewing the nozzle tip may cause the nozzle to start rotating together with the nozzle tip, which could result in leakage at the base of the nozzle.

4) Hold the nozzle body (1) firmly using an engineer's wrench at the hexagonal shape.
5) Unscrew the nozzle tip (6) from the nozzle body (1) using an engineer's wrench.



Doc006494.png

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WARNING

Hazard of Pressurized Air

Pressurized air blow can result in hot plastic parts or foreign bodies entering the eyes, causing vision damage.

6) Clean the nozzle tip using pressurized air to remove as much residual plastic as possible.

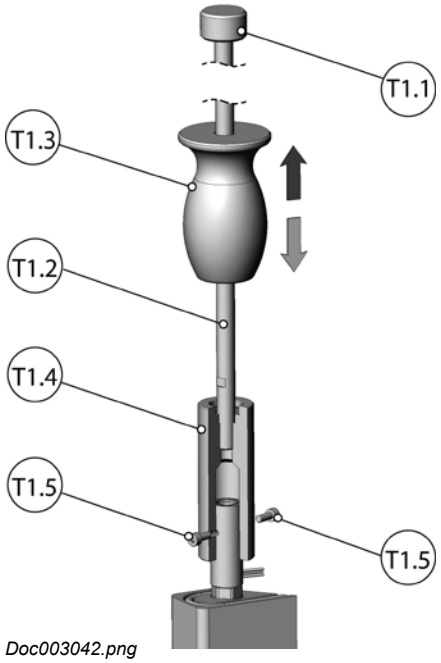
Disassembling the Nozzle Heater

WARNING

Hot Surfaces Hazard

Contact between the skin and the hot nozzle could result in burns.

1) Cool the nozzle body to approximately 25 °C (77 °F).
2) Move the adapter of the dismantling tool (T1.4) over the heater.
3) Fix the heater with 2 socket head cap screws M4 (T1.5).
4) Screw the guide (T1.2) together with the stop bolt (T1.1) and the slide hammer (T1.3) into the adapter (T1.4).
5) To remove the nozzle heater, slide the hammer (T1.3) against the stop bolt (T1.1) repeatedly until the nozzle heater is released.



Doc003042.png

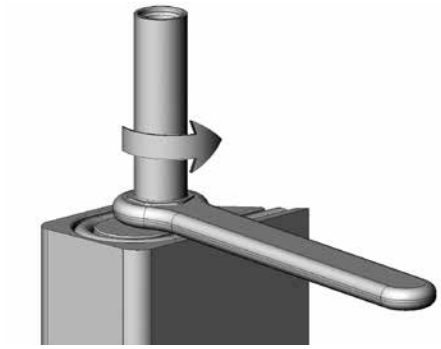
Disassembling the Nozzle Body

WARNING

Hot Surfaces Hazard

Contact between the skin and the hot nozzle could result in burns.

1) Ensure that the nozzle body (1) is cooled to approximately 25 ° C (77 ° F).
2) Unscrew nozzle body from the manifold.


Doc003040.png

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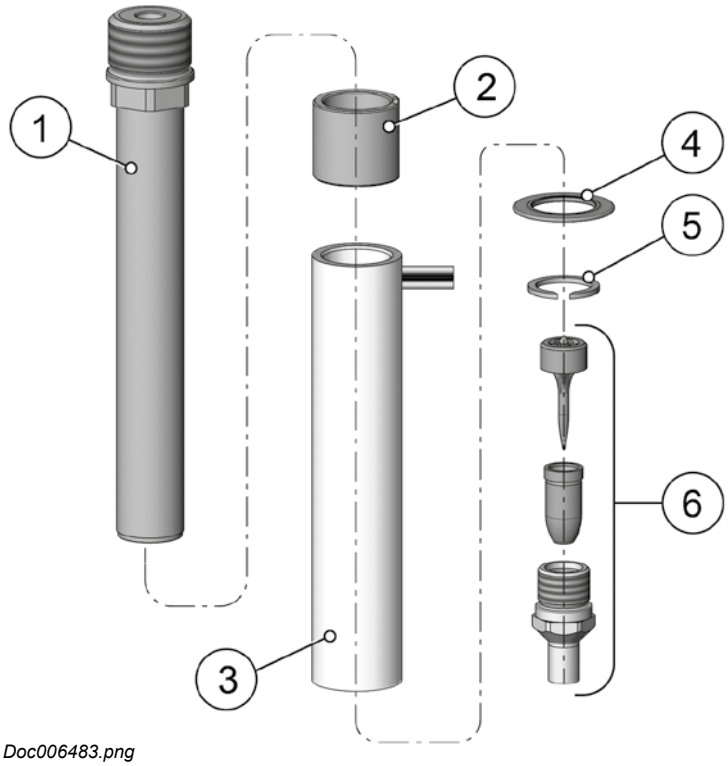
10.1.1.3 Assembling the Nozzle 06E

WARNING

Hot Surfaces Hazard

Contact between the skin and the hot nozzle could result in burns.

Use personal protective equipment: Gloves resistant to high temperatures, apron, sleeves, to guard against burns.



Doc006483.png

Nozzle 06E

(1) Nozzle body
(2) Component Ring Version 01
(3) Heating Element
(4) Component Ring Version 02
(5) Nozzle circlip
(6) Tip
(7) Wear Insert (Not shown)

Assembling the Nozzle Body

1) Apply spotting ink on the nozzle body (1) bottom surface (SF1).
2) Screw in the nozzle body (1) hand-tight into the manifold thread until seated.
3) Unscrew the nozzle body (1) from the manifold.



Doc003049.png

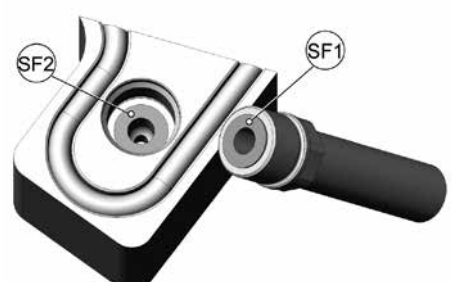
4) Check the matching between the manifold bottom surfaces (SF2) and the nozzle body (1) surface (SF1).

NOTICE

The manifold must bear on all surfaces uniformly and flatly, in particular on the nozzle head contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, please - contact Synventive Customer Service or Technical Support.

5) With a positive ink test clean the surfaces and proceed to the next step.



Doc003050.png

6) Lubricate the thread (not the face) of the nozzle body with high-temperature assembly paste (antiseize compound).

NOTICE

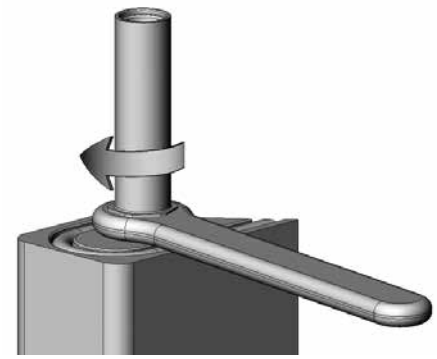
This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.


Doc003044.png

7) Tighten nozzle body to manifold.

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.


Doc003046.png

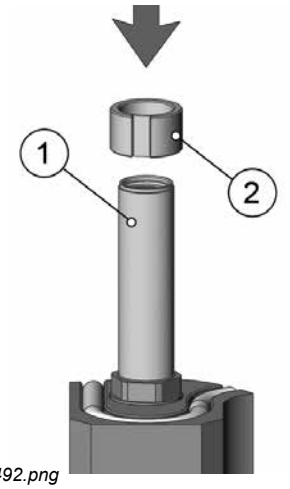
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Assembling the Nozzle Heater to the Nozzle

1) Add component ring (2) (when used)

NOTICE

This component ring version 01 (2) is an option (depend of the nozzle length). The high can be between 1 mm until 20 mm.

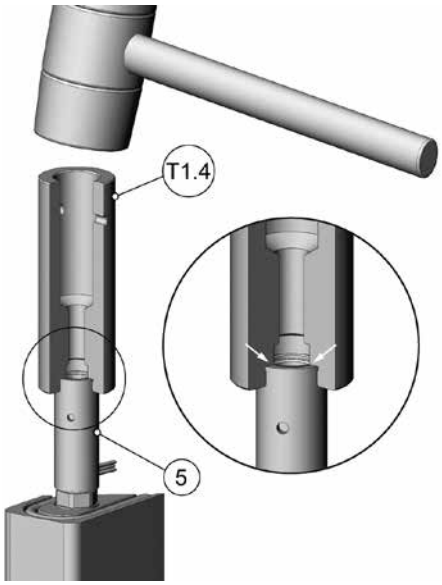


Doc006492.png

2) Mount heater top on top to nozzle body carefully with soft-head hammer and adapter (T1.4).

NOTICE

The adapter has to be turned in the pictured position.



Doc003053.png

NOTICE

To ensure the temperature control of the nozzle tip, the heater must be flush with the nozzle body.

3) Control the position of the heater.

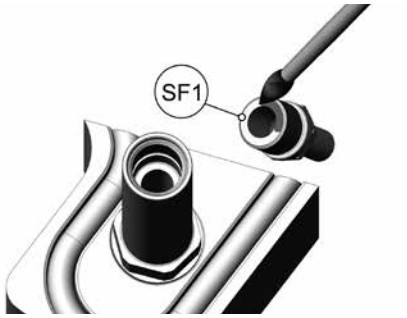


Doc003047.png

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Assembling the Nozzle Tip

1) Apply spotting ink on the nozzle tip bottom surface (SF1).
2) Screw in the nozzle tip hand-tight into the nozzle body until seated.
3) Unscrew the nozzle tip from the nozzle body.



Doc003051.png

4) Check the matching between the nozzle body surface (SF2) and the nozzle tip surface (SF1).

NOTICE

The nozzle must bear uniformly on the outer surfaces uniformly and flatly, in particular on the nozzle tip contact face.

NOTICE

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory - please contact Synventive Customer Service or Technical Support.

5) With a positive ink test, clean the surfaces and proceed to the next step.



Doc003052.png

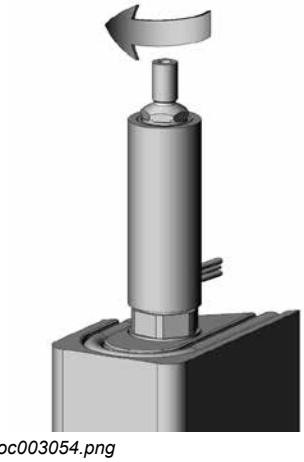
6) Lubricate the thread (not the face) of the nozzle tip body with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.


Doc003043.png

7) Screw in the nozzle tip into the nozzle body hand-tight.

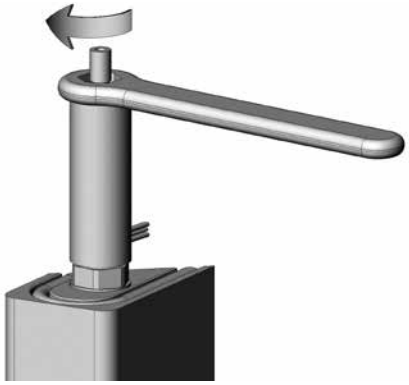

Doc003054.png

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8) Tighten the nozzle tip to nozzle at room temperature.

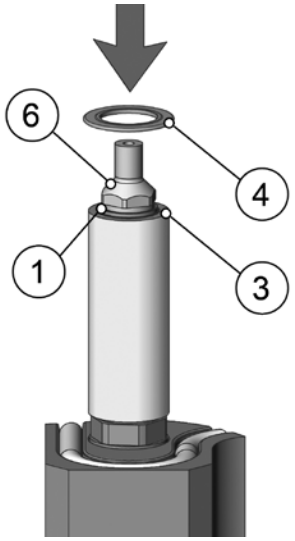
NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.



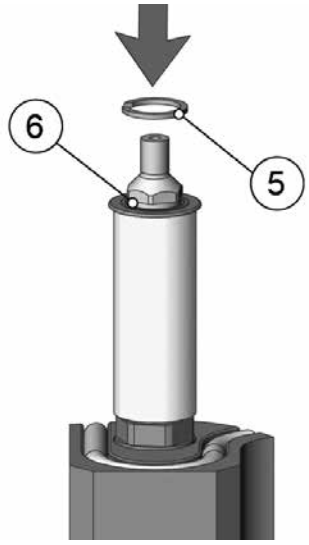
Doc003048.png

9) Place the component ring version 02 (4) on the nozzle heating (3).



Doc006491.png

10) Mount the circlip (5) at the nozzle tip (6).



Doc006493.png

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10.1.2 Nozzle 09E Series

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.

WARNING



Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.





Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.



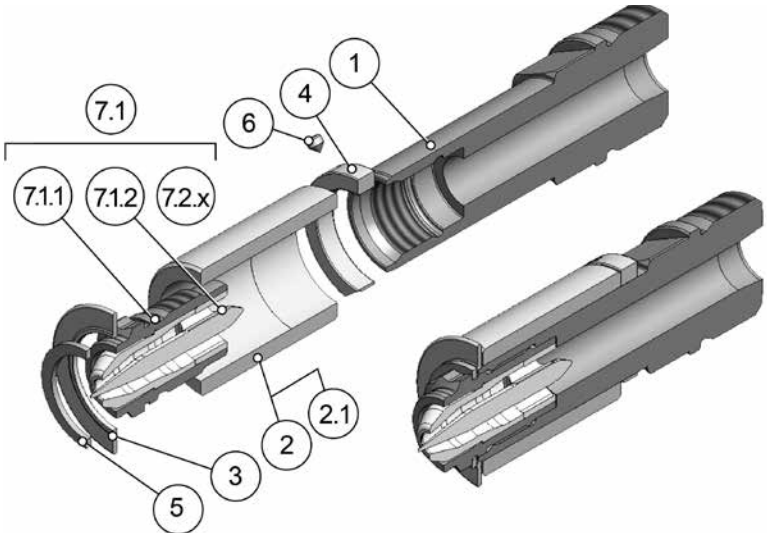
NOTICE



Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

In this section the nozzle parts are identified with the numbers indicated in the following figure.



Doc003817.png

Parts of the Nozzle 09E

(1) Threaded nozzle body

(2) Nozzle heater

(2.1) Thermocouple (Part No. 09NC-T-###-###-0#)

(3) Nozzle component ring version=4 for Brass Heater

(4) Nozzle component ring version=2 (Heater locating ring)

(5) Retaining ring DIN471

(6) Socket set screw DIN914

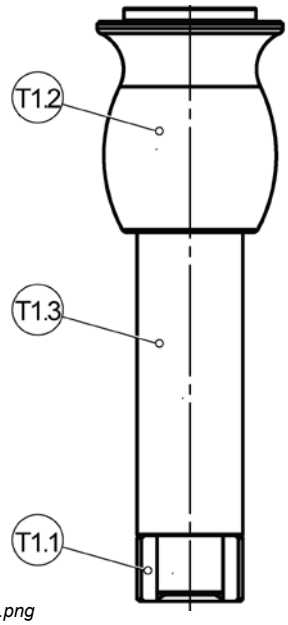
(7.1) Nozzle Tip Style Complete

(7.1.1) Tip nut

(7.1.2) Tip insert alternatively nozzle tip assemblies

(7.2.x) Valve gate pin (not shown)

In this section the Stripping and Mounting Tool parts are identified with the numbers indicated in the following figure.



Doc003818.png

Heater Disassembly Tool Compl. 09E AT09E03

(T1.1) Heater Disassembly Tool 09E Type 01 AT09E0301

(T1.2) Heater Disassembly Tool 09E Type 02 AT09E0302

(T1.3) Heater Disassembly Tool 09E Type 03 AT09E0303

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10.1.2.1 Dismounting and Mounting Thermocouple

Dismounting Thermocouple

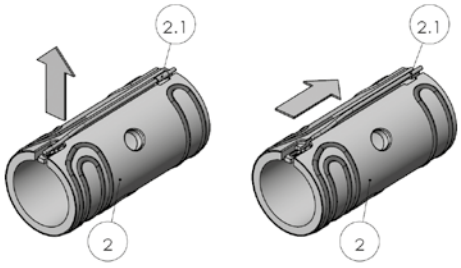
NOTICE

For dismounting of the thermocouple from the nozzle heater, the nozzle heater must be dismantled from the nozzle.

1) Lever the bracket of the heating element (2) with a screwdriver and pull the thermocouple (2.1) from its seat.
2) Pull the top of the thermocouple (2.1) from the bracket of the nozzle heater (2).

NOTICE

The thermocouple is pressed in.



Doc007556.png

Mounting Thermocouple

NOTICE

For mounting of the thermocouple to the nozzle heater, the nozzle heater must be dismantled from the nozzle.

Color coding of Thermocouples

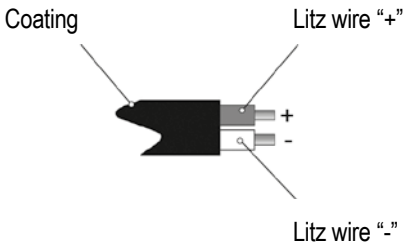
NOTICE

Take notice of the production and color identification of thermocouple cables.

Synventive uses J and K type thermocouples Their color coding is given in the following table.

Table 1: International color coding for temperature sensors

Type	International standard IEC 584-3	
J	Black	+ Black
		- White
K	Green	+ Green
		- White

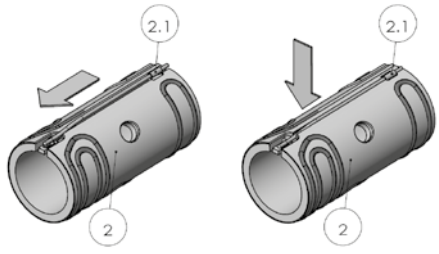


1) Push the thermocouple (2.1) under the bracket on the nozzle heater (2).

NOTICE

The fixing is needed to secure the position.
A thermocouple (well-fixed in the holder) causes correct measured values.

2) Lever the clamp of the nozzle heater with a screwdriver and fix the thermocouple (2.1) below the clamp at the nozzle heater (2).



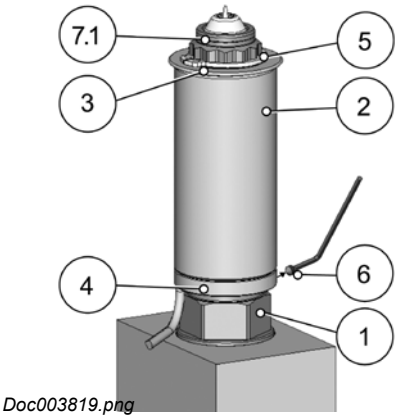
Doc007557.png

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10.1.2.2 Disassembly the Nozzle 09E

Disassembling the Nozzle Heater

1) Remove the retaining ring (5) from the nozzle tip (7.1).
2) Remove the nozzle component ring - Frontring (3).
3) Unscrew and remove the socket set screw (6) from the nozzle heater locating ring (4).

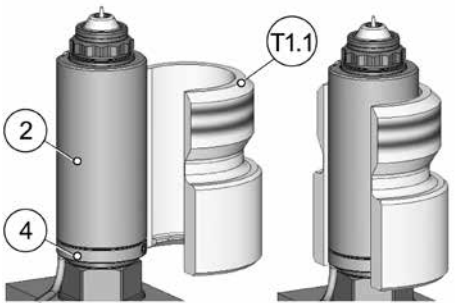


Doc003819.png

4) Mount the heater disassembly tool Type 01 (T1.1).

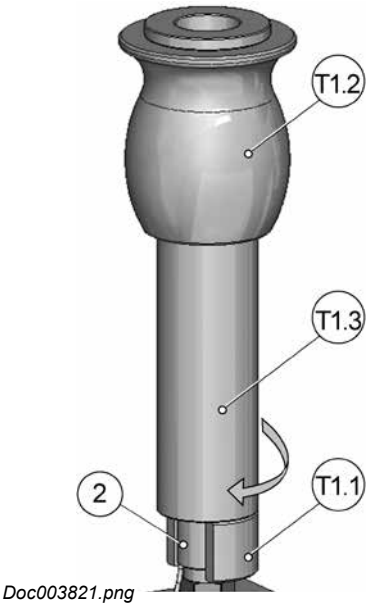
NOTICE

The lower edge of the heater removal tool type 01 (T1.1) must be set below the heater locating ring (4).



Doc003820.png

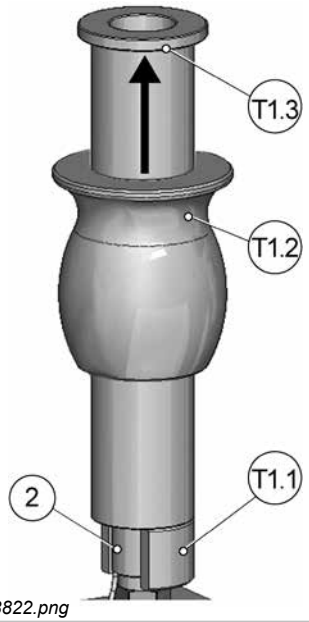
5) Slide disassembly tool Type 02 (T1.2) along the disassembly tool Type 03 (T1.3).
6) Screw disassembly tool Type 03 (T1.3) onto disassembly tool Type 01 (T1.1).



Doc003821.png

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7) To remove the nozzle heater (2), slide the disassembly tool Type 02 (T1.2) against the disassembly tool Type 03 (T1.3) repeatedly until the nozzle heater (2) is released.



Doc003822.png

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Disassembling the Nozzle Tip and Nozzle Body

WARNING

Hot Surfaces Hazard

Contact between the skin and the hot nozzle could result in burns.

Following works must be carried out by qualified persons.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

1) Heat the nozzle tip (7.1) using a heat gun to the maximum temperature of 200 °C (392 °F).
2) Hold the nozzle body (1) firmly using an engineer's wrench at the hexagonal shape.
3) Unscrew the nozzle tip (7.1) from the nozzle body (1) using a ring wrench.

WARNING

Hazard of Pressurized Air

Pressurized air blow can result in hot plastic parts or foreign bodies entering the eyes, causing vision damage.

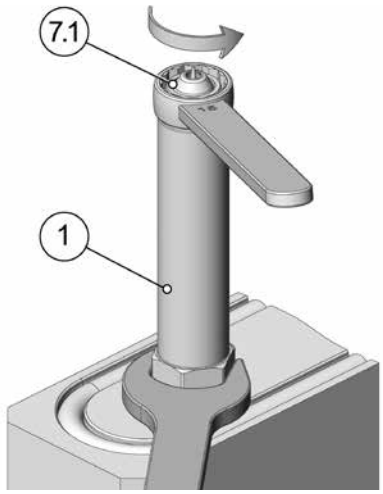
Use personal protective equipment: Face protection, hearing protection and gloves.

4) Clean the nozzle tip using pressurized air to remove as much residual plastic as possible.

NOTICE

To dismount the nozzle tip (7.1) from the nozzle, if there is plastic material in the nozzle, the tip (7.1) must be heated-up.

Never use an acetylene or welding torch, as severe nozzle damage can occur from over-heating.



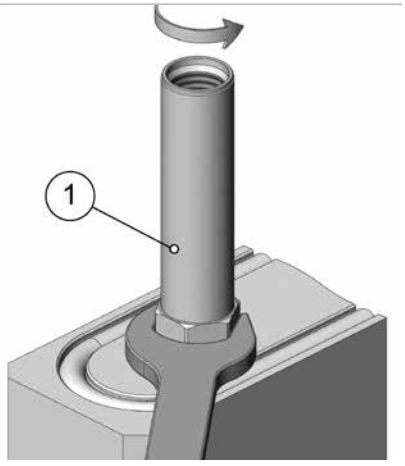
Doc003823.png

WARNING

Hot Surfaces Hazard

Contact between the skin and the hot nozzle could result in burns.

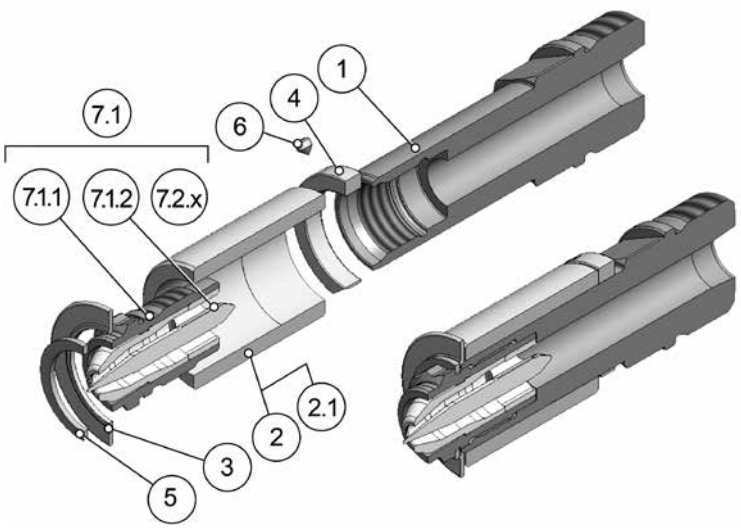
5) Cool the nozzle body (1) to approximately 25 °C (77 °F).
6) Unscrew nozzle body (1) from the manifold.



Doc003824.png

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Assembling Nozzle 09E



Doc003817.png

Parts of the Nozzle 09E

(1) Threaded nozzle body

(2) Nozzle heater

(2.1) Thermocouple (Part No. 09NC-T-###-###-0#)

(3) Nozzle component ring version=4 (front ring – Part No. 09nc-r-04) for Brass Heater

(4) Nozzle component ring version=2 (Heater locating ring)

(5) Retaining ring DIN471

(6) Socket set screw DIN914

(7.1) Nozzle Tip Style Complete

(7.1.1) Tip nut

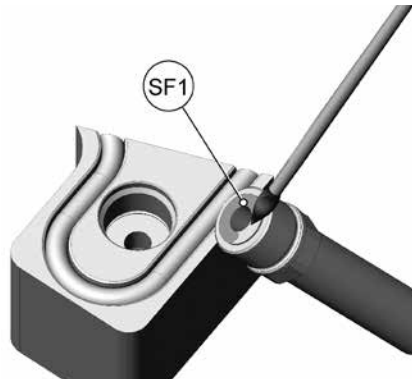
(7.1.2) Tip insert alternatively nozzle tip assemblies

(7.2.x) Valve gate pin (not shown)

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Assembling the Nozzle Body

1) Apply spotting ink on the nozzle body (1) bottom surface (SF1).
2) Screw in the nozzle body (1) hand-tight into the manifold thread until seated.
3) Unscrew the nozzle body (1) from the manifold.



Doc003825.png

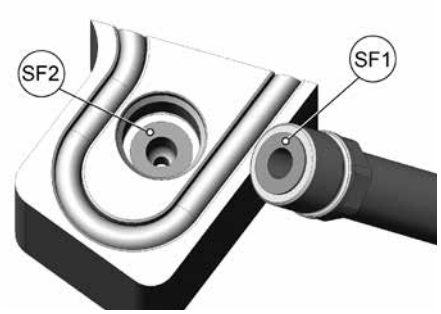
4) Check the matching between the manifold bottom surfaces (SF2) and the nozzle body (1) surface (SF1).

NOTICE

The manifold must bear on all surfaces uniformly and flatly, in particular on the nozzle head contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, please - contact Synventive Customer Service or Technical Support.

5) With a positive ink test clean the surfaces and proceed to the next step.



Doc003826.png

6) Lubricate the thread (not the face) of the nozzle body with high-temperature assembly paste (antiseize compound).

NOTICE

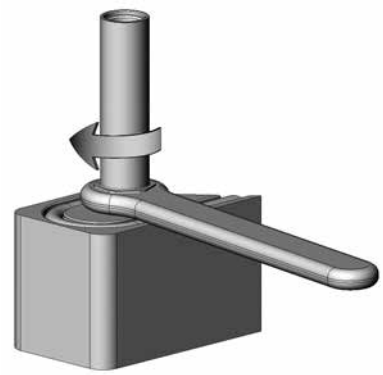
This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.


Doc003827.png

7) Tighten nozzle body (1) to the manifold.

NOTICE

Use torque wrench with wrench insert and the torque specified in the torque table in section 13.

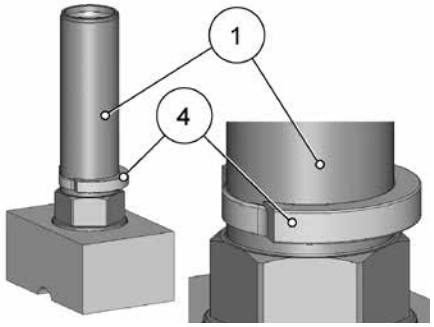

Doc003828.png

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8) Slide heater locating, ring (4), onto the nozzle body (1) up to the surface of the hexagon.

NOTICE

The opening of the heater locating ring (4), must be line up with the cable connections (see customer drawing).



Doc003829.png

9) Bend the heater and thermocouple (ex) leads.

NOTICE

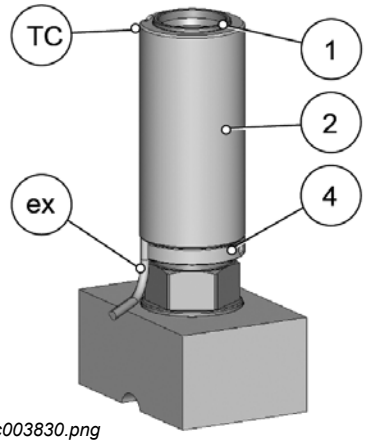
Use round-nosed pliers only.

10) Mount the nozzle heater (2) onto the nozzle (1).

NOTICE

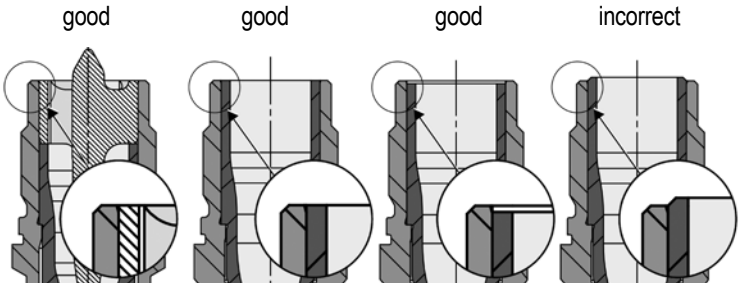
Take care that cold length of the nozzle heater (2) must be positioned through the opening of the nozzle component ring (4).

Check the correct position and fixation of the thermocouple (TC).



Doc003830.png

Assembling the Nozzle Tip



Doc004688.png

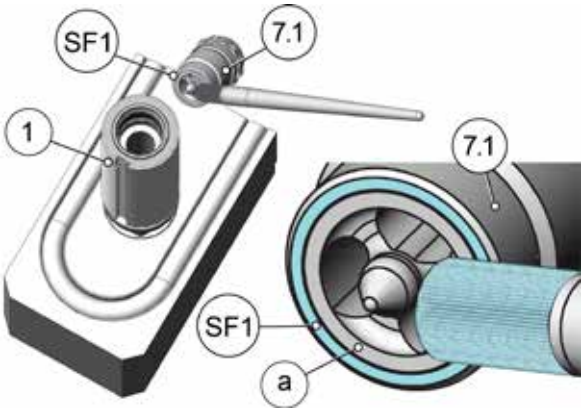
NOTICE

See examples of good and incorrect insert installations.

Make sure the insert must not exceeds the height of the nozzle tip head.

Incorrect items should not be further processed.

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Doc003831.png

1) Apply spotting ink on the nozzle tip (7.1) bottom surface (SF1).
2) Screw in the nozzle tip (7.1) hand-tight into the nozzle body (1) until seated.
3) Unscrew the nozzle tip (7.1) from the nozzle body (1).

4) Check the matching between the nozzle body surface (SF2) and the nozzle tip surface (SF1).

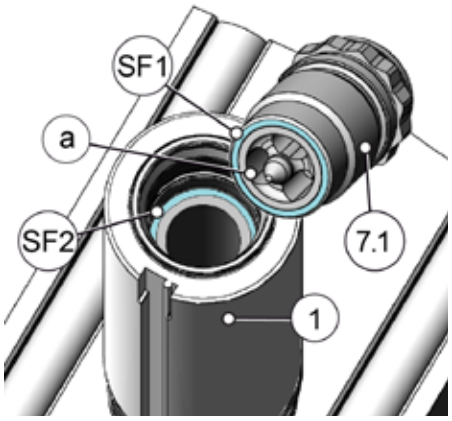
NOTICE

The nozzle must bear uniformly on the outer surfaces uniformly and flatly, in particular on the nozzle tip contact face.

NOTICE

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory - please contact Synventive Customer Service or Technical Support.

5) With a positive ink test, clean the surfaces and proceed to the next step.

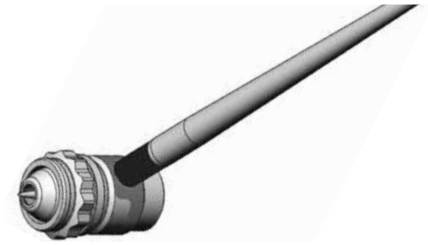


Doc003832.png

6) Lubricate the thread (not the face) of the nozzle tip body with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.



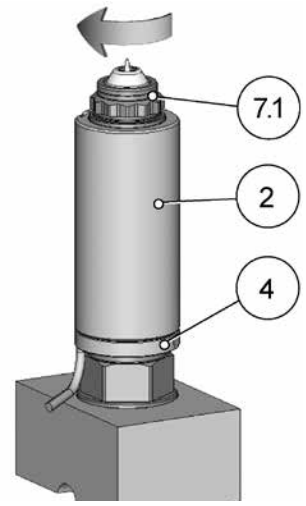
Doc003833.png

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7) Tighten the nozzle tip (7.1) at the nozzle by room temperature.

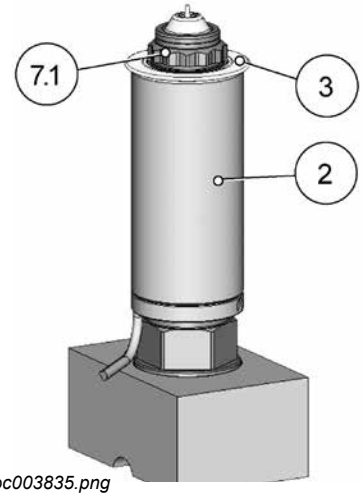
NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.



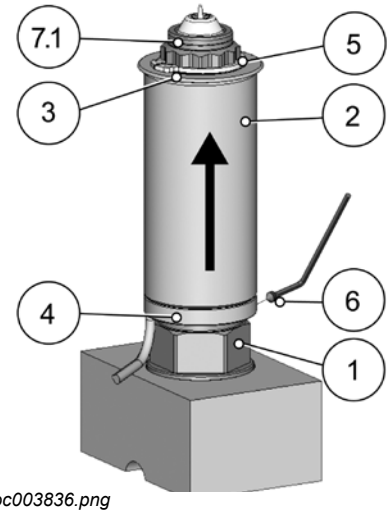
Doc003834.png

8) Place the frontring (3) on the nozzle heater (2).



Doc003835.png

9) Mount the retaining ring (5) at the nozzle tip (7.1).
10) Move the nozzle component ring (4) and nozzle heater (2) tight to the frontring (3).
11) Fix the nozzle component ring (4) with the socket set screw (6) by a ½ up to ¾ turn.



Doc003836.png

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10.1.3 Nozzle 12E-06 Series

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.

WARNING



Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.



WARNING



Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Damage to hearing may occur.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.



NOTICE

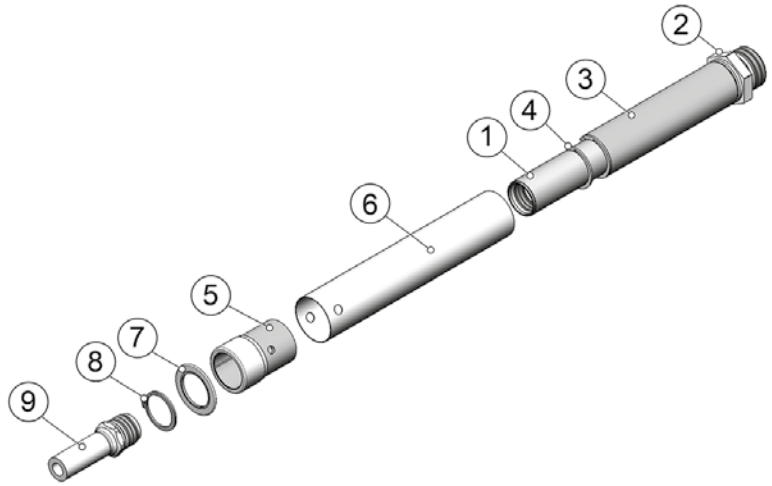


Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

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In this section the nozzle parts are identified with the numbers indicated in the following figure.



Doc008131.png

Parts of the Nozzle 12E-06	
1	Threaded nozzle body
2	Head ring 12E Series
3	Head heater
4	Retaining ring
5	Front heater
6	Cover tube
7	Pre-centering ring (optional)
8	Retaining ring DIN471
9	Nozzle tip style complete

10.1.3.1 Additional Options



Doc008142.png

12E Cooling Bushing Type12NC-05			
No.	Qty.	Description	Item
1	1	12E Cooling Bushing	12NC-B-04
2	1	O-Ring Seal	VIOR-37.77x2.62-FPM-80-G
3	1	O-Ring Seal	VIOR-32.99x2.62-FPM-80-G
4	1	Distance tube	12NC-DT-01-MOD
5	4	Parallel Pin	DIN6325-3m6x6
6	1	Cover	12NC-C-01
7	4	Hexagon Socket Cap Screw	DIN912-M4x6-12.9



Doc005588.png

12E Wear Insert

12WI-###-##-01-MOD

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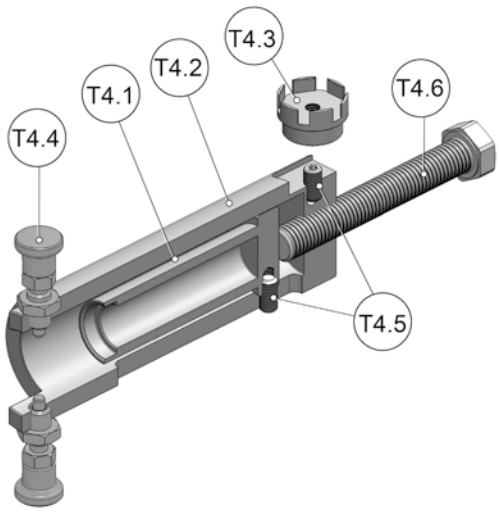
10.1.3.2 Assembly and Disassembly Tools

In this section, all parts of the assembly tools are indicated in the following images with the part numbers.

Heater Disassembly Tool Complete AT-FHA-024 for the Heater Type FHA#-024-###-##

The dismantling tool is required to pull the heater from the nozzle body or the sprue bushing.

The adapter AT-FHA-024-C-05 is only required for the dismounting of the sprue bushing.

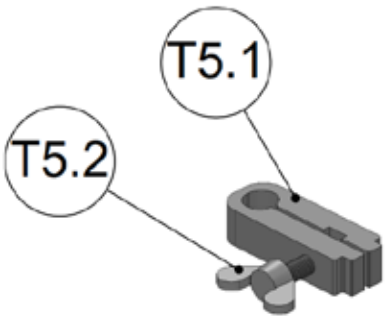


Doc008132.png

AT-FHA-024			
No.	Qty.	Item	Description
T4.1	1	AT-FHA-024-C-01	Disassembly Tool Socket
T4.2	1	AT-FHA-024-C-02	Disassembly Tool Sleeve
T4.3	1	AT-FHA-024-C-05	Disassembly Tool IB24 Adapter Nut
T4.4	1	GN817-4-4-CK	Indexing plunger; Pin Bore=4; l1=4
T4.5	2	DIN913-M6x12-45H	Flat Point Socket Set Screw 45H Alloy Steel
T4.6	1	ISO4017-M12X100-12.9	Full Thread Hexagon Screw ISO4017

Spreader Tool Head Heater Type HHA#-0##-###-##

This tool can be used to spread apart the head heater so that it can be pulled off the nozzle body more easily.



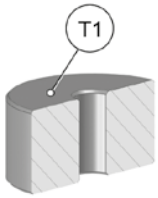
Doc008563.png

AT-HHA-00			
No.	Qty.	Item	Description
T5.1	1	AT-HHA-C-01	Head Heater Spreader
T5.2	1	DIN316-A2-M4x16	Metric DIN 316 Wing Screws M4x16

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Tools for mounting inserts in nozzle tips

(T1) Tip Assemble Tool AT12E-0104



Doc005227.png

(T2) Tip Assemble Tool AT12E-0103



Doc005228.png

(T3) Seal Cap Assemble Tool AT12E-0105



Doc005209.png

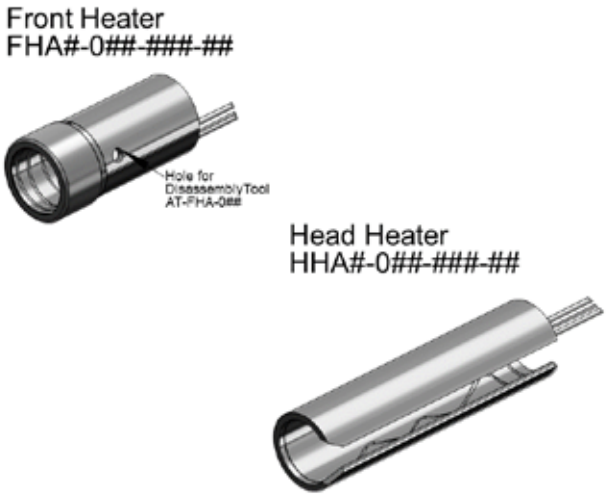
10.1.3.3 MS-Heating Element

There are two types of Molding Solution heaters.

Front Heaters FHA#-024-###-## and Head Heaters HHA#-024-###-##.

The thermocouple is pressed in firmly and cannot be replaced.

All heaters are available either with a thermocouple type J (#HAJ-024-###-##) or a thermocouple type K (#HAK-024-###-##).



Doc008133.png

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Color Coding of Thermocouples

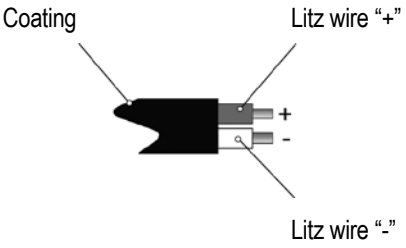
NOTICE

Take notice of the production and color identification of thermocouple cables.

Synventive uses J and K type thermocouples Their color coding is given in the following table.

Table 1: International color coding for temperature sensors

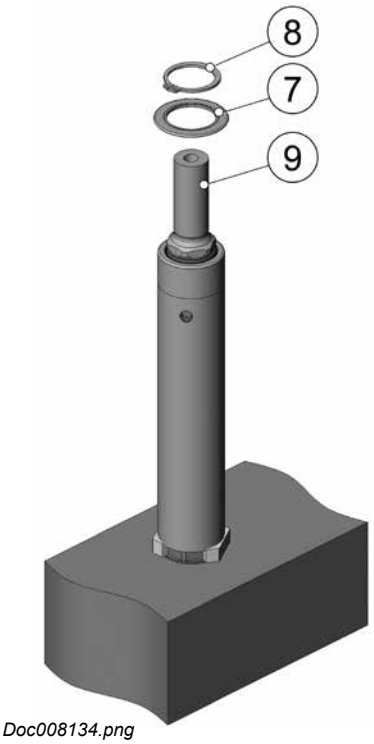
Type	International standard IEC 584-3	
J	Black	+ Black
		- White
K	Green	+ Green
		- White



Doc003124.png

10.1.3.4 Disassembly Nozzle 12E-06

Disassembling the Nozzle Heater



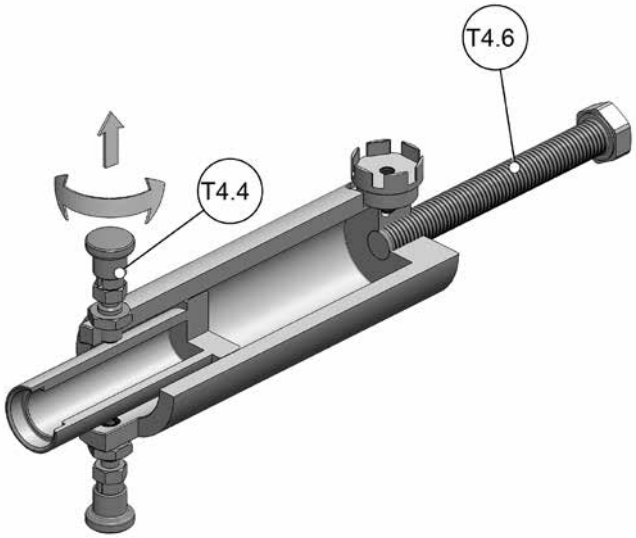
Doc008134.png

1) Remove the retaining ring (8) from the nozzle tip (9).
2) Remove the pre-centering ring (7).

NOTICE

The pre-centering ring (7) is only provided on explicit customer request.

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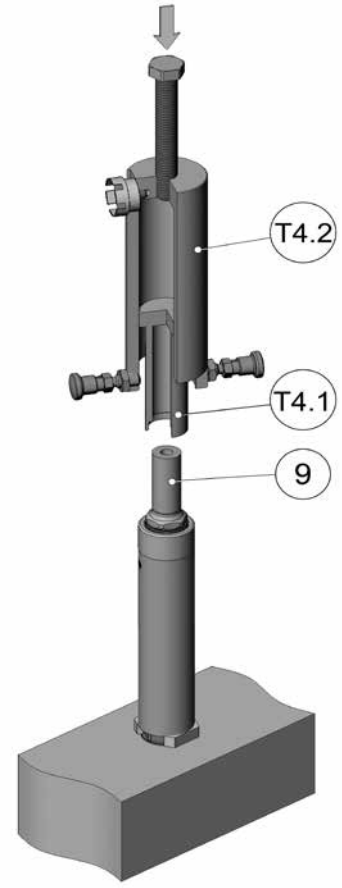
Doc008136.png

3) Turn the hexagon head screw (T4.6) of the disassembly tool completely backwards.
4) Pull the button from indexing plungers (T4.4) and fix the position by turning the button (T4.4) by 90°.

5) Guide the socket (T4.1) of the disassembly tool over the nozzle insert (9).

NOTICE

The socket (T4.1) is seated onto the nozzle tip (8) and slides back into the sleeve (T4.2).



Doc008137.png

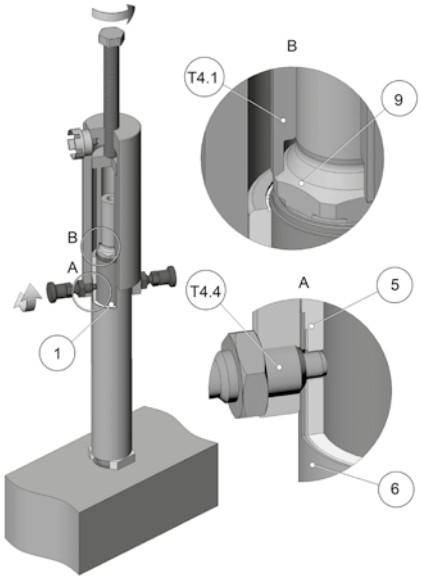
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6) Loosen the indexing plungers (T4.4), by turning the button 90°.
7) Position the disassembly tool until the indexing plungers (T4.4) snaps into the hole of the cover tube (6) and the heater (5).
8) Turn the hexagon head screw (T4.6) clockwise.

NOTICE

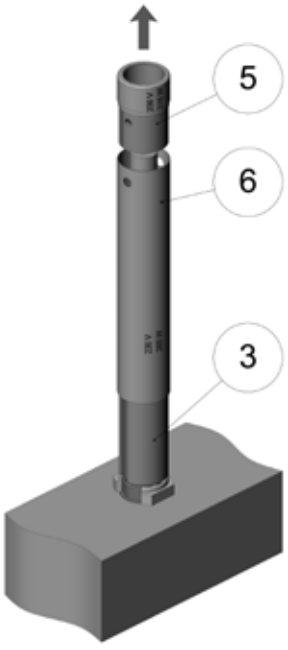
By turning the hexagon head screw (T4.6) the heater (5) together with the cover tube (6) is pulled off the nozzle body (1).

9) Turn down the hexagon head screw (T4.6) completely.



Doc008135.png

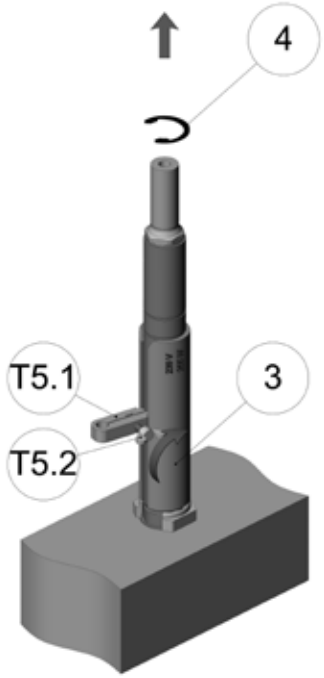
10) Remove the front heater (5).
11) Remove the Cover Tube (6).



Doc008564.png

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12) Remove the retaining ring (4).
13) Spread the head heater (3) with the spreading tool (T5).
14) Remove the head heater (3).



Doc008565.png

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Disassembling the Nozzle Tip and Nozzle Body

WARNING

Hot Surface Hazard

Contact between the skin and the hot nozzle could result in burns.

Following works must be carried out by qualified persons.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

If hot nozzles come into contact with the skin, burns may occur.

For first aid contact your medical / safety representing.

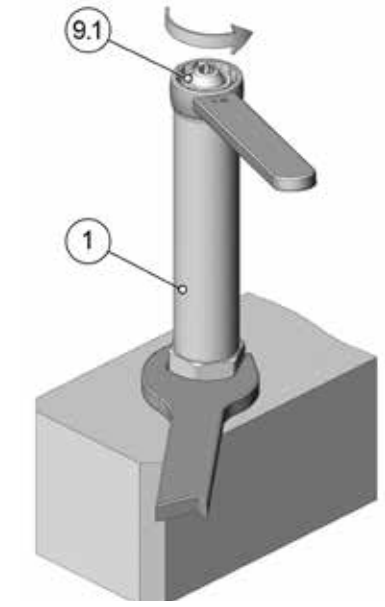
NOTICE

To dismount the nozzle tip (9.1) from the nozzle, if there is plastic material in the nozzle, the tip (9.1) must be heated-up.

Never use an acetylene or welding torch, as severe nozzle damage can occur from over-heating.

1) Heat the nozzle tip (9.1) using a heat gun to the maximum temperature of 200 °C (392 °F).

2) Hold the nozzle body (1) firmly using an engineer's wrench at the hexagonal shape.
3) Unscrew the nozzle tip (9.1) from the nozzle body (1) using a ring wrench.



Doc008247.png

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WARNING

Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Use personal protective equipment: Face protection, hearing protection and gloves- PSA.

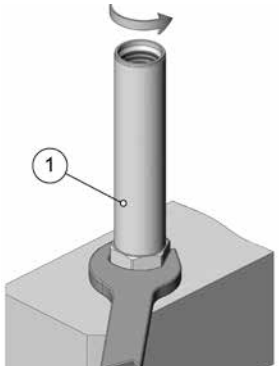
4) Clean the nozzle tip using pressurized air to remove as much residual plastic as possible.

WARNING

Hot Surfaces Hazard

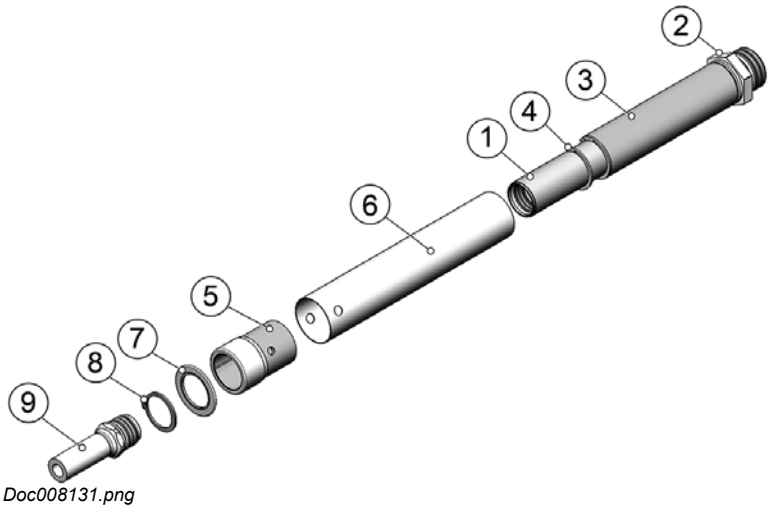
Contact between the skin and the hot nozzle could result in burns.

5) Cool the nozzle body (1) to approximately 25 °C (77 °F).
6) Unscrew nozzle body (1) from the manifold.



Doc005238.png

10.1.3.5 Assembling the Nozzle 12E-06

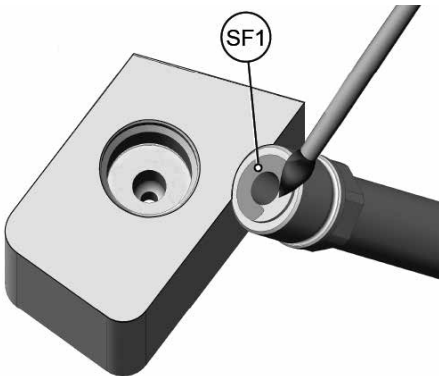


Doc008131.png

Parts of the Nozzle 12E-06	
1	Threaded nozzle body
2	Head ring 12E Series
3	Head heater
4	Retaining ring
5	Front heater
6	Cover tube
7	Pre-centering ring (optional)
8	Retaining ring DIN471
9	Nozzle tip style complete

Assembling the Nozzle Body

1) Apply spotting ink on the nozzle body (1) bottom surface (SF1).
2) Screw in the nozzle body (1) hand-tight into the manifold thread until seated.
3) Unscrew the nozzle body (1) from the manifold.



Doc005239.png

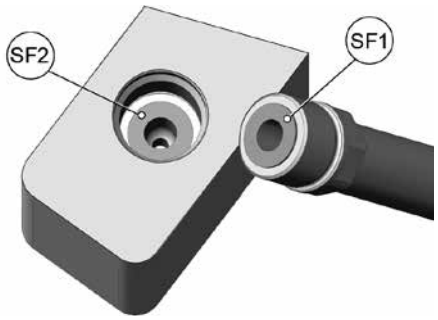
4) Check the matching between the manifold bottom surfaces (SF2) and the nozzle body (1) surface (SF1).

NOTICE

The manifold must bear on all surfaces uniformly and flatly, in particular on the nozzle head contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, please - contact Synventive Customer Service or Technical Support.

5) With a positive ink test clean the surfaces and proceed to the next step.



Doc005240.png

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6) Lubricate the thread (not the face) of the nozzle body (1) with high-temperature assembly paste (anti seize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

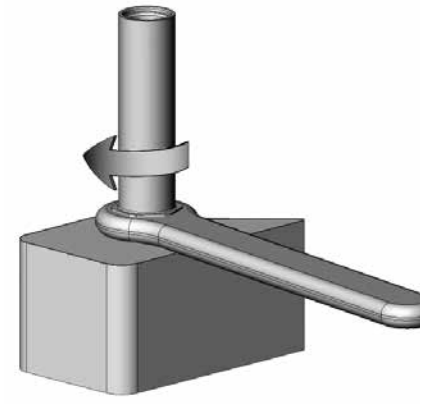


Doc005241.png

7) Tighten nozzle body (1) to the manifold.

NOTICE

Use torque wrench with wrench insert and the torque specified in the torque table in section 13.

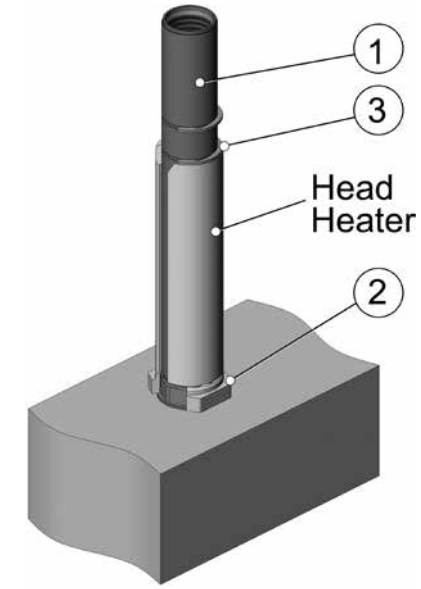


Doc005242.png

8) Slide head ring (2), onto the nozzle body (1) up to the surface of the hexagon.

NOTICE

The opening of the head ring (2), must be line up with the cable connections (see customer drawing).



Doc008138.png

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9) Bend the cable at the head heater corresponding to the opening at the head ring (2).



Doc008566.png

10) Slide head heater, onto the nozzle body (1) up to the surface of the head ring (2).

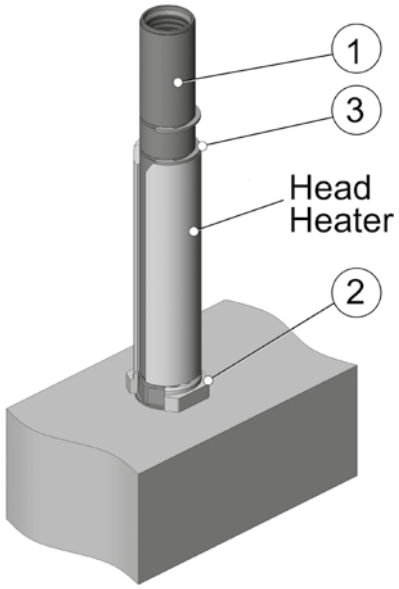
NOTICE

The head heater is only required for longer nozzles.

11) Fix the retaining rings (3) in the slots of the nozzle body (1).

NOTICE

The opening of the retaining rings (3), must be line up with the cable connections (see customer drawing).



Doc008138.png

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12) Bend the heater and thermocouple leads from the front heater (5).

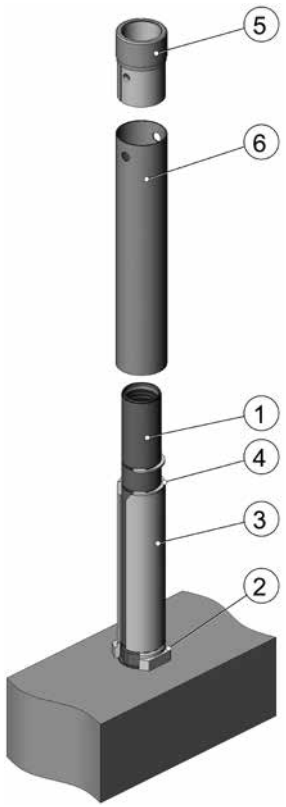
NOTICE

Use round-nosed pliers only.

13) Mount the front nozzle heater (5) together with the cover tube (6) onto the nozzle body (1).

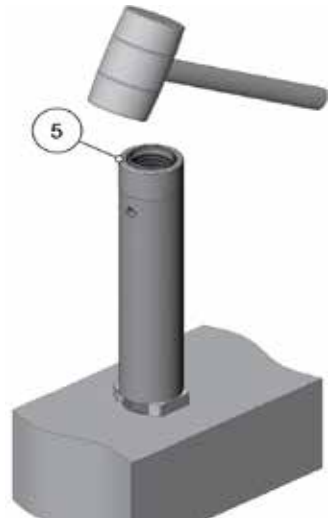
NOTICE

The heating leads of the front heater (5) have to be led into the openings of the retaining rings (4), the head heater (3) and the head ring (2).



Doc008139.png

14) Use a soft faced hammer to drive the front heater (5) into the right position.

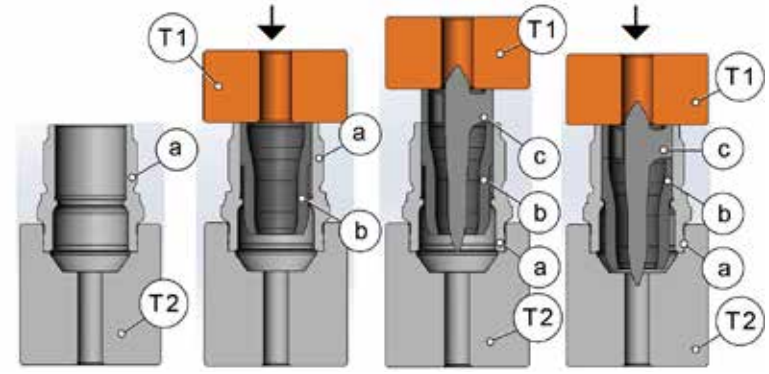


Doc008140.png

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Assembling the Nozzle Tip Inserts

1) 2) 3) 4)

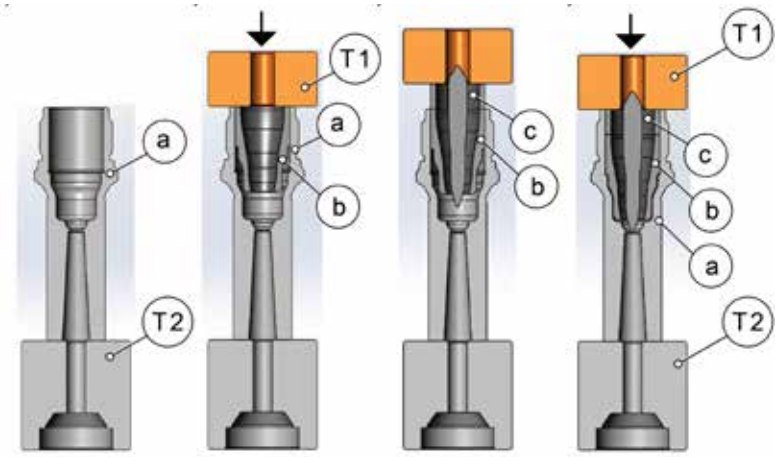


Doc005230.png

TTW Nozzle Tip Assembly

1) Place the tip nut (a) into the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).
3) Place the torpedo (c) on the tip insert (b).
4) Using the tool (T1) to push the torpedo (c) and the tip insert (b) into the tip nut (a).

1) 2) 3) 4)

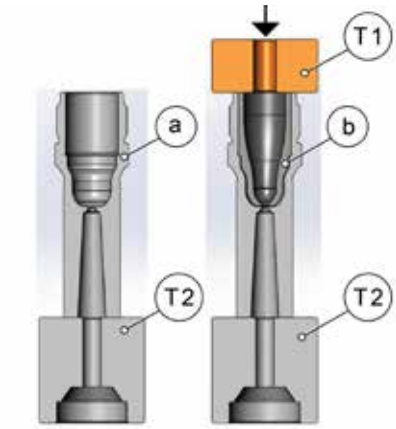


Doc005231.png

TTP Nozzle Tip Assembly

1) Place the tip nut (a) on the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).
3) Place the torpedo (c) on the tip insert (b).
4) Using the tool (T1) to push the torpedo (c) and the tip insert (b) into the tip nut (a).

1) 2)



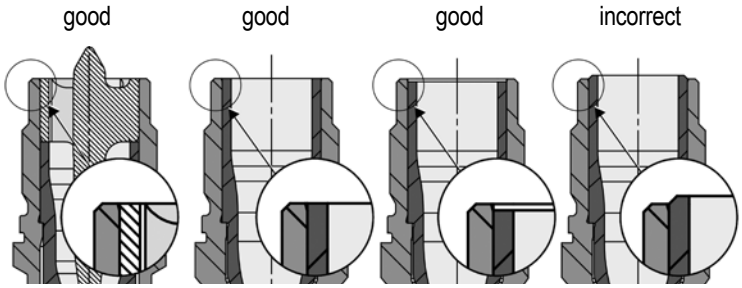
Doc005232.png

TFP Nozzle Tip Assembly

1) Place the tip nut (a) on the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).

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Shown are the tip nuts, for checking the correct seating of the tip inserts



Doc004688.png

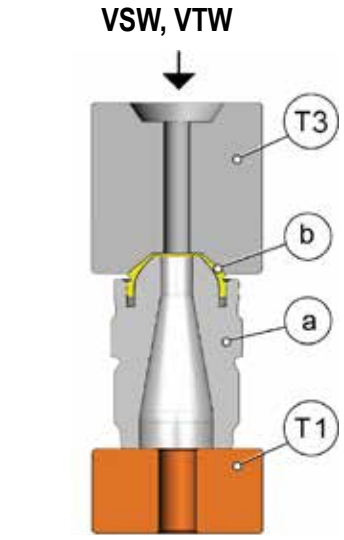
NOTICE

See examples of good and incorrect insert installations.

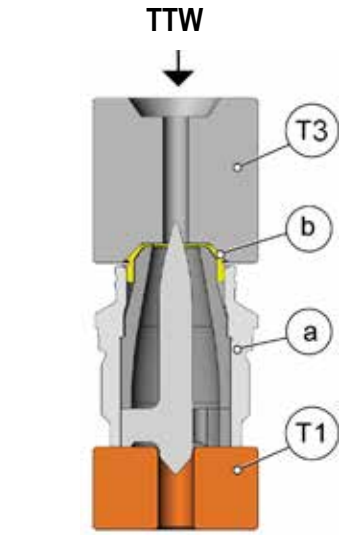
Make sure the insert must not exceed the height of the nozzle tip head.

Incorrect items should not be further processed.

Assemble the Seal Cap on VSW, VTW, TTW Nozzle Tips



Doc007731.png



Doc007732.png

1) Place the tip nut (a) on the tool (T1).
2) Place the seal cap (b) on the tip nut (a).
3) Using the tool (T3) to push the seal cap (b) on the tip nut (a).

NOTICE

The assembly tool (T3) has an engraved note on both sides on the front for use with VSW, VTW or TTW screw-in parts (VW / TW).

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Assembling the Nozzle Tip on the Nozzle

1) Apply spotting ink on the nozzle tip (9.1) bottom surface (SF1).
2) Screw in the nozzle tip (9.1) hand-tight into the nozzle body (1) until seated.
3) Unscrew the nozzle tip (9.1) from the nozzle body (1).
4) Check the matching between the nozzle body surface (SF2) and the nozzle tip surface (SF1).

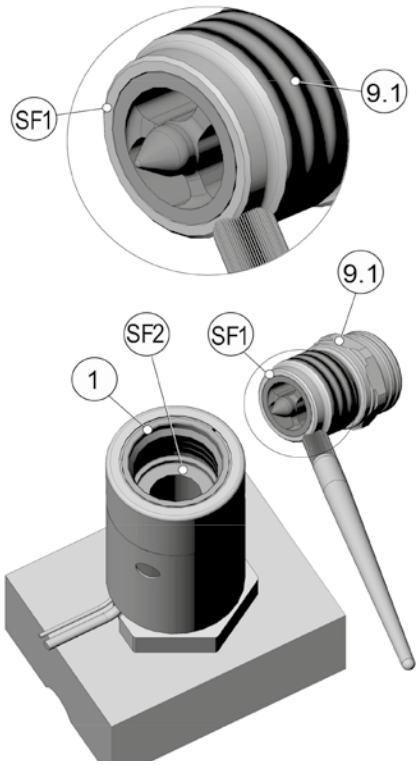
NOTICE

The nozzle must bear uniformly on the outer surfaces (SF2) (SF1) uniformly and flatly, in particular on the nozzle tip contact face (SF1).

NOTICE

In case of any uncertainty, clean the surfaces (SF1) (SF2) with a cleaning cloth. If the next ink test is still unsatisfactory - please contact Synventive Customer Service or Technical Support.

5) With a positive ink test, clean the surfaces and proceed to the next step.



Doc008243.png

6) Lubricate the thread (not the face) of the nozzle tip body with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.


Doc005247.png

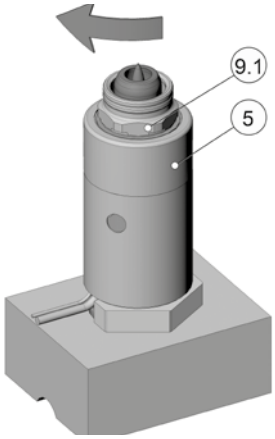
NOTICE

In case of a nozzle tip with spider, see following procedure in the next chapter.

7) Tighten the nozzle tip (9.1) at the nozzle by room temperature.

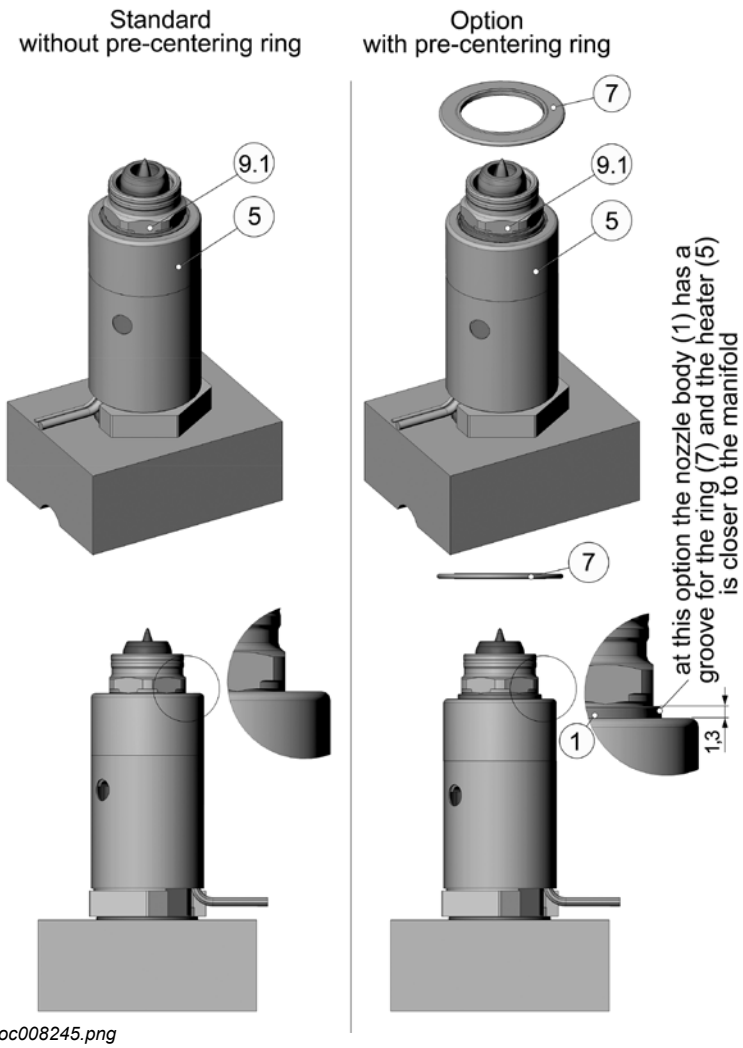
NOTICE

Use torque wrench with wrench insert (HEX21) and a torque of 100 Nm.



Doc008244.png

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Doc008245.png

NOTICE

The pre-centering ring (7) is only provided on customer request.

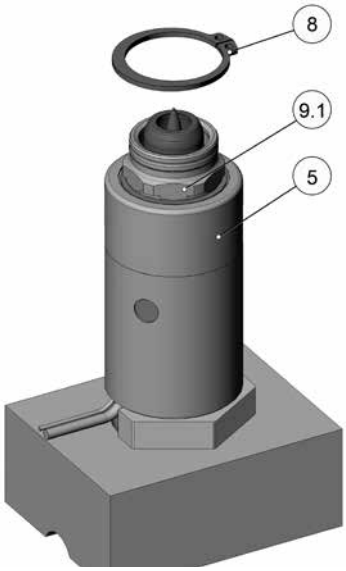
8) Place the pre centering ring (7) on the nozzle heater (5).

NOTICE

This procedure is only required for the optional version (with centering ring).

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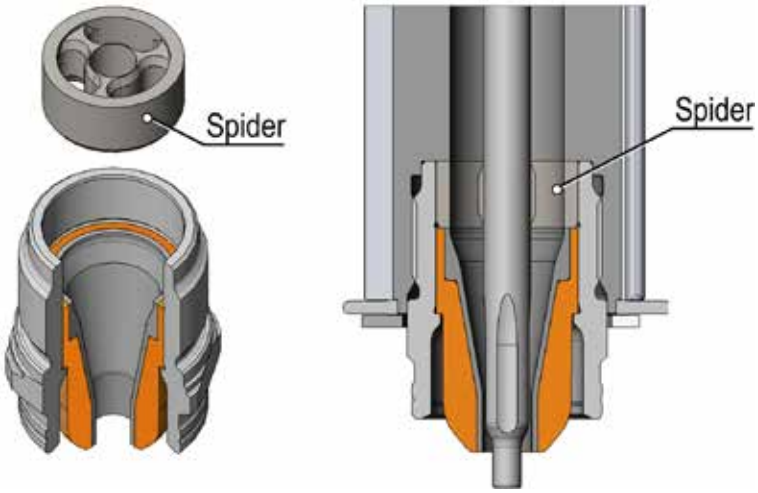
9) Mount the retaining ring (8) at the nozzle tip (9.1).



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Assembling the Nozzle Tip with Spider



Doc008084.png

NOTICE

Nozzle tips with spider may only be mounted in the nozzle after the valve pin has been assembled.

Valve pins in nozzle tips with spider must not be moved after nozzle tip assembly in cold state after nozzle tip assembly.

1) Please follow work steps 1 - 6 of above chapter “Assembling the Nozzle Tip on the Nozzle”.

2) Assemble the valve pin.

NOTICE

In case a leakage and function test of the system is conducted, this must be done before the installation of the tip.



Doc008242.png

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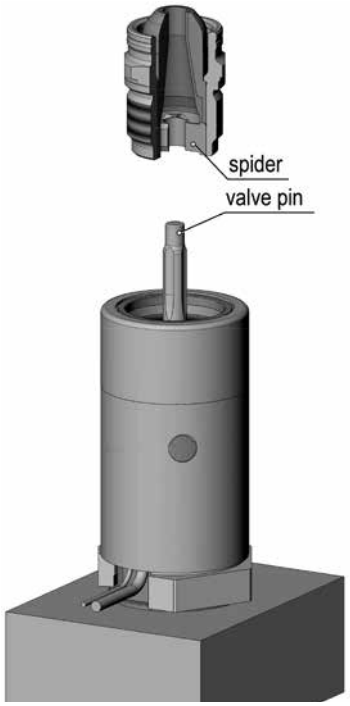
3) Set the valve pin to close.
4) Guide the nozzle tip (with spider) over the valve pin.
5) Tighten the nozzle tip at the nozzle by room temperature.

NOTICE

Use torque wrench with wrench insert (HEX21) and the torque of 100 Nm.

NOTICE

Valve pins in nozzle tips with spider must not be moved after nozzle tip assembly in cold state after nozzle tip assembly.



Doc008242.png

6) Please follow work steps 8 - 9 of above chapter “Assembling the Nozzle Tip on the Nozzle”.

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10.1.4 Nozzle 16E-06 / 22E-06 Series

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.

⚠ WARNING

Hazard of Pressurized Air



Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Following work must be carried out by qualified and experienced persons.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.



Heavy Weight Hazard



Transport and lifting equipment should be operated only by trained personnel.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.

When unpacking the Hot Runner System, there is a risk of injury due to falling parts and sharp edges. Maintain a minimum distance of 1 m from the Hot Runner System.

Use personal protective equipment, such as head gear, safety shoes and work gloves.

For first aid contact your medical / safety representing.



Hot Surfaces Hazard



Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.



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NOTICE

Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

10.1.4.1 Technical Data - Threaded Nozzle 16E-06 / 22E-06 Series



Doc008836_RIS.png

Threaded Nozzle 16E-06	
Flow bore (J)	Ø 16 mm
Nozzle length (L)	90 - 1000 mm
Nozzle cutout (D)	Ø 45 mm (L <450mm) Ø 45 / Ø 52 mm (L ≥450mm)
Thermocouple	Type J, Type K
Nozzle tips	VSP, VTP, VSW, VTW, TFP, TTP, TTW
Threaded Nozzle 22E-06	
Flow bore (J)	Ø 22 mm
Nozzle length (L)	100 - 1000 mm
Nozzle cutout (D)	Ø 55 mm (L <450mm) Ø 55 / Ø 62 mm (L ≥450mm)
Thermocouple	Type J, Type K
Nozzle tips	VSP, VTP, VSW, VTW, TFP, TTP, TTW

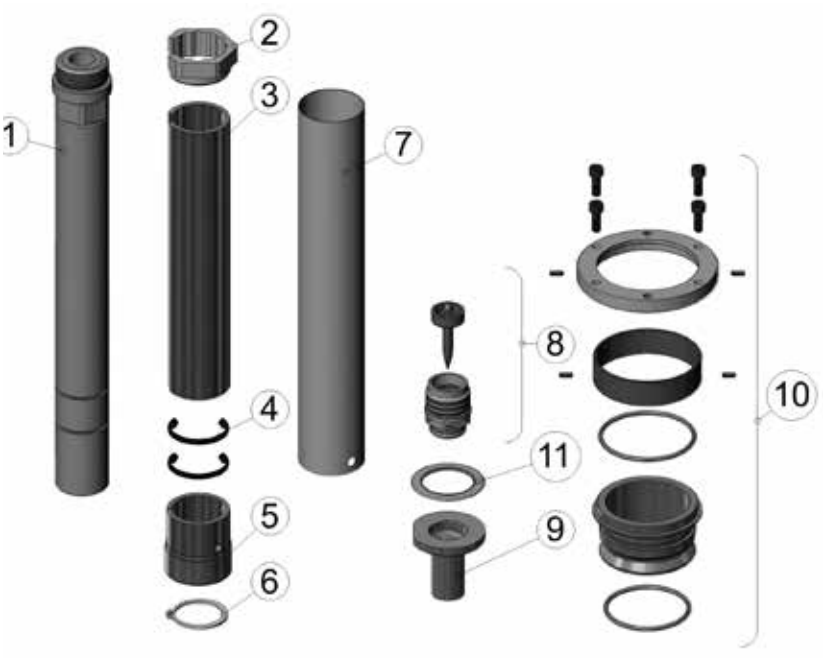
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10.1.4.2 Parts of the Nozzles 16E-06 / 22E-06

In this section the nozzle parts are identified with the numbers indicated in the following figure.

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.



Doc008837_RIS.png

Pos.	Description
1	Nozzle body
2	Head ring
3	Head heater (optional)
4	Retaining ring
5	Front heater
6	Retaining ring
7	Cover tube
8	Tip
9	Wear insert (optional)
10	Cooling bushing (optional)
11	Pre-centering ring (optional)

10.1.4.3 Cooling bushing (optional)



Doc008838_RIS.png

Cooling bushing type 16nc-04			
Pos.	QYT	Part No.	Description
1	1	16NC-B-03	16E Cooling Bushing
2	1	16NC-DT-01-MOD	16E Distance Tube
3	1	16NC-C-01	16E Cover
4	1	VIOR-47.29X2.62-FPM-80-G	Viton O-Ring
5	1	VIOR-53.64X2.62-FPM-80-G	Viton O-Ring
6	4	DIN6325-3m6x8	Paralell pin
7	4	DIN912-M5x14-12.9	Hexagon socket cap screw. DIN912-M5x14-12.9

Cooling bushing type 22nc-04			
Pos.	QYT	Part No.	Description
1	1	22NC-B-03	22E Cooling Bushing
2	1	22NC-DT-01-MOD	22E Distance Tube
3	1	22NC-C-01	22E Cover
4	1	VIOR-56.82X2.62-FPM-80-G	Viton O-Ring
5	1	VIOR-63.17X2.62-FPM-80-G	Viton O-Ring
6	4	DIN6325-3m6x8	Paralell pin
7	4	DIN912-M5x14-12.9	Hexagon socket cap screw. DIN912-M5x14-12.9

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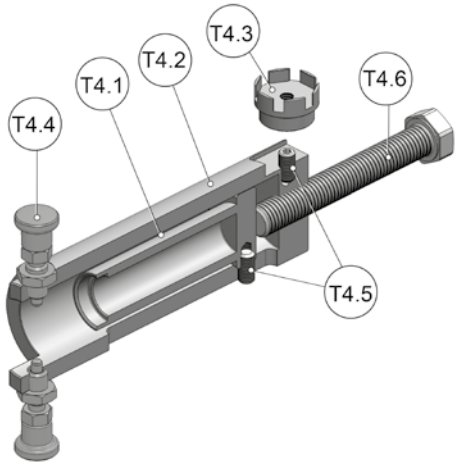
10.1.5 Disassembly / Assembly Tools

In this section the Stripping and Mounting Tool parts are identified with the numbers indicated in the following figure.

10.1.5.1 Nozzle Heater Disassembly Tool AT-FHA-032 for the Heater Type FHA#-032-###-##

The dismantling tool is required to pull the front heater from the nozzle body or the sprue bushing.

The adapter AT-FHA-032-C-05 is only required for the sprue bushing.

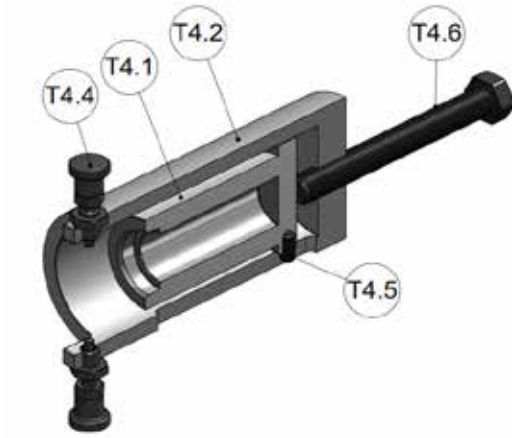


Doc008132.png

AT-FHA-032			
Pos.	Qty.	Part No.	Description
T4.1	1	AT-FHA-032-C-01	Disassembly Tool Socket
T4.2	1	AT-FHA-032-C-02	Disassembly Tool Sleeve
T4.3	1	AT-FHA-032-C-05	Disassembly Tool IB24 Adapter Nut
T4.4	1	GN817-4-4-CK	Indexing plunger; Pin Bore=4; l1=4
T4.5	2	DIN913-M6x12-45H	Flat Point Socket Set Screw 45H Alloy Steel
T4.6	1	ISO4017-M12X100-12.9	Full Thread Hexagon Screw ISO4017

10.1.5.2 Nozzle Heater Disassembly Tool AT-FHA-041 for the Heater Type FHA#-041-###-##

The dismantling tool is required to pull the front heater from the nozzle body.



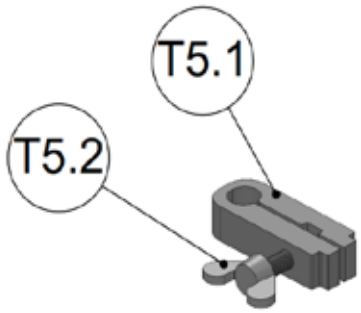
Doc008839_RIS.png

AT-FHA-041			
Pos.	Qty.	Part No.	Description
T4.1	1	AT-FHA-041-C-01	Disassembly Tool Socket
T4.2	1	AT-FHA-041-C-02	Disassembly Tool Sleeve
T4.3	-	-	-
T4.4	1	GN817-4-4-CK	Indexing plunger; Pin Bore=4; l1=4
T4.5	2	DIN913-M6x12-45H	Flat Point Socket Set Screw 45H Alloy Steel
T4.6	1	ISO4017-M12X100-12.9	Full Thread Hexagon Screw ISO4017

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10.1.5.3 Spreader Tool Head Heater Type HHA#-0##-###-##

With this tool the head heaters can be spread apart to make it easier to pull them off the nozzle body.

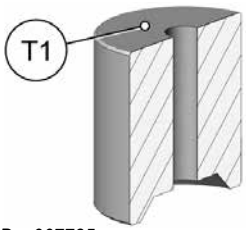
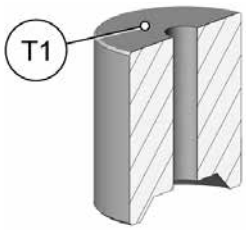


Doc008150.png

AT-HHA-00			
No.	Qty.	Part No.	Description
T5.1	1	AT-HHA-C-0-01	Head Heater Spreader
T5.2	1	DIN316-A2-M4x16	Metric DIN 316 Wing Screws M4x16

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Nozzle Tip Assembly Tools

Tip Assembly Tool for 16E-06 Nozzle Tips TTW, TTP, TFP		Tip Assembly Tool for 22E-06 Nozzle Tips TTW, TTP, TFP	
(T2) AT-16-040102	**(T1) AT-16-040101**	**(T2) AT-22-040102**	**(T1) AT-22-040101**
Also used for the assembly of seal caps.		Also used for the assembly of seal caps.	
 *Doc005228.png*	 *Doc007735.png*	 *Doc005228.png*	 *Doc007735.png*

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10.2 MS-Heating Element

There are two types of **M**olding **S**olution heaters.

Front Heaters **F**HA#-0##-###-## and Head Heaters **H**HA#-0##-###-##.

The thermocouple is pressed in firmly and cannot be replaced.

All heaters are available either with a thermocouple type J (#HA**J**-0##-###-##) or a thermocouple type K (#HA**K**-0##-###-##).



Doc008133.png

10.2.1 Color Coding of Thermocouples

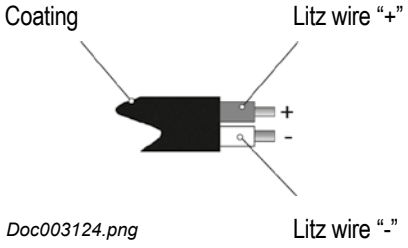
NOTICE

Take notice of the production and color identification of thermocouple cables.

Synventive uses J and K type thermocouples. Their color coding is given in the following table.

Table 1: International color coding for temperature sensors

Type	International standard IEC 584-3	
J	Black	+ Black
		- White
K	Green	+ Green
		- White

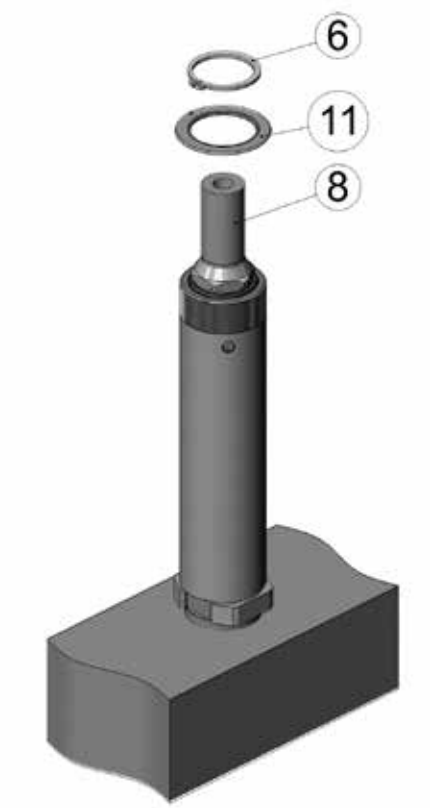


Doc003124.png

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10.2.1.1 Disassembly the Nozzle 16E-06 / 22E-06 Series

Disassembling the Nozzle Heaters

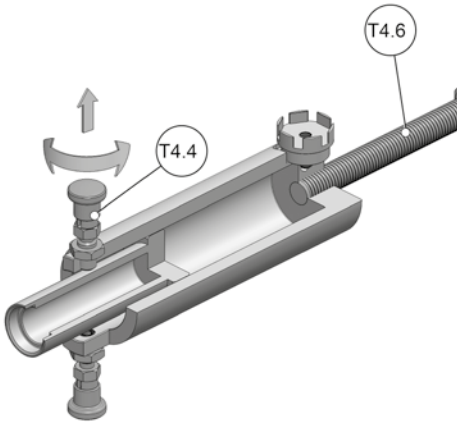


Doc008840_RIS.png

1) Remove the retaining ring (6) from the nozzle tip (8).
2) Remove the pre-centering ring (11).

NOTICE

The pre-centering ring (11) is only provided on explicit customer request.



Doc008841_RIS.png

3) Turn the hexagon head screw (T4.6) of the disassembly tool completely backwards.
4) Pull the button from indexing plungers (T4.4) and fix the position by turning the button (T4.4) by 90°.

5) Guide the socket (T4.1) of the disassembly tool over the nozzle insert (8).

NOTICE

The socket (T4.1) is seated onto the nozzle tip (8) and slides back into the sleeve (T4.2).



Doc008842_RIS.png

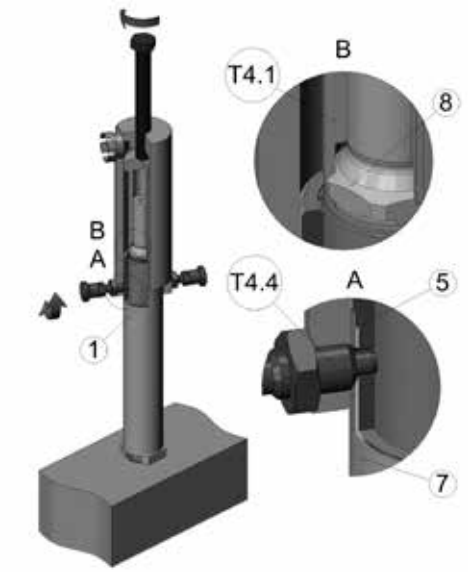
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6) Loosen the indexing plungers (T4.4), by turning the button 90°.
7) Position the disassembly tool until the indexing plungers (T4.4) snaps into the hole of the cover tube (7) and the front heater (5).
8) Turn the hexagon head screw (T4.6) clockwise.

NOTICE

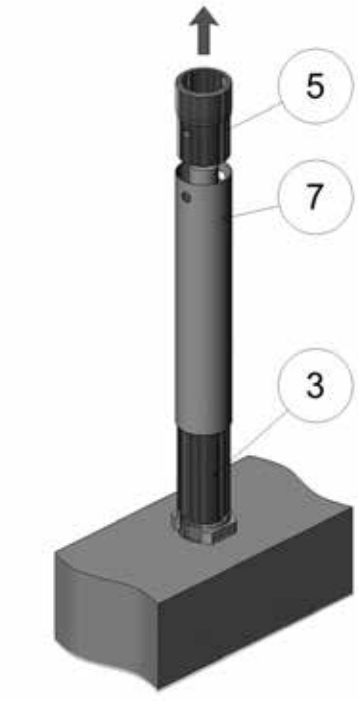
By turning the hexagon head screw (T4.6) the front heater (5) together with the cover tube (7) is pulled off the nozzle body (1).

9) Turn down the hexagon head screw (T4.6) completely.



Doc008843_RIS.png

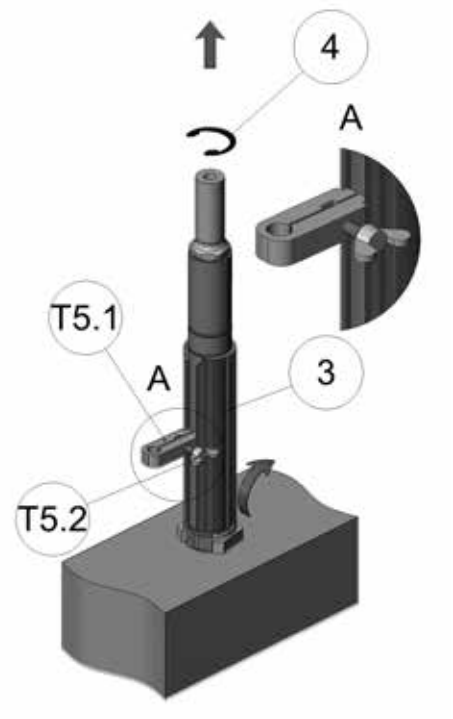
10) Remove the front heater (5).
11) Remove the Cover Tube (7).



Doc008844_RIS.png

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12) Remove the retaining ring (4).
13) Spread the head heater (3) with the spreading tool (T5).
14) Remove the head heater (3).



Doc008846_RIS.png

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10.2.2 Disassembling the Nozzle Tip and Nozzle Body

WARNING

Hazard of Pressurized Air



Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Following work must be carried out by qualified and experienced persons.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first contact your medical / safety representing.



Hot Surfaces Hazard



Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as work gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first contact your medical / safety representing.



WARNING

Hot Surfaces Hazard

The nozzle is still hot.

NOTICE

To dismount the nozzle tip from the nozzle, if there is plastic material in the nozzle, the tip must be heated-up.

Never use an acetylene or welding torch, as severe nozzle damage can occur from over-heating.

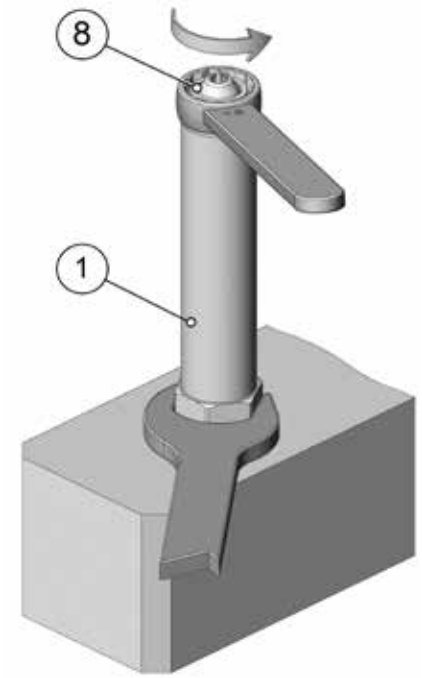
NOTICE

When unscrewing the nozzle tip, the nozzle can rotate with the nozzle tip, this can lead to leakage at the base of the nozzle.

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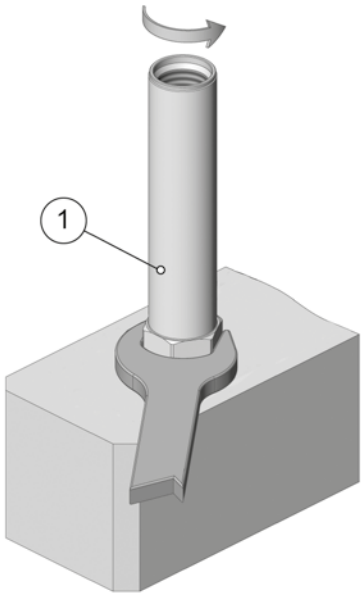
Service and Maintenance / Disassembling the Nozzle Tip and Nozzle Body

1) Heat the nozzle tip (8) using a heat gun to the maximum temperature of 200 °C (392 °F).
2) Hold the nozzle body (1) firmly using an engineer's wrench at the hexagonal shape.
3) Unscrew the nozzle tip (8) from the nozzle body (1) using a ring wrench.
4) Clean the nozzle tip using pressurized air to remove as much residual plastic as possible.



Doc008847_RIS.png

5) Unscrew nozzle body (1) from the manifold.



Doc005238.png

10.3 Assembly the Nozzles 16E-06 / 22E-06 Series

In this section the nozzle parts are identified with the numbers indicated in the following figure.

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.



Doc008837_RIS.png

Pos.	Description
1	Nozzle body
2	Head ring
3	Head heater (optional)
4	Retaining ring
5	Front heater
6	Retaining ring
7	Cover tube
8	Tip
9	Wear insert (optional)
10	Cooling bushing (optional)
11	Pre-centering ring (optional)

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10.3.1 Mount the nozzle 16E-06 / 22E-06

10.3.1.1 Mount the nozzle body and the nozzle heater

1) Apply spotting ink on the nozzle body (1) bottom surface (SF1).
2) Screw in the nozzle body (1) hand-tight into the manifold thread until seated.
3) Unscrew the nozzle body (1) from the manifold.



Doc005239.png

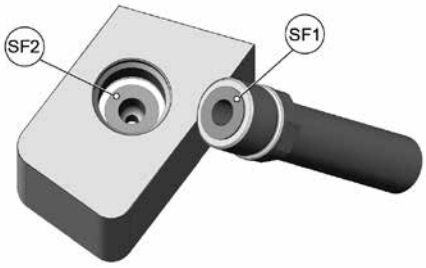
4) Check the matching between the manifold bottom surfaces (SF2) and the nozzle body (1) surface (SF1).

NOTICE

The manifold must bear on all surfaces uniformly and flatly, in particular on the nozzle head contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, contact Synventive Customer Service or Technical Support.

5) With a positive ink test clean the surfaces and proceed to the next step.



Doc005240.png

6) Lubricate the thread (not the face) of the nozzle body with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.



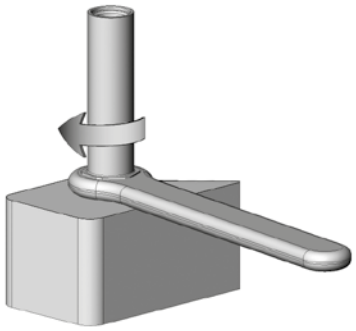
Doc005241.png

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7) Tighten nozzle body (1) to the manifold.

NOTICE

Use torque wrench with wrench insert and the torque specified in the torque table in section 13.

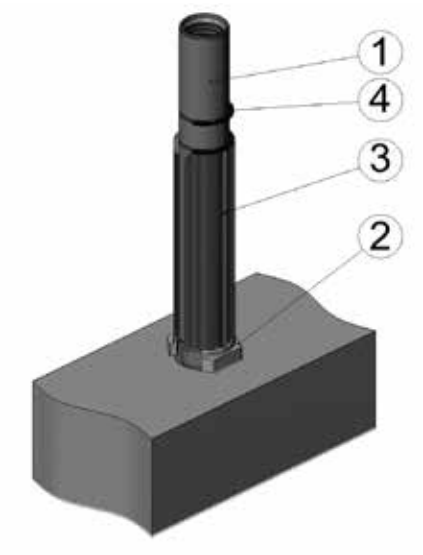


Doc005242.png

8) Slide head ring (2), onto the nozzle body (1) up to the surface of the hexagon.

NOTICE

The opening of the head ring (2), must be line up with the cable connections (see customer drawing).



Doc008848_RIS.png

9) Bend the cable at the head heater corresponding to the opening at the head ring (2).



Doc008849_RIS.png

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10) Slide head heater (3), onto the nozzle body (1) up to the surface of the head ring (2).

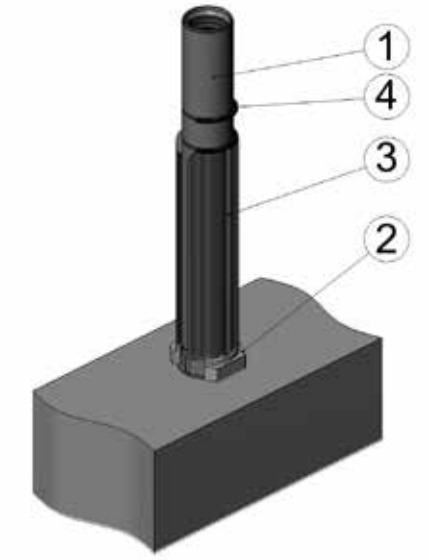
NOTICE

The head heater is only required for longer nozzles.

11) Fix the retaining rings (4) in the slots of the nozzle body (1).

NOTICE

The opening of the retaining rings (4), must be line up with the cable connections (see customer drawing).



Doc008848_RIS.png

12) Bend the heater and thermocouple leads from the front heater.

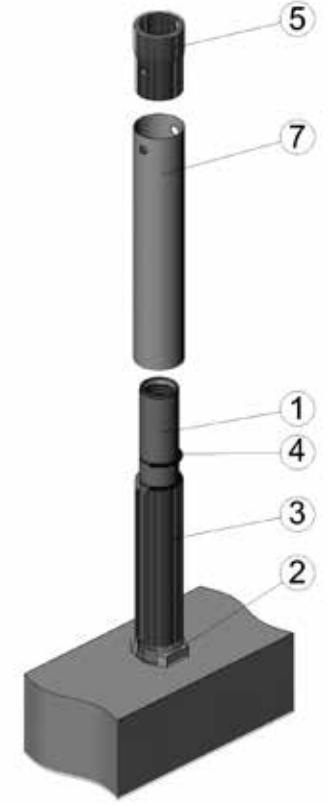
NOTICE

Use round-nosed pliers only.

13) Mount the front nozzle heater (5) together with the cover tube (7) onto the nozzle body (1).

NOTICE

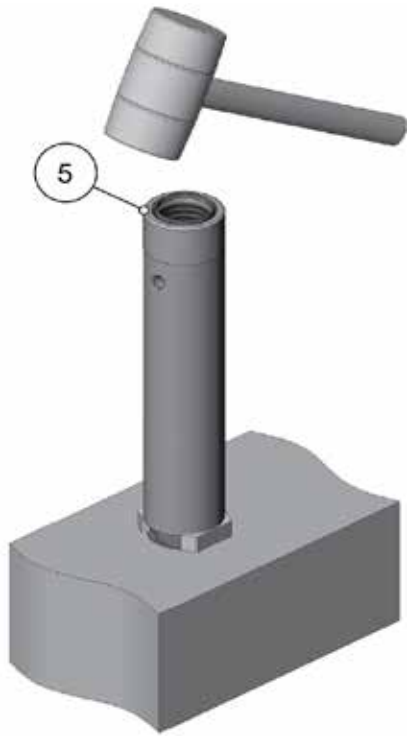
The heating leads of the front heater (5) have to be led into the openings of the retaining rings (4), the head heater (3) and the head ring (2).



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14) Use a soft faced hammer to drive the front heater (5) into the right position.

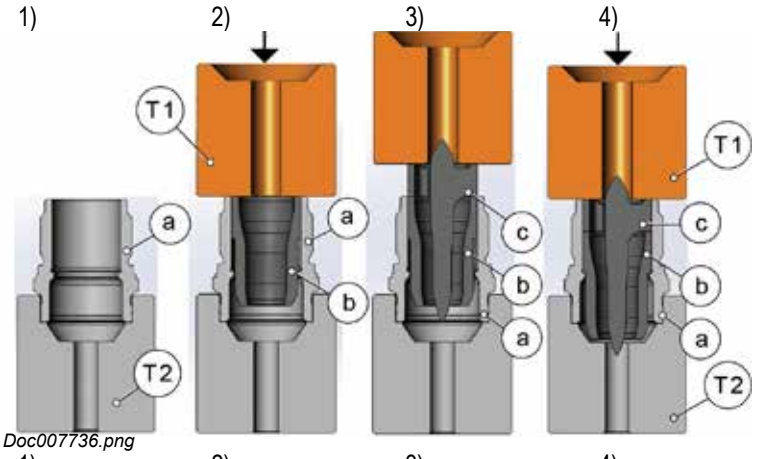


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10.3.2 Nozzle Tip Assembling

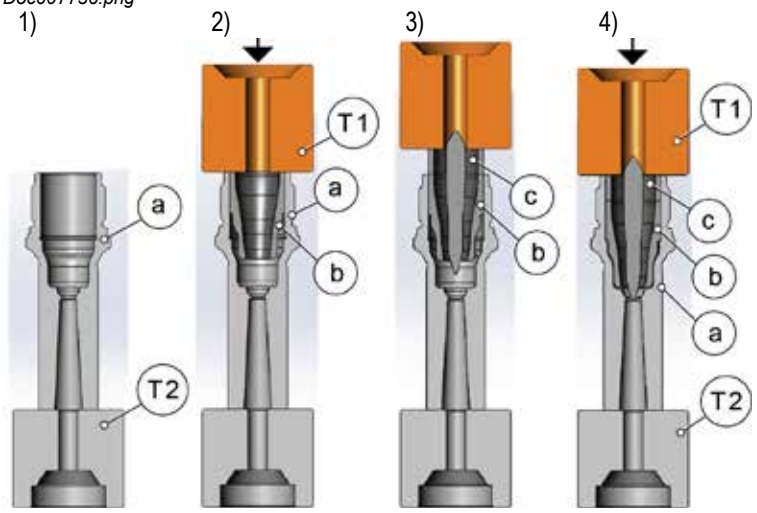
Assembling the Nozzle Tips TTW, TTP, TFP



Doc007736.png

TTW Nozzle Tip Assembly

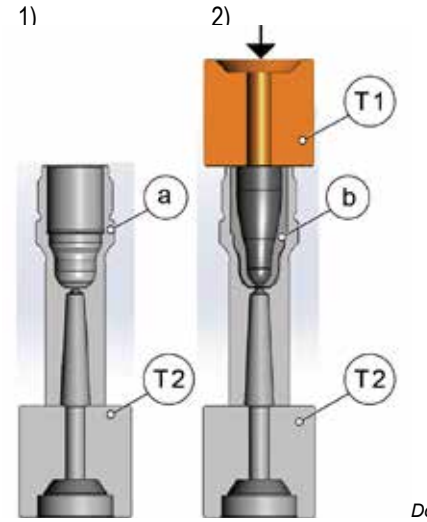
1) Place the tip nut (a) into the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).
3) Place the torpedo (c) on the tip insert (b).
4) Using the tool (T1) to push the torpedo (c) and the tip insert (b) into the tip nut (a).



Doc007737.png

TTP Nozzle Tip Assembly

1) Place the tip nut (a) on the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).
3) Place the torpedo (c) on the tip insert (b).
4) Using the tool (T1) to push the torpedo (c) and the tip insert (b) into the tip nut (a).



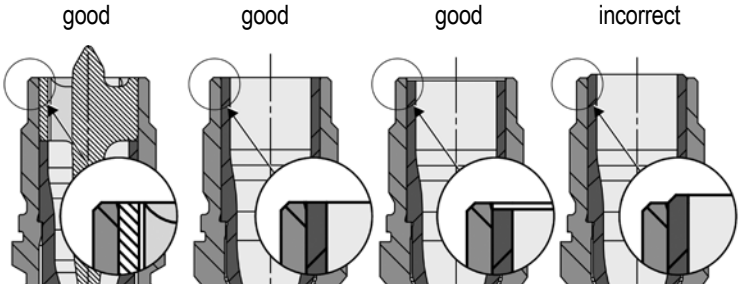
Doc007738.png

TFP Nozzle Tip Assembly

1) Place the tip nut on the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).

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Shown are the tip nuts, for checking the correct seating of the tip inserts



Doc004688.png

NOTICE

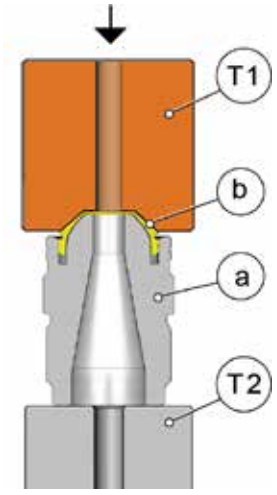
See examples of good and incorrect insert installations.

Make sure the insert must not exceeds the height of the nozzle tip head.

Incorrect items must not be further processed.

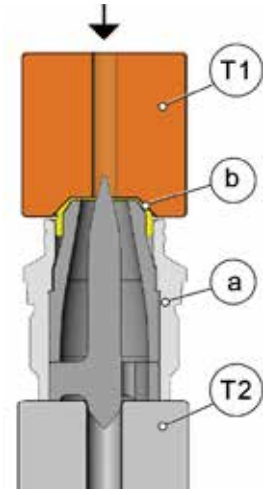
Assemble the Seal Cap on VSW, VTW, TTW Nozzle Tips

VSW, VTW



Doc007733.png

TTW



Doc007734png

1) Place the tip nut (a) on the tool (T2).
2) Place the seal cap (b) on the tip nut (a).
3) Using the tool (T1) to push the seal cap (b) on the tip nut (a).

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10.3.3 Assembling the Nozzle Tip on the Nozzle

10.3.3.1 Assembly of the common Nozzle Tip

1) Apply spotting ink on the nozzle tip (8) bottom surface (SF1).
2) Screw in the nozzle tip (8) hand-tight into the nozzle body (1) until seated.
3) Unscrew the nozzle tip (8) from the nozzle body (1).
4) Check the matching between the nozzle body surface (SF2) and the nozzle tip surface (SF1).

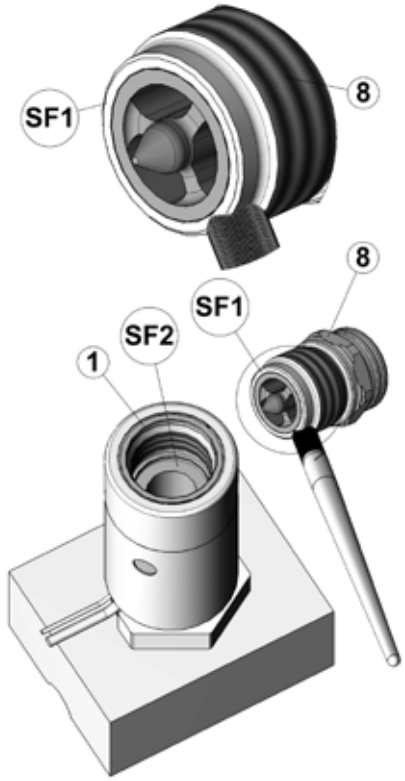
NOTICE

All contact surfaces (SF2 and SF1) of the nozzle must be clearly visible on the outer edge, especially on the contact surface of the nozzle tip (SF1).

NOTICE

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory contact Synventive Customer Service or Technical Support.

5) With a positive ink test, clean the surfaces and proceed to the next step.



Doc008853_RIS.png

6) Lubricate the thread (not the face) of the nozzle tip body with high-temperature assembly paste (anti-seize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.



Doc005247.png

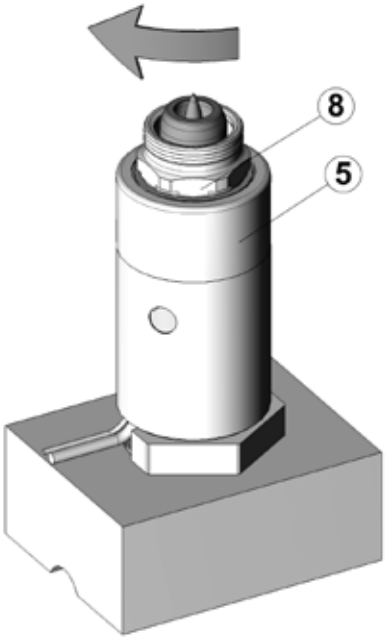
NOTICE

In case of a nozzle tip with spider, see following procedure in chapter 10.3.3.2 Assembly of a nozzle tip with spider.

7) Tighten the nozzle tip (8) at the nozzle by room temperature.

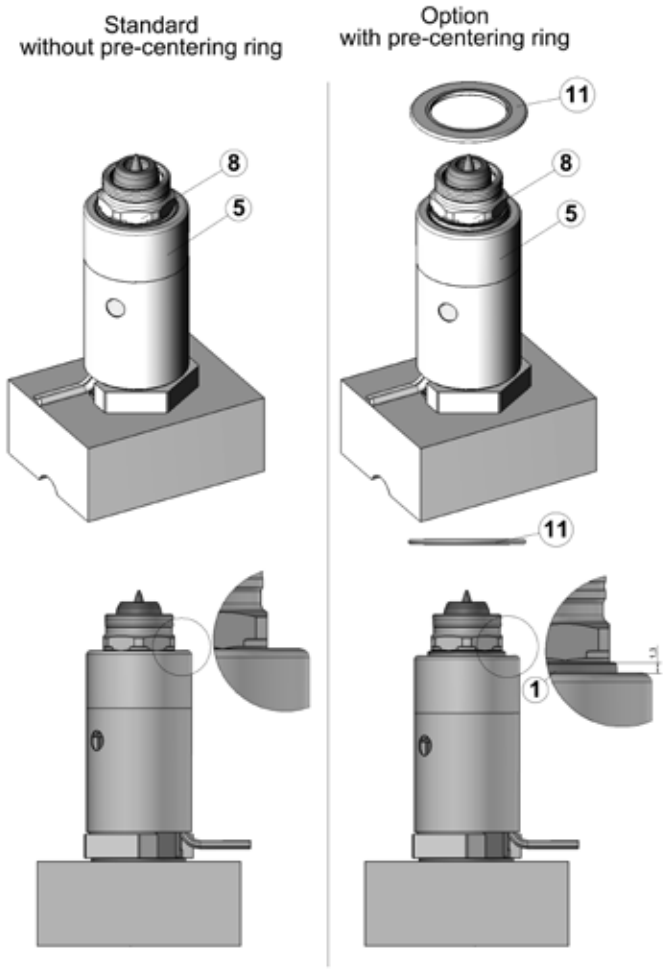
NOTICE

Use torque wrench with wrench insert (HEX21) and the torque of 100 Nm.



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Doc008855_RIS.png

At this option the nozzle body (1) has a groove for the ring (7) and the front heater (5) is closer to the manifold.

NOTICE

The pre-centering ring (11) is only provided on customer request.

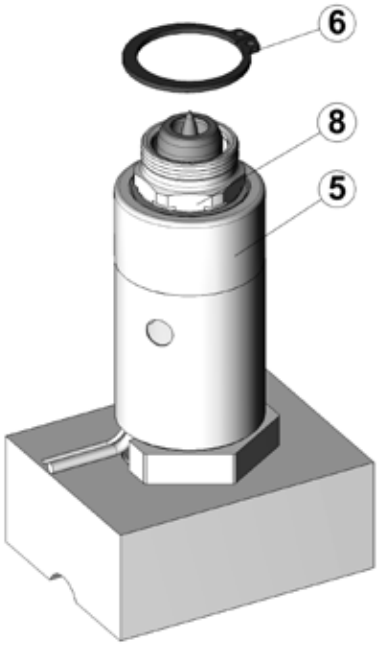
8) Place the pre centering ring (11) on the front heater (5).

NOTICE

This procedure is only required for the optional version with pre-centering ring.

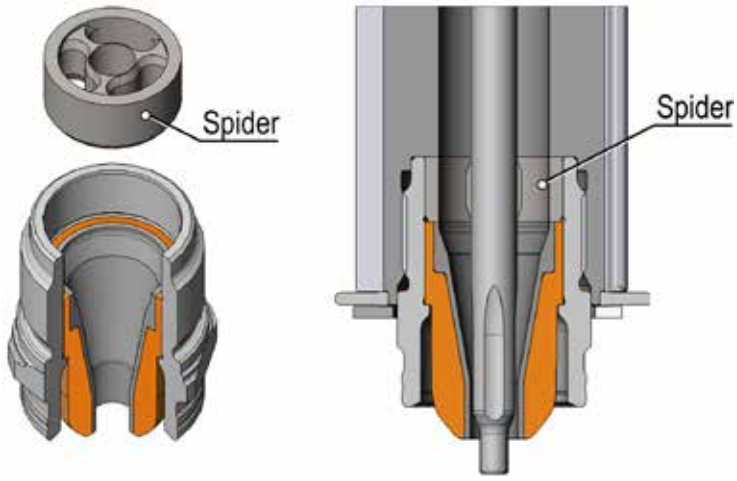
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9) Mount the retaining ring (6) at the nozzle tip (8).



Doc008856_RIS.png

10.3.3.2 Assembly of a nozzle tip with spider



Doc008857_RIS.png

NOTICE

Nozzle tips with spider may only be mounted in the nozzle after the valve pin has been assembled.

Valve pins in nozzle tips with spider must not be moved after nozzle tip assembly in cold state after nozzle tip assembly.

1) Please follow work steps 1 - 6 of chapter 10.3.3.2 Assembly of a nozzle tip with spider.

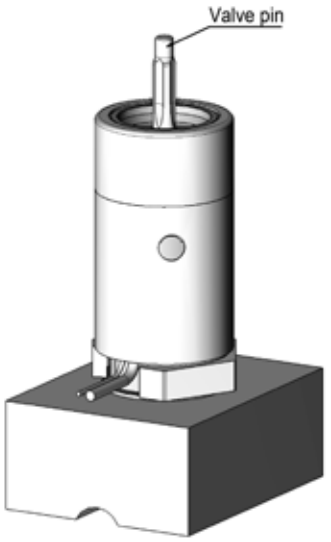
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Service and Maintenance / Assembling the Nozzle Tip on the Nozzle

2) Assemble the valve pin.

NOTICE

In case a leakage and function test of the system is conducted, this must be done before the installation of the tip.



Doc008858_RIS.png

3) Set the valve pin to close.
4) Guide the nozzle tip (with spider) over the valve pin.
5) Screw the nozzle tip (8) at the nozzle by room temperature.

NOTICE

Use torque wrench with wrench insert (HEX21) and the torque of 100 Nm.

NOTICE

Valve pins in nozzle tips with spider must not be moved after nozzle tip assembly in cold state after nozzle tip assembly.



Doc008859_RIS.png

6) Please follow work steps 8 - 9 of chapter Assembly of the common Nozzle Tip.

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10.3.4 Nozzle 12EX16-03 / 16EX22-03 Series

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.

WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.



Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Following work must be carried out by qualified and experienced persons.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.



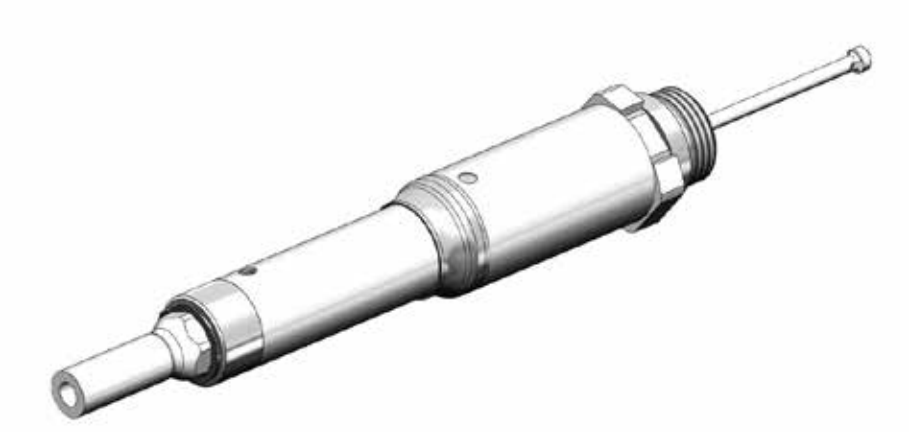
NOTICE

Hazard of Material Damage

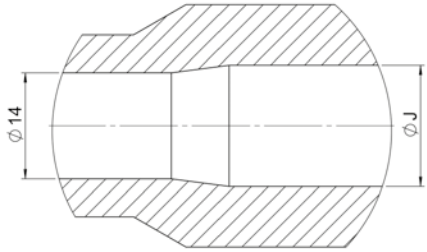
Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

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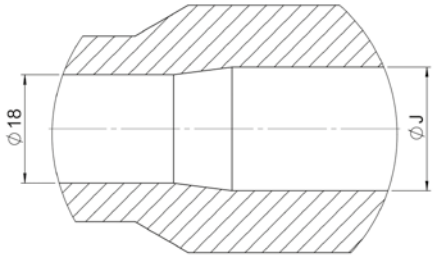
10.3.4.1 Technical Data - Threaded Nozzle 12EX16-03 / 16EX22 Series-03



Doc008770_RIS.png



Doc006969.png



Doc006970.png

Screw Fit Nozzle 12EX16-03	
Flow bore (J)	Ø 16 mm (Ø 18 mm)
Nozzle length, flexible (L)	200 – 915 mm
Nozzle cutout (D)	Ø35 / Ø 50 mm (Ln <400 mm) Ø35 / Ø 50 / Ø 60 mm (Ln ≥400 mm) Ø35 / Ø 50 / Ø 60 mm / Ø 80 (Ln ≥650 mm)
Thermocouple	Type J, Type K
Nozzle tips	VSP, VTP, VSW, VTW, TFP, TTP, TTW

Screw Fit Nozzle 16EX22-03	
Flow bore (J)	Ø 22 mm (Ø 20 mm / Ø 24 mm)
Nozzle length (L)	200 – 915 mm
Nozzle cutout (D)	Ø43 / Ø 60 mm (Ln <450 mm) Ø43 / Ø 60 / Ø 70 mm (Ln ≥450 mm) Ø43 / Ø 60 / Ø 70 mm / Ø 95 (Ln ≥650 mm)
Thermocouple	Type J, Type K
Nozzle tips	VSP, VTP, VSW, VTW, TFP, TTP, TTW

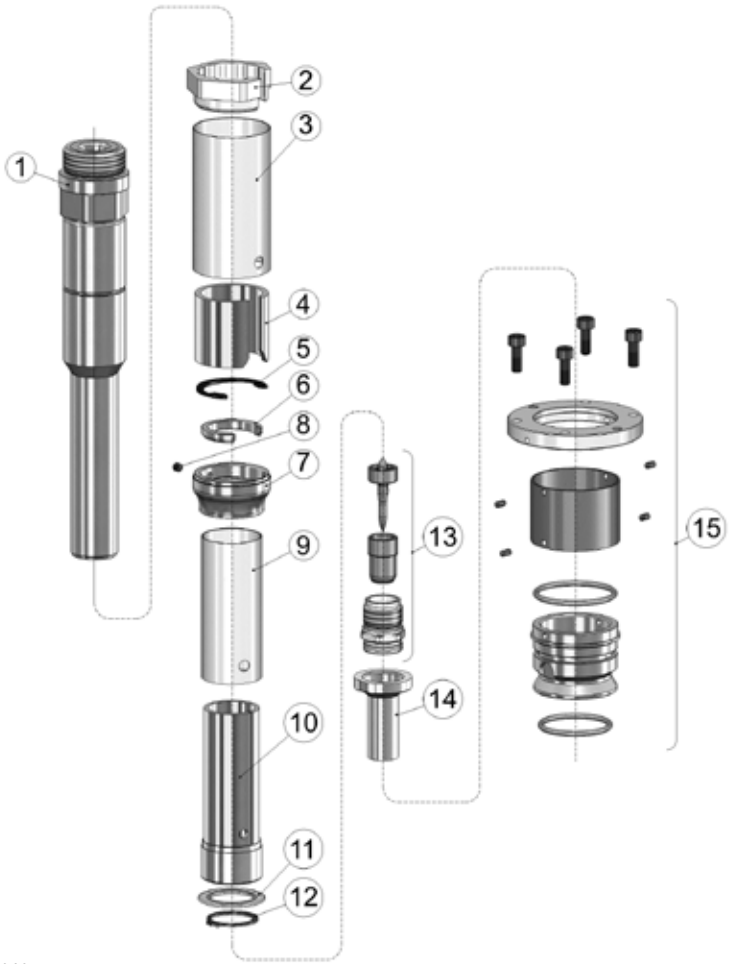
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10.3.4.2 Parts of the Nozzles 12EX16-03 / 16EX22-03

In this section the nozzle parts are identified with the numbers indicated in the following figure.

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.



Doc006968.png

Pos.	Description
1	Nozzle body
2	Head ring
3	Cover Tube-16E
4	Head heater
5	Retaining ring
6	Front Heater Head Ring
7	Lock and Cover Ring
8	Hexagon socket set screw
9	Cover Tube-12E
10	Front heater
11	Pre-centering ring (optional)
12	Circlip
13	Nozzle tip
14	Wear insert (optional)
15	Cooling bushing (optional)

10.3.4.3 Cooling bushing (optional)



Doc008772_RIS.png

Cooling bushing type 12nc-05 for nozzle 12EX16-03			
Pos.	QYT	Part No.	Description
1	1	12NC-B-04	12E Cooling Bushing
2	1	12NC-DT-01-MOD	12 Distance Tube
3	1	12NC-C-01	12 Cover
4	1	VIOR-32.99x2.62-FPM-80-G	Viton O-Ring
5	1	VIOR-37.77X2.62-FPM-80-G	Viton O-Ring
6	4	DIN6325-3m6x6	Paralell pin
7	4	DIN912-M5x14-12.9	Hexagon socket cap screw
Cooling bushing type 16nc-04 for nozzle 16EX22-03			
Pos.	QYT	Part No.	Description
1	1	16NC-B-03	16E Cooling Bushing
2	1	16NC-DT-01-MOD	16 Distance Tube
3	1	16NC-C-01	16 Cover
4	1	VIOR-47.29X2.62-FPM-80-G	Viton O-Ring
5	1	VIOR-53.64X2.62-FPM-80-G	Viton O-Ring
6	4	DIN6325-3m6x8	Paralell pin
7	4	DIN912-M5x14-12.9	Hexagon socket cap screw

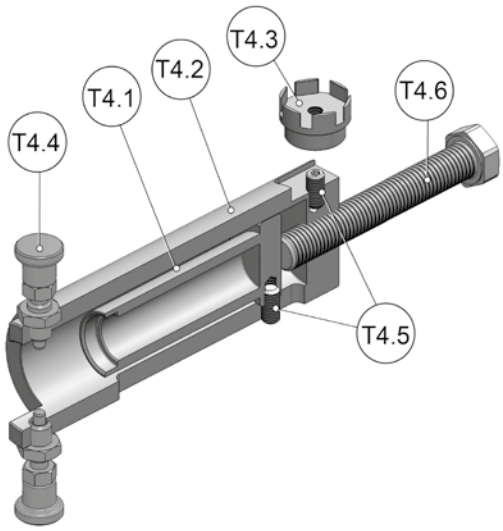
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10.3.4.4 Disassembly- Assembly Tools 12EX16-03 / 16EX22-03

In this section the Stripping and Mounting Tool parts are identified with the numbers indicated in the following figure.

For nozzle 12EX16-03, disassembly tool AT-FHA-032

The dismantling tool is required to pull the front heater type FHA#-032-##-## from the nozzle body or the sprue bushing. The adapter AT-FHA-032-C-05 is only required for the sprue bushing.

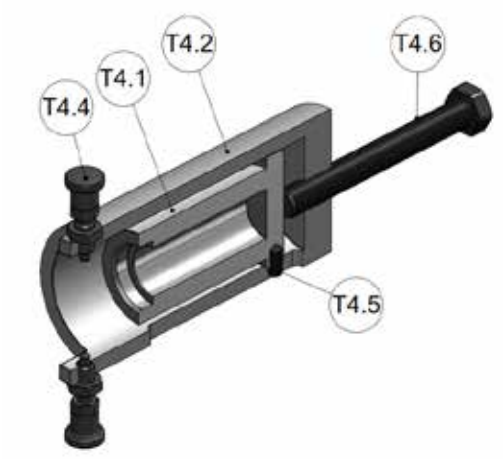


Doc008132.png

AT-FHA-032			
No..	Qty.	Item	Description
T4.1	1	AT-FHA-032-C-01	Disassembly Tool Socket
T4.2	1	AT-FHA-032-C-02	Disassembly Tool Sleeve
T4.3	1	AT-FHA-032-C-05	Disassembly Tool IB24 Adapter Nut
T4.4	1	GN817-4-4-CK	Indexing plunger; Pin Bore=4; l1=4
T4.5	2	DIN913-M6x12-45H	Flat Point Socket Set Screw 45H Alloy Steel
T4.6	1	ISO4017-M12X100-12.9	Full Thread Hexagon Screw ISO4017

For nozzle 16EX22-03, disassembly tool AT-FHA-041

The dismantling tool is required to pull the front heater type FHA#-041-##-## from the nozzle body.



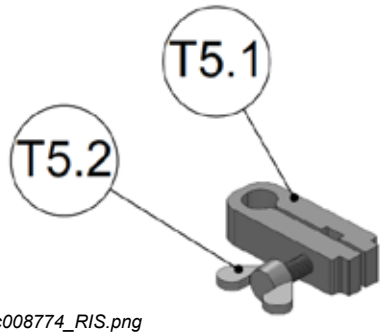
Doc008773_RIS.png

AT-FHA-041			
No..	Qty.	Item	Description
T4.1	1	AT-FHA-041-C-01	Disassembly Tool Socket
T4.2	1	AT-FHA-041-C-02	Disassembly Tool Sleeve
T4.3	-	-	-
T4.4	1	GN817-4-4-CK	Indexing plunger; Pin Bore=4; l1=4
T4.5	2	DIN913-M6x12-45H	Flat Point Socket Set Screw 45H Alloy Steel
T4.6	1	ISO4017-M12X100-12.9	Full Thread Hexagon Screw ISO4017

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Spreader Tool Head Heater Type HHA#-0##-###-##

With this tool the head heaters can be spread apart to make it easier to pull them off the nozzle body.



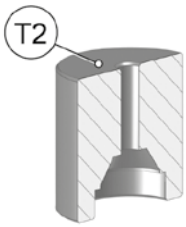
Doc008774_RIS.png

AT-HHA-00			
No.	Qty.	Item	Description
T5.1	1	AT-HHA-C-0-01	Head Heater Spreader
T5.2	1	DIN316-A2-M4x16	Metric DIN 316 Wing Screws M4x16

12EX16-03 Tip Assembly Tool

(T2) Tip Assembly tool

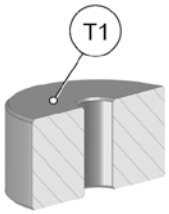
AT12E-0103



Doc005228.png

(T1) Tip Assembly tool

AT12E-0104



Doc005227.png

T3) Seal Cap Assembly tool

AT12E-0105



Doc005209.png

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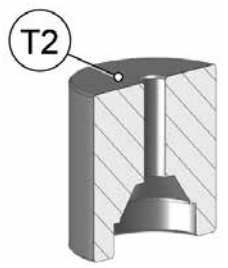
16EX22-03 Tip Assembly Tool

Tip Assembly Tool for 16EX22-03 Nozzle Tips

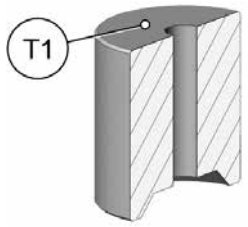
TTW, TTP, TFP

(T2) AT-16-040102 (T1) AT-16-040101

Also used for the assembly of seal caps.



Doc005228.png



Doc007735.png

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10.3.5 MS-Heating Element

There are two types of **M**olding **S**olution heaters.

Front Heaters **F**HA#-0##-###-## and **H**ead Heaters HHA#-0##-###-##.

The thermocouple is pressed in firmly and cannot be replaced.

All heaters are available in two different types (typ J or typ K thermocouple).



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10.3.5.1 Color coding of Thermocouples

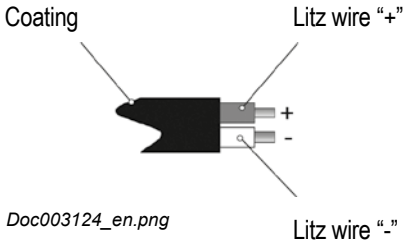
NOTICE

Take notice of the production and color identification of thermocouple cables.

Synventive uses J and K type thermocouples. Their color coding is given in the following table.

Table 1: International color coding for temperature sensors

Type	International standard IEC 584-3	
J	Black	+ Black
		- White
K	Green	+ Green
		- White

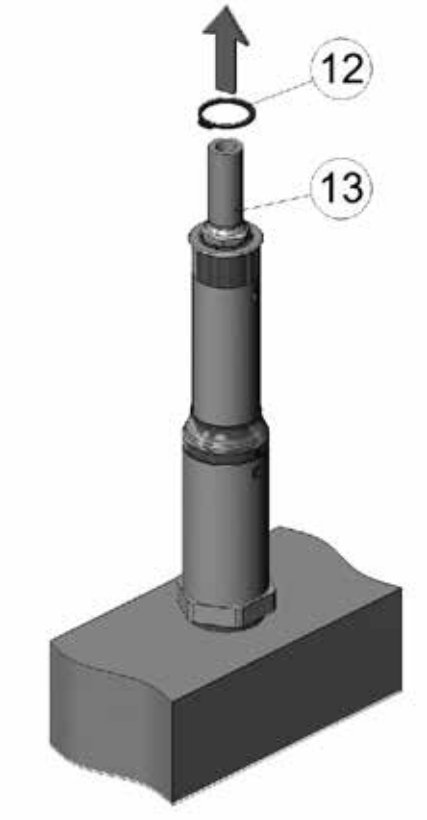


Doc003124_en.png

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10.3.5.2 Disassembly the Nozzle 12EX16-03 / 16EX22-03 Series

Disassembling the Nozzle Front Heater



Doc008775_RIS.png

NOTICE

The hot runner nozzle has to be screwed into the hot runner manifold for the following working steps.

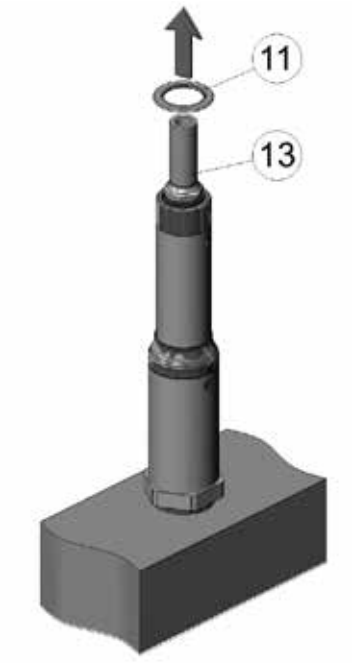
1) Remove the circlip (12) from the nozzle tip (13).

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2) Remove the pre-centering ring (11).

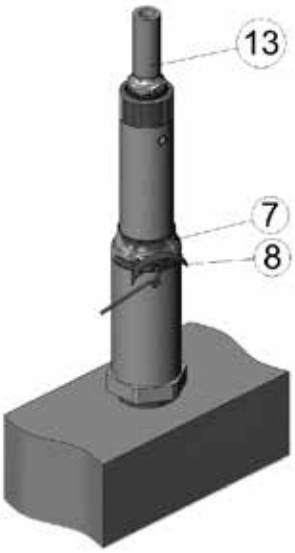
NOTICE

The pre-centering ring (11) is only provided on explicit customer request.



Doc008776_RIS.png

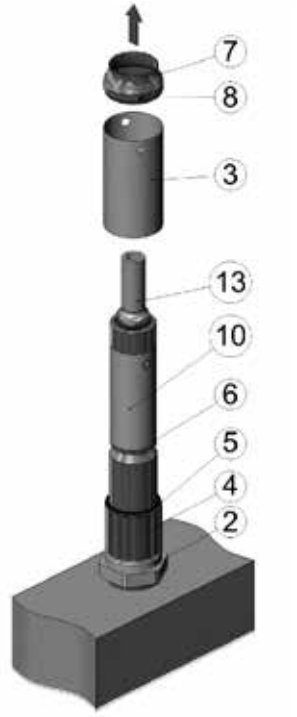
3) Loosen the hexagon socket set screw (8) from the Lock and Cover ring (7).



Doc008777_RIS.png

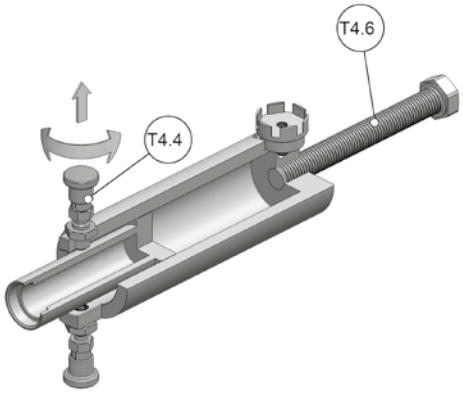
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4) Remove the Lock and Cover ring (7).
5) Remove the Cover tube-16E (3).



Doc008778_RIS.png

6) Turn the hexagon head screw (T4.6) of the disassembly tool completely backwards.
7) Pull the button from indexing plungers (T4.4) and fix the position by turning the button (T4.4) by 90°.



Doc008779_RIS.png

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8) Guide the socket (T4.1) of the disassembly tool over the nozzle tip (13).

NOTICE

The socket (T4.1) is seated onto the nozzle tip (13) and slides back into the sleeve (T4.2).



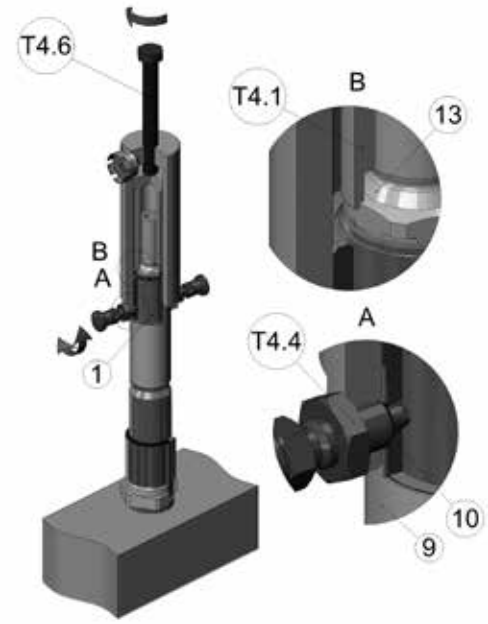
Doc008780_RIS.png

9) Loosen the indexing plungers (T4.4), by turning the button 90°.
10) Position the disassembly tool until the indexing plungers (T4.4) snaps into the hole of the Cover Tube-12E (9) and the Front Heater (10).
11) Turn the hexagon head screw (T4.6) clockwise.

NOTICE

By turning the hexagon head screw (T4.6) the Front Heater (10) together with the Cover Tube-12E (9) is pulled off the nozzle body (1).

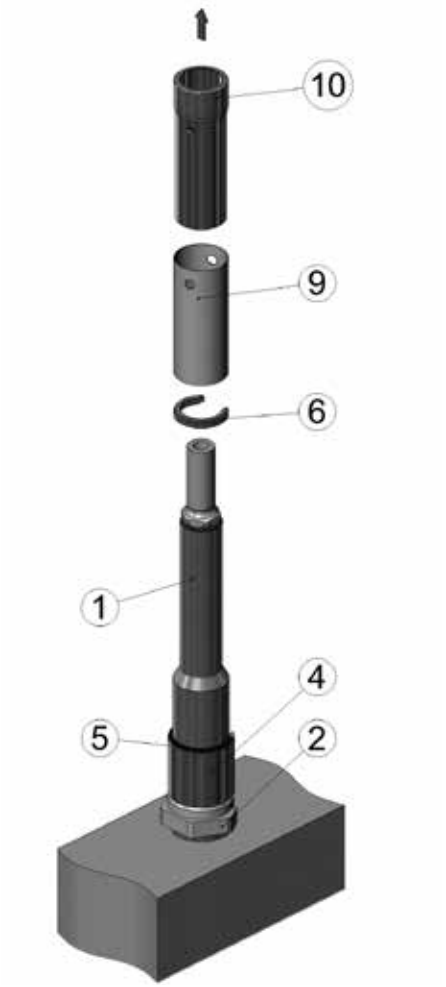
12) Turn down the hexagon head screw (T4.6) completely.



Doc008796_RIS.png

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13) Remove the Front Heater (10).
14) Remove the Cover Tube-12E (9).
15) Remove the Front Heater Head Ring (6).



Doc008782_RIS.png

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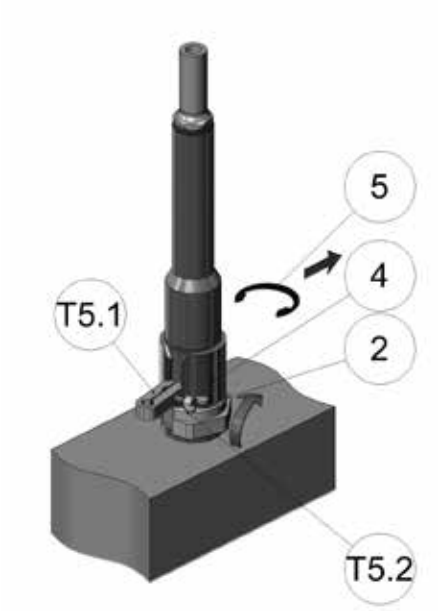
10.3.6 Disassembling the Head heater

NOTICE

Depending on the nozzle length is more than one Head heater (4) used.

1) The nozzle Front heater (10) must be dismounted from the nozzle body (1), as described in the above section Disassembling the Nozzle Front Heater.

2) Remove the retaining ring (5).
3) Spread the head heater (4) with the spreading tool (T5.1).
4) Remove the head heater (4).
5) Remove Head Ring (2).



Doc008783_RIS.png

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10.3.7 Disassembling the Nozzle Tip

⚠ WARNING

Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Following work must be carried out by qualified and experienced persons.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.

Hot Surfaces Hazard

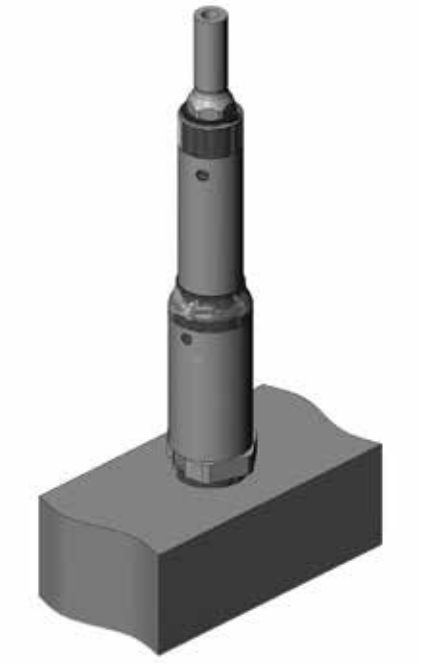
Contact between the skin and the hot nozzle could result in burns.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.

NOTICE

The nozzle has to be screwed into the manifold.

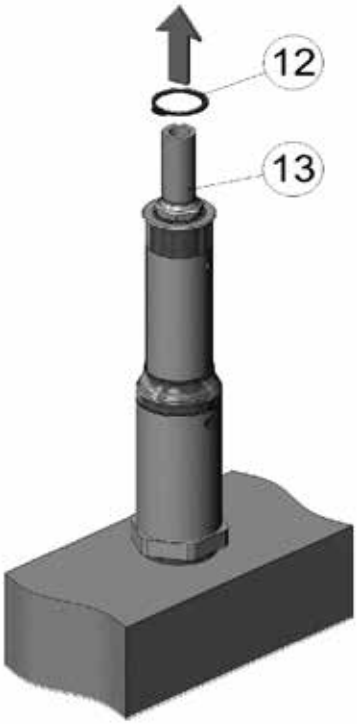


Doc008784_RIS.png

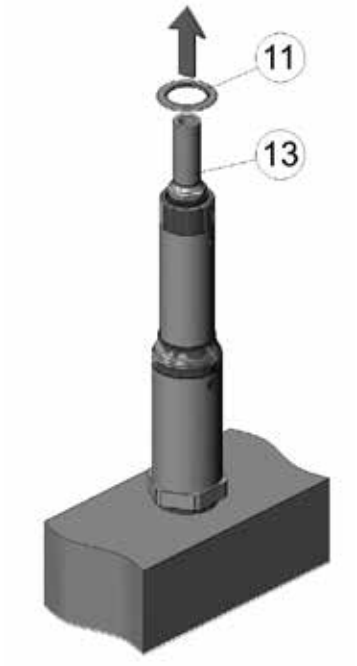
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Service and Maintenance / Disassembling the Nozzle Tip

1) Remove the circlip (12) from the nozzle tip (13).



Doc008775_RIS.png



Doc008776_RIS.png

2) Remove the pre-centering ring (11).

NOTICE

The pre-centering ring (11) is only provided on explicit customer request.

WARNING

Hot Surfaces Hazard

Contact between the skin and the hot nozzle could result in burns.

Following works must be carried out by qualified persons.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

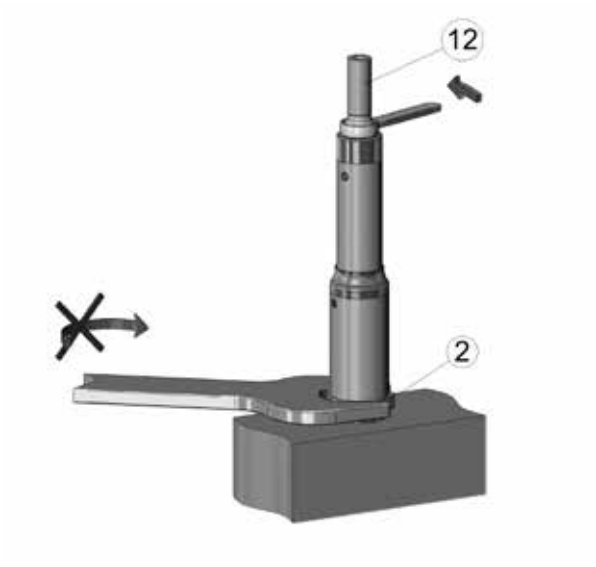
NOTICE

To dismount the nozzle tip from the nozzle, if there is plastic material in the nozzle, the tip must be heated-up.

Never use an acetylene or welding torch, as severe nozzle damage can occur from over-heating.

3) Heat the nozzle tip (13) using a heat gun to the maximum temperature of 200 °C (392 °F).

Service and Maintenance / Disassembling the Nozzle Tip



Doc008785_RIS.png

4) Fix the nozzle body at the head ring (2) with a wrench and loosen the nozzle tip (13) counter clockwise.

WARNING

Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage

Use personal protective equipment: Face protection, hearing protection and gloves - PPE.

5) Clean the nozzle tip using pressurized air to remove as much residual plastic as possible

10.3.8 Disassembling the Nozzle Body

⚠ WARNING

Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Following work must be carried out by qualified and experienced persons.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact you medical / safety representing.

Hot Surfaces Hazard

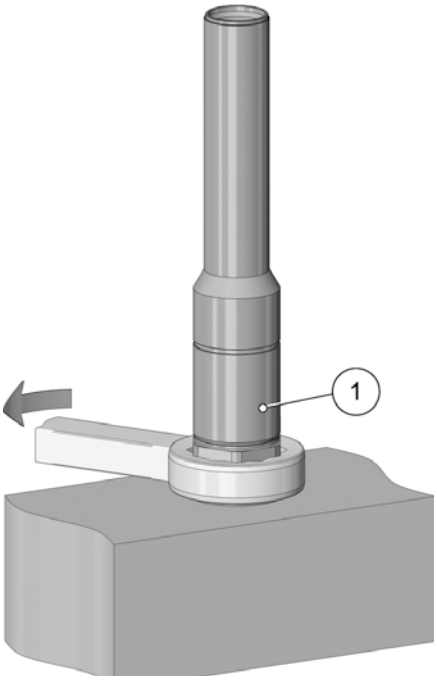
Contact between the skin and the hot nozzle could result in burns.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact you medical / safety representing.

1) Cool the nozzle body (1) to approximately 25 °C (77 °F).
2) Dismount the nozzle front heater (10) and head heater (4), as described in above section Disassembling the Nozzle Front Heater and Disassembling the Head heater.
3) Dismount the nozzle tip (13) from the nozzle body (1), as described in the above section Disassembling the Nozzle Tip..

4) Use a wrench to loosen the nozzle body (1) from the manifold by rotation (counter clockwise).



Doc006985.png

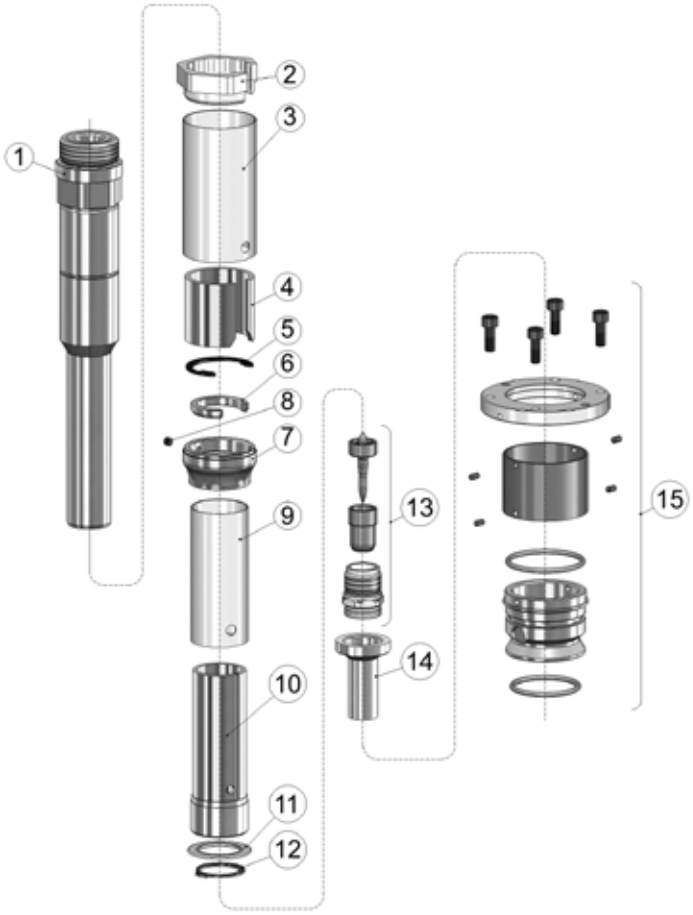
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10.3.8.1 Assembling the Nozzles 12EX16-03 / 16EX22-03 Series

In this section the nozzle parts are identified with the numbers indicated in the following figure.

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.



Doc008771_RIS.png

Pos.	Description
1	Nozzle body
2	Head ring
3	Cover Tube-16E
4	Head heater
5	Retaining ring
6	Front Heater Head Ring
7	Lock and Cover Ring
8	Hexagon socket set screw
9	Cover Tube-12E
10	Front heater
11	Pre-centering ring (optional)
12	Circlip
13	Nozzle tip
14	Wear insert (optional)
15	Cooling bushing (optional)

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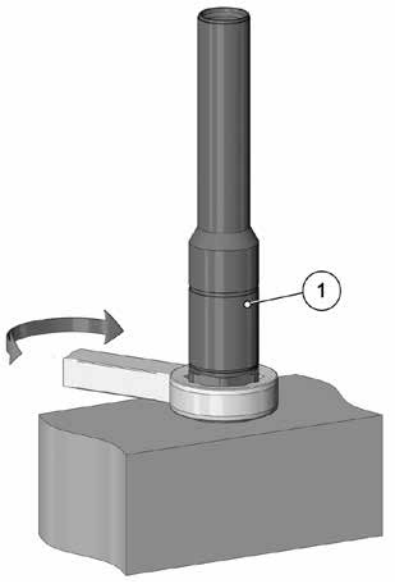
10.3.9 Assembling the Nozzle Body

1) Apply spotting ink on the nozzle body (1) bottom surface (SF1).



Doc006724.png

2) Screw in the nozzle body (1) hand-tight into the manifold thread until seated.
3) Unscrew the nozzle body (1) from the manifold.



Doc006986.png

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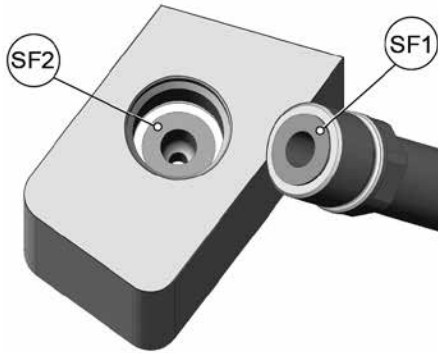
4) Check the matching between the manifold bottom surfaces (SF2) and the nozzle body (1) surface (SF1).

NOTICE

The manifold must bear on all surfaces uniformly and flatly, in particular on the nozzle head contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, contact Synventive Customer Service or Technical Support.

5) With a positive ink test, clean the surfaces and proceed to the next step.

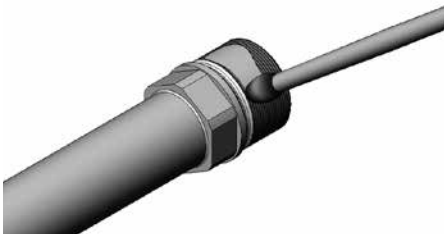


Doc005240.png

6) Lubricate the thread (not the face) of the nozzle body with high-temperature assembly paste (antiseize compound).

NOTICE

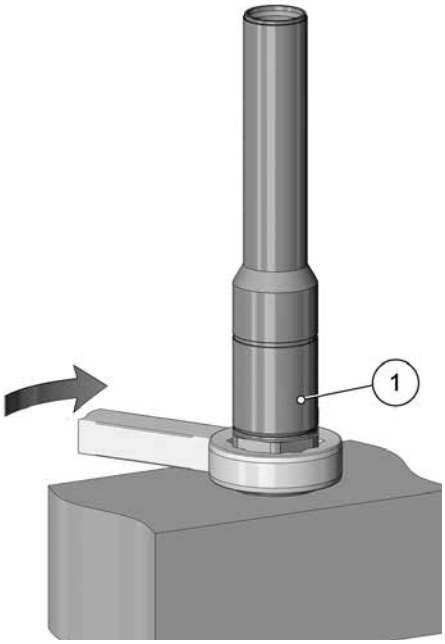
This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.


Doc003827.png

7) Tighten the nozzle body (1) to the manifold.

NOTICE

Use torque wrench with wrench insert and the torque specified in the torque table in section 13.



Doc006987.png

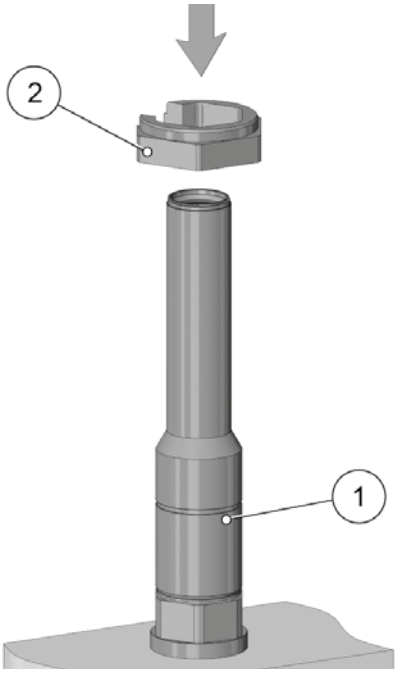
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10.3.10 Mounting the Nozzle Rear Heater and Front Heater

1) Slide the head ring (2), onto the nozzle body (1) up to the surface of the hexagon of the head ring (2).

NOTICE

The opening of the head ring (2) has to match with the cable connections (see customer drawing).



Doc006988.png

2) Bend the cable at the head heater (4) corresponding to the opening at the head ring (2). Depending at the length of the nozzle, several heaters in the rear region may be possible.



Doc008786_RIS.png

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3) Slide the head heater (4), onto the nozzle body (1) up to the head ring (2).

NOTICE

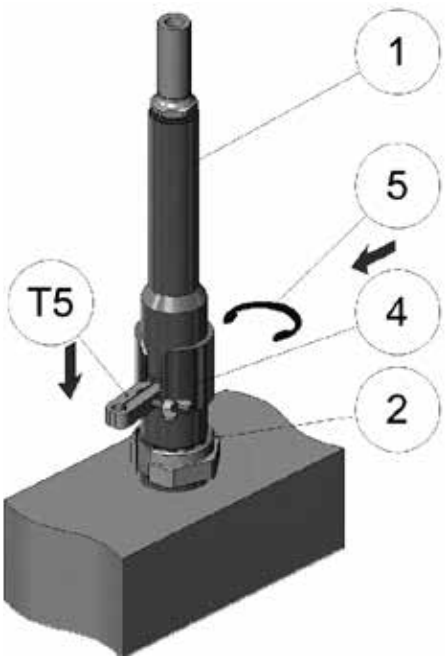
By spreading the head heater (4) slightly with the spreader tool (T5), it is easier to slide the head heater over the nozzle body (1).

The opening from the retaining ring (5) has to match with the opening from rear heating element (4).

4) Fit the retaining ring (5) into the groove at the nozzle body (1).

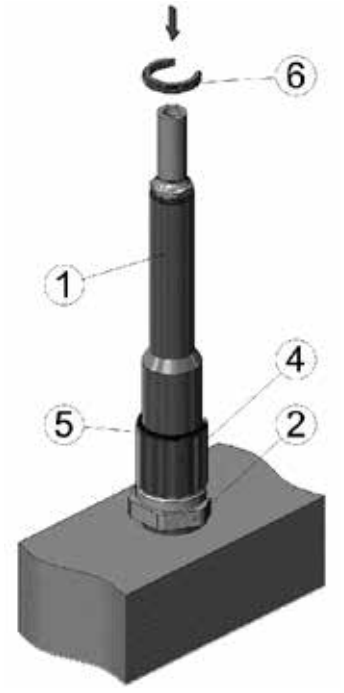
NOTICE

Depending at the length of the nozzle, perform step 2-4 more times.



Doc008787_RIS.png

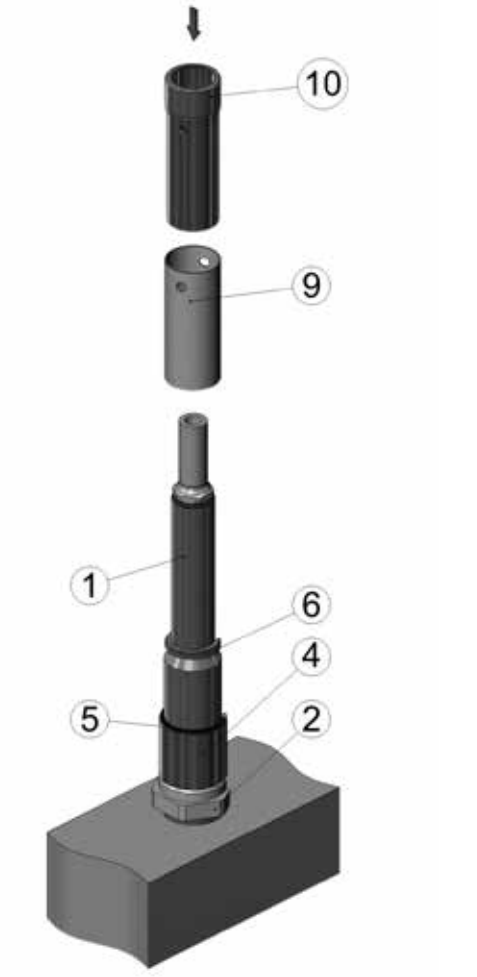
5) Slide Front heater head ring (6), onto the nozzle body (1).



Doc008788_RIS

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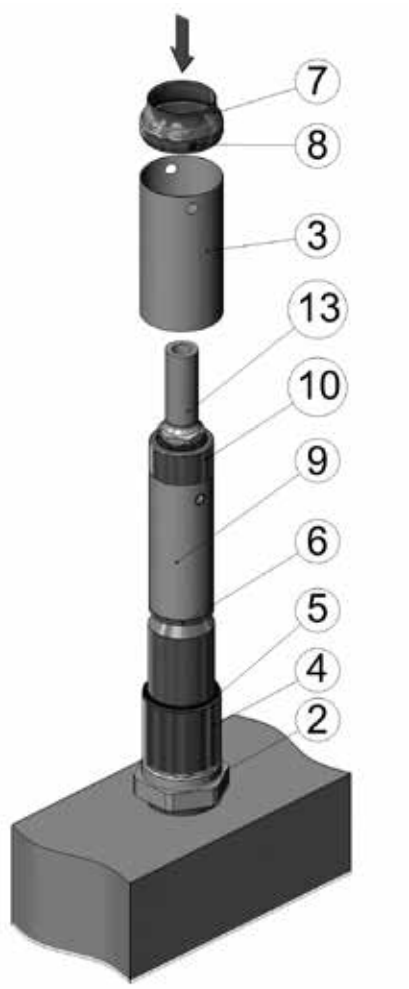
6) Slide the front heater (10) together with cover tube-12E (9) over the nozzle body (1).



Doc008789_RIS.png

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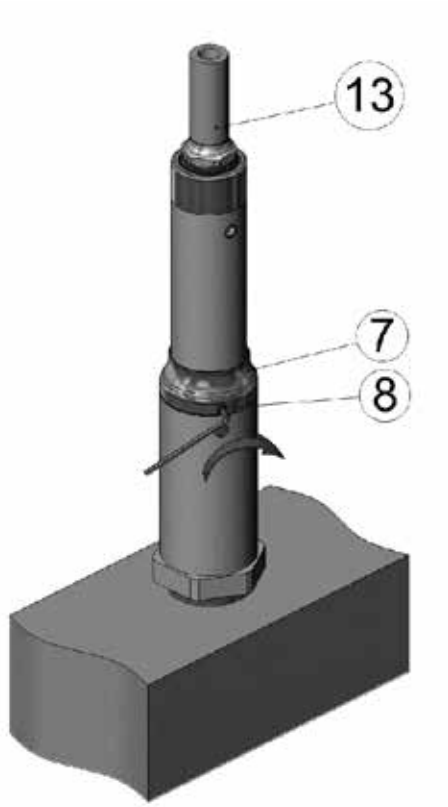
7) Slide the cover tube-16E (3) and the lock and cover ring (7) over the nozzle.



Doc008790_RIS.png

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8) Fix the hexagon socket set screw (8) from the lock and cover ring (7) by turning the hexagon socket wrench to the right.



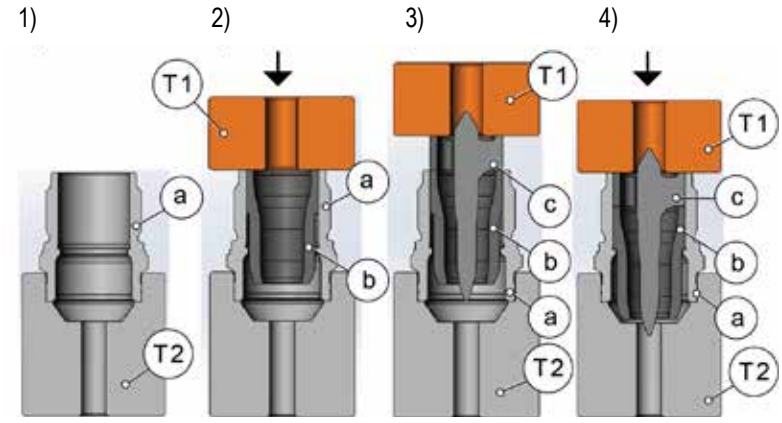
Doc008791_RIS.png

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10.3.11 Assemble the Nozzle Tips

1) Assemble the nozzle body (1) on the manifold, as described in the above section Assembling the Nozzle Body.
2) Assemble the rear heating element (4) on the nozzle body (1), as described in the above section Assembling the Head heater and Front heater.
3) Assemble the front heater (8) on the nozzle body (1), as described in the above section Assembling the Head heater and Front heater.

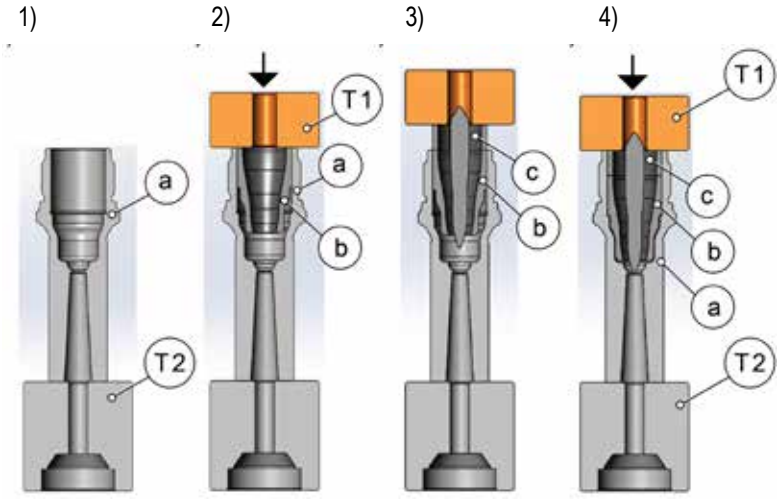
10.3.12 Assemble the Nozzle Tip Inserts TTW, TTP, TFP for 12EX16-03



Doc005230.png

TTW Nozzle Tip Assembly

1) Place the tip nut (a) into the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).
3) Place the torpedo (c) on the tip insert (b).
4) Using the tool (T1) to push the torpedo (c) and the tip insert (b) into the tip nut (a).



Doc005231.png

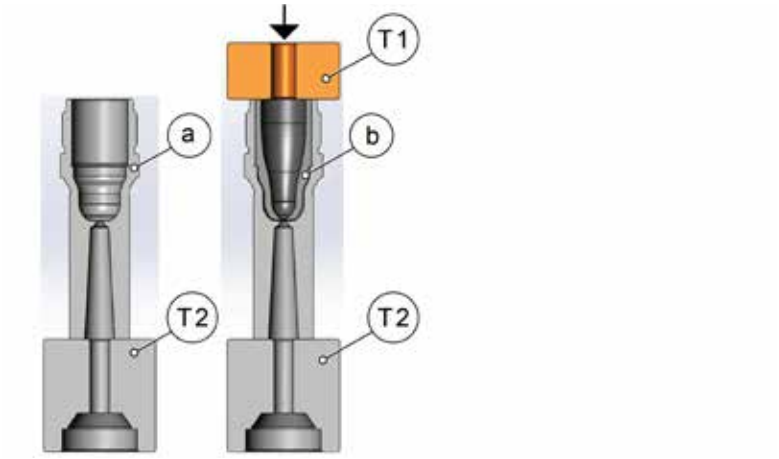
TTP Nozzle Tip Assembly

1) Place the tip nut (a) on the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).
3) Place the torpedo (c) on the tip insert (b).
4) Using the tool (T1) to push the torpedo (c) and the tip insert (b) into the tip nut (a).

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Service and Maintenance / Assemble the Nozzle Tip Inserts TTW, TTP, TFP for 12EX16-03

1) 2)

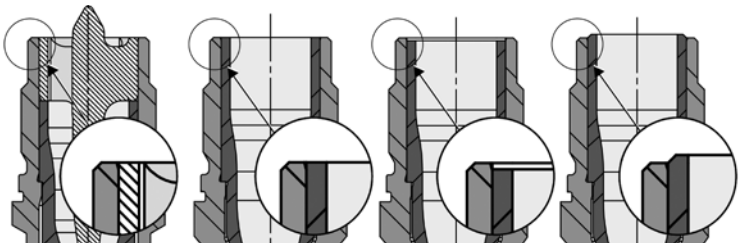


Doc005232.png

TFP Nozzle Tip Assembly

1) Place the tip nut (a) on the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).

good good good incorrect



Doc004688.png

NOTICE

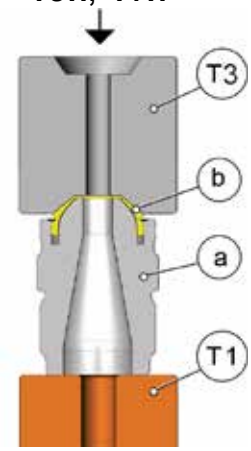
See examples of good and incorrect insert installations (at Illustration Doc004688).

Make sure the insert must not exceeds the height of the nozzle tip head.

Incorrect items should not be further processed.

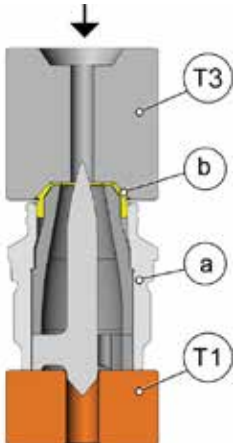
Assembling the Seal Cap on VSW, VTW, TTW Nozzle Tips for 12EX16-03

VSW, VTW



Doc007731.png

TTW



Doc007732.png

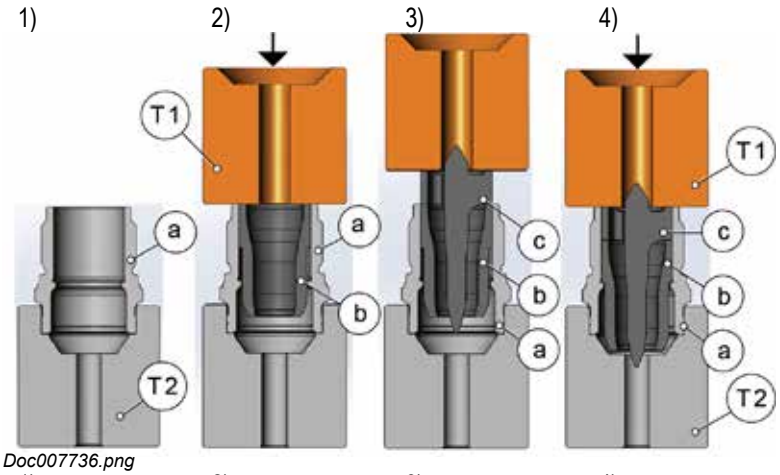
1) Place the tip nut (a) on the tool (T1).
2) Place the seal cap (b) on the tip nut (a).
3) Using the tool (T3) to push the seal cap (b) on the tip nut (a).

NOTICE

The assembly tool (T3) has an engraved note on both sides on the front for use with VSW, VTW or TTW screw-in parts (VW / TW).

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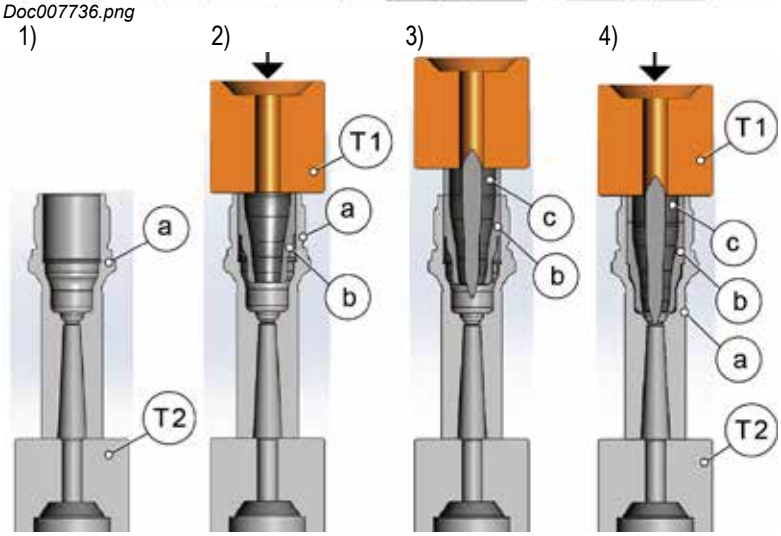
Assemble the Nozzle Tip Inserts TTW, TTP, TFP for 16EX22-03



Doc007736.png

TTW Nozzle Tip Assembly

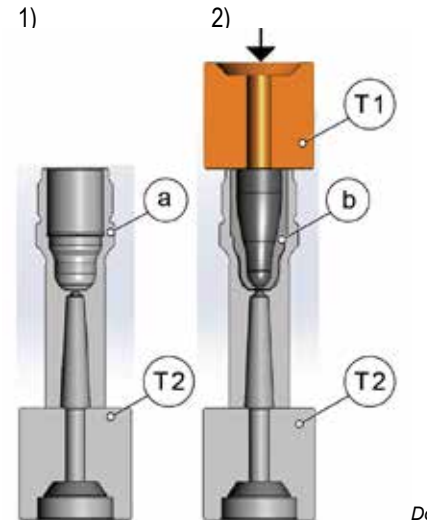
1) Place the tip nut (a) on the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).
3) Place the torpedo (c) on the tip insert (b).
4) Using the tool (T1) to push the torpedo (c) and the tip insert (b) into the tip nut (a).



Doc007737.png

TTP Nozzle Tip Assembly

1) Place the tip nut (a) on the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).
3) Place the torpedo (c) on the tip insert (b).
4) Using the tool (T1) to push the torpedo (c) and the tip insert (b) into the tip nut (a).

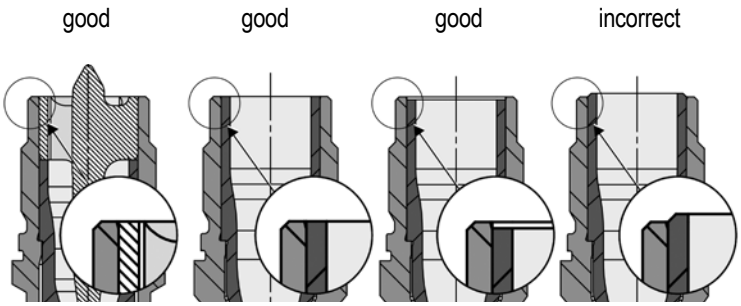


Doc007738.png

TFP Nozzle Tip Assembly

1) Place the tip nut on the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).

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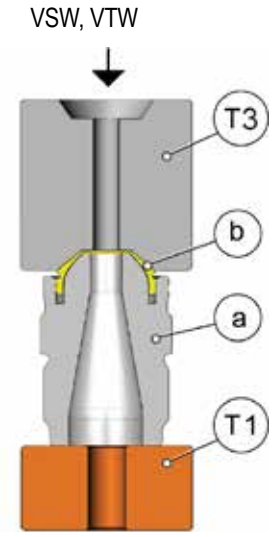
NOTICE

See examples of good and incorrect insert installations (at Illustration Doc004688).

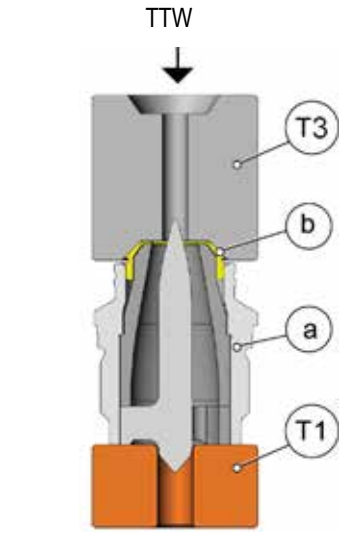
Make sure the insert must not exceeds the height of the nozzle tip head.

Incorrect items should not be further processed.

Assembling the Seal Cap on VSW, VTW, TTW Nozzle for 16EX22-03



Doc008797_RIS.png



Doc008798_RIS.png

1) Place the tip nut (a) on the tool (T3).
2) Place the seal cap (b) on the tip nut (a).
3) Using the tool (T3) to push the seal cap (b) on the tip nut (a).

NOTICE

The assembly tool (T3) has an engraved note on both sides on the front for use with VSW, VTW or TTW screw-in parts (VW / TW).

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Assembling the Nozzle Tip on the Nozzle

1) Apply spotting ink on the nozzle tip (9) bottom surface (SF1).
2) Screw in the nozzle tip (9) hand-tight into the nozzle body (1) until seated.
3) Unscrew the nozzle tip (9) from the nozzle body (1).
4) Check the matching between the nozzle body surface (SF2) and the nozzle tip surface (SF1).

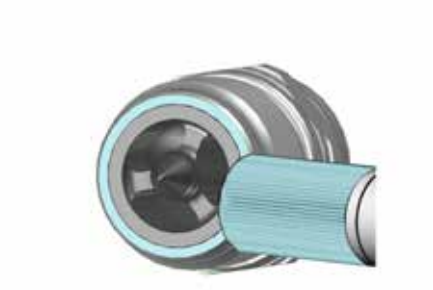
NOTICE

The nozzle must bear uniformly on the outer surfaces uniformly and flatly, in particular on the nozzle tip contact face.

NOTICE

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory - contact Synventive Customer Service or Technical Support.

5) With a positive ink test, clean the surfaces and proceed to the next step.



Doc005245-detail.tif



Doc005251.png

6) Lubricate the thread (not the face) of the nozzle tip body with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.



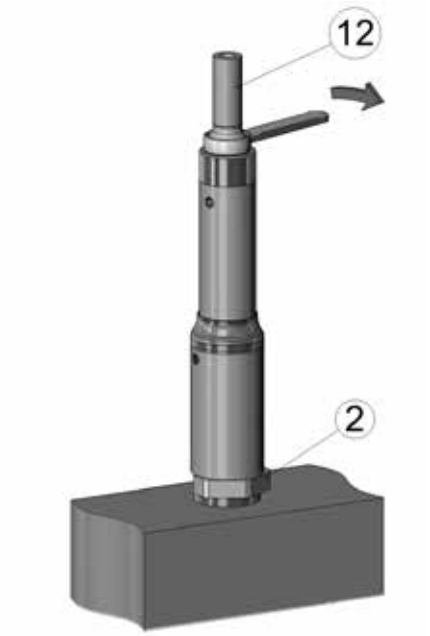
Doc005247.png

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7) Screw in the nozzle tip (12) into the nozzle body hand-tight.
8) Tighten the nozzle tip (12) into the nozzle.

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

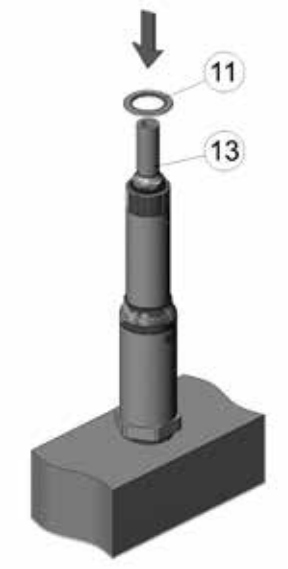


Doc008792_RIS.png

9) Add the Pre-centering ring (11) on the nozzle body (1).

NOTICE

The pre-centering ring (11) is only provided on explicit customer request.



Doc008793_RIS.png

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10) Mount the circlip (12) in the groove provided on the nozzle tip (13).



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10.4 Nozzles (APT)

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.

WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.



Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Following work must be carried out by qualified and experienced persons.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.



NOTICE

Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

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10.4.1 Replacing Nozzle Tips, Inserts and Nozzle Tip Seals (APT)

10.4.1.1 Dismounting of the Nozzle parts

Removing the Nozzle Tip

NOTICE

The Removal of the nozzle tip should be done at room temperature 20 °C (68 °F).

Abb. 1

1) Unscrew the nozzle tip with a six point deep socket wrench and the split wrench if applicable.

WARNING

Hot Surfaces Hazard

Contact between the skin and the hot nozzle could result in burns.

2) If the nozzle tip is frozen, heat the Hot Runner System up to operating temperature and unscrew the nozzle tip.

3) Remove the plastic from the seal and from the inside sealing diameter on the nozzle tip.

NOTICE

Do not damage the seal.

Abb.2

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Removing the Nozzle Tip Seal

1) The nozzle tip has to be removed before removal of the seal.

Abb.3

2) Ensure no plastic has leaked past the seal.
3) Ensure no scratches or dents on the outside diameter of the insert.

NOTICE

Thermal operation of the gate may be adversely affected by any damage or plastic leakage.

Abb.4

4) Gently remove the damaged seal by lifting it out using pliers.

NOTICE

To avoid scratching the insert with pliers, only contact the seal not the insert.

Abb.5

5) If the insert is damaged, ascertain the cause and resolve it.

NOTICE

If this is not possible please contact our Synventive Customer Service or Technical Support.

Abb.6

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Removing the Tip Insert

The BeCu (Beryllium Copper) insert should only be removed if it is going to be replaced by a new one.

NOTICE

Hazard of Material Damage

After renewed installation of an insert the optimum heat transfer can not be.

After disassembly of an insert do not install it a second time.

Do not drill deeper as described in the table below (thread depth) otherwise the nozzle can get damaged.

1) Counterbore the insert with a drill for depth of 10 mm and tap a thread into it. Determine the drill size from the table below.

Abb.7

2) After the insert is tapped, thread in a rod.
3) Place the insert removal tool over the rod.

NOTICE

The rod has to be so long that it dominates the insert removal tool.

Abb.8

4) Place the insert removal tool over the rod.
5) Using a nut, screw the nut against the removal tool to pull out the insert.

Abb.9

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10.4.1.2 Installing Nozzle Tips, Inserts and Nozzle Tip Seals (APT)

Installing the Tip Insert

1) Clean all plastic from the insert counter bore and from the insert press diameter.
2) Measure the insert counter bore diameter and the insert press diameter.

Abb.10

3) The diameter of the insert must be minimum 0.013 mm (0.0005") – 0.030 mm (0.0012") bigger than the diameter of the insert counter bore.

Abb.11

NOTICE

This is necessary to ensure proper heat transfer to the insert.

4) The insert must be pressed so that the insert shoulder is flush with the nozzle tip seat +/- 0.005 mm (+/- 0.0002").

Abb.12

NOTICE

This is achieved by using the insert installation tool with a small arbor press.

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Installing the Nozzle Tip Seal

NOTICE

The seal has to be installed into the nozzle tip before the nozzle tip gets installed into the nozzle.

1) Make sure the area where the seal seats are smooth and free of plastic. *Abb.13*

2) Inspect the seal when replacing the nozzle tip.

NOTICE

No plastic should have leaked past the seal, and there should be no scratches or dents on the outside diameter of the insert. Thermal operation of the gate may be adversely affected by any damage or plastic leakage. *Abb.14*

3) Use a special installation tool to install the new seal.

NOTICE

This tool is available when a new seal is factory installed or when ordering a complete new insert. *Abb.15*

4) You must first place the new seal over the installation tool so the groove on the seal fits over the ribbing on the tool. *Abb.16*

5) Set the bushing vertically in a light arbor press and slide down to seat the seal on the insert shoulder. *Abb.17*
6) Remove the tool and verify seal is seated properly.

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Installing the Nozzle Tip

NOTICE

Hazard of Material Damage

While spotting ink the nozzle tip the seal has not yet to be installed into the nozzle tip also do not use high-temperature assembly paste.

The seal and the high-temperature assembly paste have to be applied after the spotting ink of the nozzle tip.

Before Installing the nozzle tip ensure the seal is installed into the nozzle tip.

1) Using spotting paste, check if the nozzle tip properly bears on the insert press diameter.

   NOTICE

   Proceed as described in 3) and 4).

   Note the nozzle tip seal has not yet to been installed into the nozzle tip.

   Do not use high-temperature assembly paste.

Abb.18

2) Install the seal (see “Installing the Nozzle Tip Seal”).

Abb.19 Insert the seal

3) Screw the nozzle tip into the nozzle as follows.

   NOTICE

   Use high-temperature assembly paste for the thread.

   This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

4) Screw the nozzle tip into the nozzle with a six point deep socket wrench and the split wrench.

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

Abb.20 Screw the nozzle tip into the nozzle

10.4.1.3 Nozzle Tip Insert Removal (SR16)

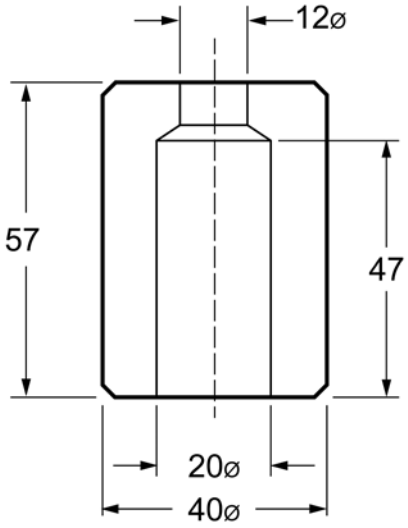
Example of SR16 nozzle tip insert removal.

NOTICE

The conductive BeCu insert should only be removed if it is to be replaced by a new insert. Reinstallation of the same insert may affect the heat transfer from the steel body to the BeCu insert.

1) Using an Ø 8.9 mm drill, machine into the center of the insert for a depth of 15 mm.
2) Add a thread into the borehole, using a M10 tap.
3) After the insert is tapped, thread in an M10 rod (a).
4) Place the insert removal tool over the M10 rod.

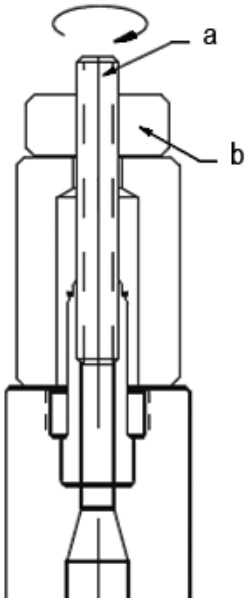
Insert removal tool - Doc003272



Doc003272.png

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5) Using a M10 nut (b), thread the nut against the removal tool to pull out the insert.



Doc003273.png

NOTICE

Hazard of Material Damage

Do not exceed thread depth of nozzle tip insert or damage to the nozzle will occur.

Table 8: Thread depth

Thread depth			
Nozzle Style	**Recommended drill diameter**	**Depth**	**Tap**
SR-16	8.9 mm (0.35“)	15 mm (0.59“)	M10
SR-20	8.9 mm (0.35“)	15 mm (0.59“)	M10
SR-24	11.1 mm (0.44“)	15 mm (0.59“)	M12
Thread depth for D-2 Inserts			
SR-16	8.9 mm (0.35“)	15 mm (0.59“)	M10
SR-20	10.2 mm *(0.4“)*	20 mm *(0.79“)*	M12 x 1.75
SR-24	14 mm (0.55“)	20 mm *(0.79“)*	M16 x 2

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10.5 Single Axis Valve Gate Nozzles

10.5.1 Single Axis Valve Gate Nozzle 12SVH-06



Doc008172.png

Technical Data	
Valve pin operation	
Operation medium	hydraulic
Pressure range	40 - 60 bar (580 - 870 psi)
Flowrate	2.5 l/min
Reaction time	~0,5 s
Valve pin stroke:	13 mm
Adjustment	± 1 mm Via adjustment threads from outside.
Connection	M12x1,5 (8-L)
Valve pin	
Valve pin diameter	Ø 6 mm
Attachment	Quick coupling, anti-rotation
Heating Power	The numbering of the heating zones starts at the nozzle tip and ends at the nozzle head.
Zone 1 (From a nozzle length of 50 mm)	195 - 290 Watt
Zone 2 (From a nozzle length of >190 mm)	480 - 1200 Watt
Head	630 plus 650 Watt

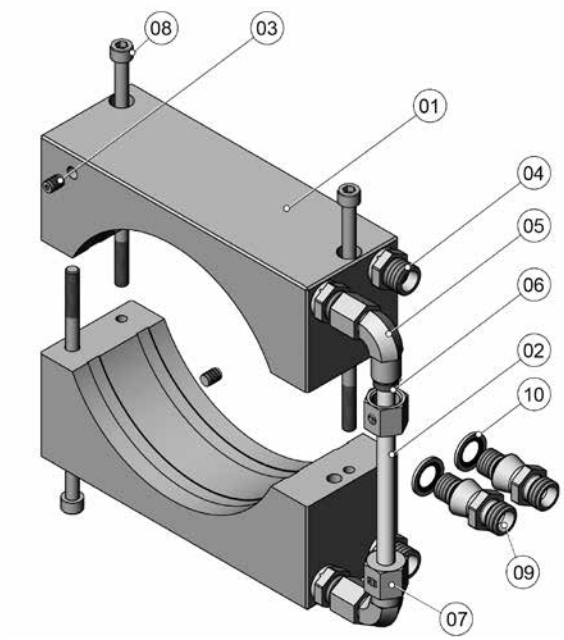
NOTICE

To ensure long life and continued flawless operation of the actuator, we recommend using a service medium that complies with the requirements of classification 21/18/13 pursuant to ISO 4406.

Technical Data - Cooling Unit CU12SVH01

NOTICE

If the mold temperature is 80 °C (176 °F) or more, the Cooling Unit CU12SVH01 is required.



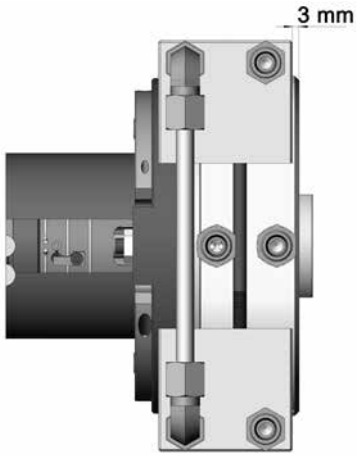
Doc007275.png

Technical Data CU12SVH01

Method:	Cooling water
Temperature:	min. 30 °C / max. 60 °C Temp. difference IN/OUT max. 5 °C
Flow rate per unit:	4 l/min
Pressure:	max. 8 bar (116 psi)
Connections:	M14x1.5

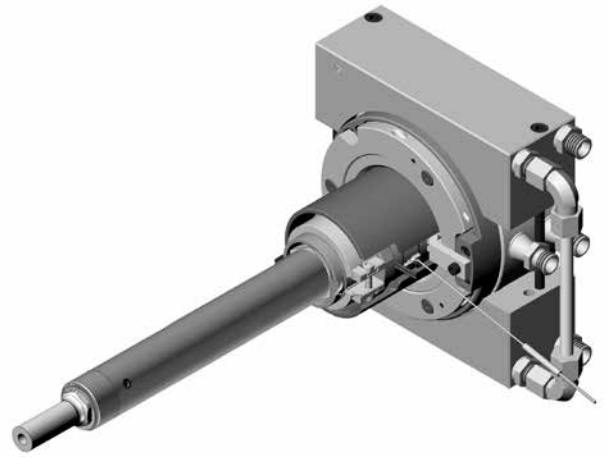
Pos.	Qty.	Part Number	Description
01	2	CU12SVHCS01	Cooling Sleeve
02	1	CU12SVHCT01	Connecting Tube
03	2	Z942/6	Sealing Plug
04	4	GE08LMEDVITOMDCF	Straight Coupling
05	2	EW08LVITOMDCF	Elbow Coupling
06	2	PSR08LX	Cutting Ring
07	2	M08LCFX	Nut
08	3	DIN912-M6x120-12.9	Hexagon Socket Cap Screw
09	2	XAA01201401	Straight Coupling
10	2	12.7X18X1.5USSFPM	O-ring Seal

Position of the cooling unit on the nozzle head.



Doc008170.png

CU12SVH01 mounted on Single Axis Valve Gate Nozzle 12SVH-06



Doc008174.png

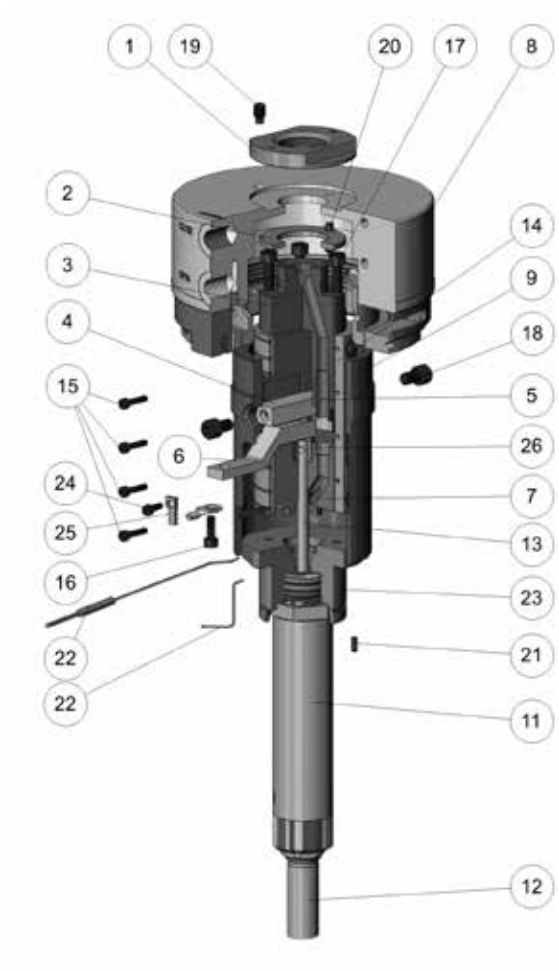
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10.5.1.1 Single Axis Valve Gate Nozzle 12SVH-06

In this section the nozzle parts are identified with the numbers indicated in the following figure.

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.

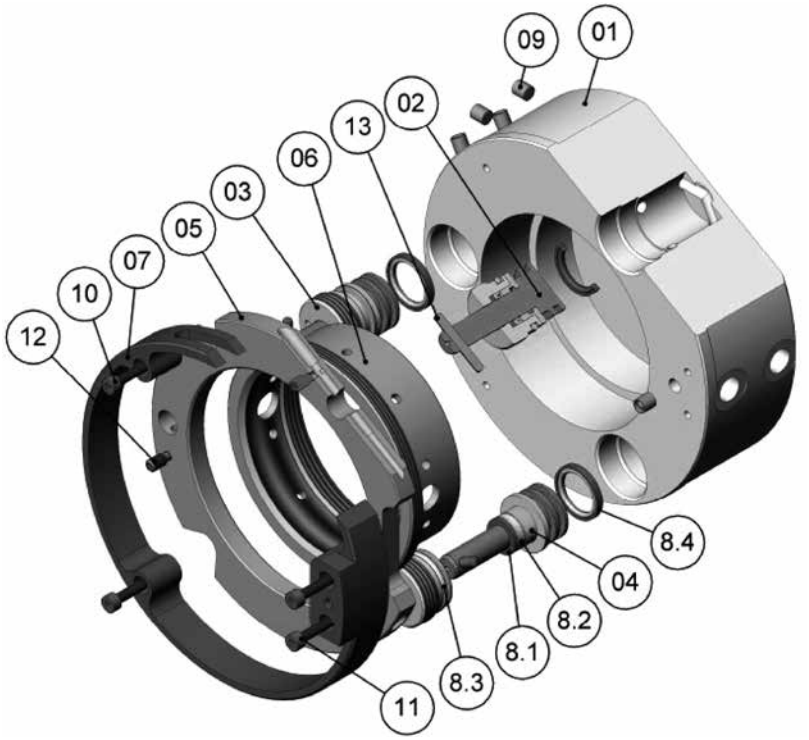


Doc008669_RIS.png

Pos.	Qty.	Description	Part Number
1	1	Isolation nut	GAN0010S
2	1	Isolation ring	GAN0020S
3	1	Nozzle head top	GAN0030S### / GAN0031S###
4	1	Bridge	GAN0040S
5	2	Sealing sleeve	GAN0050S
6	1	Cooling bar	GAN0060S
7	1	Nozzle head bottom	GAN0074S / GAN0075S
8	1	Actuator	HYC2013S01
9	1	Guide sleeve	12SVP-S-01
10	1	Heater band	HT-045-022-01
11	1	Nozzle body complete	12E-06 (varied)
12	1	Shutoff nozzle tip	(varied)
13	1	Shutoff valve pin	(varied)
14	1	Heater band	HB450941
15	4	Hexagon socket cap screw	DIN912-M3X14-12.9
16	1	Hexagon socket cap screw	DIN912-M4X12-12.9
17	4	Hexagon socket cap screw	DIN912-M5X90-12.9
18	2	Hexagon socket cap screw	DIN912-M6X10-12.9
19	1	Hexagon socket set screw	DIN915-M6X10-45H
20	1	Parallel pin	DIN6325-4M6X16
21	1	Parallel pin	DIN6325-3M6X8
22	2	Thermo couple	XTA00115001
23	1	Head body	12SVPHB-01
24	1	Hexagon socket cap screw	DIN912-M3X10-12.9
25	1	Clamping device	GAN0170S
26	1	Valve pin guide	SVPG-G-06-01

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Exploded view and Part List Actuator HYC2013S01



Doc003305.png

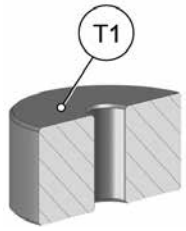
Pos.	Qty.	Description	Part Number
01	1	Actuator housing	HYC2013CH01
02	3	Piston D23	HYC2013PI01
03	3	Gasket locator	HYC2013GL01
04	3	Gasket locator cover	HYC2013GC01
05	1	Suspension ring	HYC2013SR01
06	1	Adjustment bushing	HYC2013AB01
07	1	Protection ring	HYC2013PR01
08	1	Seal kit complete	HYC2013SK01
8.1	3	Back up ring 10x15x2	Y21015PS030
8.2	3	Rod seal	C1-1005-V3664
8.3	3	O-ring seal	VIOR17.12X2.62FPM80
8.4	3	Piston seal (Compact sealing ring consist of an O-ring and a sealing element).	2G0-20X14X2.85
8.5	3	Guiding element	FB2.3-1.5L33
09	13	Sealing plug	MB600060
10	2	Hexagon socket cap screw	DIN912-M4X16-12.9
11	2	Hexagon socket cap screw	DIN912-M4X25-12.9
12	3	Set screw	DIN915-M4X6-45H
13	3	Parallel pin	DIN6325-4M6X28

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Assembly and Disassembly Tools

In this section the Stripping and Mounting Tool parts are identified with the numbers indicated in the following figure.

Assembly Tools for VSW Nozzle Tip



Doc005227.png



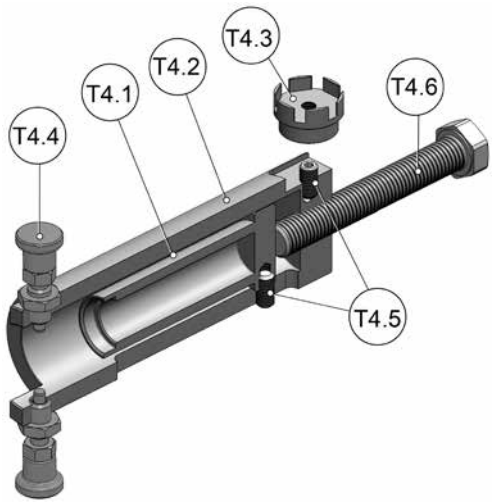
Doc005228.png



Doc005209.png

Pos.	Part No.	Description
T1	AT12E-0104	Tip Assembly Tool
T2	AT12E-0103	Tip Assembly Tool
T3	AT12E-0105	Seal Cap Assembly Tool

Heater Disassembly Tool Compl. AT-FHA-024 for the Heater Type FHA#-024-###-##



Doc008132.png

AT-FHA-024			
Pos.	Cty.	Part No.	Description
T4.1	1	AT-FHA-024-C-01	Disassembly Tool Socket
T4.2	1	AT-FHA-024-C-02	Disassembly Tool Sleeve
T4.3	1	AT-FHA-024-C-05	Disassembly Tool IB24 Adapter Nut
T4.4	1	GN817-44-CK	Indexing plunger
T4.5	2	DIN913-M6x12-45H	Flat Point Socket Set Screw
T4.6	1	ISO4017-M12X100-12.9	Full Thread Hexagon Screw

Nozzle Assembly / Disassembly Tool

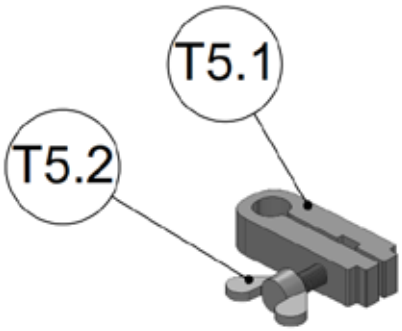

Doc007382.png

Pos.	Part No.	Description
T3	AT12S-01	Nut

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Spreader Tool Head Heater Type HHA#-0##-###-##

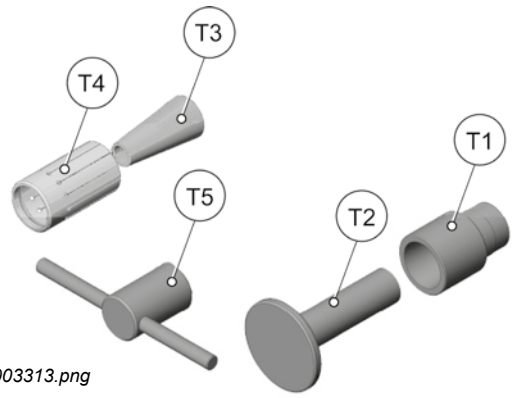
With this tool the head heaters can be spread apart to make it easier to pull them off the nozzle body.



Doc008150.png

AT-HHA-00			
No.	Qty.	Item	Description
T5.1	1	AT-FHA-024-C-01	Disassembly Tool Socket
T5.2	1	AT-FHA-024-C-02	Disassembly Tool Sleeve

Tools for Disassembling the Actuators - ATCYL10



Doc003313.png

Mounting Tool for Piston Seals		
Pos.	Part No.	Description
T1	ATCYL1001	Calibration sleeve
T2	ATCYL1002	Mounting tool
T3	ATCYL1003	Installation cone
T4	ATCYL1004	Spread tube
T5	ATCYL1005	Wrench complete

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Safety Instructions for the Service at the Single Axis Valve Gate Nozzle 12SVH-06

⚠ WARNING



Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.





Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.



NOTICE



Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

Any impact against the nozzle tip may result in its damage.

Never hammer or impact the nozzle tip from the front (i.e. from the side of the mold).

Twisting could damage the nozzle tip.

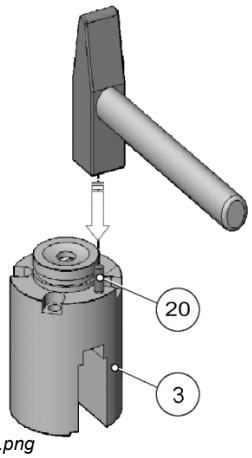
When replacing the nozzles, the sealing rings must always be replaced.

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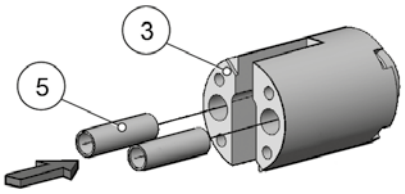
10.5.1.2 Assembly of the Nozzle

1) Drive the parallel pin (20) into the nozzle head top (3).



Doc007293.png

2) Put the sealing sleeves (5) into the nozzle head top (3).



Doc007271.png

3) Screw nozzle head bottom (7) together with valve pin guide (26).

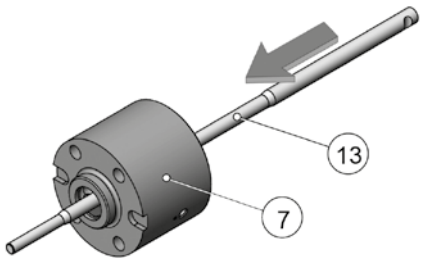
NOTICE

Torque value – 22 Nm



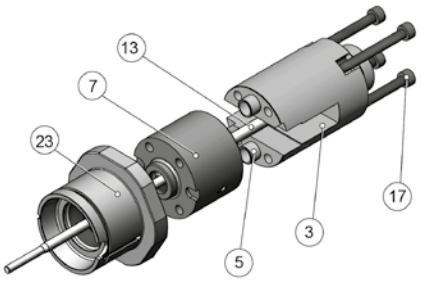
Doc008670_RIS.png

4) Put the valve pin (13) into the nozzle head bottom (7) and check the easy movement.



Doc007350.png

5) Mount nozzle head top (3), nozzle head bottom (7) and head body (23) with 4 hexagon socket head cap screws (17) hand-tight.



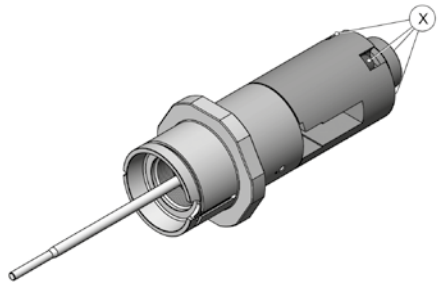
Doc007351.png

6) Tighten the assembly with four socket head cap screws (17) in an X pattern in two torque levels.

NOTICE

Level 1; Torque value – 8 Nm.

Level 2; Tighten these four screws again in an X pattern with 14 Nm torque.



Doc007250.png

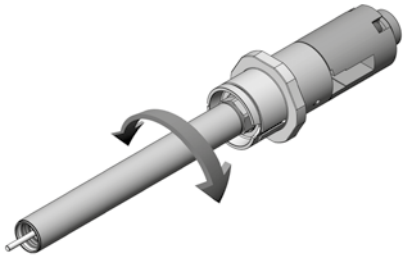
7) Apply spotting ink on the nozzle body bottom surface.



Doc004734.png

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8) Screw in the nozzle body hand-tight into the head body thread until seated.
9) Unscrew the nozzle body from the head body.



Doc007251.png

10) Check the matching between the head body surfaces and the nozzle body surface.

NOTICE

The head body must bear on all surfaces uniformly and flatly, in particular on the head body contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, please - contact Synventive Customer Service or Technical Support.

11) With a positive ink test clean the surfaces and proceed to the next step.

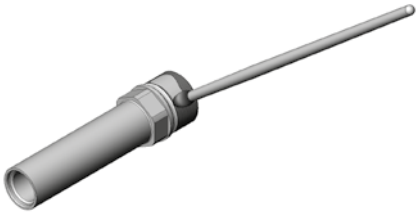


Doc007252.png

12) Lubricate the thread (not the face) of the nozzle body with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.



Doc003827.png

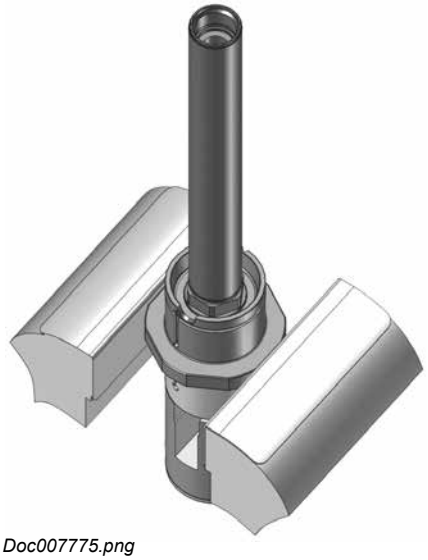
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NOTICE

For assembly instructions, see 12E-06.

The difference is as follows:

- The 12SVH-06 nozzle is fixed in a vice.
- The 12E-06 is fixed in the manifold.



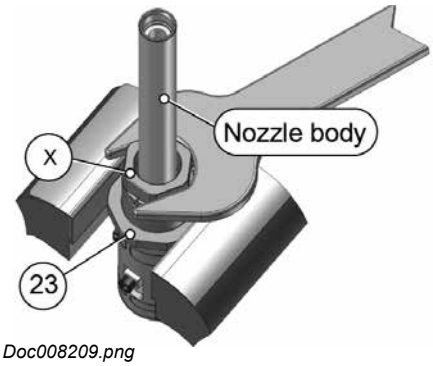
Doc007775.png

13) Tighten the nozzle body into the thread of the nozzle head assembly.

NOTICE

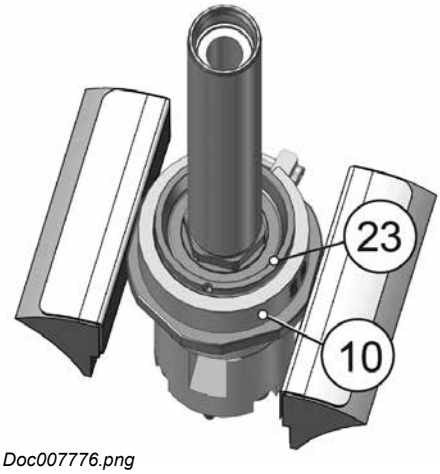
Using the tool “at12s-01” (X).

Torque value – 175 Nm.



Doc008209.png

14) Mount the heater band (10) on the head body (23).



Doc007776.png

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15) Complete the nozzle 12E-06.

NOTICE

Please refer to “12E-06 Series-S+A_Guideline”, Chapter 3.

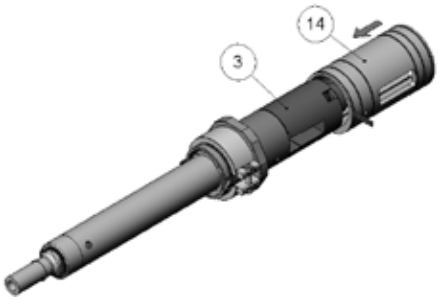


Doc008212.png

16) Put the heater band (14) above the nozzle head (3) by considering of the heater exit.

NOTICE

Same direction as the nozzle heater exit.

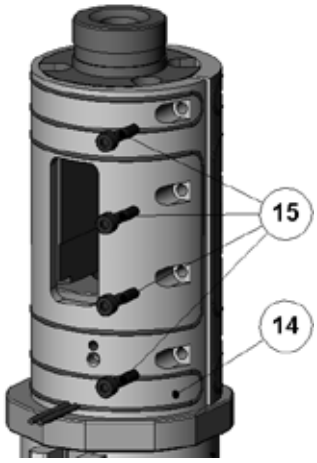


Doc008213.png

17) Fixing the heater band (14) by tighten the hexagon socket cap screws (15) in a regular way.

NOTICE

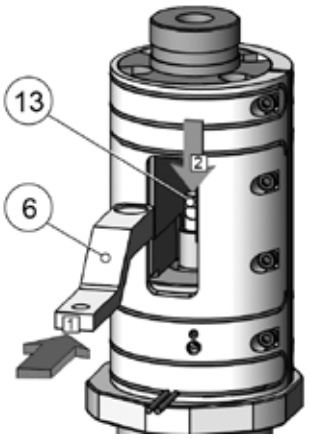
The torque value is 3 Nm.



Doc008214.png

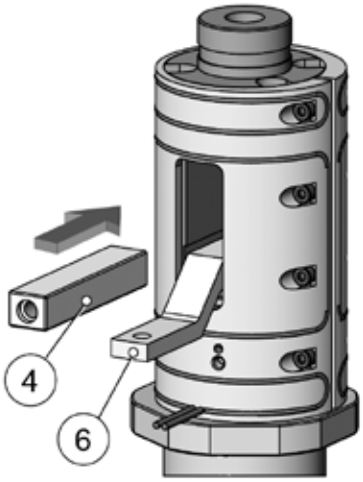
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18) Put the cooling bar (6) over the valve pin (13) onto the valve pin guide.



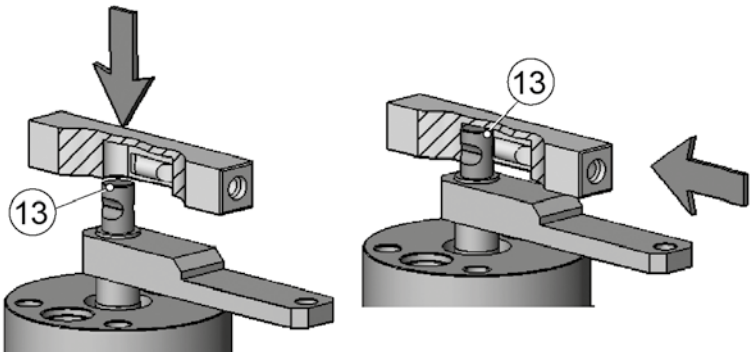
Doc007354-12E-06.png

19) Put the bridge (4) into the nozzle head.

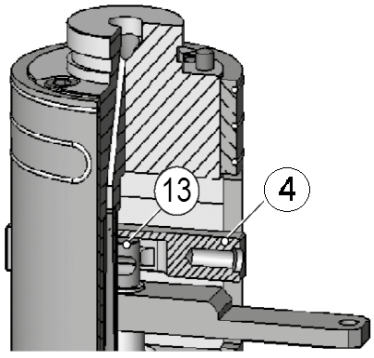


Doc007257-12E-06.png

20) Take up the valve pin (13) into the bridge (4).

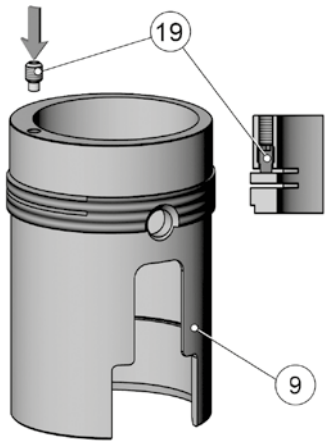


Doc007294.png



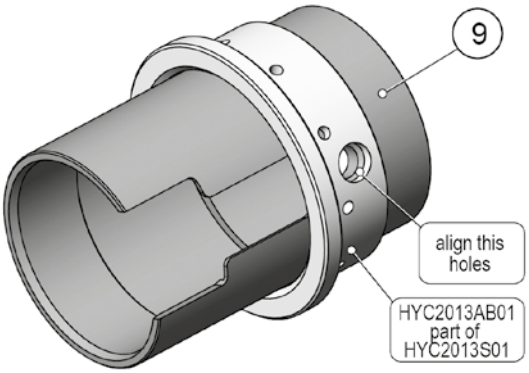
Doc007295.png

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Doc007355.png

21) Screw the hexagon socket set screw (19) into the guide sleeve (9).

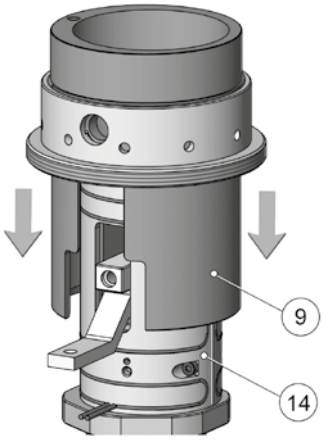


Doc007277.png

22) Screw the adjustment bushing (HYC2013AB01) loose-fitting together with the guide sleeve (9).

NOTICE

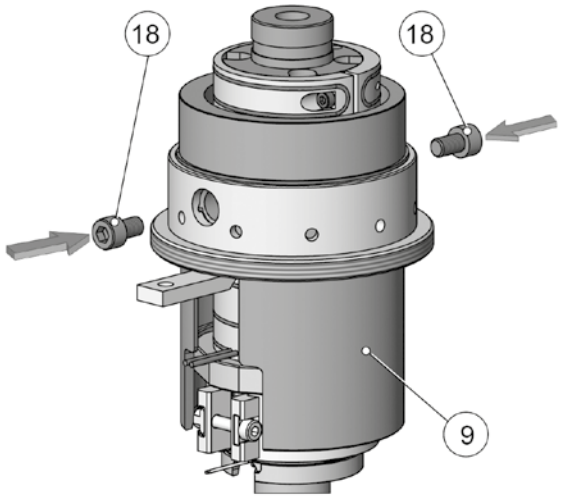
The holes at the guide sleeve have to be aligned with the holes from the adjustment bushing.



Doc007278.png

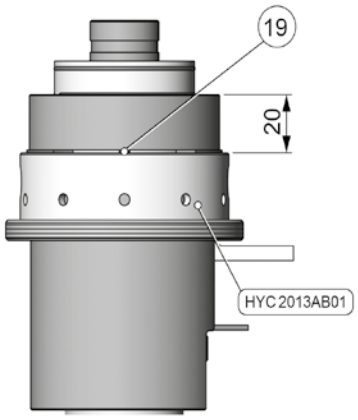
23) Sleeve the guide sleeve (9) over the heater band (14).

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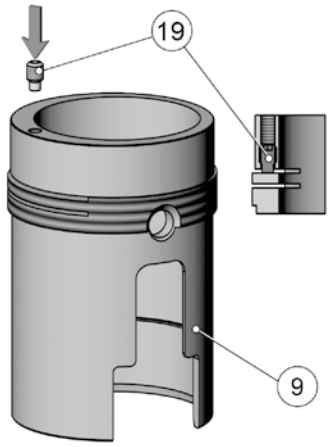


Doc007279.png

24) Screw in 2 hexagon socket screws (18) through the guide sleeve (9) and heater band into the bridge (4).



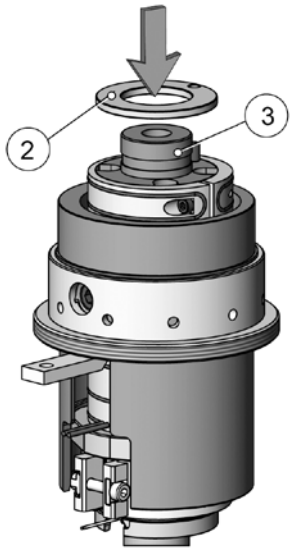
Doc007280.png



Doc007355.png

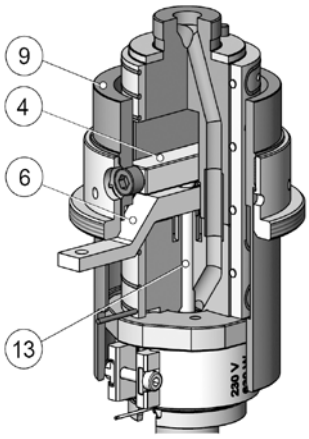
25) Adjust the dimension 20mm with the adjustment bushing (HYC2013AB01) and fix it with the Hexagon socket set screw (19).

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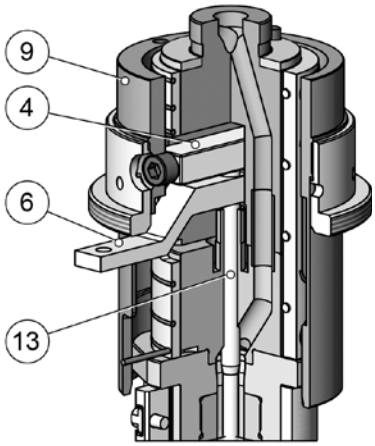


Doc007281.png

26) Place the isolation ring (2) on the nozzle head top (3).



Doc007282.png



Doc007433.png

27) Bring the valve pin (13) with the bridge (4) and guide sleeve (9) into the back position (see Doc007433).

NOTICE

Now the guide sleeve (9) is in the right position on the nozzle to mount the cylinder housing.

10.5.1.3 Dismounting and Mounting the Hydraulic Cylinder Housing

NOTICE

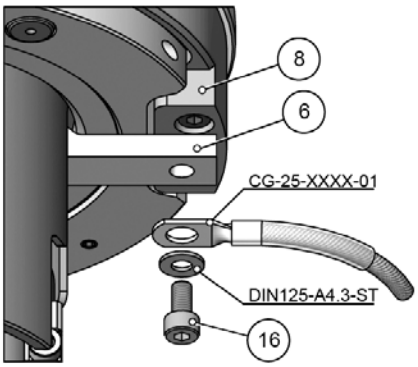
Please refer to “HYC2013S01-S+A_Guideline”.

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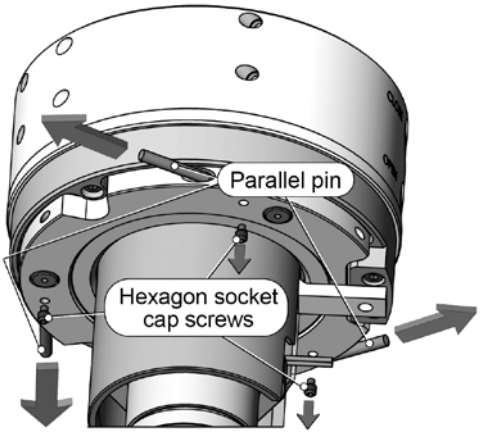
10.5.1.4 Dismounting and Mounting the Cylinder Housing on the Nozzle

Dismounting the Cylinder Housing from the Nozzle

1) Remove the Hexagon socket cap screw (16).
2) Remove the washer (DIN125) and cable grounding like the right side image.



Doc007414.png



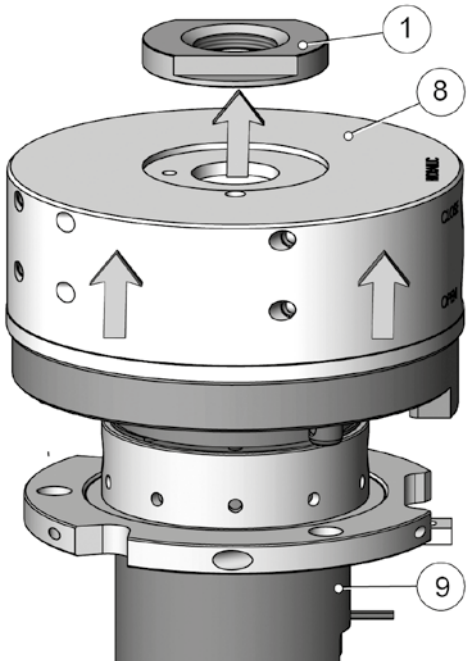
Doc007284.png

3) Unlocked the Hexagon socket cap screws.
4) Remove the parallel pins.

5) Fasten the isolation nut (1) in a vice.
6) Losen the isolation nut (1) at the nozzle tip (12).



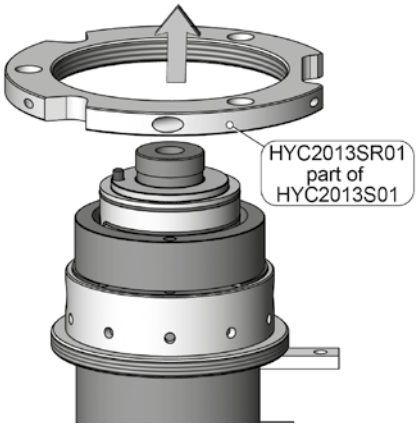
Doc008224.png



Doc007285.png

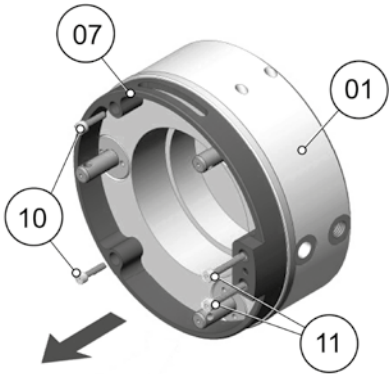
7) Remove the isolation nut (1).
8) Lift the complete actuator housing (8) from the guide sleeve (9).

9) Unscrew the suspension ring (HYC2013SR01) from the adjustment bushing (HYC2013AB01).



Doc007286.png

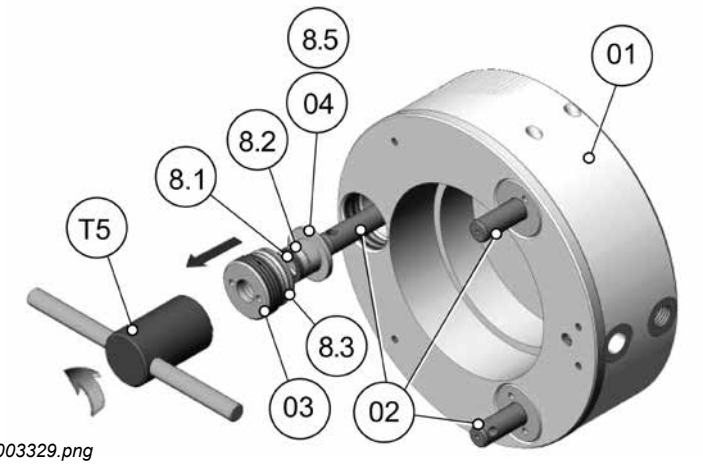
10) Loosen and remove the socket cap screws (10, Part of HYC2013S01) and (11, Part of HYC2013S01).
11) Remove the protection ring (07, Part of HYC2013S01) from the cylinder housing.



Doc003328.png

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Service and Maintenance / Single Axis Valve Gate Nozzle 12SVH-06



Doc003329.png

12) At the 3 pistons (02) loosen and remove the gasket locators (03) with the wrench ATCYL1005 (T5).

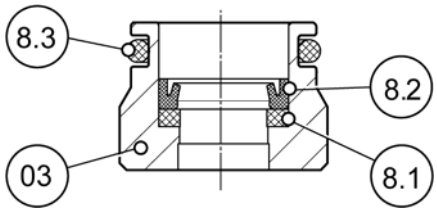
13) Pull the pistons (02) out of the cylinder housing (01).

14) Dismount the seals from the gasket locators (03).

8.1 Back up ring

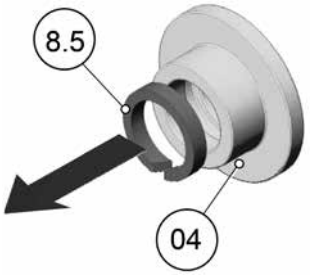
8.2 Rod seal

8.3 O-ring seal



Doc003338.png

15) Dismount the guiding elements (8.5) out of the inner groove of the gasket locator covers (04).



Doc003330.png

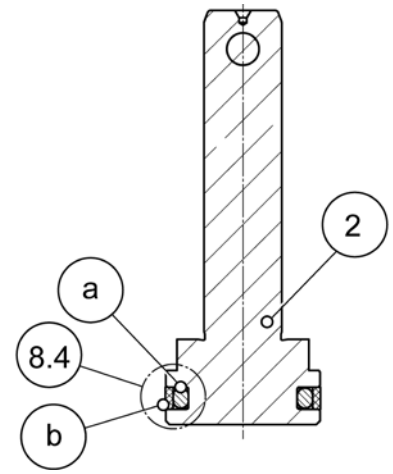
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16) Dismount the piston seals (8.4) out of the grooves of the piston (2).

NOTICE

The piston seal is a compact seal consisting of:

- O-ring (a)
- Sealing element (b)



Doc003339.png

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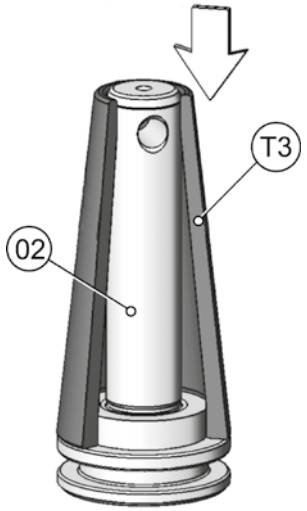
Mounting the Cylinder Housing on the Nozzle

Assembly of the Pistons into the Actuator HYC2013S01

NOTICE

After disassembly of the sealing elements, the original seals should be replaced as required by Synventive.

1) Fit the mounting cone (T3) on the piston (02).

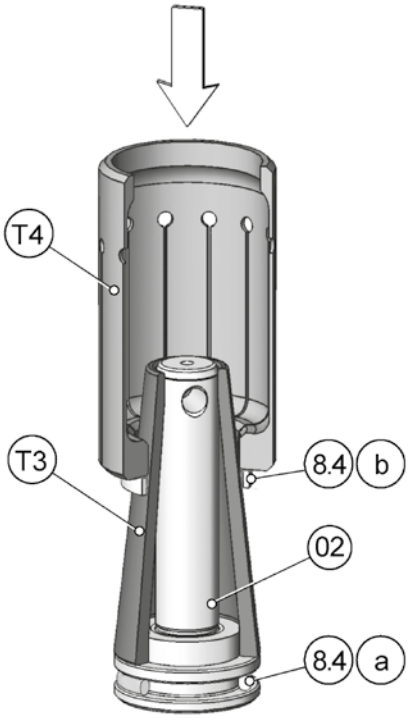


Doc003315.png

2) Lubricate the piston seal elements (8.4) with hydraulic oil or white grease.
   - O-ring (8.4) (a)
   - Sealing element (8.4) (b)
3) Mount the O-ring (8.4) (a) into the seal groove of the piston (02).
4) Using the spreader sleeve (T4) and the mounting cone (T3) to push the sealing element (8.4) (b) into the seal groove of the piston (02).

NOTICE

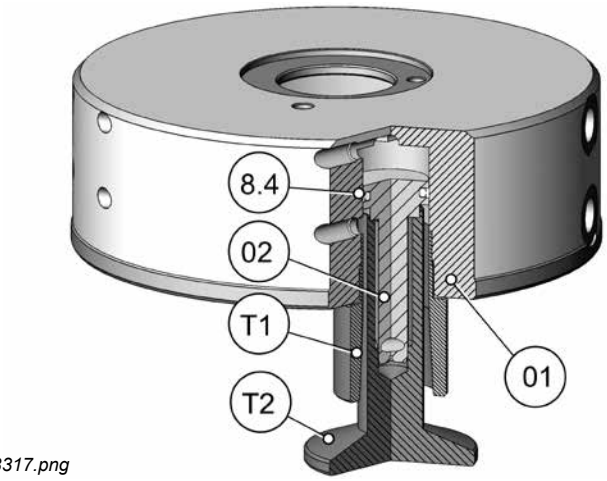
In the seal groove of the piston (02) the sealing element (8.4) (b) is placed above the O-ring (8.4) (a).



Doc003316.png

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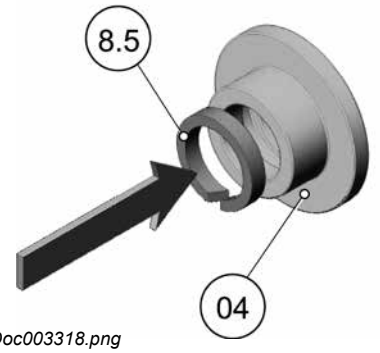
Service and Maintenance / Single Axis Valve Gate Nozzle 12SVH-06



Doc003317.png

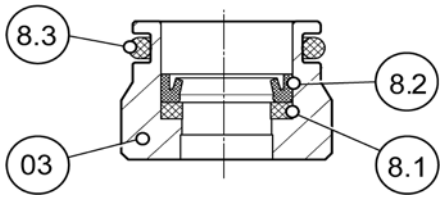
5) Fit the shaft of the piston (02) into the mounting tool (T2).
6) Place the calibration sleeve (T1) into the bore in the cylinder housing (01).
7) Insert the piston (02) with the mounting tool (T2) through the calibration sleeve (T1) into the cylinder housing (01).

8) Insert the guiding element (8.5) into the groove of the gasket locator cover (04).



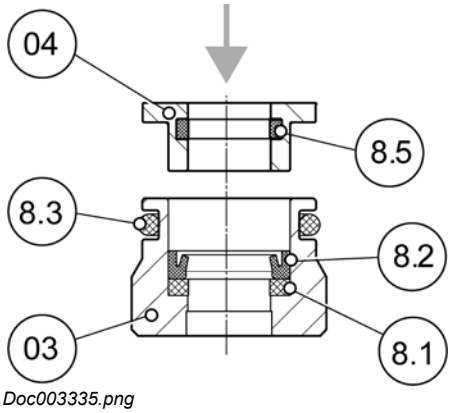
Doc003318.png

9) Install the seals of the gasket locators (03).
   - 8.1 Back up ring
   - 8.2 Rod seal
   - 8.3 O-ring seal



Doc003338.png

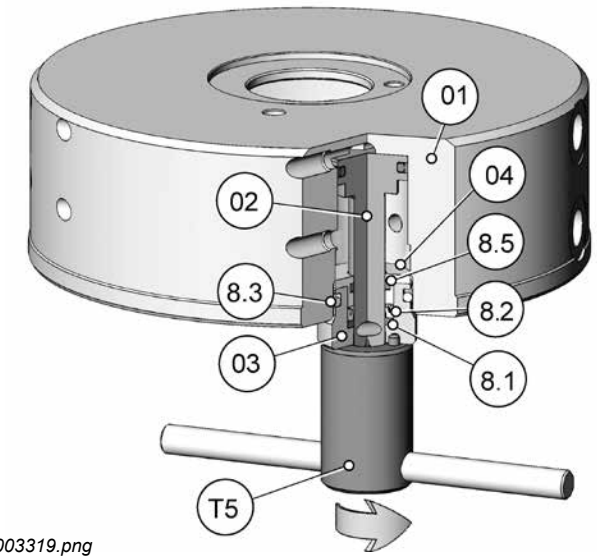
10) Install the gasket locator covers (04) into the gasket locators (03).



Doc003335.png

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Service and Maintenance / Single Axis Valve Gate Nozzle 12SVH-06



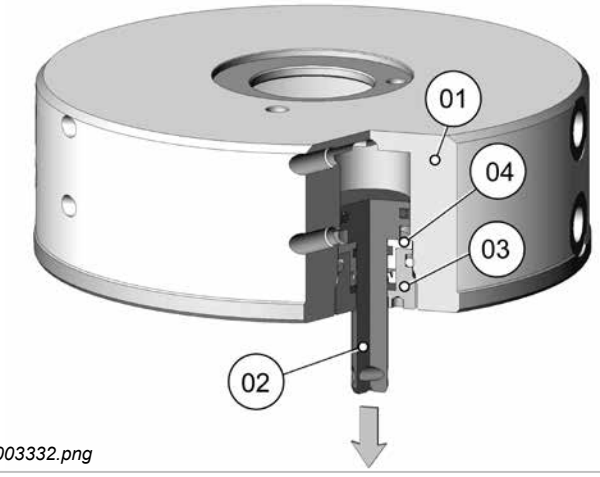
Doc003319.png

11) Place the gasket locator (03) (04) on the shaft of the piston (02).

12) Turn the gasket locator (03) (04) into the cylinder housing (01) thread with the wrench ATCYL1005 (T5) up to the mechanical stop.

NOTICE

The top of the gasket locator (03) must not exceed (01) the lower edge of the cylinder housing.

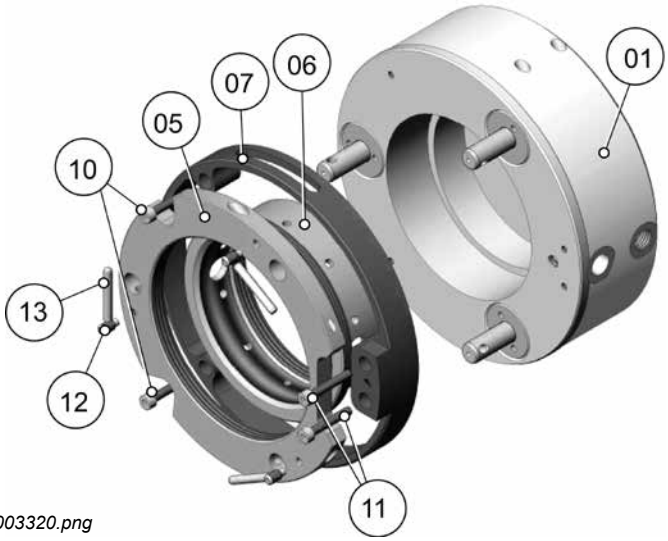


Doc003332.png

13) Pull the piston (02) until it reaches the gasket locator cover (04).

NOTICE

In this position, the top of the piston shaft protrudes 24 mm above the cylinder housing (01).



Doc003320.png

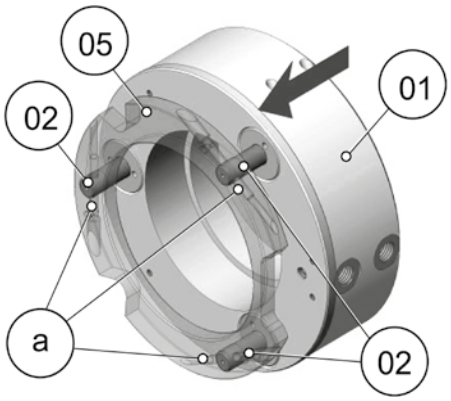
14) The following components are provided for mounting on the nozzle (not screwed together):

- (1) Cylinder housing (pre assembled)
- (5) Suspension ring
- (6) Adjustment bushing
- (7) Protection ring
- (10) Hexagon socket cap screw DIN912-M4X16-12.9
- (11) Hexagon socket cap screw DIN912-M4X25-12.9
- (12) Set screw DIN915-M4X6-45H
- (13) Parallel pin DIN6325-4m6X28

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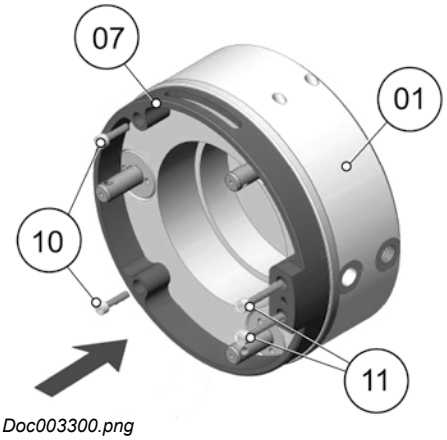
Mounting the Actuator Housing HYC2013S01 on the Single Axis Valve Gate Nozzle 12SVH-06

1) Mount the actuator housing (1, part of HYC2013S01) with the pistons (2, part of HYC2013S01) into the related holes of the suspension ring (5, part of HYC2013S01).
2) Turn the pistons (2, part of HYC2013S01) to align the holes (a) at the pistons (2, part of HYC2013S01) regarding the holes at the suspension ring (5, part of HYC2013S01).
3) Take the actuator housing (1, part of HYC2013S01) away from the suspension ring (5, part of HYC2013S01).



Doc003297.png

4) Attach the Protection ring (07, part of HYC2013S01) with hexagon socket cap screws (10 and 11, part of HYC2013S01) at the actuator housing (01, Part of HYC2013S01).



Doc003300.png

5) Check the fit of the adjustment bushing (HYC2013AB01).

NOTICE

The adjustment bushing (HYC2013AB01) has to be positioned 20 mm to the upper edge of the guide sleeve and fixed with the hexagon socket set screw (19).

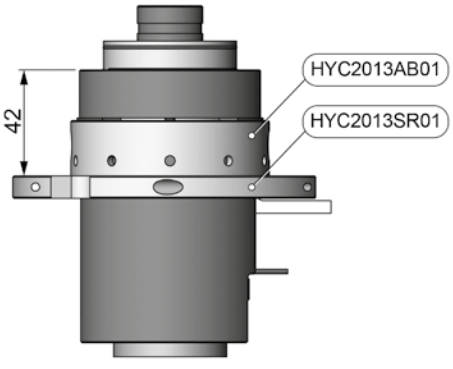
NOTICE

The inside thread of the suspension ring (HYC2013SR01) is a left-hand thread.

6) Screw the suspension ring (HYC2013SR01) at the adjustment bushing (HYC2013AB01).

NOTICE

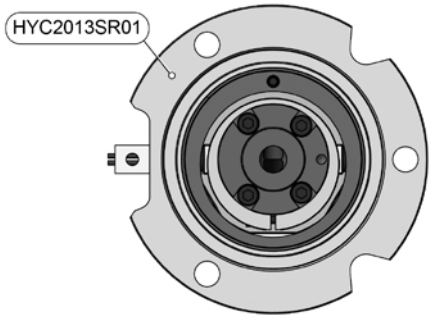
The suspension ring (HYC2013SR01) has to be positioned 42 mm to the upper edge of the guide sleeve.



Doc007287.png

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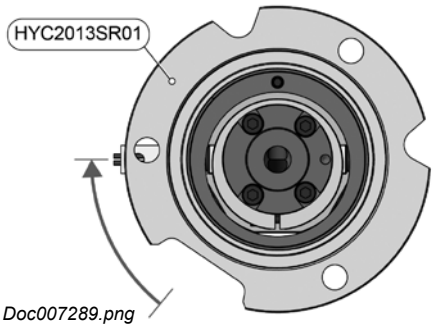
7) Keep the suspension ring (HYC2013SR01) showen like right.



Doc007288.png

NOTICE

If the suspension ring is not exactly aligned with the large recess to the cooling strip, place the bearing ring (HYC2013SR01) in the shortest path to the position shown in figure Doc007289.

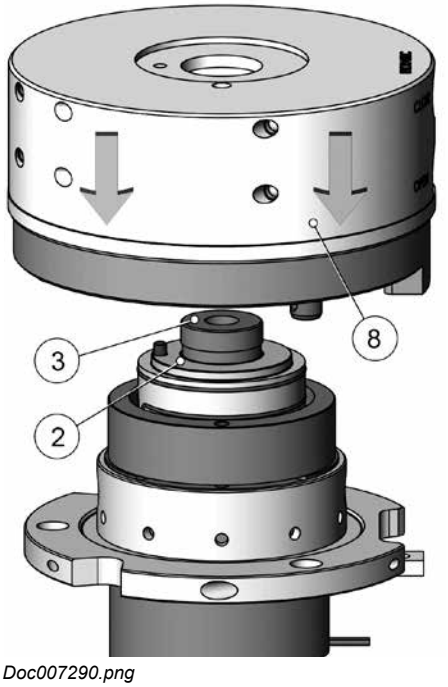


Doc007289.png

NOTICE

Examine whether the isolation ring (2) at the nozzle head top (3) is placed in the right position.

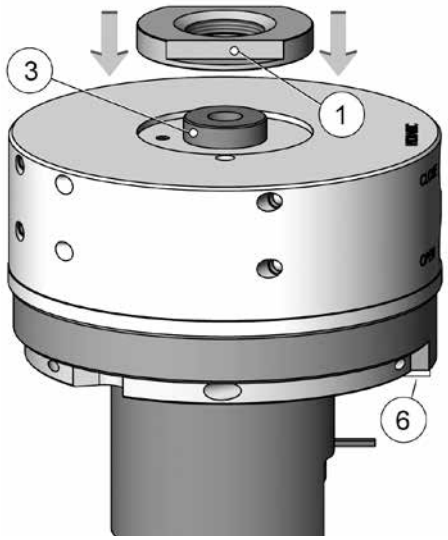
8) Mount the actuator (8) at the nozzle.



Doc007290.png

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9) Screw in the isolation nut (1) at the nozzle head top (3).
10) Check the clearance of the cooling bar (6).



Doc007291.png

11) Fix the nozzle at the isolation nut (1) in a vice.
12) Fasten the isolation nut (1) at the nozzle tip (12).

NOTICE

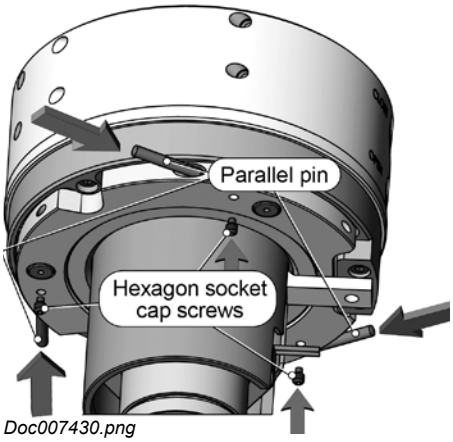
Torque value - 40 Nm



Doc008223.png

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13) Mount the parallel pin and lock it with the socket head cap screw.



Doc007430.png

14) Check the position of the cooling bar (6) on the actuator (8).

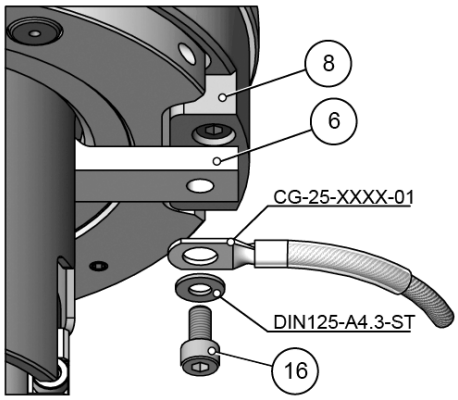
NOTICE

The cooling bar (6) must be easily movable to be positioned on the actuator (8). If this is not possible, contact Synventive customer service.

15) Tighten the ground wire with a socket cap screw (16) on the cooling bar (6).

NOTICE

Note the arrangement of the components shown in the figure (Doc007414.png) on the right side.



Doc007414.png

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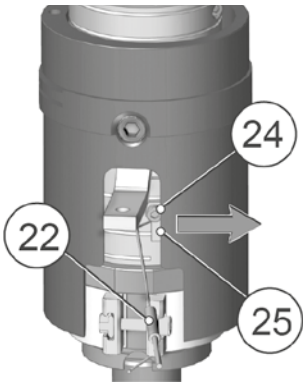
10.5.1.5 Dismounting and Mounting of the Thermocouple

Dismounting of the Thermocouple

NOTICE

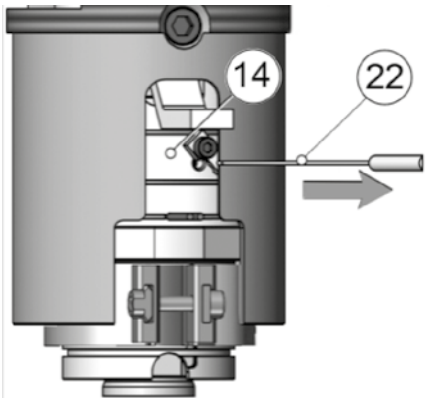
For dismounting and mounting the thermocouple, don't need to dismount the cylinder housing first.

1) Loosen the hexagon socket cap screw (24).
2) Move the clamping device (25) to the side, away from the thermocouple (22).



Doc007356.png

3) Pull the thermocouple (22) out of the bore of the heater band (14) and nozzle head bottom (7).



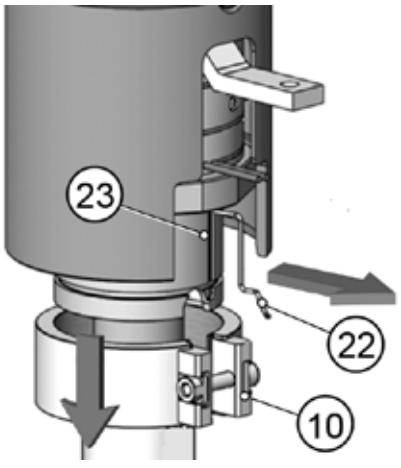
Doc007357.png

4) Dismount the 12E-06 nozzle heater.

NOTICE

Follow the heater dismounting procedure of the nozzle 12E-06 Series-S+A_Guideline.

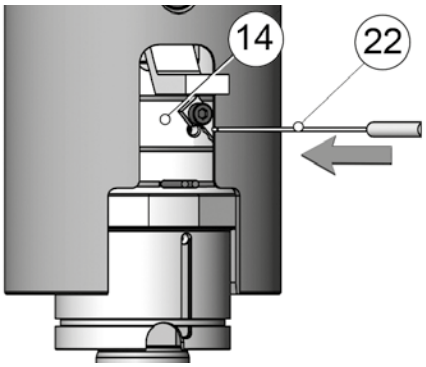
5) Move the heater band (10).
6) Pull the thermocouple (22) out of the bore of the head body (23).



Doc007358_12E-06.png

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Mounting of the Thermocouple

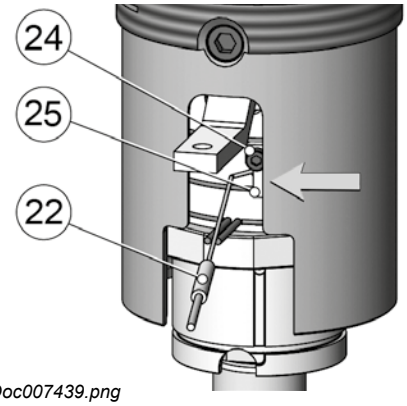


Doc007440.png

NOTICE

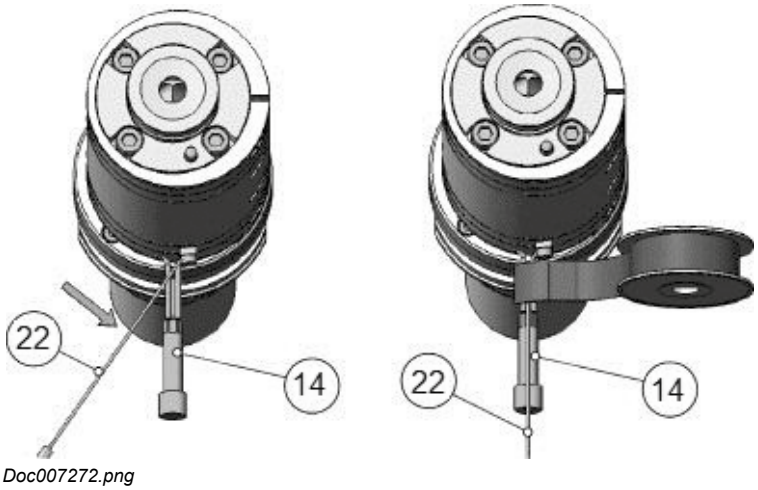
For dismounting and mounting the thermocouple, don't need to dismount the cylinder housing first.

1) Guide the thermocouple (22) through the heater band (14) into the thermocouple hole on the nozzle head bottom (7).



Doc007439.png

2) Bring the clamping device (25) to vertical position.
3) Fix the thermocouple (22) with the hexagon socket cap screw (24).



Doc007272.png

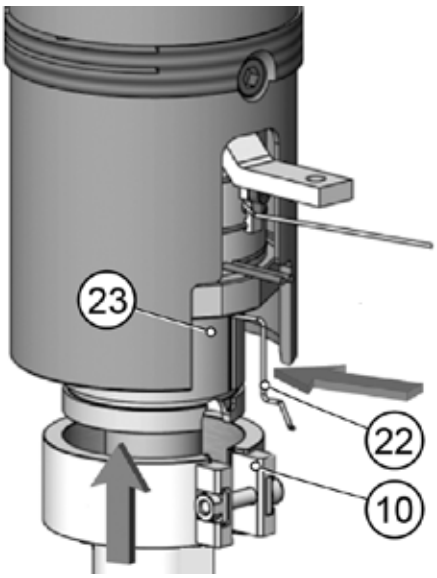
4) Align the thermocouple (22) in the nozzle heater (14) direction.
5) Fix the thermocouple (22) with heat resistant adhesive tape at the outlet of the nozzle heater (14).

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6) Guide the thermocouple (22) into the thermocouple hole of the head body (23).
7) Mount the heater band (10).
8) Complete the nozzle 12E-06.

NOTICE

Follow the mounting procedure of the nozzle 12E-06 Series-S+A_Guideline.



Doc007359_12E-06.png

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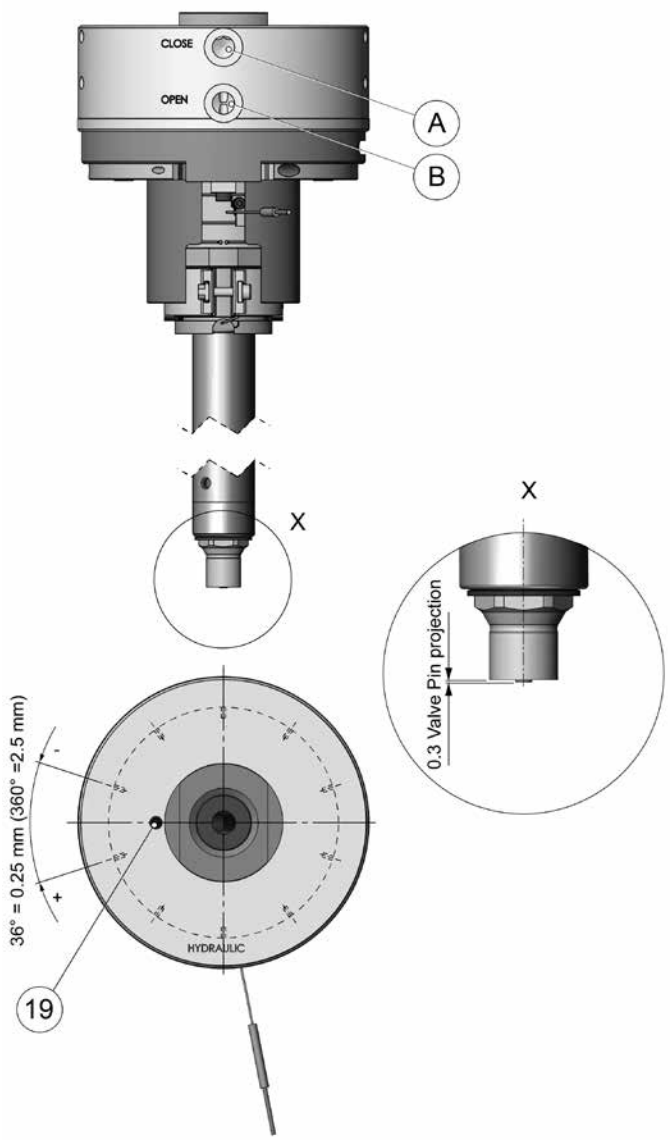
10.5.1.6 Valve Pin Height Adjustment

1) Unscrew the hexagon socket cap screw (19).
2) Close the valve guide by pressure on the hydraulic connection (A) with reduced pressurized air of approx. 2.76 bar (40 psi).
3) Adjust the position of the valve pin via the adjustment bushing (HYC2013AB01) using a Ø4 mm pin.
4) Turn the adjustment bushing (HYC2013AB01) by using a pin to get the valve pin front into basic position 0,3 mm.

NOTICE

Turning one hole forward results in a height adjustment of 0.25 mm at the valve pin.

5) Tighten the socket cap screw (19).



(A) Hydraulic access “CLOSE”

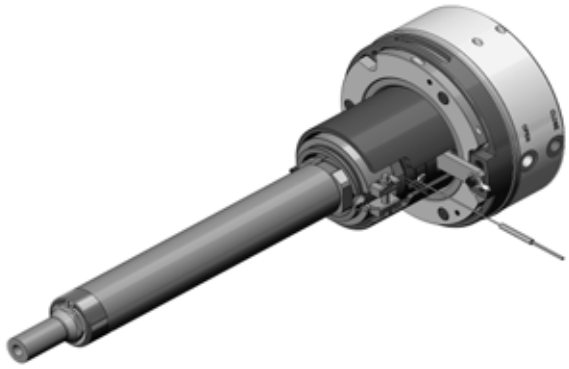
(B) Hydraulic access “OPEN”

Doc008220.png

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10.5.2 Single Axis Valve Gate Nozzle 16SVH-06

10.5.2.1 Technical Data – Single Axis Valve Gate 16SVH-06



Doc008861_RIS.png

Valve gate pin	
Valve pin diameter	Ø 8 mm
Valve Pin Adjustment:	Coupling, anti-rotation ± 1 mm Via adjustment threads from outside.
Valve pin operation	
Operation medium	hydraulic
Valve pin stroke:	14 mm
Pressure range	40 - 60 bar (580 - 870 psi)
Flowrate	2.5 l/min
Reaction time	~0.5 s
Closing force	4984 N / 40 bar (580 psi)
Opening force	4043 N / 40 bar (580 psi)
Connection	M12x1.5
Heating Power	The numbering of the heating zones starts at the nozzle tip and ends at the nozzle head.
Zone 1 (From a nozzle length of 90 mm)	285 - 450 Watt
Zone 2 (From a nozzle length of 225 mm)	735 - 785 Watt
Head	800 plus 680 Watt

NOTICE

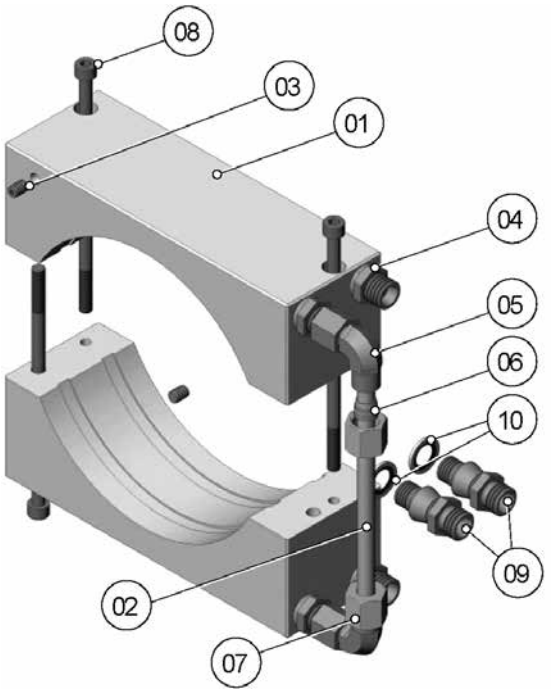
To ensure long life and continued flawless operation of the actuator, we recommend using a service medium that complies with the requirements of classification 21/18/13 pursuant to ISO 4406.

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10.5.3 Technical Data / Exploded View - Cooling Unit CU16SVH01

NOTICE

If the mold temperature is 80 °C (176 °F) or more, the Cooling Unit CU16SVH01 is required.

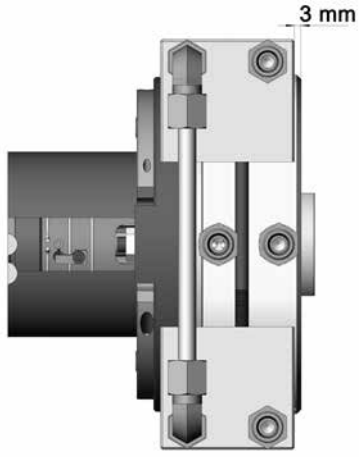


Doc007362.png

Method	Water Cooling
Temperature:	min. 30 °C / max. 60 °C Temp. difference IN/OUT max. 5 °C
Flow rate per unit:	4 l/min
Pressure:	max. 8 bar (116 psi)
Connections:	M14x1.5

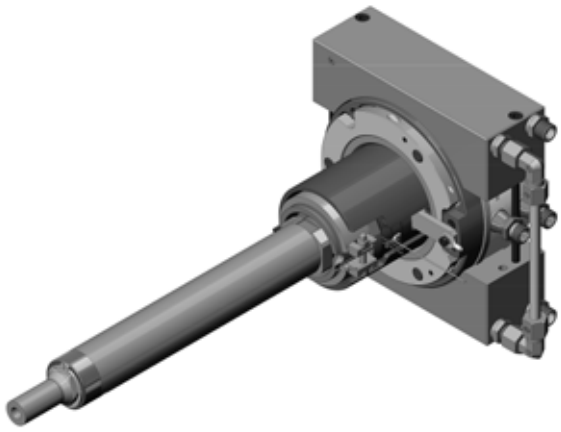
Pos.	Qty.	Part Number	Description
01	2	CU16SVHCS01	Cooling Sleeve
02	1	CU16SVHCT01	Connecting Tube
03	2	Z942/6	Sealing Plug
04	4	GE08LMEDVITOMDCF	Straight Coupling
05	2	EW08LVITOMDCF	Elbow Coupling
06	2	PSR08LX	Cutting Ring
07	2	M08LCFX	Nut
08	3	DIN912-M6x130-12.9	Hexagon Socket Cap Screw
09	2	XAA01201401	Straight Coupling
10	2	12.7X18X1.5USSFPM	Bonded Seal

Position of the cooling unit on the nozzle head.



Doc005042.png

CU16SVH01 mounted on Single Axis Valve Gate Nozzle 16SVH-06



Doc008862_RIS.png

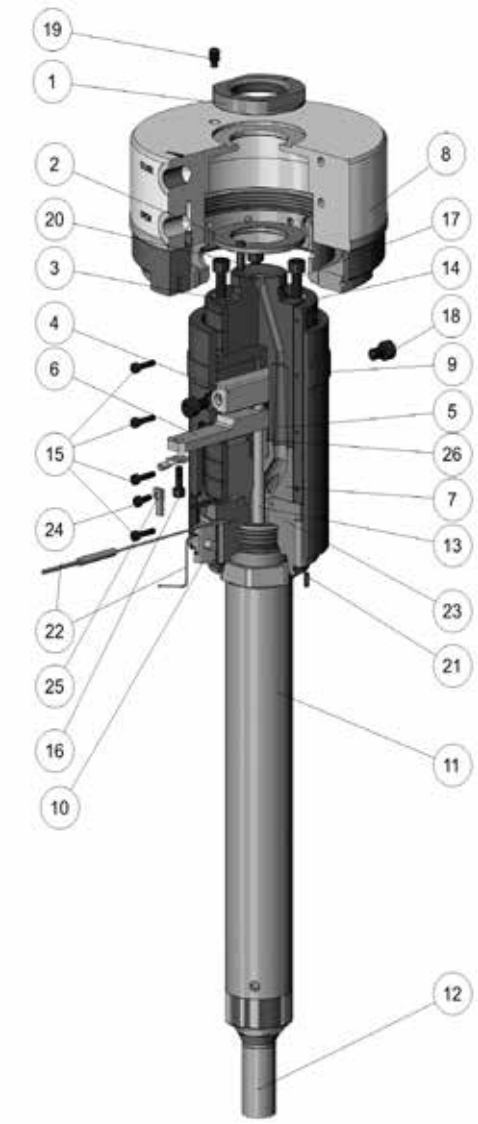
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10.5.3.1 Single Axis Valve Gate Nozzle 16SVH-06 Parts List

In this section the nozzle parts are identified with the numbers indicated in the following figure.

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.

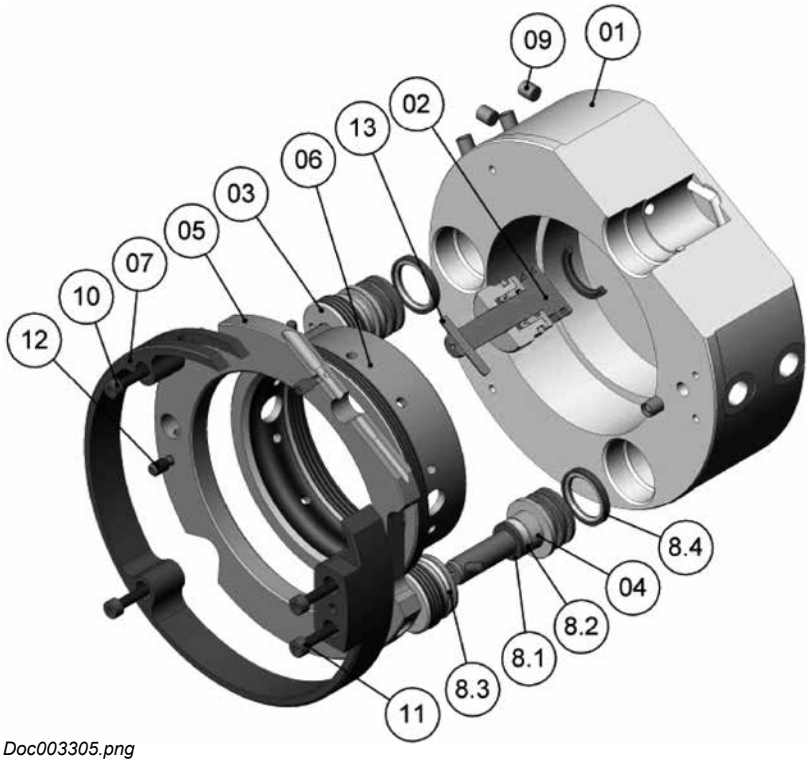


Doc008863_RIS.png

Pos.	Qty.	Description	Part Number
1	1	Isolation nut	GBN0010S
2	1	Isolation ring	GBN0020S
3	1	Nozzle head top	GBN0031S### / GBN0032S### (varied)
4	1	Bridge	GBN0041S
5	2	Sealing sleeve	GBN0050S
6	1	Cooling bar	GBN0060S
7	1	Nozzle head bottom	GBN0074S / GBN0075S
8	1	Actuator	HYC2314S01
9	1	Guide sleeve	16SVP-S-01
10	1	Heater band	HT-060-025-01
11	1	Nozzle body complete	16E-06 (varied)
12	1	Shutoff nozzle tip	(varied)
13	1	Shutoff valve pin	(varied)
14	1	Heater band	HB571071
15	4	Hexagon socket cap screw	DIN912-M3X14-12.9
16	1	Hexagon socket cap screw	DIN912-M4X12-12.9
17	4	Hexagon socket cap screw	DIN912-M6X110-12.9
18	2	Hexagon socket cap screw	DIN912-M6X10-12.9
19	1	Hexagon socket set screw	DIN915-M6X10-45H
20	1	Parallel pin	DIN6325-5M6X16
21	1	Parallel pin	DIN6325-3M6X8
22	2	Thermocouple	XTA00115001
23	1	Head body	16SVPHB-01
24	1	Hexagon socket cap screw	DIN912-M3X10-12.9
25	1	Clamping device	GAN0170S
26	1	Valve pin guide	SVPG-G-08-01

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Actuator HYC2314S01 Parts List



Doc003305.png

Pos.	Qty.	Description	Part Number
01	1	Actuator housing	HYC2314CH01
02	3	Piston D23	HYC2314PI01
03	3	Gasket locator	HYC2314GL01
04	3	Gasket locator cover	HYC2314GC01
05	1	Suspension ring	HYC2314SR01
06	1	Adjustment bushing	HYC2314AB01
07	1	Protection ring	HYC2314PR01
08	1	Seal kit complete	HYC2314SK01
8.1	3	Back up ring 10x15x2	Y21015PS030
8.2	3	Rod seal	C1-1005-V3664
8.3	3	O-ring seal	VIOR20.29X2.62FPM80
8.4	3	Piston seal (Compact sealing ring consist of an O-ring and a sealing element).	2G0-23X17X2.85
8.5	3	Guiding element	FB2.3-1.5L33
09	13	Sealing plug	MB600060
10	2	Hexagon socket cap screw	DIN912-M4X16-12.9
11	2	Hexagon socket cap screw	DIN912-M4X25-12.9
12	3	Set screw	DIN915-M4X6-45H
13	3	Parallel pin	DIN6325-4M6X28

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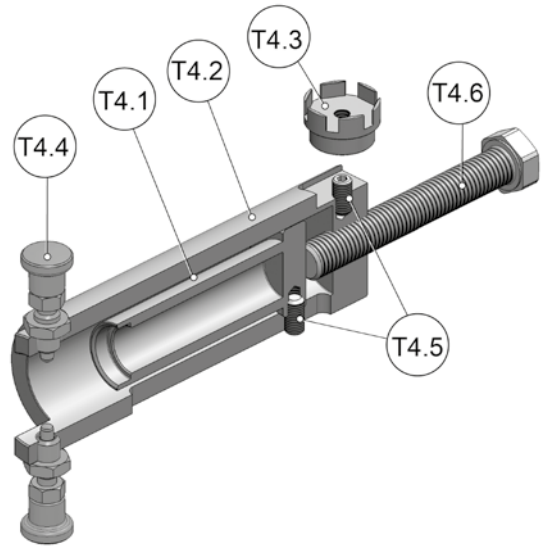
10.6 Assembly / Disassembly Tools

In this section the Stripping and Mounting Tool parts are identified with the numbers indicated in the following figure.

10.6.1 Nozzle Heater Disassembly Tool AT-FHA-032 for the Heater Type FHA#-032-###-##

The dismantling tool is required to pull the front heater from the nozzle body or the sprue bushing.

The adapter AT-FHA-032-C-05 is only required for the sprue bushing.

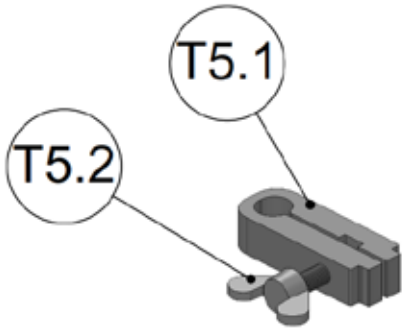


Doc008132.png

AT-FHA-032			
No.	Qty.	Item	Description
T4.1	1	AT-FHA-032-C-01	Disassembly Tool Socket
T4.2	1	AT-FHA-032-C-02	Disassembly Tool Sleeve
T4.3	1	AT-FHA-032-C-05	Disassembly Tool IB24 Adapter Nut
T4.4	1	GN817-4-4-CK	Indexing plunger; Pin Bore=4; l1=4
T4.5	2	DIN913-M6x12-45H	Flat Point Socket Set Screw 45H Alloy Steel
T4.6	1	ISO4017-M12X100-12.9	Full Thread Hexagon Screw ISO4017

10.6.2 Spreader Tool AT-HH-00 for the Head Heater Type HHA#-0##-###-##

With this tool the head heaters can be spread apart to make it easier to pull them off the nozzle body.

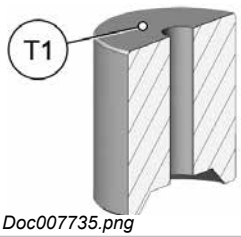


Doc008802_RIS.png

AT-HHA-00			
No.	Qty.	Item	Description
T5.1	1	AT-HHA-C-01	Head Heater Spreader
T5.2	1	DIN316-A2-M4x16	Metric DIN 316 Wing Screws M4x16

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10.6.3 Nozzle Tip Assembly Tool

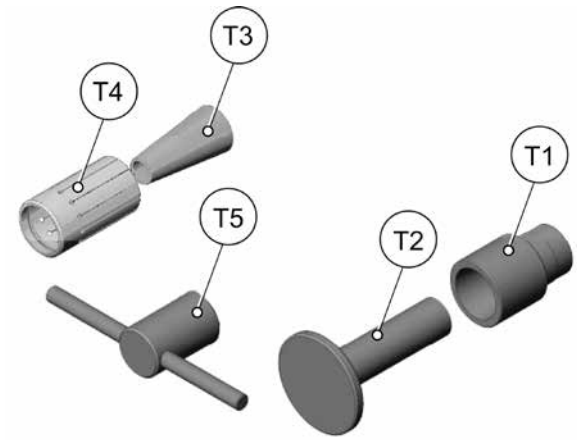
Nozzle Assembly / Disassembly Tool	Seal Cap Assembly Tool	Seal Cap Assembly Tool
AT16S-01	AT16-040102	AT16-040101
 *Doc007379.png*	 *Doc005228.png*	 *Doc007735.png*

10.7 Dismounting and Mounting the Hydraulic Cylinder Housing

10.7.1 Tools for Assembling and Disassembling the Actuator ATCYL11

The following overview contains a list of special tools needed for the assembly and disassembly of the actuator.

In this section the parts of the assembly and disassembly tools are identified as shown in this figure, which shows the components.



Doc003313.png

Assembly and Disassembly Tools - ATCYL11	
Pos.	Description
(T1)	Calibration sleeve ATCYL1101
(T2)	Mounting tool ATCYL1002
(T3)	Installation cone ATCYL1102
(T4)	Spread tube ATCYL1103
(T5)	Wrench complete ATCYL1005

NOTICE

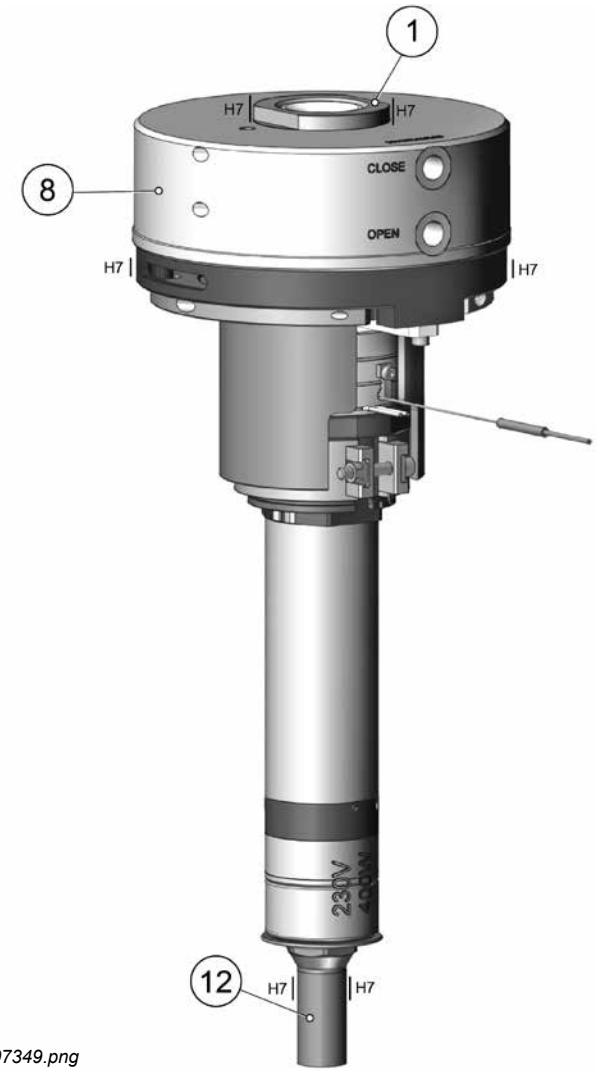
These tools are not included with the Hot Runner System and must be ordered from Synventive separately.

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10.8 Disassembling the Single Axis Valve Gate Nozzle out of the Mold

NOTICE

The Single Axis Valve Gate Nozzle is located on the fit diameters of the nozzle tip and the lower part of the cylinder housing in the mold.



Doc007349.png

(1) Isolation nut
(8) Actuator
(12) Nozzle tip

Disassembling the Single Axis Valve Gate Nozzle inclusive of actuator out of the mold

1) Cool down the Single Axis Valve Gate Nozzle and the mold to room temperature.
2) Lift the Single Axis Valve Gate Nozzle inclusive of actuator out of the mold.

NOTICE

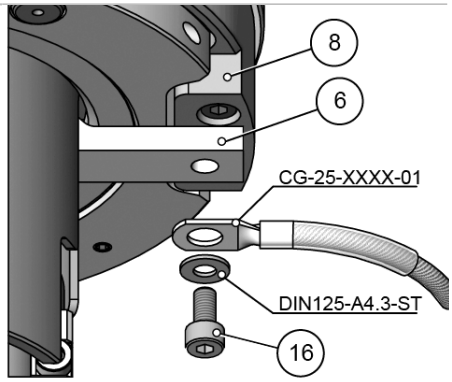
If it is not possible to lift the Single Axis Valve Gate Nozzle inclusive of actuator out of the mold, please contact the Synventive Customer Service or Technical Support.

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10.9.1.1 Dismounting and Mounting the Hydraulic Cylinder Housing and Sealing

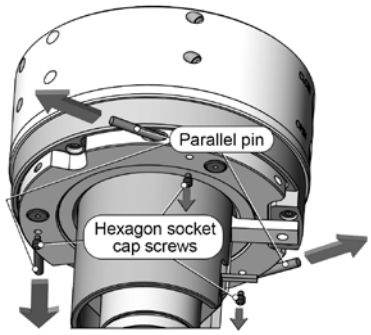
10.9.1 Dismounting the Cylinder Housing from the Nozzle

1) Remove the Hexagon socket cap screw (16).
2) Remove the DIN125 and the cable grounding (see the image on the right side).



Doc007414.png

3) Unlocked the Hexagon socket cap screws.
4) Remove the parallel pins.



Doc007284.png

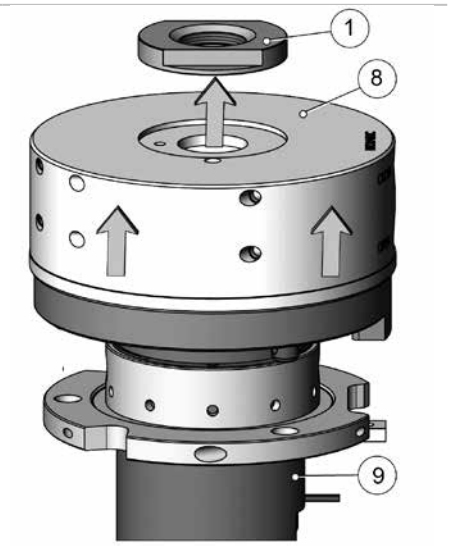
5) Fix the isolation nut (1) with a vice.
6) Loosen the isolation nut (1) via the nozzle tip (12).



Doc007386.png

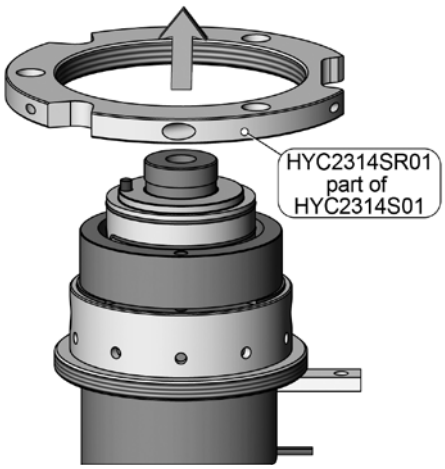
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7) Loosen the isolation nut (1).
8) Remove the Actuator (8).



Doc007285.png

9) Unscrew the suspension ring (HYC2314SR01).



Doc007375.png

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10.9.2 Safety instructions for servicing the HYC2314S01 valve actuation cylinder

⚠ WARNING



Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.





Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Following work must be carried out by qualified and experienced persons.

Use personal protective equipment: Face protection, hearing protection and gloves.

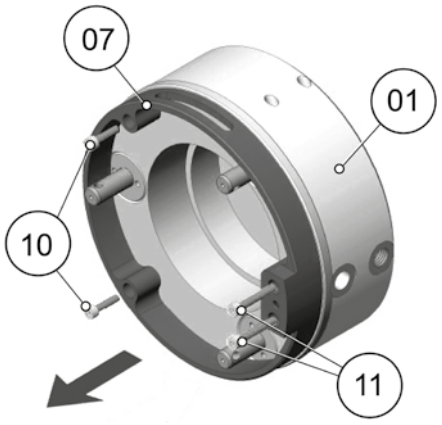
For first aid contact your medical / safety representing.



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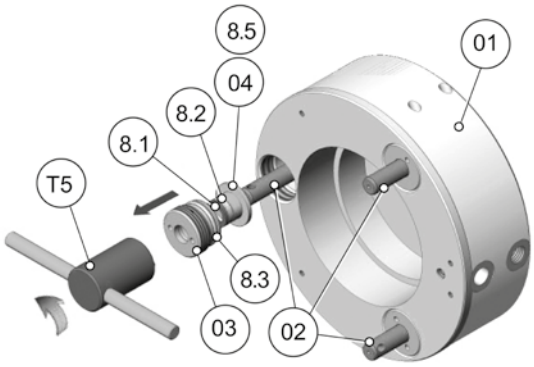
10.9.3 Dismounting the Piston Seals

1) Loosen and remove the socket cap screws (10) and (11).
2) Remove the protection ring (07) from the cylinder housing (01).



Doc003328.png

3) At the 3 pistons (02) loosen and remove the gasket locators (03) with the wrench ATCYL1005 (T5).
4) Pull the pistons (02) out of the cylinder housing (01).



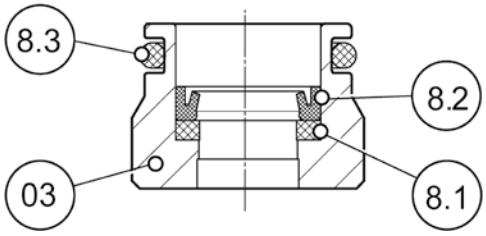
Doc003329.png

5) Dismount the seals from the gasket locators (03).

8.1 Back up ring

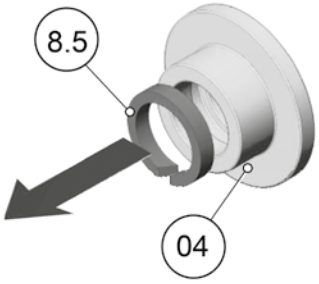
8.2 Rod seal

8.3 O-ring seal



Doc003338.png

6) Dismount the guiding elements (8.5) out of the inner groove of the gasket locator covers (04).



Doc003330.png

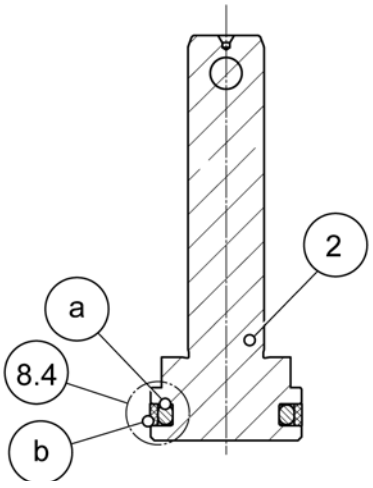
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7) Dismount the piston seals (8.4) out of the inner grooves at the pistons (02).

NOTICE

The piston seal is a compact seal consisting of:

- O-ring (a)
- Sealing element (b)



Doc003339.png

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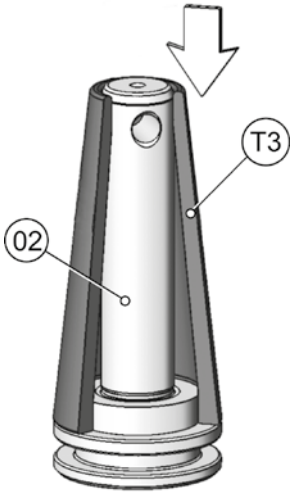
10.10 Assembly of the Cylinder Housing HYC2314S01 on the Nozzle

10.10.1 Assembly of the Pistons into the Actuator HYC2314S01

NOTICE

After disassembly of the sealing elements, the original seals must be replaced as required by Synventive.

1) Fit the mounting cone (T3) on the piston (02).

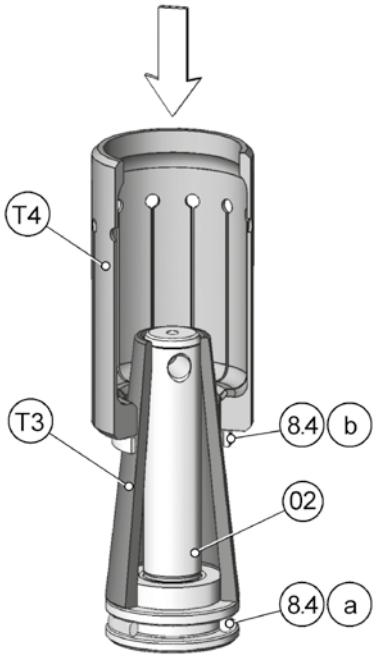


Doc003315.png

2) Lubricate the piston seal elements (8.4) with hydraulic oil or white grease.
   - O-ring (8.4) (a)
   - Sealing element (8.4) (b))
3) Mount the O-ring (8.4) (a) into the seal groove of the piston (02).
4) Using the spreader sleeve (T4) and the mounting cone (T3) to push the sealing element (8.4) (b) into the seal groove of the piston (02).

NOTICE

In the seal groove of the piston (02) the sealing element (8.4) (b) is placed above the O-ring (8.4) (a).

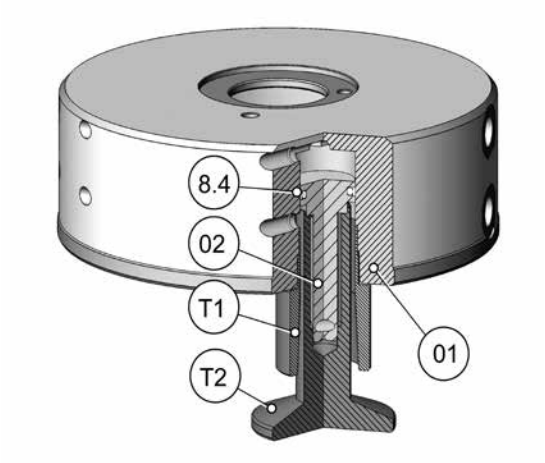


Doc003316.png

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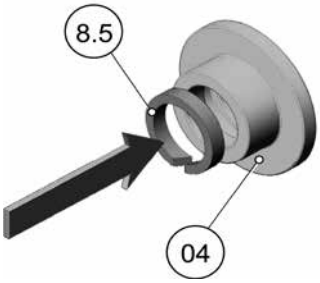
Service and Maintenance / Assembly of the Pistons into the Actuator HYC2314S01

5) Fit the shaft of the piston (02) into the mounting tool (T2).
6) Place the calibration sleeve (T1) into the bore in the cylinder housing (01).
7) Insert the piston (02) with the mounting tool (T2) through the calibration sleeve (T1) into the cylinder housing (01).



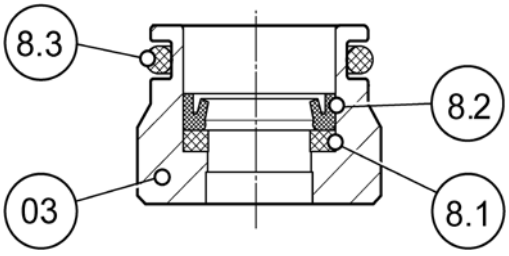
Doc003317.png

8) Insert the guiding element (8.5) into the groove of the gasket locator cover (4).



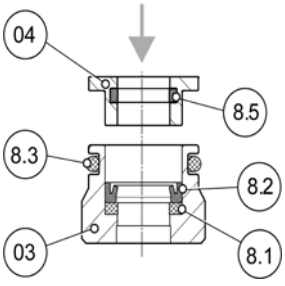
Doc003318.png

9) Install the seals of the gasket locators (03).
   - 8.1 Back up ring
   - 8.2 Rod seal
   - 8.3 O-ring seal



Doc003338.png

10) Install the gasket locator covers (04) into the gasket locators (03).



Doc003335.png

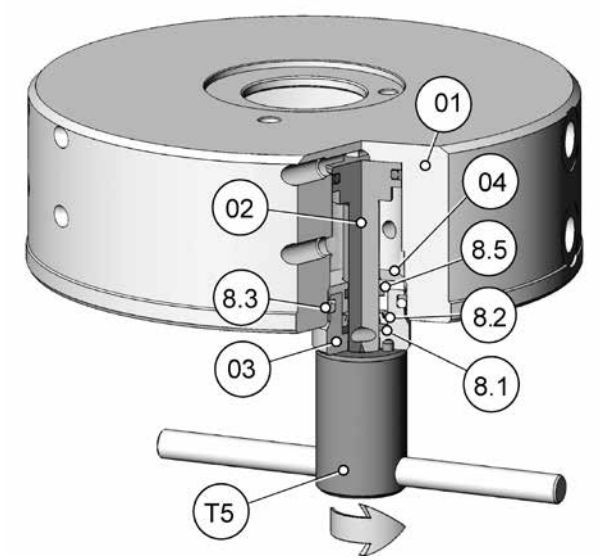
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Service and Maintenance / Assembly of the Pistons into the Actuator HYC2314S01

11) Place the gasket locator (03) (04) on the shaft of the piston (02).
12) Turn the gasket locator (03) into the cylinder housing (01) thread with the wrench ATCYL1005 (T5) up to the mechanical stop.

NOTICE

The top of the gasket locator (03) must not exceed (01) the lower edge of the cylinder housing.

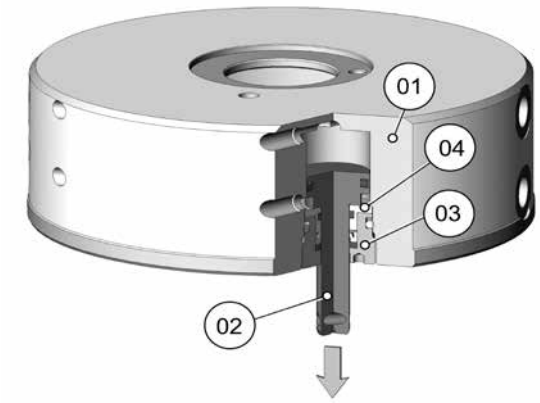


Doc003319.png

13) Pull the piston (02) until it reaches the gasket locator cover (04).

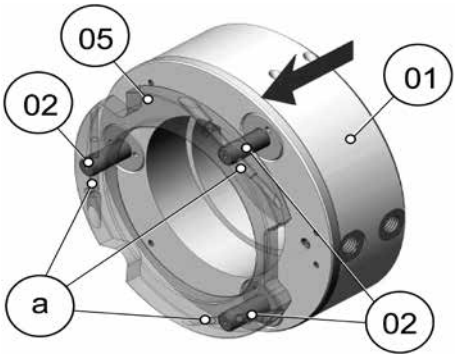
NOTICE

In this position, the top of the piston shaft protrudes 24 mm above the cylinder housing (01).



Doc003332.png

14) Mount the actuator housing (01) with the pistons (02) into the related holes of the suspension ring (05).
15) Turn the pistons (02) to align the holes (a) at the pistons (02) regarding the holes at the suspension ring (05).



Doc003297.png

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Service and Maintenance / Assembly of the Pistons into the Actuator HYC2314S01

16) Attach the Protection ring (07) with hexagon socket cap screws (10) and (11) at the actuator housing (01)..



Doc008903_RIS.png

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Service and Maintenance / Assembly of the Pistons into the Actuator HYC2314S01

Safety Instructions for the Service at the Single Axis Valve Gate Nozzle 16SVH-06

⚠ WARNING



Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.





Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Following work must be carried out by qualified and experienced persons.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.



NOTICE



Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

Any impact against the nozzle tip may result in its damage.

Never hammer or impact the nozzle tip from the front (i.e. from the side of the mold).

Twisting could damage the nozzle tip.

When replacing the nozzles, the sealing rings must always be replaced.

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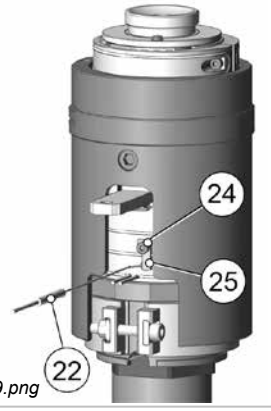
10.11 Dismounting and Mounting of the Thermocouple

10.11.1 Dismounting of the Thermocouple

NOTICE

For dismounting and mounting the thermocouple, don't need to dismount the cylinder housing first.

1) Loosen the hexagon socket cap screw (24).
2) Move the terminal (25) to the side, away from the thermocouple (22).



Doc007369.png

3) Pull the thermocouple (22) out of the bore of the heater band (14) and nozzle head bottom (7).



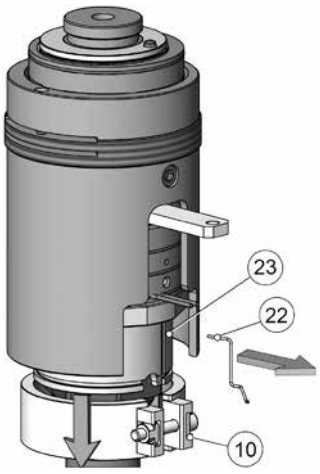
Doc007370.png

4) Dismount the 16E-06 nozzle heater.

NOTICE

Follow the heater dismounting procedure of the nozzle 16E-06 Series-S+A_Guideline.

5) Move the heater band (10).
6) Pull the thermocouple (22) out of the bore of the head body (23).

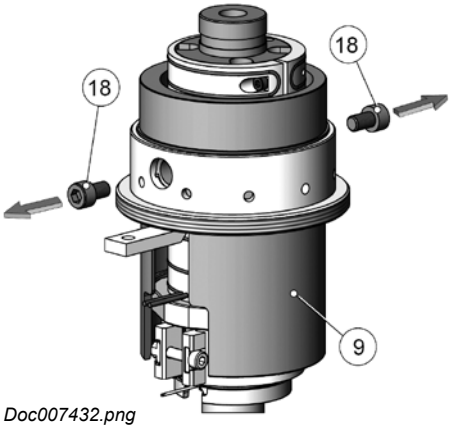


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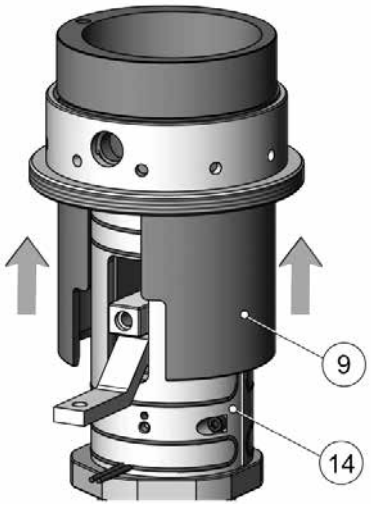
Service and Maintenance / Dismounting of the Thermocouple

7) Unscrew the two cylinder head screws (18) from the guide sleeve (9), heating tape (14) and bridge (4).



Doc007432.png

8) Remove the guide sleeve (9) from the heating tape (14).



Doc007343.png

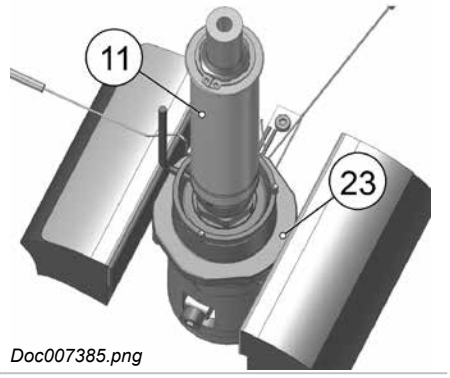
9) Fix the nozzle (11) with the nozzle head base body (23) in a vice.

NOTICE

Reference to the instruction of section 10.1.4.5 Disassembly of nozzle 16E including “Disassembly of nozzle heater” and “Disassembly of nozzle tip and grounding tube”.

The difference is as follows:

- The nozzle is fixed in a vice.
- The nozzle is screwed into the manifold.

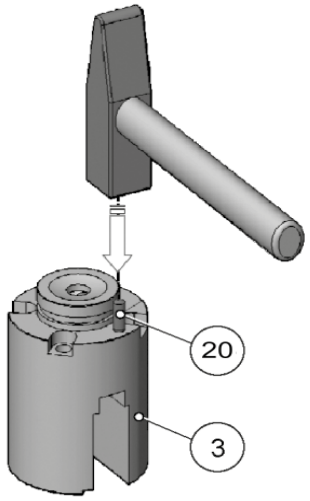


Doc007385.png

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10.12 Assembly of the Nozzle

1) Drive the parallel pin (20) into the nozzle head top (3).

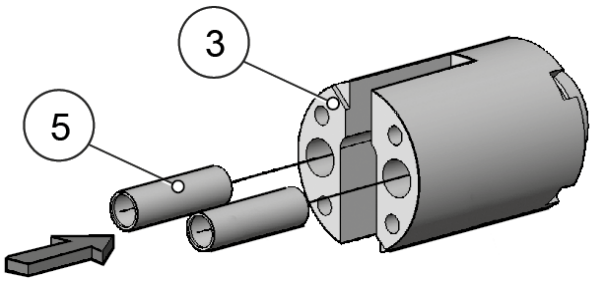


Doc007293.png

2) Put the sealing sleeves (5) into the nozzle head top (3).

NOTICE

There is an arrow on the sealing sleeves (5) that indicate the mounting direction for assembly department, because the flow bore is conical.



Doc007271.png

3) Screw nozzle head bottom (7) together with valve pin guide (26).

NOTICE

Torque value – 22 Nm.

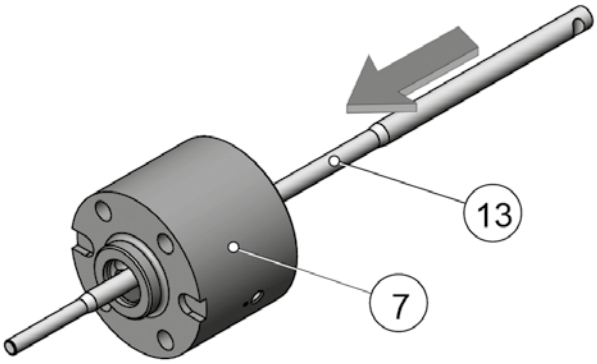


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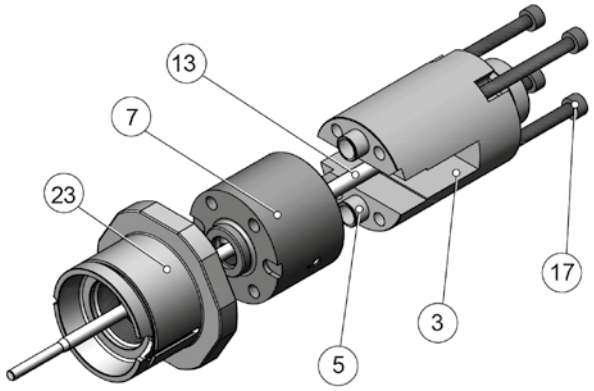
Service and Maintenance / Dismounting of the Thermocouple

4) Put the valve pin (13) into the nozzle head bottom (7) and check the easy movement.



Doc007350.png

5) Mount nozzle head top (3), nozzle head bottom (7) and head body (23), tighten them with 4 hexagon socket cap screws (17).



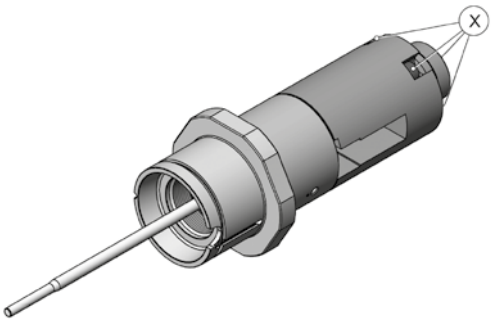
Doc007351.png

6) Tighten the assembly with four socket head cap screws (20) in an X pattern.

NOTICE

Step 1, Torque value – 8 Nm.

Step 2, Tighten the four screws in an X pattern with a torque value of 14 Nm.



Doc007250.png

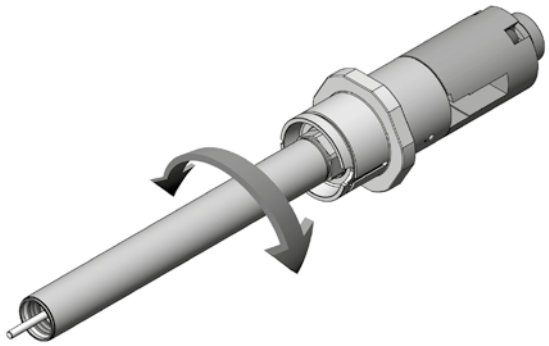
Service and Maintenance / Dismounting of the Thermocouple

7) Apply spotting ink on the nozzle body bottom surface.



Doc004734.png

8) Screw in the nozzle body hand-tight into the head body thread until seated.
9) Unscrew the nozzle body from the head body.



Doc007251.png

10) Check the matching between the head body surfaces and the nozzle body surface.

NOTICE

The head body must bear on all surfaces uniformly and flatly, in particular on the head body contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, contact Synventive Customer Service or Technical Support.

11) With a positive ink test clean the surfaces and proceed to the next step.

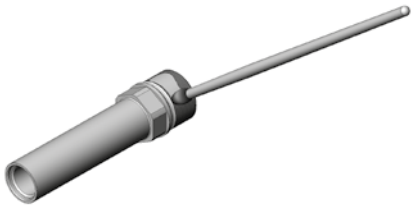


Doc007252.png

12) Lubricate the thread (not the face) of the nozzle body with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.



Doc003827.png

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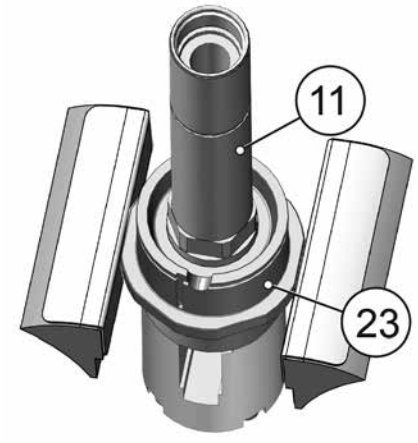
Service and Maintenance / Dismounting of the Thermocouple

NOTICE

For the assembly procedure, follow the Service & Assembly Guideline “Assembling Nozzle 16E-06”.

The difference is as follow:

- The 16SVH-06 nozzle is fixed in a vice.
- The 16E-06 is fixed in the manifold..



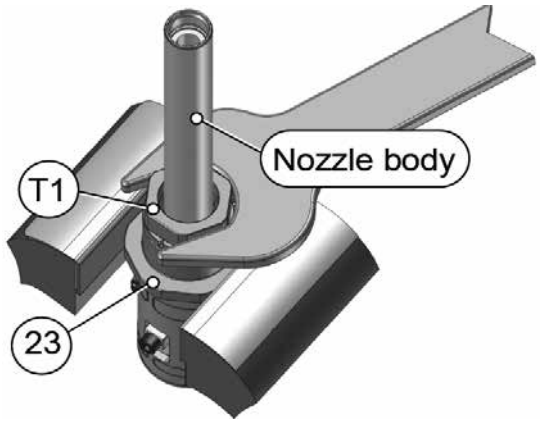
Doc007780.png

13) Tighten the nozzle body.

NOTICE

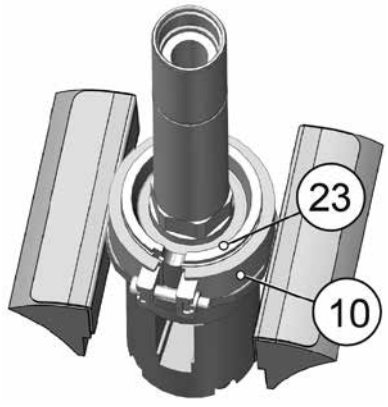
Using the tool “at16s-01” (T1).

Torque value – 340 Nm.



Doc007435.png

14) Mount the heater band (10) on the head body (23).



Doc007781.png

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Mounting of the nozzle and the nozzle heater

NOTICE

Für die Anleitung zur Montage, siehe Sektion Sektion 10.1.4.6 “Montage der Düse 16E”.

The difference is as follows:

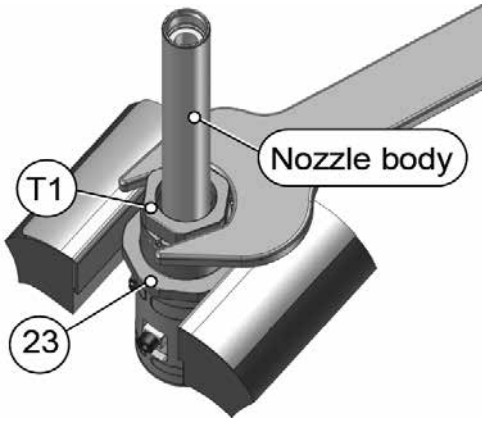
- The 16SVH nozzle is fixed in a vice.
- The 16E nozzle is screwed into the manifold.

For mounting the HYC2314S01 cylinder housing on the 16SVH single needle valve nozzle, see the previous section 10.3.2.5.

NOTICE

The torque for fastening the ground tube to the nozzle tip base body is 340 Nm.

Setup for disassembly and assembly of the nozzle from or to the nozzle head Base body



Doc007435.png

(T1) - Disassembly tool AT16S-01
(23) - nozzle head body base

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Service and Maintenance / Dismounting of the Thermocouple

1) Complete the nozzle 16E-06.

NOTICE

Please refer to “16E-06_22E-06 Series-S+A_ Guldeline”.



Doc008864.png

2) Put the heater band (14) above the nozzle head (3) by considering of the heater exit.

NOTICE

Same direction as the nozzle heater exit.

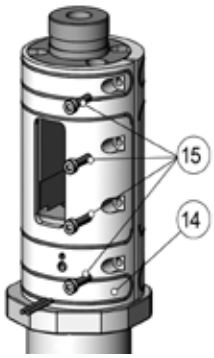


Doc008871_RIS.png

3) Fixing the heater band (14) by tighten the hexagon socket cap screws (15) in a regular way.

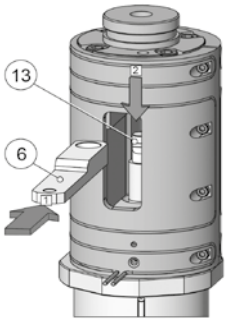
NOTICE

The torque value is 3 Nm.



Doc007353.png

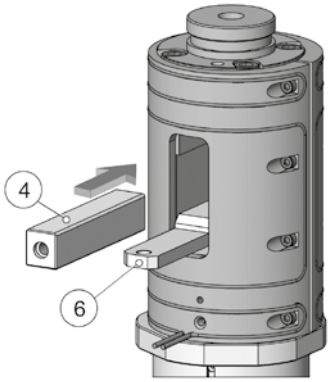
4) Put the cooling bar (6) over the valve pin (13) onto the valve pin guide.



Doc007368.png

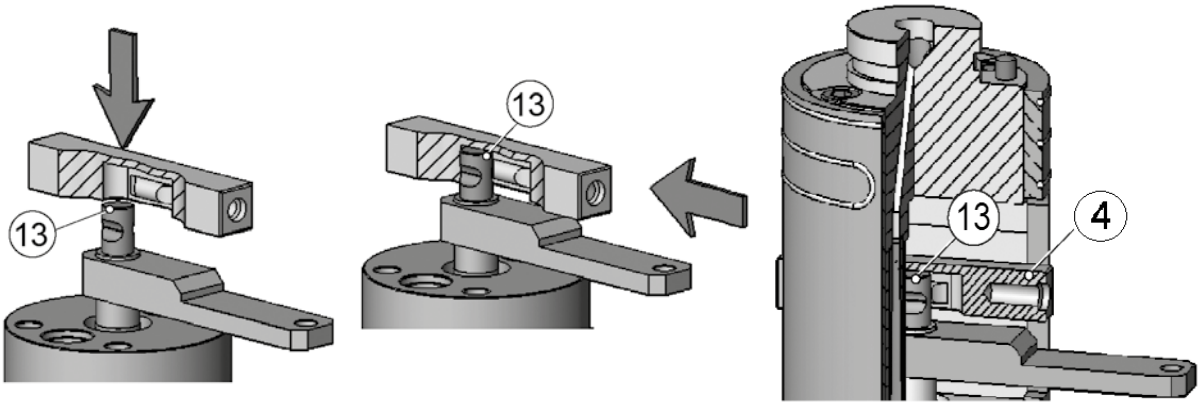
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5) Put the bridge (4) into the nozzle head.



Doc007304.png

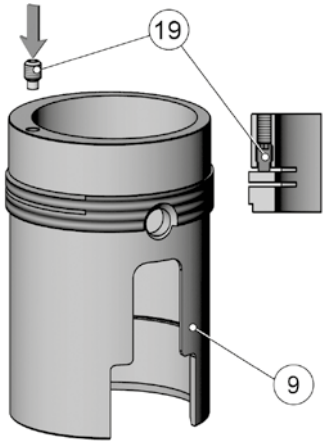
6) Take up the valve pin (13) into the bridge (4).



Doc007295.png

Doc007294.png

7) Screw the hexagon socket set screw (19) into the guide sleeve (9).



Doc007355.png

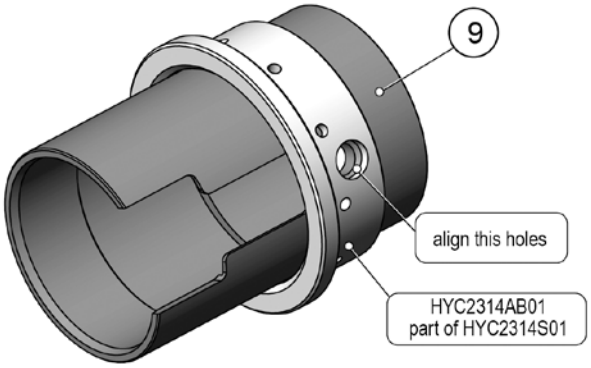
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Service and Maintenance / Dismounting of the Thermocouple

8) Screw the adjustment bushing (HYC2314AB01) loose-fitting together with the guide sleeve (9).

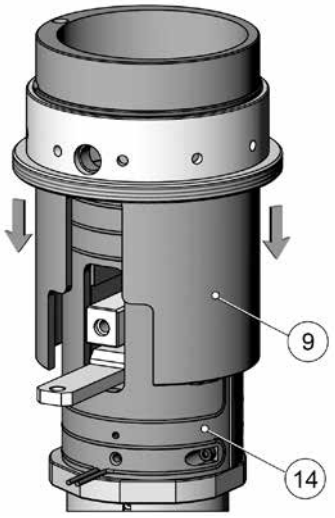
NOTICE

The holes at the guide sleeve must be aligned with the holes from the adjustment bushing.



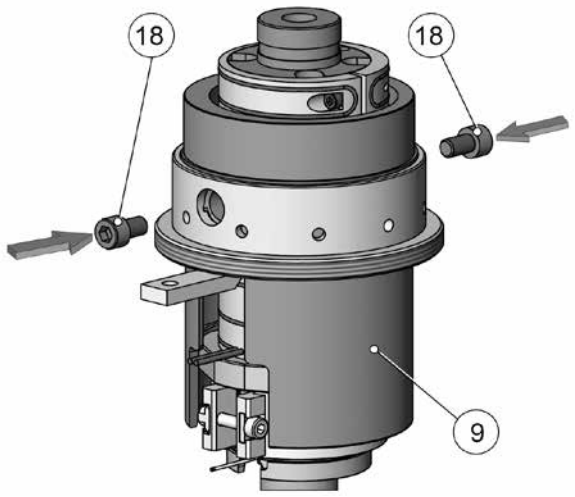
Doc007373.png

9) Sleeve the guide sleeve (9) over the heater band (14).



Doc007364.png

10) Screw in 2 hexagon socket screws (18) through the guide sleeve (9) and heater band into the bridge (4).

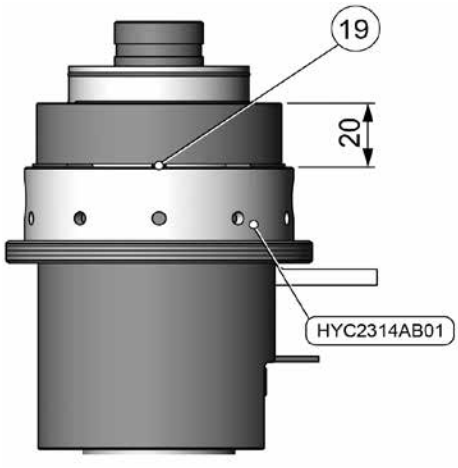


Doc007279.png

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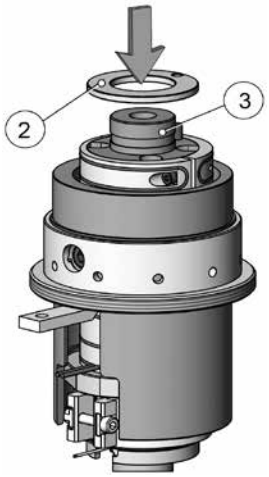
Service and Maintenance / Dismounting of the Thermocouple

11) Adjust the dimension 20 mm with the adjustment bushing (HYC2314AB01) and fix it with the Hexagon socket set screw (19).



Doc007374.png

12) Place the isolation ring (2) on the nozzle head top (3).

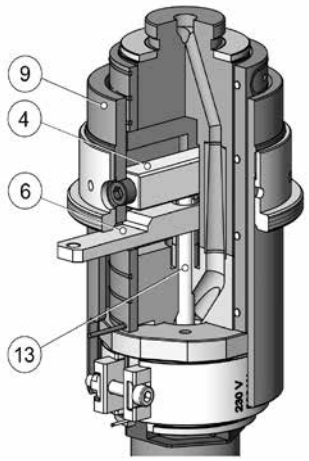


Doc007281.png

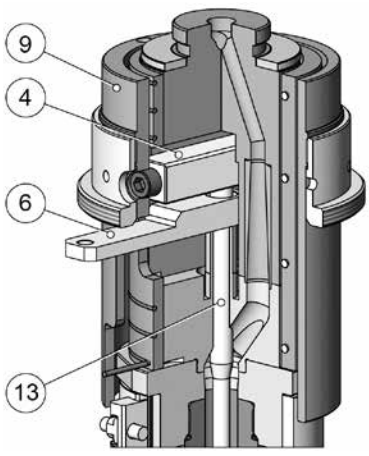
13) Bring the valve pin (13) with the bridge (4) and guide sleeve (9) into the back position (see Doc007429).

NOTICE

Now the guide sleeve (9) is in the right position on the nozzle to mount the cylinder housing.



Doc007365.png

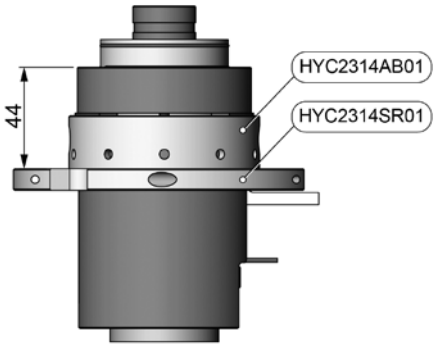


Doc007429.png

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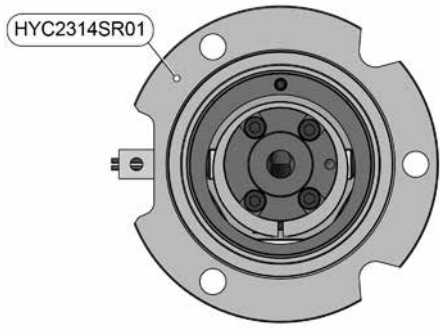
10.8.1.1 Mounting the Cylinder Housing on the Nozzle

1) Screw the suspension ring (HYC2314SR01) at the adjustment bushing (HYC2314AB01) and measure 44 mm setting.



Doc007376.png

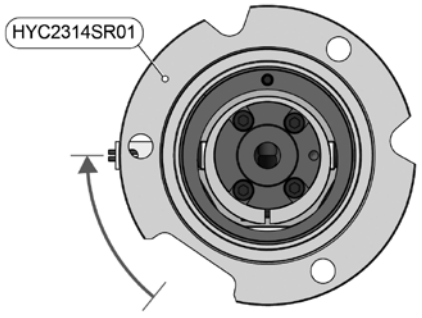
2) Keep the suspension ring show like right.



Doc007377.png

NOTICE

The suspension ring is not exactly aligned with the large recess to the cooling strip. Screw the suspension ring in the shortest path to the position shown in figure Doc007372.png.



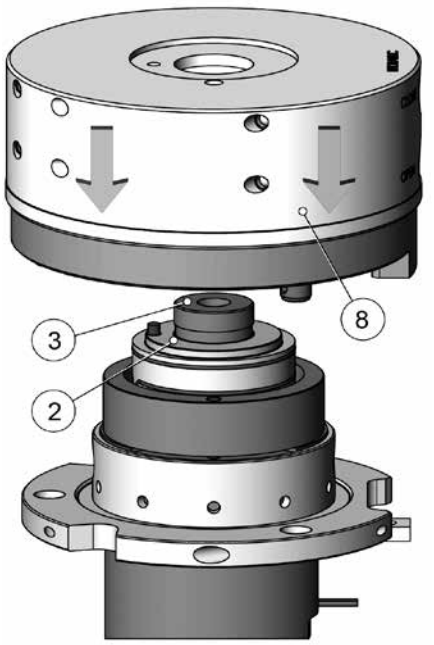
Doc007372.png

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NOTICE

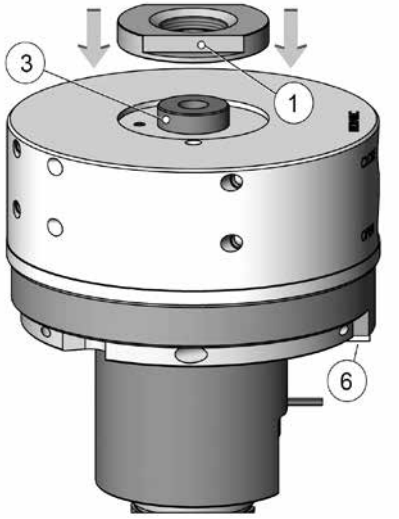
Examine whether the isolation ring (2) at the nozzle head top (3) is placed in the right position.

3) Mount the actuator (8) at the nozzle.



Doc007290.png

4) Screw in the isolation nut (1) at the nozzle head top (3).
5) Look after the clearance of the cooling bar (6).



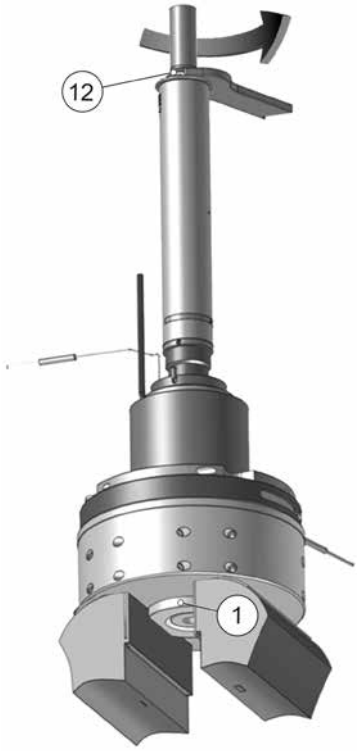
Doc007291.png

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6) Fix the isolation nut (1) with a vice.
7) Tighten the nozzle via the nozzle tip.

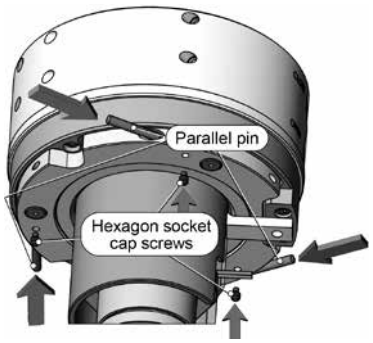
NOTICE

Torque value - 40 Nm.



Doc007381.png

8) Mount the parallel pin and lock it with the socket head cap screw.



Doc007430.png

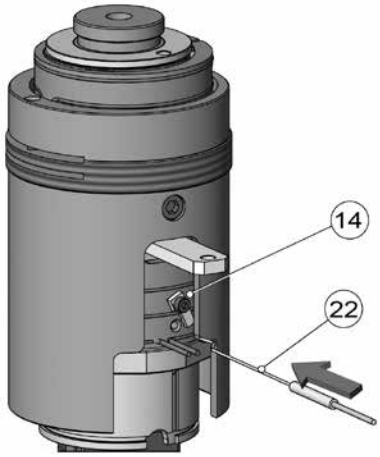
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10.8.1 Mounting of the Thermocouple

NOTICE

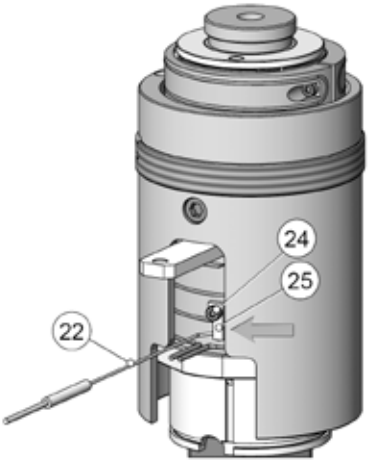
For dismounting and mounting the thermocouple, don't need to dismount the cylinder housing first.

1) Guide the thermocouple (22) through the heater band (14) into the thermocouple hole on the nozzle head.



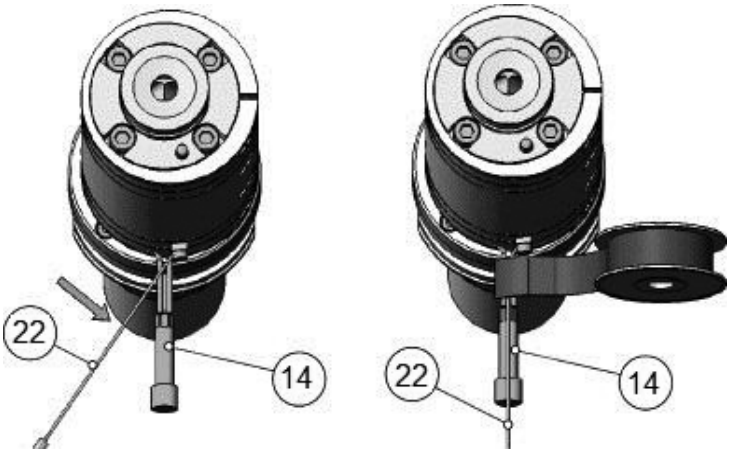
Doc007380.png

2) Bring the clamping device (25) to vertical position.
3) Fix the thermocouple (22) with the hexagon socket cap screw (24).



Doc007431.png

4) Align the thermocouple (22) in the nozzle heater (14) direction.
5) Fix the thermocouple (22) with heat resistant adhesive tape at the outlet of the nozzle heater (14).



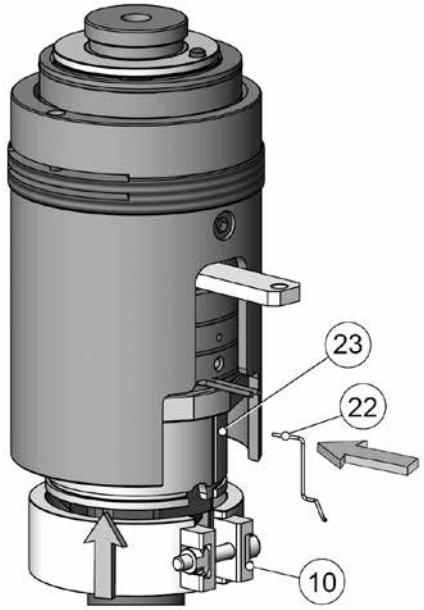
Doc007272.png

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6) Guide the thermocouple (22) into the thermocouple hole of the head body (23).
7) Mount the heater band (10).
8) Complete the nozzle 16E-06.

NOTICE

Follow the heater mounting procedure of the nozzle 16E-06.



Doc007371.png

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10.8.1.1 Grounding of the Single Axis Valve Gate Nozzle

DANGER

Danger to Life by Electric Shock

The Single Axis Valve Gate Nozzle has to be properly grounded to prevent serious personal injury or death.

Electrical work must be carried out by qualified persons.

Verify that all power source connections are properly grounded.

In Emergency case - Switch all systems off.

For first aid contact your medical / safety representing.

1) Check the position of the cooling bar (6) on the actuator (8).

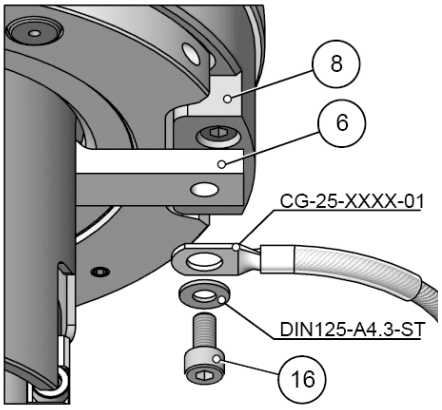
NOTICE

The cooling bar (6) must be easily movable to be positioned on the actuator (8). If this is not possible, contact Synventive customer service.

2) Tighten the ground wire with a socket cap screw (16) on the cooling bar (6).

NOTICE

See the order of the components in the image of the right side Doc007414.png.



Doc007414.png

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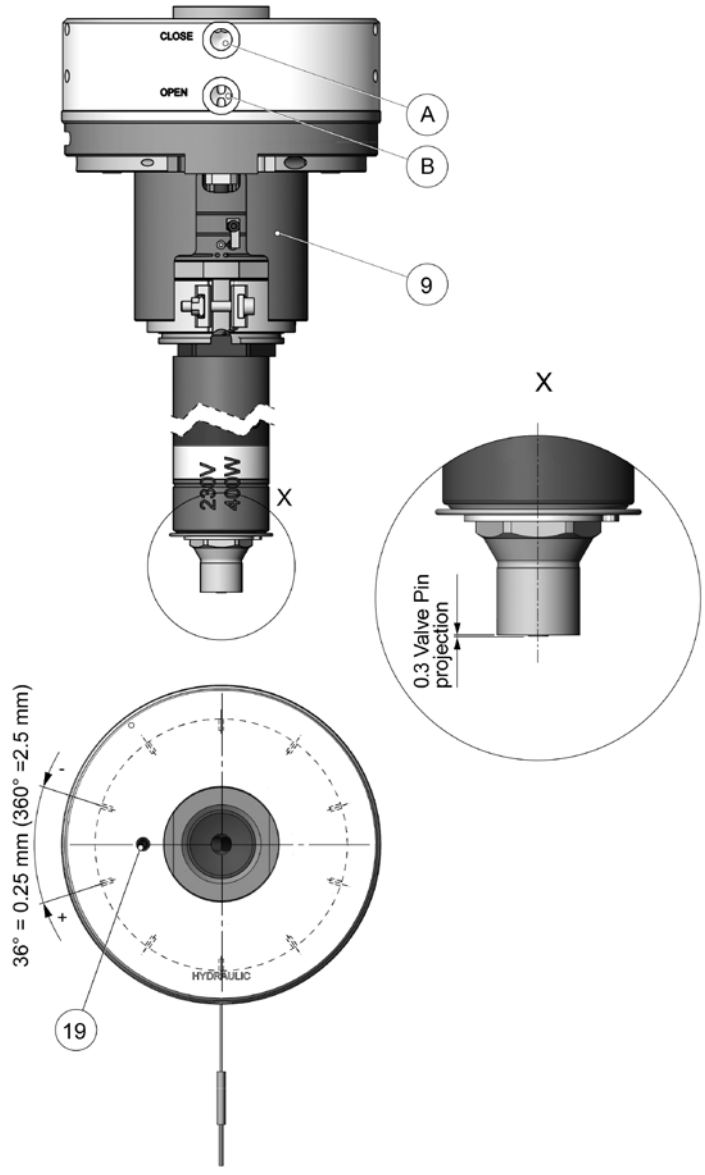
10.9 Valve Pin Height Adjustment

1) Unscrew the hexagon socket cap screw (19).
2) Close the valve guide by pressure on the hydraulic connection (A).
3) Adjust valve pin position by inserting a suitable pin in holes of the adjustment bushing (HYC2314AB01).
4) Turn the adjustment bushing (HYC2314AB01) by using a pin to get the valve pin front into basic position 0.3 mm.

NOTICE

Turning one hole forward results in a height adjustment of 0.25 mm at the valve pin.

5) Tighten the hexagon socket cap screw (19).



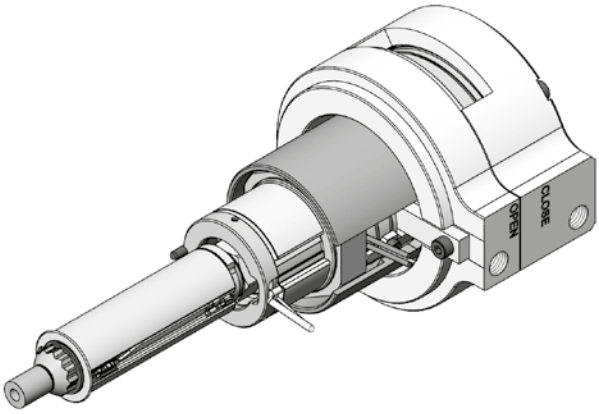
(A) Hydraulic access “CLOSE”

(B) Hydraulic access “OPEN”

Doc007366.png

10.12.1 Single Axis Valve Gate Nozzle 09SVP

10.12.1.1 Technical Data



Doc007210.png

Valve pin	
Valve pin diameter	3.8 mm
Valve Pin Adjustment	Quick coupling, anti-rotation ± 1.5 mm Via adjustment threads from outside.
Valve pin operation	
Operation medium	pneumatic
Valve pin stroke	8 mm
Pressure range	5 - 10 bar (72.5 - 145 psi)
Flowrate	1.2 l/min / 5 bar (72.5 psi)
Reaction time	~1.2 s
Closing force	792 N / 6 bar (87 psi)
Opening force	792 N / 6 bar (87 psi)
Connection	M10x1 (8-L)
Heating Power	
Numbering	The numbering of the heating zones starts at the nozzle tip and ends at the nozzle head.
Zone 1 (From a nozzle length of 50 mm)	150 - 250 Watt
Zone 2 (From a nozzle length of 170 mm)	270 - 490 Watt
Head	450 plus 500 Watt

NOTICE

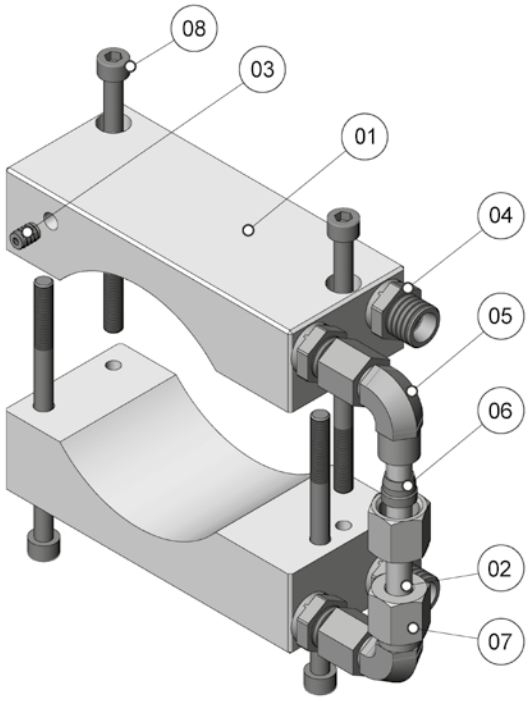
Operate the actuator only with filtered compressed air to ensure a continues flawless operation.

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10.12.1.2 Technical Data / Exploded View - Cooling Unit CU07SVP01

NOTICE

If the mold temperature is 80 °C (176 °F) or more, the Cooling Unit CU07SVP01 is required.

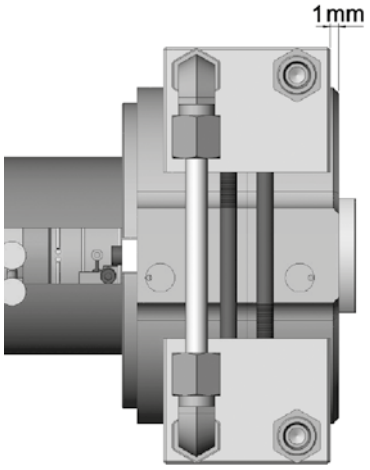


Docc005051.png

Method	Water cooling
Temperature	min. 30 °C / max. 60 °C Temp. difference IN/OUT max. 5 °C
Flow rate per unit	4 l/min
Pressure	max. 8 bar (116 psi)
Connections	M14x1.5 (10-L)

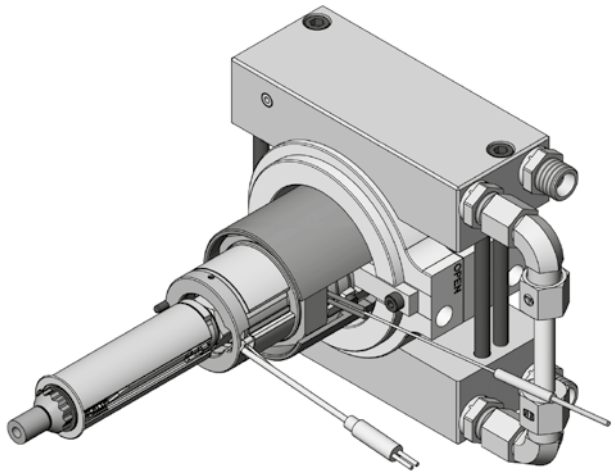
Pos.	Qty.	Part Number	Description
01	2	CU07SVPCS01	Cooling Sleeve
02	1	CU07SVPCT01	Connecting Tube
03	2	Z942/6	Sealing Plug
04	4	GE08LMEDVITOMDCF	Straight Coupling
05	2	EW08LVITOMDCF	Elbow Coupling
06	2	PSR08LX	Cutting Ring
07	2	M08LCFX	Nut
08	3	DIN912-M6x95-12.9	Hexagon Socket Cap Screw

Position of the cooling unit on the nozzle head.



Doc005052.png

CU07SVP01 mounted on Single Axis Valve Gate Nozzle 09SVP



Doc007212.png

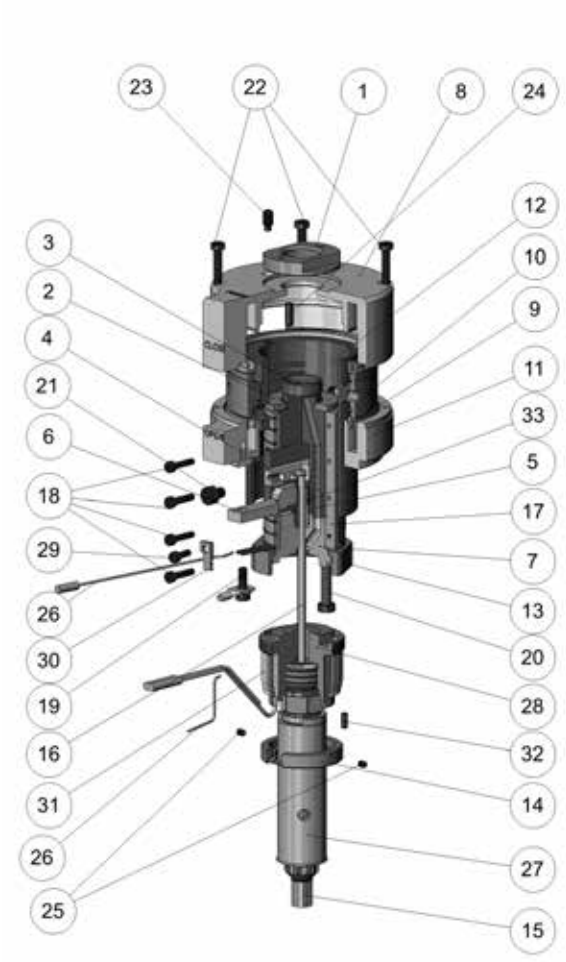
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10.12.1.3 Single Axis Valve Gate Nozzle 09SVP Parts List

In this section the nozzle parts are identified with the numbers indicated in the following figure.

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.



Doc008865_RIS.png

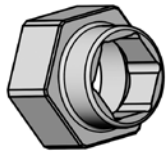
Pos.	Qty.	Description	Part Number
1	1	Isolation nut	CBN0010S
2	1	Isolation ring	CBN0020S
3	1	Nozzle head top	CBN0030S### / CBN0031S###
4	1	Bridge	CBN0040S
5	2	Sealing sleeve	CBN0050S
6	1	Cooling bar	CBN0060S
7	1	Nozzle head bottom	CBN0074S / CBN0075S
8	1	Pneumatic cylinder housing top	CBN0081S
9	2	Piston sealing	CBN0090S
10	1	Threaded ring	CBN0100S
11	1	Pneumatic cylinder housing bottom	CBN0111S
12	1	Guide sleeve	CBN120S
13	1	Sleeve nut	CBN0160S
14	1	Head body ring	09SVPHB-R-01
15	1	Shutoff nozzle tip	(varied)
16	1	Shutoff valve pin	(varied)
17	1	Heater band	HB320691
18	4	Hexagon socket cap screw	DIN912-M3X14-12.9
19	1	Hexagon socket cap screw	DIN912-M4X12-12.9
20	4	Hexagon socket cap screw	DIN7984-M5X40-10.9
21	2	Hexagon socket cap screw	DIN912-M5X6-12.9
22	4	Hexagon socket cap screw	DIN7984-M4X40-8.8
23	1	Hexagon socket set screw	DIN915-M5X10-45H
24	1	Parallel pin	DIN6325-4M6X12
25	2	Hexagon socket set screw	DIN914-M3X5-45H
26	2	Thermocouple	XTA00115001
27	1	Nozzle body complete	09E02 (varied)
28	1	Head body	09SVPHB-01
29	1	Hexagon socket cap screw	DIN912-M3X10-12.9
30	1	Clamping device	GAN0170S
31	1	Heater band	FHA0-032-022-01
32	1	Parallel pin	DIN6325-3M6X8
33	1	Valve pin guide	SVPG-G-38-01

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10.12.1.4 Assembly Tools

In this section the Stripping and Mounting Tool parts are identified with the numbers indicated in the following figure.

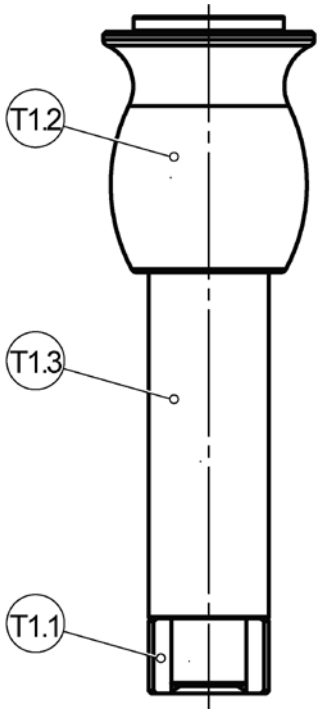
Nozzle Disassembly Tool



Doc007237.png

Pos.	Part No.	Description
T1	AT09SVP-01	Nut

Heater Disassembly Tool Compl. 09E AT09E03



Doc003818.png

Pos.	Part No.	Description
T1.1	AT09E0301	Heater Disassembly Tool 09E Type 01
T1.2	AT09E0302	Heater Disassembly Tool 09E Type 02
T1.3	AT09E0303	Heater Disassembly Tool 09E Type 03

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Safety Instructions for the Service at the Single Axis Valve Gate Nozzle 09SVP

⚠ WARNING



Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.





Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.



NOTICE



Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

Any impact against the nozzle tip may result in its damage.

Never hammer or impact the nozzle tip from the front (i.e. from the side of the mold).

Twisting could damage the nozzle tip.

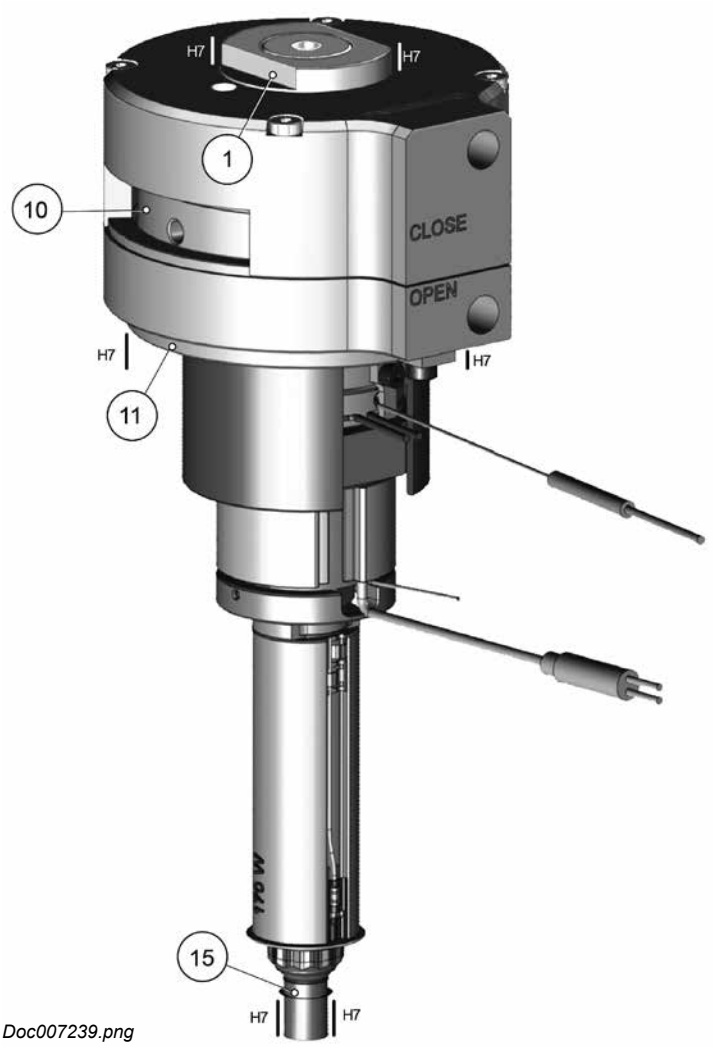
When replacing the nozzles, the sealing rings must always be replaced.

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10.13 Disassembling the Single Axis Valve Gate Nozzle out of the Mold

NOTICE

The Single Axis Valve Gate Nozzle is located on the fit diameters of the nozzle tip and the lower part of the cylinder housing in the mold.



Doc007239.png

(1) Isolation nut
(10) Threaded ring
(11) Cylinder housing bottom
(15) Nozzle tip

Disassembling the Single Axis Valve Gate Nozzle inclusive of actuator out of the mold

1) Cool down the Single Axis Valve Gate Nozzle and the mold to room temperature.
2) Lift the Single Axis Valve Gate Nozzle inclusive of actuator out of the mold.

NOTICE

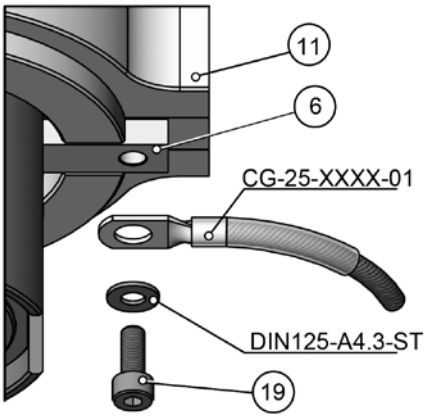
If it is not possible to lift the Single Axis Valve Gate Nozzle inclusive of actuator out of the mold, please contact the Synventive Customer Service or Technical Support.

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10.14 Dismounting and Mounting the Cylinder Housing on the Nozzle

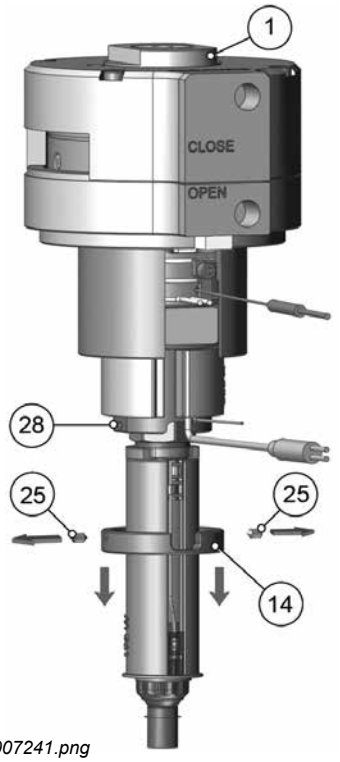
10.14.1 Dismounting the Cylinder Housing from the Nozzle

1) Remove the socket head cap screw (19).
2) Remove the DIN125 and cable grounding like the right side image.



Doc007413.png

3) Loosen the hexagon socket set screws (25).
4) Remove the head body ring (14).
5) Tension the nozzle on the flanks of the head body (28) in a vice.



Doc007241.png

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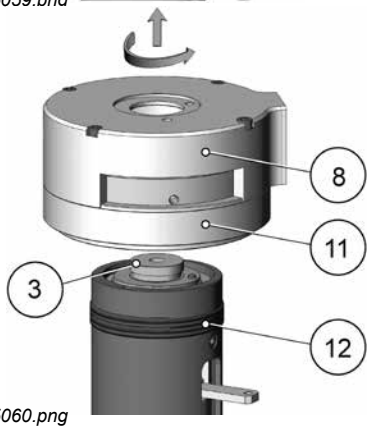
Service and Maintenance / Dismounting the Cylinder Housing from the Nozzle

6) Remove the isolation nut (1).
7) Loosen the hexagon socket set screw (23).



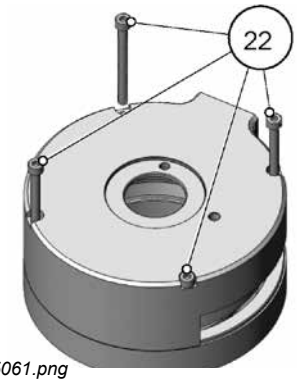
Doc005059.png

8) Uncrew the complete actuator housing (11) (8) from the guide sleeve (12).



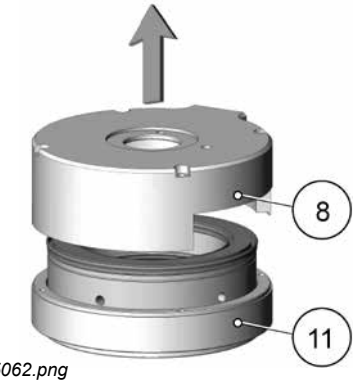
Doc005060.png

9) Remove the 4 socket head cap screws (22).



Doc005061.png

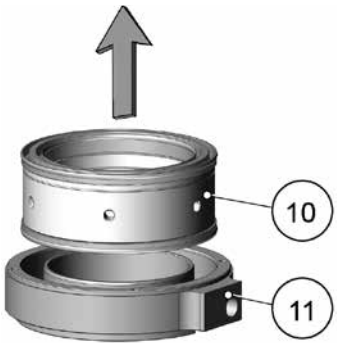
10) Lift the cylinder housing top (8) from the cylinder housing bottom (11).



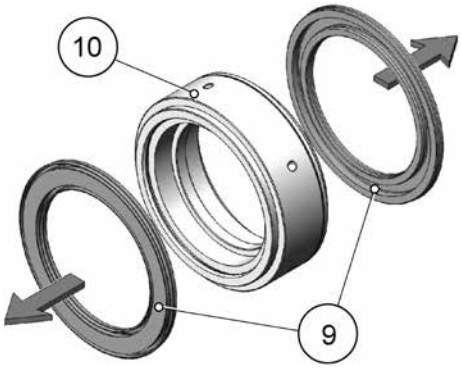
Doc005062.png

Service and Maintenance / Dismounting the Cylinder Housing from the Nozzle

11) Lift the threaded ring (10) out of the cylinder housing bottom (11).



Doc005063.png



Doc005064.png

12) Dismount the piston sealing (9) out of the threaded ring (10).

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10.14.1.1 Disassembly Nozzle 09E from the Head Body

1) Fix the nozzle (27) at the head body (28) in a vice.

NOTICE

Refer to the procedure section 10.1.2.2 including „Disassembling the Nozzle Heater“ and „Disassembling the Nozzle Tip“

The difference is as follow:

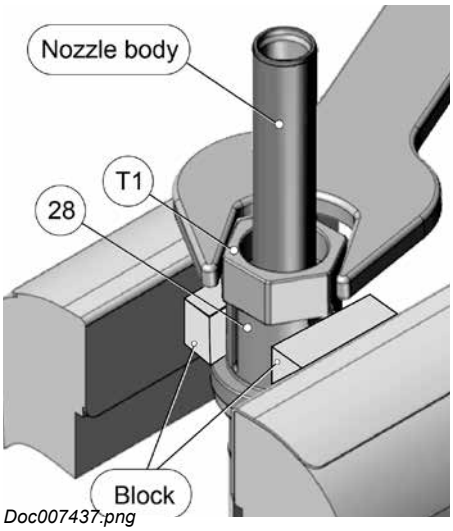
- The 09SVP nozzle is fixed in a vice
- The 09E is fixed in the manifold.

NOTICE

Using the tool “at09svp-01”.

2) Place the tool nut (T1) over the nozzle body (1.1) at the hexagonal shape.
3) Use a wrench to loosen the nozzle (1.1) from the nozzle head (2.1) via the tool nut (T1) by rotation (counter clockwise).

Setup for the Disassembly and Assembly of the Nozzle from / to the Head body



Doc007437.png

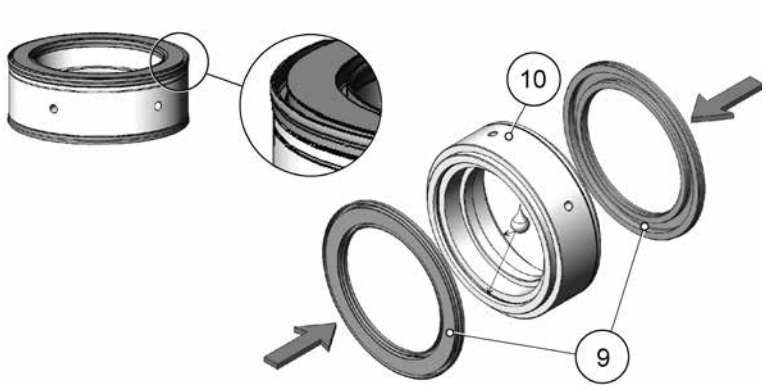
(T1) - Nozzle Disassembly Tool AT09SVP-01

(28) - Head body

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10.14.1.2 Assembly of the Pneumatic Actuator on the Nozzle

Assembly of the Threaded Ring into the Cylinder Housing



Doc005065.png

NOTICE

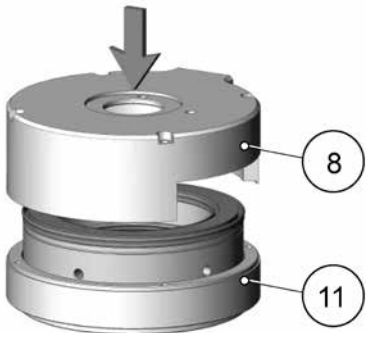
After disassembly of the sealing elements, the original seals must be replaced as required by Synventive.

1) Lubricate the piston sealing (9) with hydraulic oil or white grease.
2) Mount the piston sealing (9) into the seal groove of the threaded ring (10).

NOTICE

Avoid damage of the piston sealing and check the correct fit. Damaged piston sealing (9) must be replaced.

3) Assemble the cylinder housing top (8) on cylinder housing bottom (11).



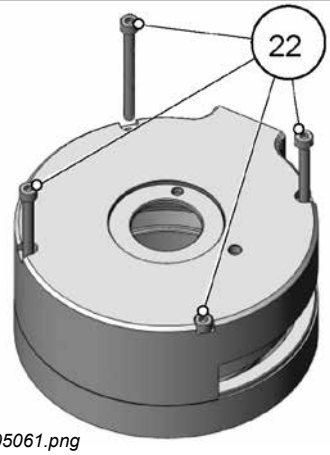
Doc005067.png

4) Attach the 4 hexagon socket cap screws (22).

NOTICE

Tighten the hexagon socket cap screws (22) crosswise.

Use torque wrench with wrench insert and the torques indicated in the torque table (Section 13).



Doc005061.png

Mounting the Nozzle 09E on the Head Body

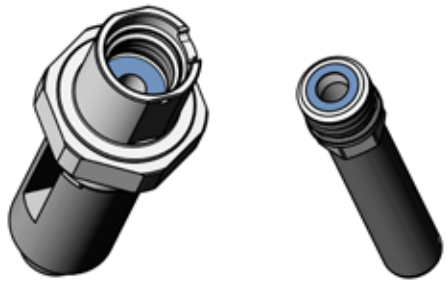
1) Check the matching between the head body surfaces and the nozzle body surface.

NOTICE

The head body must bear on all surfaces uniformly and flatly, in particular on the head body contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, please - contact Synventive Customer Service or Technical Support.

With a positive ink test clean the surfaces and proceed to the next step.

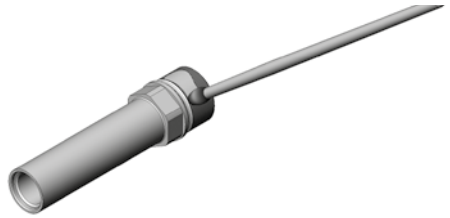


Doc007223.png

2) Lubricate the thread (not the face) of the nozzle body with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.



Doc003827.png

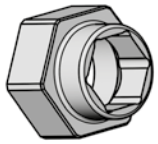
Setup for the Disassembly and Assembly of the Nozzle from / to the Head body

3) Fix the nozzle (27) at the head body (28) in a vice.
4) Tighten the nozzle body

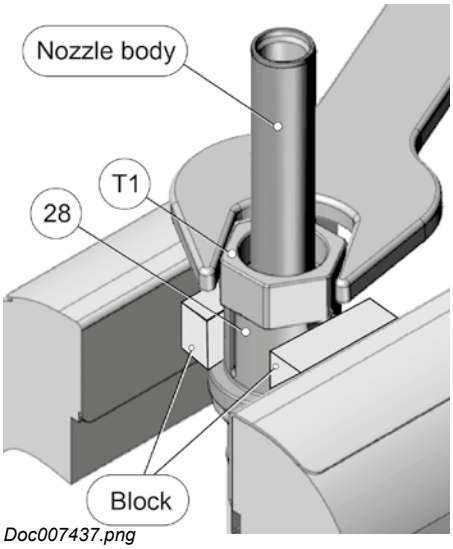
NOTICE

Using the tool “at09svp-01”

Torque value – 100 Nm



Doc007237.png



Doc007437.png

(T1) - Nozzle Disassembly Tool AT09SVP-01
(28) - Head body

NOTICE

To complete the nozzle refer to the procedure section “Assembling Nozzle 09E-02” on page 287 including „Assembling the Nozzle Heater“ and „Assembling the Nozzle Tip and Nozzle Body“

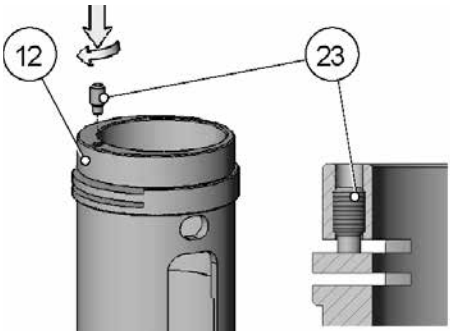
The difference is as follow:

- The 09SVP nozzle is fixed in a vice
- The 09E is fixed in the manifold

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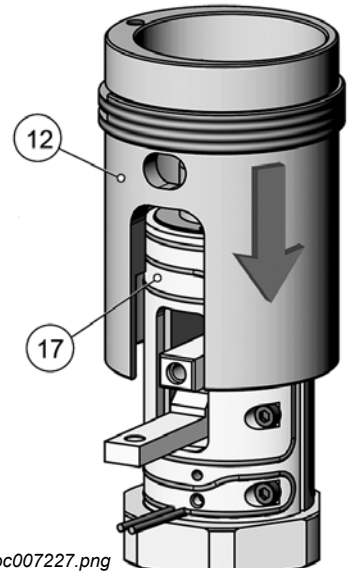
Mounting the Pneumatic Cylinder Housing on the Nozzle Assembly

1) Screw the hexagon socket set screw (23) into the guide sleeve (12).



Doc005098.png

2) Sleeve the guide sleeve (12) over the heater band (17).



Doc007227.png

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Service and Maintenance / Dismounting the Cylinder Housing from the Nozzle

3) Solve the hexagon socket set screws (25).
4) Lower the head body ring (14).
5) Tension the nozzle on the flanks of the head body (28) in a vice.



Doc007242.png

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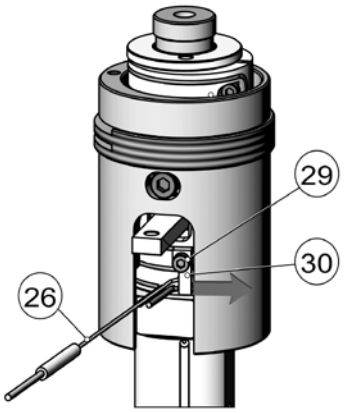
10.15 Dismounting and Mounting of the Thermocouple

10.15.1 Dismounting of the Thermocouple

NOTICE

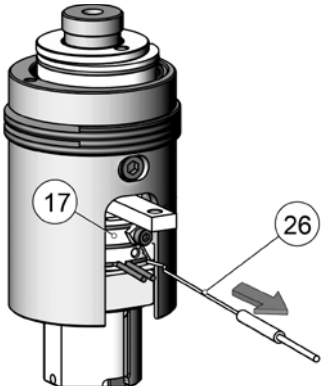
For dismounting and mounting the thermocouple there is not a need to have the cylinder housing dismounted.

1) Loosen the hexagon socket cap screw (29).
2) Move the clamping device (30) to the side, away from the thermocouple (26).



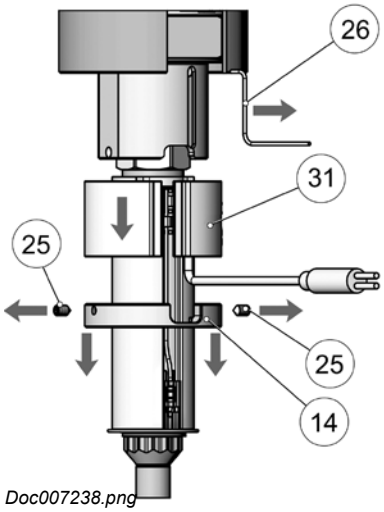
Doc007231.png

3) Pull the thermocouple (26) out of the bore of the heater band (17) and nozzle head bottom.



Doc007232.png

4) Loosen the hexagon socket set screws (25).
5) Move the head body ring (14), then move the heater band (31).
6) Pull the thermocouple (26) out of the bore of the head body (28).



Doc007238.png

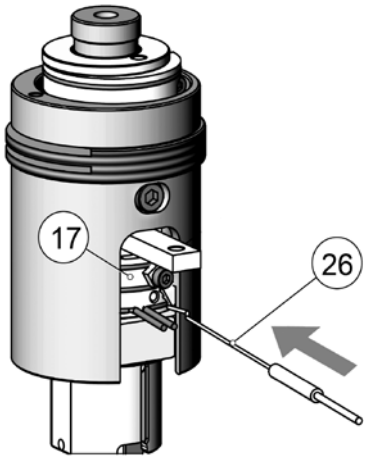
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10.15.2 Mounting of the Thermocouple

NOTICE

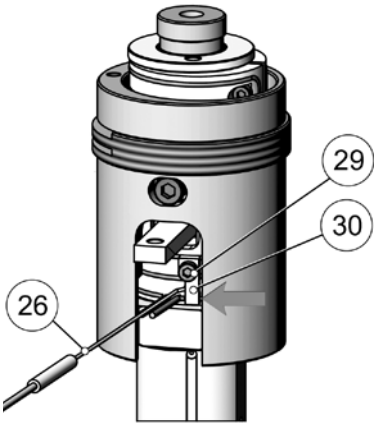
For dismounting and mounting the thermocouple there is not a need to have the cylinder housing dismounted.

1) Guide the thermocouple (26) through the heater band (17) into the thermocouple hole on the nozzle head bottom (7).

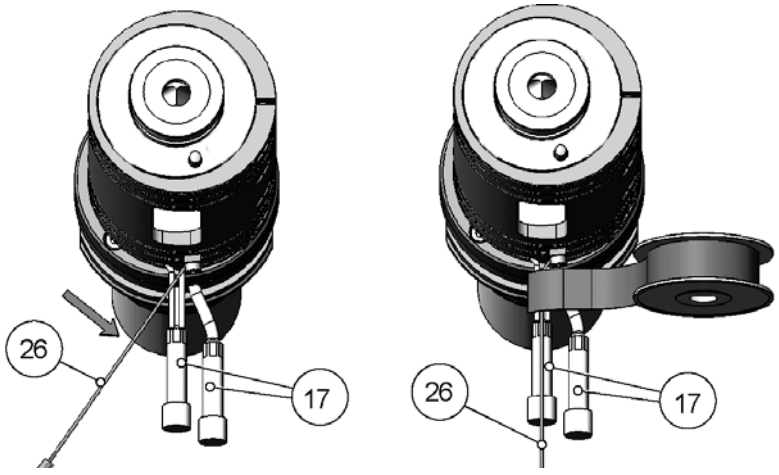


Doc007233.png

2) Bring the clamping device (30) to vertical position.
3) Fix the thermocouple (26) with the hexagon socket cap screw (29).



Doc007207.png



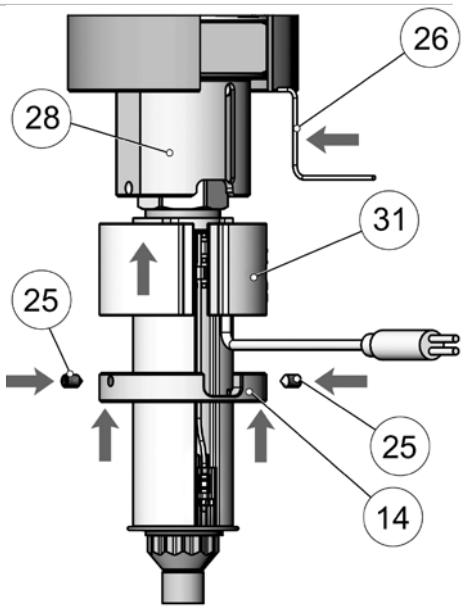
Doc005077.png

4) Align the thermocouple (26) in the nozzle heater (17) direction.
5) Fix the thermocouple (26) with heat resistant adhesive tape at the outlet of the nozzle heater (17).

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Service and Maintenance / Mounting of the Thermocouple

6) Guide the thermocouple (26) into the thermocouple hole of the head body (28).
7) Mount the heater band (31).
8) Slide the head body ring (14) over the head body (28).
9) Tighten the head body ring (14) with the two hexagon socket set screws (25).



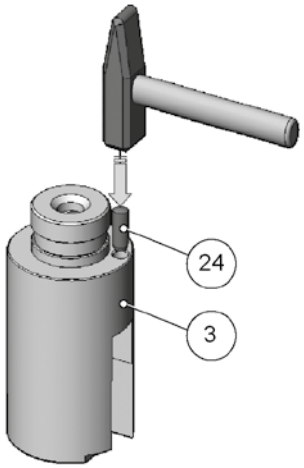
Doc007206.png

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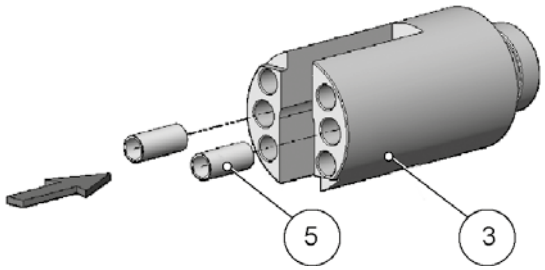
10.16 Assembly of the Nozzle

1) Drive the parallel pin (24) into the nozzle head top (3).



Doc005083.png

2) Put the sealing sleeves (5) into the nozzle head top (3).



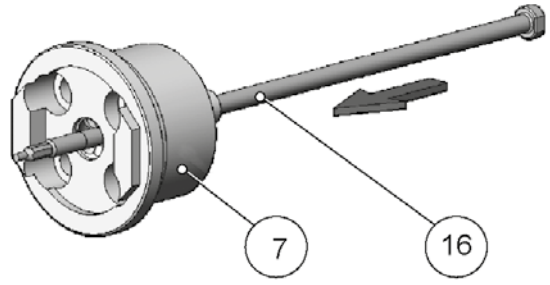
Doc005084.png

3) Screw nozzle head bottom (7) together with valve pin guide (33).



Doc008904_RIS.png

4) Put the valve pin (16) into the nozzle head bottom (7) and check the easy movement.



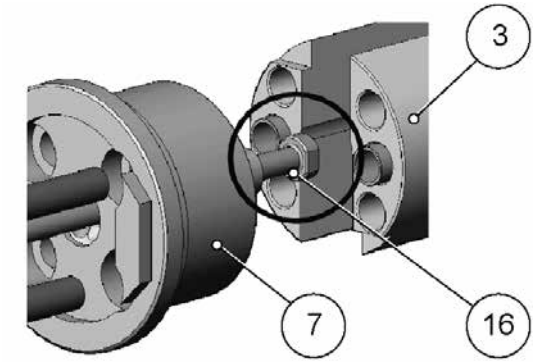
Doc005085.png

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Service and Maintenance / Mounting of the Thermocouple

NOTICE

Note the flattened portions at the valve pin head (16) (for anti- rotation), it is important for the assembly of the bridge (4) in the nozzle head top (3).



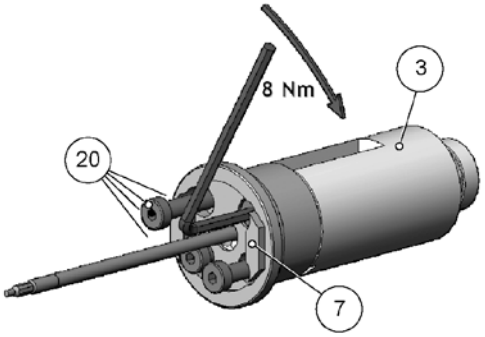
Doc005086.png

5) Tighten the nozzle head top (3) and nozzle head bottom (7) with 4 hexagon socket cap screws (20).

NOTICE

Tighten the socket head cap screws (20) in an X pattern.

The torque value is 8 Nm.

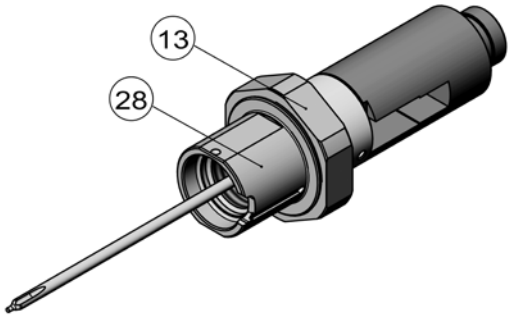


Doc005087.png

6) Mount the head body (28) and tighten the sleeve nut (13).

NOTICE

The torque value is 110 Nm.



Doc007235.png

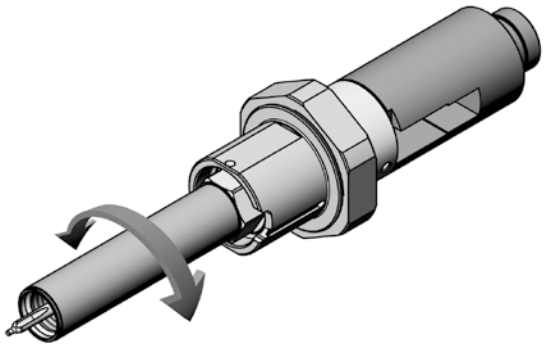
7) Apply spotting ink on the nozzle body bottom surface.



Doc004734.png

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8) Screw in the nozzle body hand-tight into the head body thread until seated.
9) Unscrew the nozzle body from the head body.



Doc007236.png

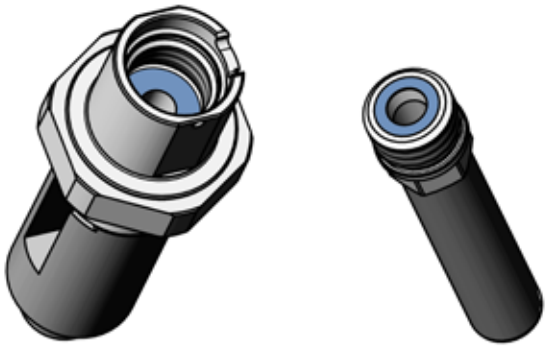
10) Check the matching between the head body surface and the nozzle body surface.

NOTICE

The head body must bear on all surfaces uniformly and flatly, in particular on the head body contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, contact Synventive Customer Service or Technical Support.

11) Clean the surfaces at a positive ink test and proceed to the next step.

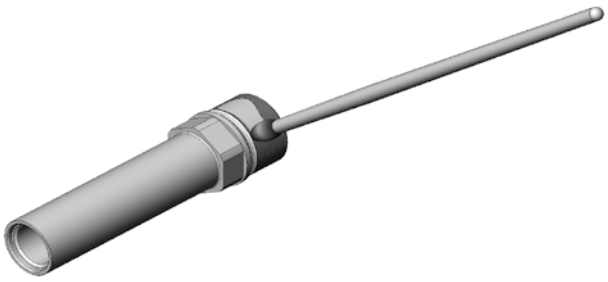


Doc007223.png

12) Lubricate the thread (not the face) of the nozzle body with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.



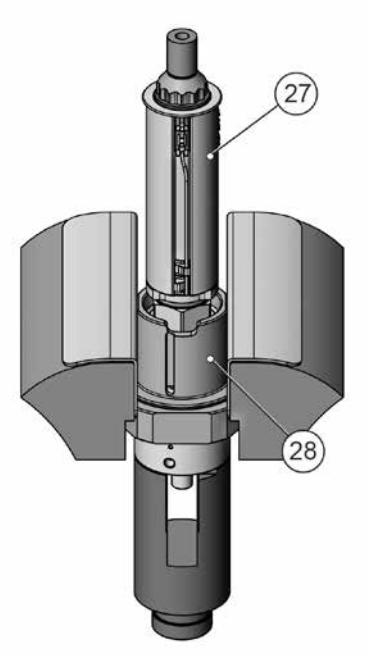
Doc003287.png

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NOTICE

The difference is as follow:

The 09SVP nozzle is fixed in a vice, the 09E is fixed in the manifold.



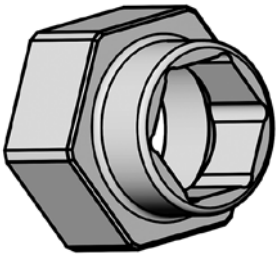
Doc007240.png

13) Tighten the nozzle body.

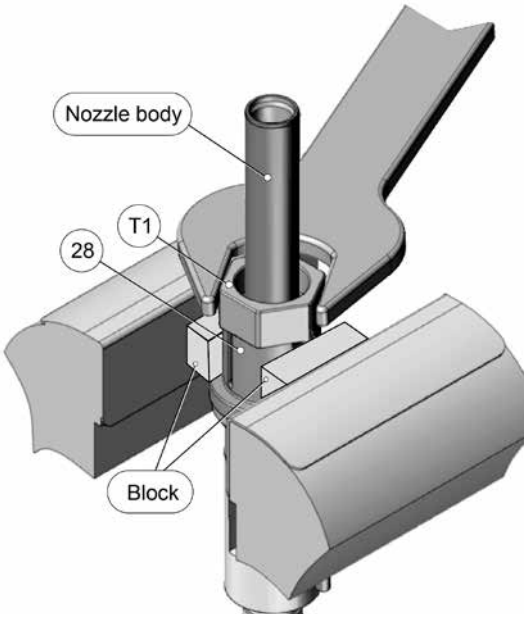
NOTICE

Using the tool “at09svp-01” (T1).

The torque value is 100 Nm.



Doc007237.png



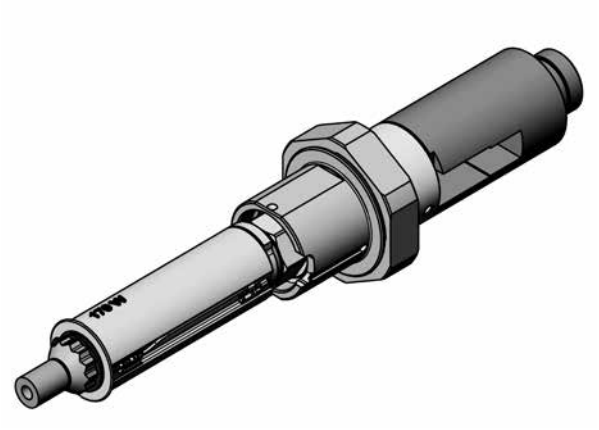
Doc007437.png

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14) Complete the nozzle 09E-02.

NOTICE

Please refer to the Installation Guide “Nozzle 09E Assembling the Nozzle body”.

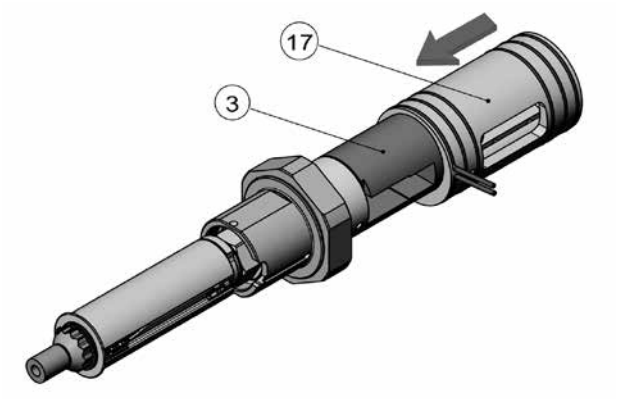


Doc007214.png

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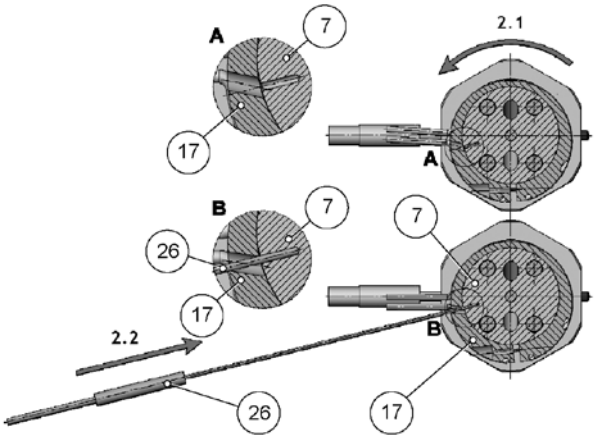
Service and Maintenance / Mounting of the Thermocouple

15) Put the heater band (17) above the nozzle head (3) by considering of the heater exit (same direction as the nozzle heater exit).



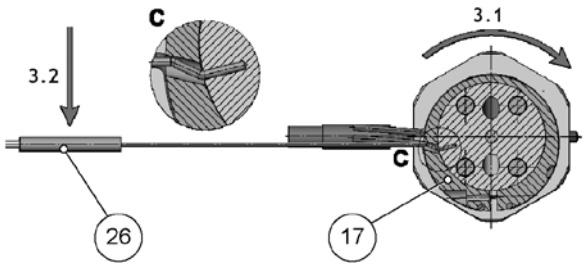
Doc007220.png

16) Turn the heater band (17) in suitable position and put the thermocouple (26) into the bore of the nozzle head.



Doc005091.png

17) Turn the heater band (17) back into basic position and the thermocouple (26) align the nozzle heater direction.



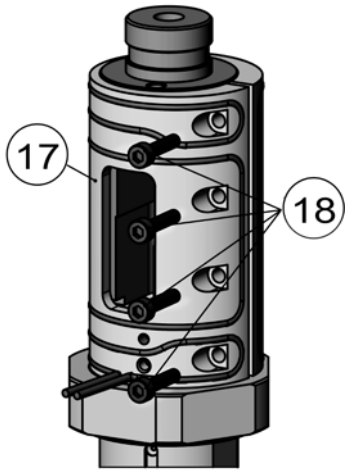
Doc005092.png

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18) Fixing the heater band (17) by tighten the hexagon socket cap screws (18) in a regular way.

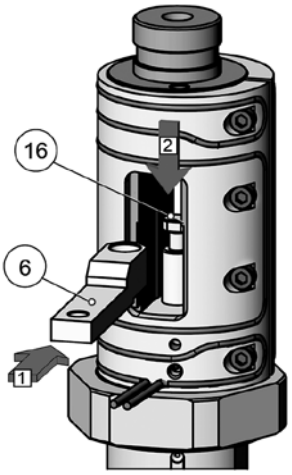
NOTICE

The torque value is 3 Nm.



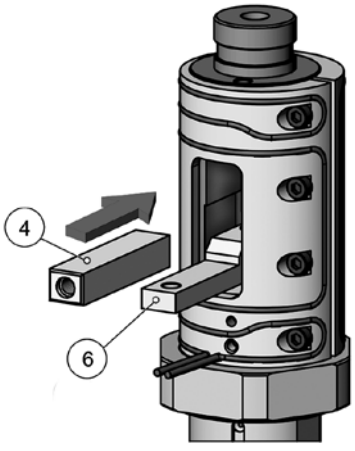
Doc007224.png

19) Put the cooling bar (6) over the valve pin (16) onto the valve pin guide.



Doc007225.png

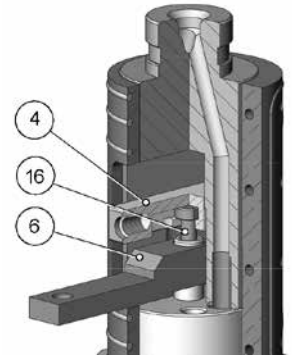
20) Put the bridge (4) into the nozzle head.



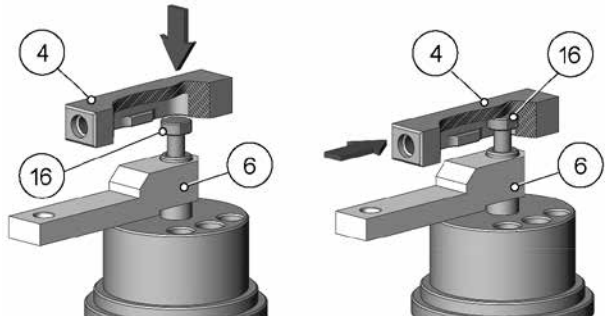
Doc007226.png

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21) Take up the valve pin (16) into the bridge (4).

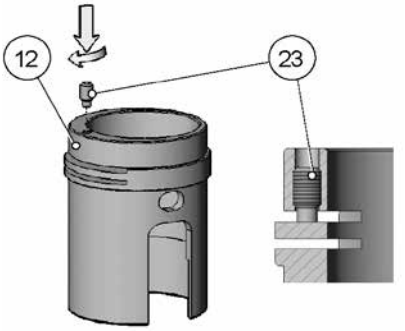


Doc005097.png



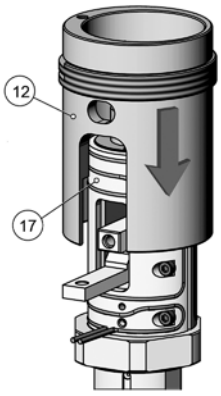
Doc005096.png

22) Screw the hexagon socket set screw (23) into the guide sleeve (12).



Doc005098.png

23) Sleeve the guide sleeve (12) over the heater band (17).

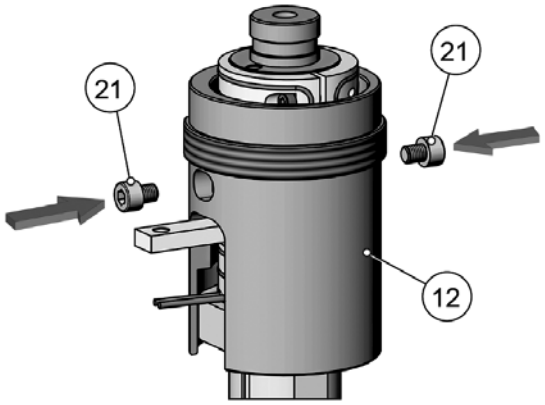


Doc007227.png

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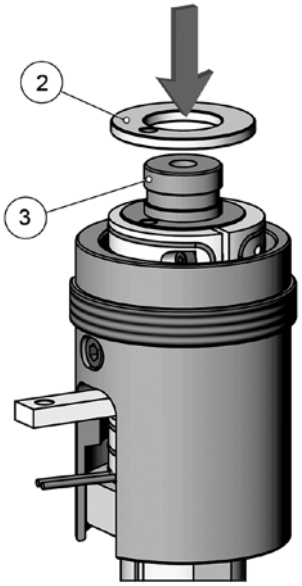
Service and Maintenance / Mounting of the Thermocouple

24) Screw in 2 hexagon socket screws (21) through the guide sleeve (12) and heater band into the bridge (4).



Doc007228.png

25) Place the isolation ring (2) on the nozzle head top (3).

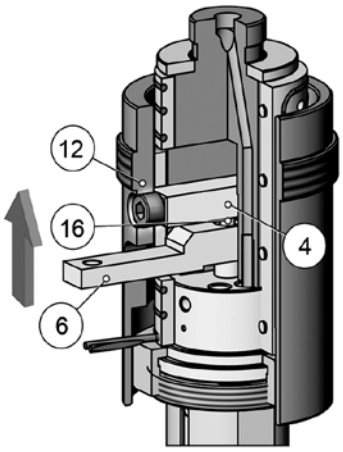


Doc007229.png

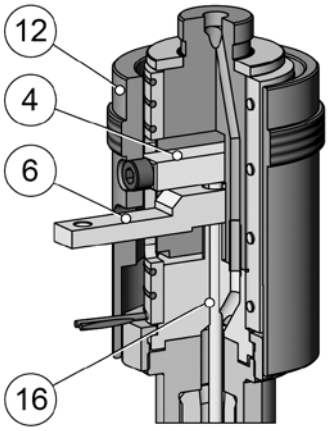
26) Bring the valve pin (16) with the bridge (4) and guide sleeve (12) into the back position (see Doc007209).

NOTICE

The guide sleeve (12) is now in the right position on the nozzle to mount the cylinder housing.



Doc007230.png



Doc007209.png

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10.17 Mounting the Cylinder Housing on the Nozzle

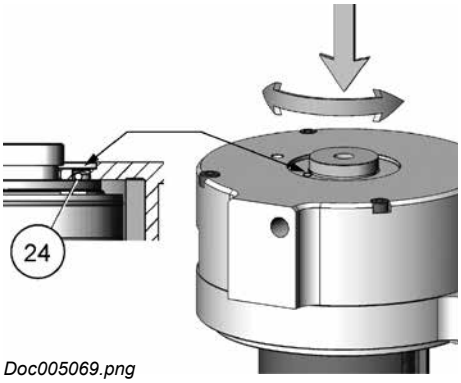


Doc005068.png

NOTICE

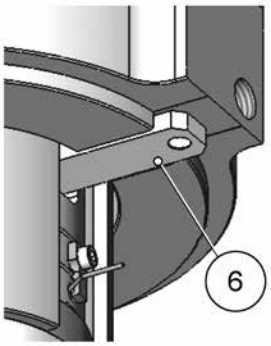
Examine whether the isolation ring (2) at the nozzle head top (3) is placed in the right position.

1) Screw in the pneumatic cylinder housing (11) (8) at the guide sleeve (12).



Doc005069.png

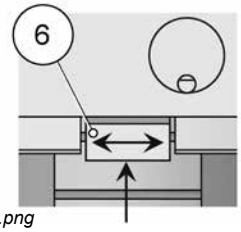
2) Orientate the housing within parallel pin (24) and press up the pneumatic cylinder housing to the limit stop.



3) Check the movement of the cooling bar (6).

NOTICE

If the movement of the cooling bar (6) is restricted, contact the Synventive Customer Service or Technical Support.



Doc005070.png

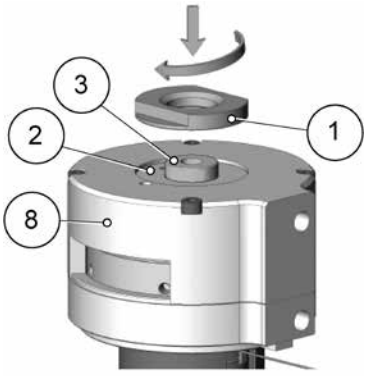
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Service and Maintenance / Mounting of the Thermocouple

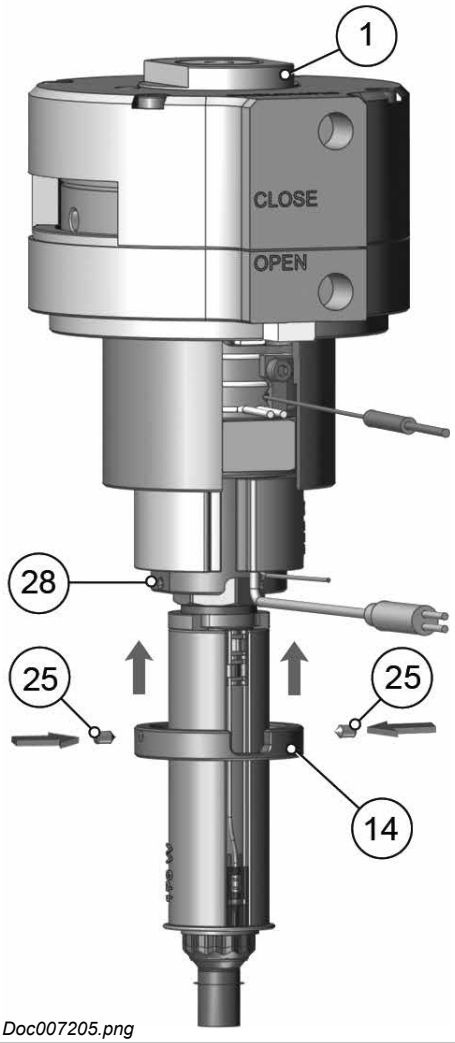
4) Screw in the isolation nut (1) at the nozzle head top (3).
5) Fix the Head body (28) with a vice.
6) Tighten the isolation nut (1).

NOTICE

The torque value is 40 Nm.



Doc005071.png



Doc007205.png

7) Check the position of the cooling bar (6) on the pneumatic cylinder housing bottom (11).

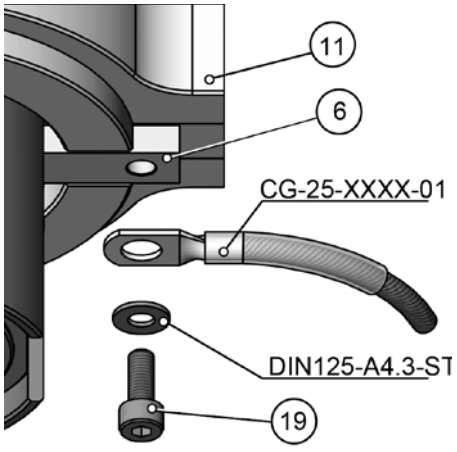
NOTICE

The cooling bar (6) must be easily movable to be positioned on the pneumatic cylinder housing bottom (11). If this is not possible, contact Synventive customer service.

8) Fix with the hexagon socket cap screw (19) the cooling bar (6) and cable grounding and DIN125 on the pneumatic cylinder housing bottom (11).

NOTICE

See the order of the components in the image of the right side Doc007413.png



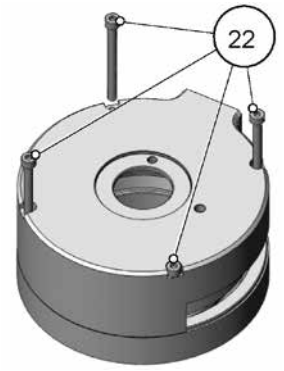
Doc007413.png

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10.18 Dismounting and Mounting the Pneumatic Cylinder Housing

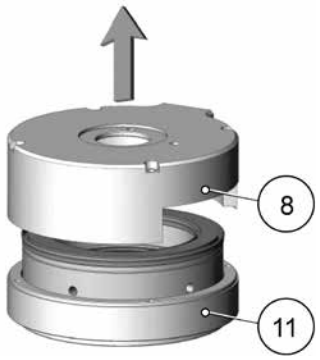
10.18.1 Dismounting the Cylinder Housing and Sealing

1) Remove the 4 socket head cap screws (22).



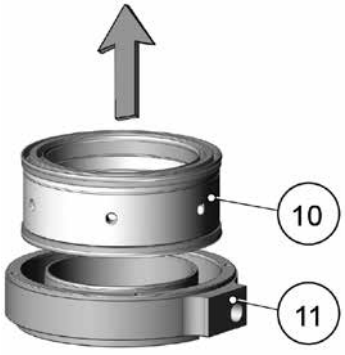
Doc005061.png

2) Lift the cylinder housing top (8) from the cylinder housing bottom (11).



Doc005062.png

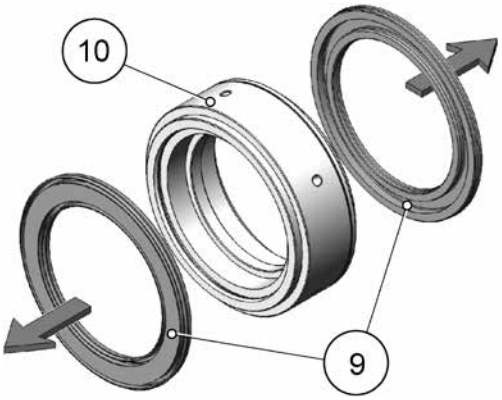
3) Lift the threaded ring (10) out of the cylinder housing bottom (11).



Doc005063.png

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4) Dismount the piston sealing (9) out of the threaded ring (10).



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10.19 Mounting the Cylinder Housing and Sealing

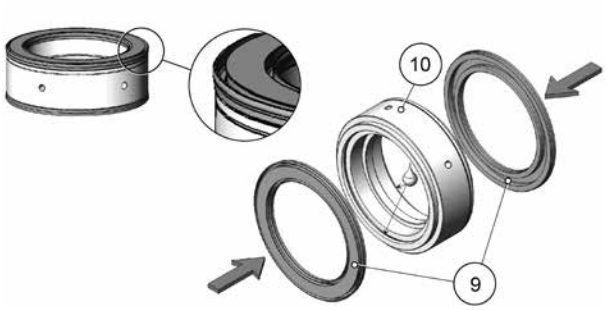
NOTICE

After disassembly of the sealing elements, the original seals must be replaced as required by Synventive.

1) Lubricate the piston sealing (9) with hydraulic oil or white grease.
2) Mount the piston sealing (9) into the seal groove of the threaded ring (10).

NOTICE

Avoid damage of the piston sealing and check the correct fit. Damaged piston sealing (9) must be replaced.

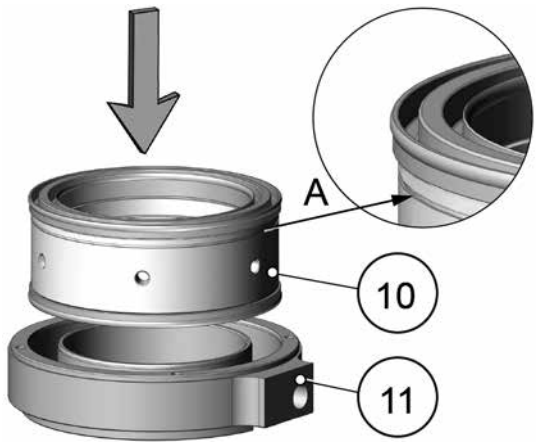


Doc005065.png

NOTICE

The groove at the threaded ring follows the direction of machine nozzle (A).

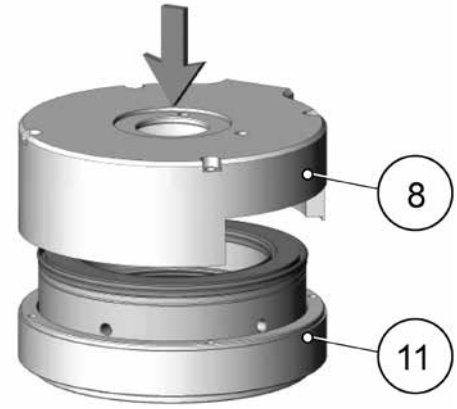
3) Guide the threaded ring (10) into the cylinder housing (11).



Doc005066.png

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4) Assemble the cylinder housing top (8) on cylinder housing bottom (11) .



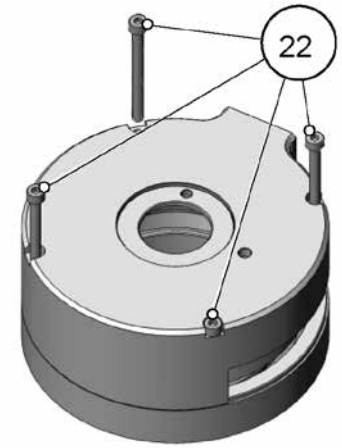
Doc005067.png

5) Attach the 4 hexagon socket cap screws (22).

NOTICE

Tighten the hexagon socket cap screws (22) crosswise.

Use a torque wrench with wrench insert and the torques indicated in the torque table (chapter 13).



Doc005061.png

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10.20 Grounding of the Single Axis Valve Gate Nozzle

DANGER

Danger to Life by Electric Shock

The Single Axis Valve Gate Nozzle has to be properly grounded to prevent serious personal injury or death.

Electrical work must be carried out by qualified persons.

Verify that all power source connections are properly grounded. **In Emergency case - Switch all systems off.**

For first aid contact your medical / safety representing.

1) Check the position of the cooling bar (6) on the pneumatic cylinder housing bottom (11).

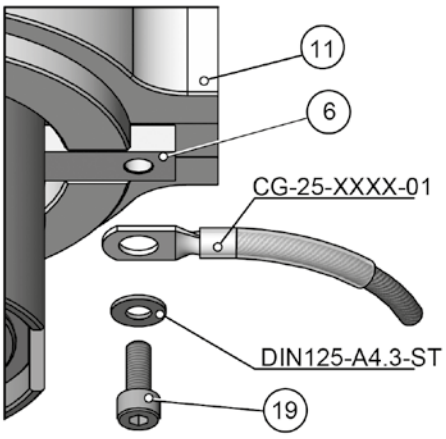
NOTICE

The cooling bar (6) must be easily movable to be positioned on the pneumatic cylinder housing bottom (11). If this is not possible, contact Synventive customer service.

2) Tighten the cooling bar (6) and ground wire with a socket cap screw (19) on the cylinder housing bottom (11).

NOTICE

See the order of the components in the image of the right side Doc007413.png



Doc007413.png

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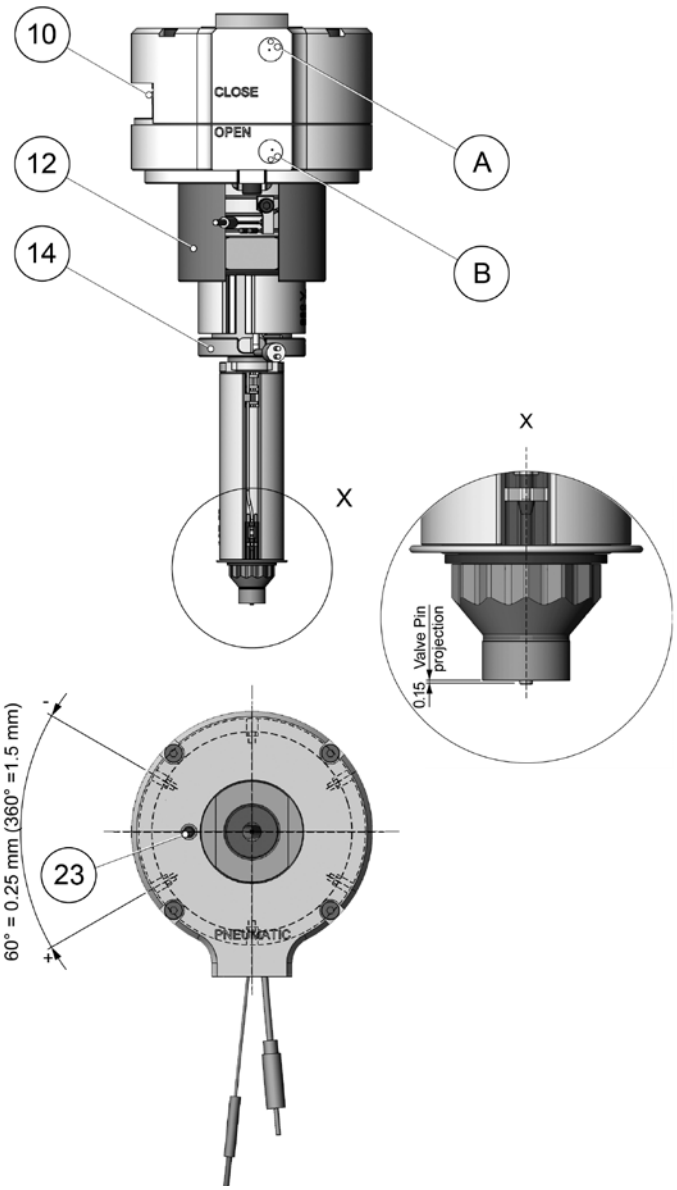
10.21 Valve Pin Height Adjustment

1) Use pneumatic pressure with reduced pressurized air of approx. 2.76 bar (40 psi) on connection (A) to drive the valve pin in valve gate closed position.
2) Unscrew the hexagon socket cap screw (23).
3) Adjust valve pin position by inserting a Ø5mm pin in holes of the threaded ring (10).
4) Turn the threaded ring (10) by using a pin (ø 5) to get the valve pin front into basic position 0.15 mm.

NOTICE

Turning one hole forward results in a height adjustment of 0.25 mm at the valve pin.

5) Tighten the socket set screw (23) - screw up to stop and then turn 90° degree to tying up.



(A) Pneumatic access “CLOSE”

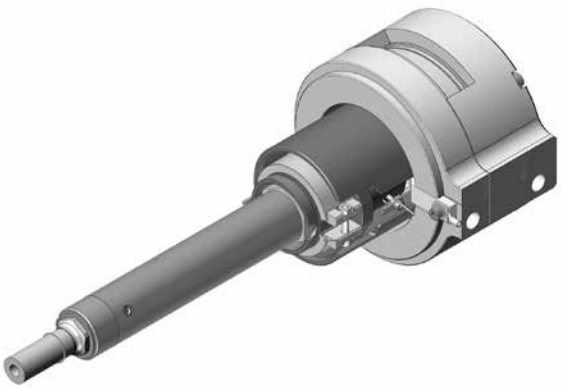
(B) Pneumatic access “OPEN”

Doc007221.png

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10.22 Single Axis Valve Gate Nozzle 12SVP-06

10.22.1 Technical Data Single Axis Valve Gate Nozzle 12SVP-06



Doc008255.png

Technical Data	
Valve pin operation	
Operation	pneumatic
Pressure range	5 - 10 bar (72.5 - 145 psi)
Flow rate	5.4 l/min / 5 bar (72.5 psi)
Reaction time	~1.2 s
Valve pin stroke	13 mm
Adjustment	± 1.5 mm Via adjustment threads from outside.
Connection	M12x1.5
Valve pin	
Valve pin diameter	Ø 6 mm
Attachment	Quick coupling, anti-rotation
Heating Power	The numbering of the heating zones starts at the nozzle tip and ends at the nozzle head.
Zone 1 (From a nozzle length of 50 mm)	195 – 290 Watt
Zone 2 (From a nozzle length of 215 mm)	265 – 585 Watt
Head	630 plus 650 Watt

NOTICE

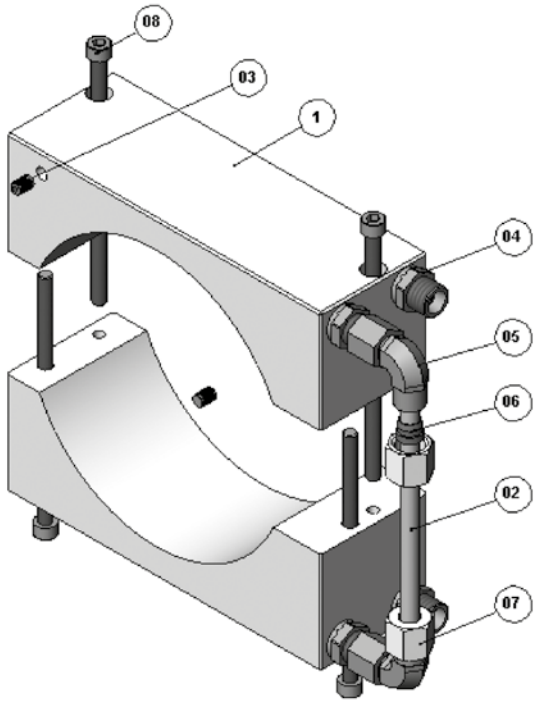
To ensure long life and continued flawless operation of the actuator, we recommend using filtered compressed air.

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Technical Data - Cooling Unit CU12SVP01

NOTICE

If the mold temperature is 80 °C or more, the Cooling Unit CU12SVP01 is required.



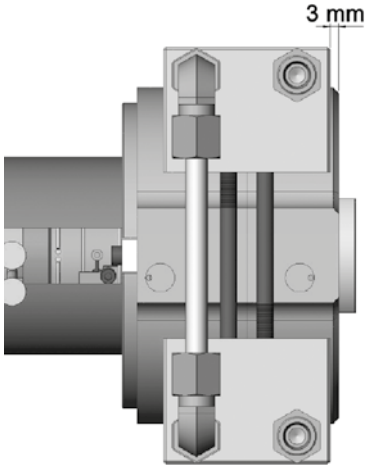
Doc003430.png

Technical Data

Method:	Water cooling
Temperature:	min. 30 °C / max. 60 °C Temp. difference IN/OUT max. 5 °C
Flow rate per unit:	4 l/min
Pressure:	max. 8 bar (116 psi)
Connections:	M14x1.5

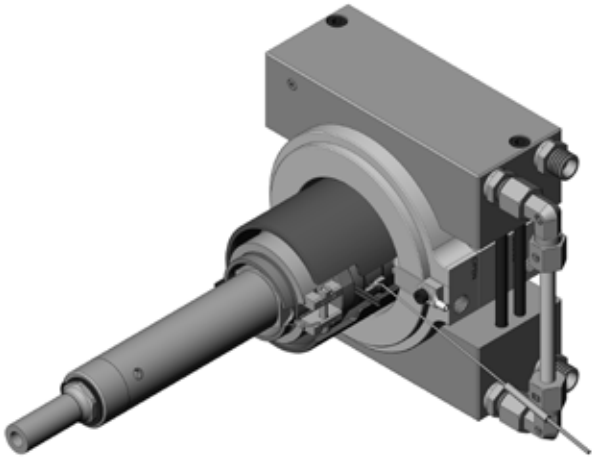
Pos.	Qty.	Part Number	Description
01	2	CU12SVPCS01	Cooling Sleeve
02	1	CU12SVPCT01	Connecting Tube
03	2	Z942/6	Sealing Plug
04	4	GE08LMEDVITOMDCF	Straight Coupling
05	2	EW08LVITOMDCF	Elbow Coupling
06	2	PSR08LX	Cutting Ring
07	2	M08LCFX	Nut
08	3	DIN912-M6x110-12.9	Hexagon Socket Cap Screw

Position of the cooling unit on the nozzle head.



Doc004922.png

CU12SVP01 mounted on Single Axis Valve Gate Nozzle 12SVP-06



Doc008567.png

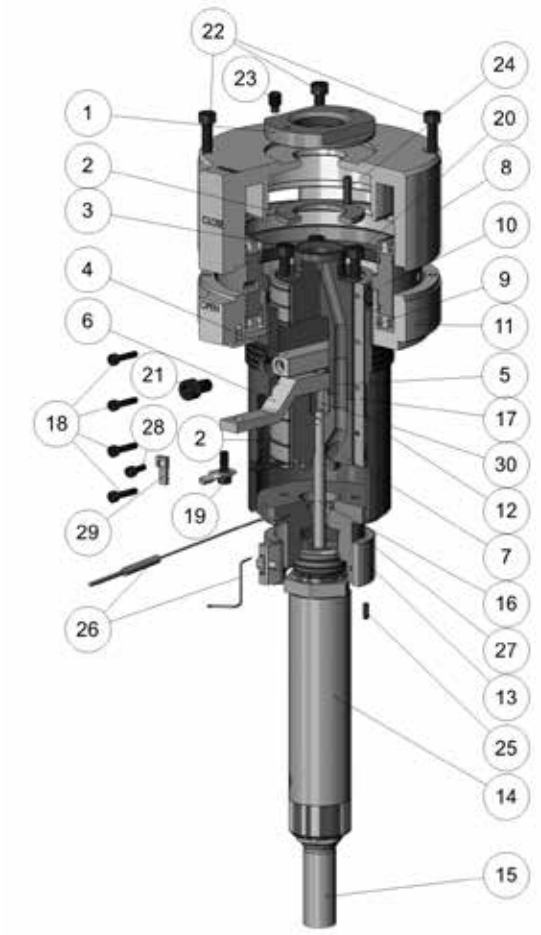
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10.22.1.1 Single Axis Valve Gate Nozzle 12SVP-06 Parts List

In this section the nozzle parts are identified with the numbers indicated in the following figure.

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.



Doc008660_RIS.png

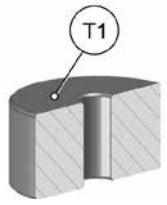
Pos.	Qty.	Description	Part Number
1	1	Isolation nut	GAN0010S
2	1	Isolation ring	GAN0020S
3	1	Nozzle head top	GAN0030S### / GAN0031S###
4	1	Bridge	GAN0040S
5	2	Sealing sleeve	GAN0050S
6	1	Cooling bar	GAN0060S
7	1	Nozzle head bottom	GAN0074S / GAN0075S
8	1	Pneumatic cylinder housing	GAN0081S
9	2	Piston sealing	GAN0091S
10	1	Threaded ring	GAN0100S
11	1	Pneumatic cylinder housing	GAN0111S
12	1	Guide sleeve	12SVP-S-01
13	1	Heater band	HT-045-022-01
14	1	Nozzle body complete	12E04 (varied)
15	1	Shutoff nozzle tip	(varied)
16	1	Shutoff valve pin	(varied)
17	1	Heater band	HB450941
18	4	Hexagon socket cap screw	DIN912-M3X14-12.9
19	1	Hexagon socket cap screw	DIN912-M4X12-12.9
20	4	Hexagon socket cap screw	DIN912-M5X90-12.9
21	2	Hexagon socket cap screw	DIN912-M6X10-12.9
22	4	Hexagon socket cap screw	DIN912-M5X60-12.9
23	1	Hexagon socket set screw	DIN915-M6X10-45H
24	1	Parallel pin	DIN6325-4M6X16
25	1	Parallel pin	DIN6325-3M6X8
26	2	Thermo couple	XTA00115001
27	1	Head body	12SVPHB-01
28	1	Hexagon socket cap screw	DIN912-M3X10-12.9
29	1	Clamping device	GAN0170S
30	1	Valve pin guide	SVPG-G-06-01

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Assembly and Disassembly Tools

In this section the Stripping and Mounting Tool parts are identified with the numbers indicated in the following figure.

Assembly Tools for Nozzle Tips



Doc005227.png



Doc005228.png



Doc005209.png

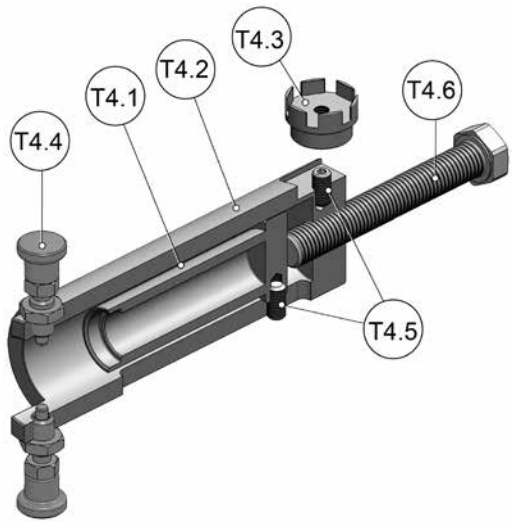
Pos.	Part No.	Description
T1	AT12E-0104	Tip Assembly Tool
T2	AT12E-0103	
T3	AT12E-0105	Seal Cap Assembly Tool

Nozzle Assembly / Disassembly Tool


Doc007382.png

Pos.	Part No.	Description
T1	AT12S-01	Nut

Heater Disassembly Tool Compl. AT-FHA-024 for the Heater Type FHA#-024-###-##



Doc008132.png

Pos.	Qty.	Part No.	Description
T4.1	1	AT-FHA-024-C-01	Disassembly Tool Socket
T4.2	1	AT-FHA-024-C-02	Disassembly Tool Sleeve
T4.3	1	AT-FHA-024-C-05	Disassembly Tool IB24 Adapter Nut
T4.4	1	GN817-44-CK	Indexing plunger
T4.5	2	DIN913-M6x12-45H	Flat Point Socket Set Screw
T4.6	1	ISO4017-M12X100-12.9	Full Thread Hexagon Screw

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Safety Instructions for the Service at the Single Axis Valve Gate Nozzle 12SVP-06

WARNING



Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.





Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.



NOTICE



Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

Any impact against the nozzle tip may result in its damage.

Never hammer or impact the nozzle tip from the front (i.e. from the side of the mold).

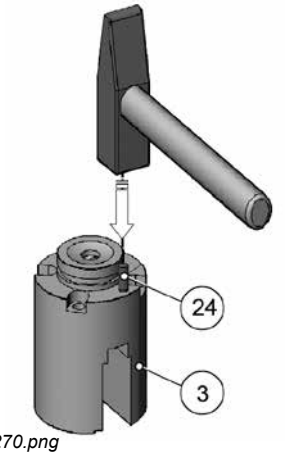
Twisting could damage the nozzle tip.

When replacing the nozzles, the sealing rings must always be replaced.

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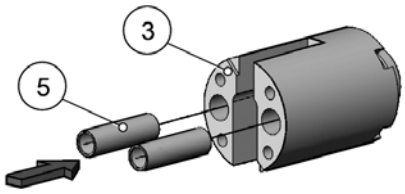
10.22.1.2 Assembly of the Nozzle

1) Drive the parallel pin (24) into the nozzle head top (3).



Doc007270.png

2) Put the sealing sleeves (5) into the nozzle head top (3).



Doc007271.png

3) Screw nozzle head bottom (7) together with valve pin guide (30).

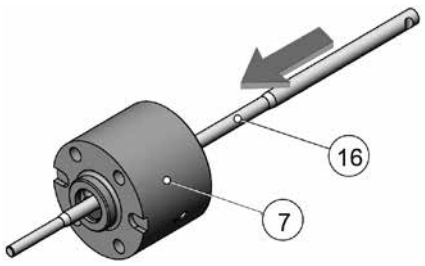
NOTICE

Torque value – 22 Nm



Doc008661_RIS.png

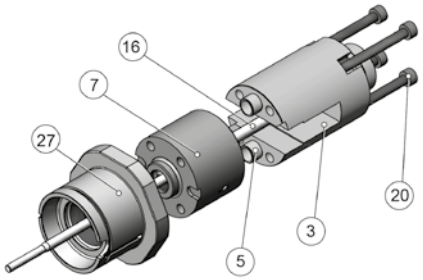
4) Put the valve pin (16) into the nozzle head bottom (7) and check the easy movement.



Doc007248.png

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5) Mount nozzle head top (3), nozzle head bottom (7) and head body (27) with 4 hexagon socket head cap screws (20) hand-tight.



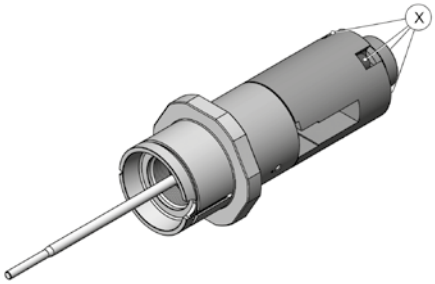
Doc007249.png

6) Tighten the assembly with four socket head cap screws (20) in an X pattern.

NOTICE

Torque value – 8 Nm.

Tighten these four screws again in an X pattern with 14Nm torque.



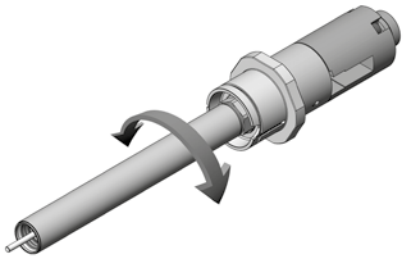
Doc007250.png

7) Apply spotting ink on the nozzle body (1) bottom surface (SF1).



Doc004734.png

8) Screw in the nozzle body hand-tight into the head body thread until seated.
9) Unscrew the nozzle body from the head body.



Doc007251.png

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10) Check the matching between the head body surfaces and the nozzle body surface.

NOTICE

The head body must bear on all surfaces uniformly and flatly, in particular on the head body contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, please - contact Synventive Customer Service or Technical Support.



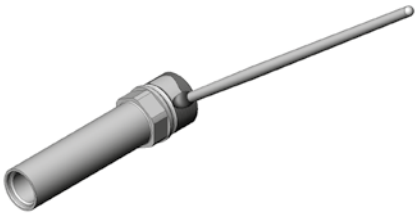
Doc007252.png

11) With a positive ink test clean the surfaces and proceed to the next step.

12) Lubricate the thread (not the face) of the nozzle body with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

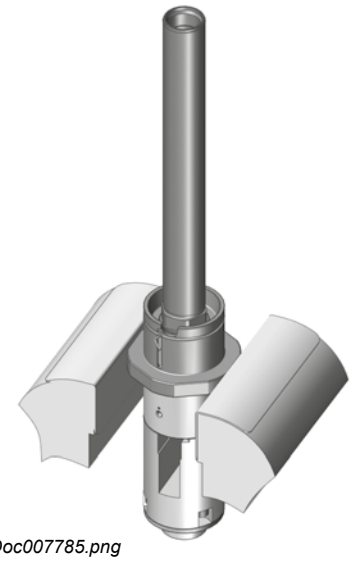


Doc003827.png

NOTICE

The difference is as follow:

- The 12SVP-06 nozzle is fixed in a vice
- The 12E-06 is fixed in the manifold



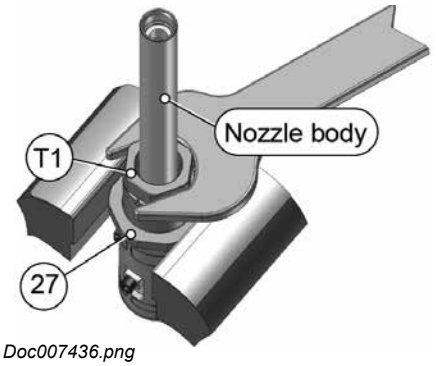
Doc007785.png

13) Tighten the nozzle body.

NOTICE

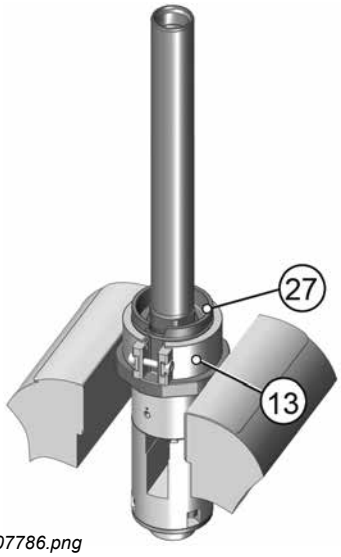
Using the tool “at12s-01” (T1).

Torque value – 175 Nm.



Doc007436.png

14) Mount the heater band (13) on the head body (27).



Doc007786.png

15) Complete the nozzle 12E-06.

NOTICE

Please refer to “12E-06 Series-S+A_Guideline”, Chapter 3.



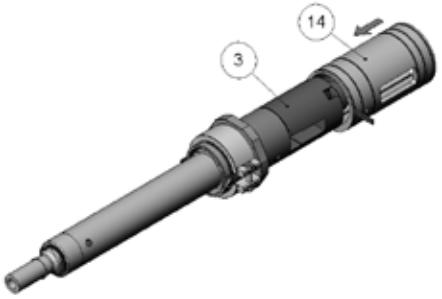
Doc008212.png

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16) Put the heater band (14) above the nozzle head (3) by considering of the heater exit.

NOTICE

Same direction as the nozzle heater exit.

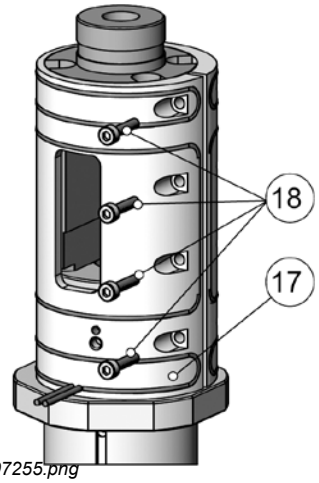


Doc008213.png

17) Fixing the heater band (17) by tighten the hexagon socket cap screws (18) in a regular way.

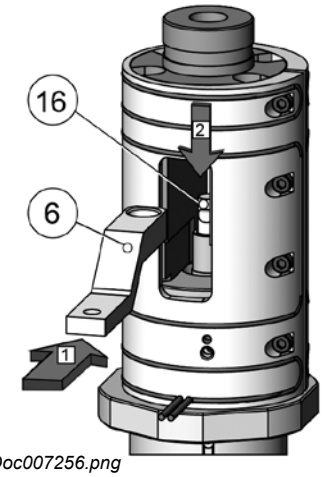
NOTICE

The torque value is 3 Nm.



Doc007255.png

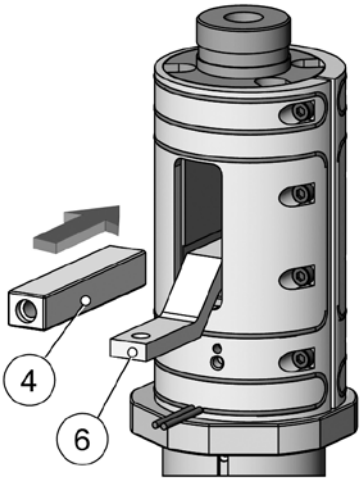
18) Put the cooling bar (6) over the valve pin (16) onto the valve pin guide.



Doc007256.png

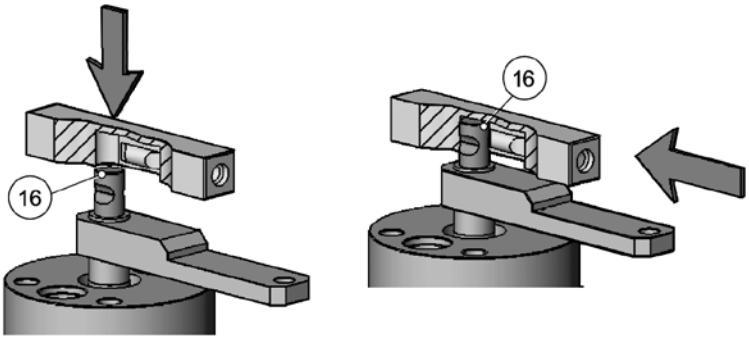
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19) Put the bridge (4) into the nozzle head.

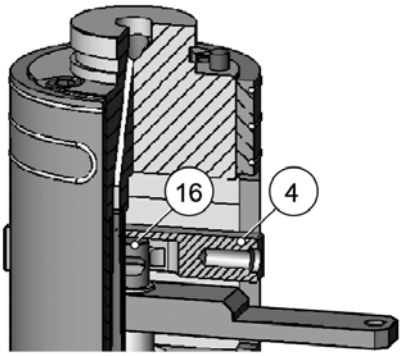


Doc007257.png

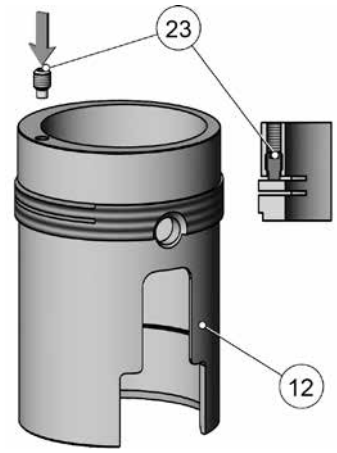
20) Take up the valve pin (16) into the bridge (4).



Doc007243.png



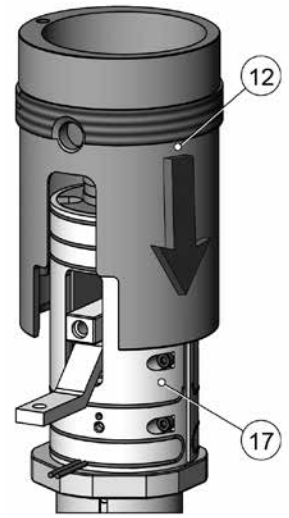
Doc007244.png



Doc007258.png

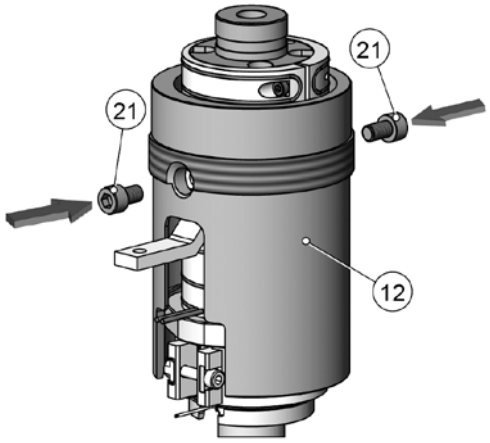
21) Screw the hexagon socket set screw (23) into the guide sleeve (12).

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Doc007259.png

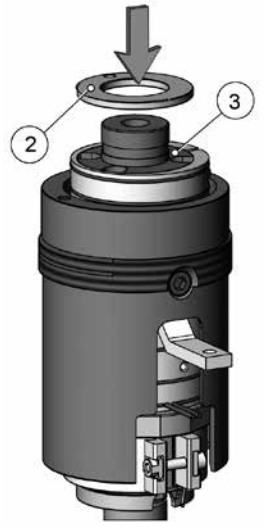
22) Sleeve the guide sleeve (12) over the heater band (17).



Doc007260.png

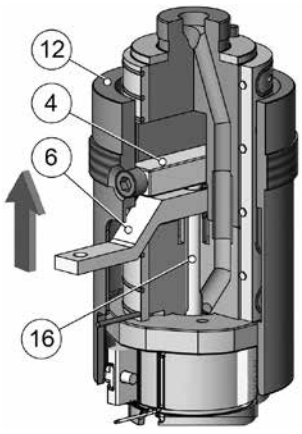
23) Screw in 2 hexagon socket screws (21) through the guide sleeve (12) and heater band into the bridge (4).

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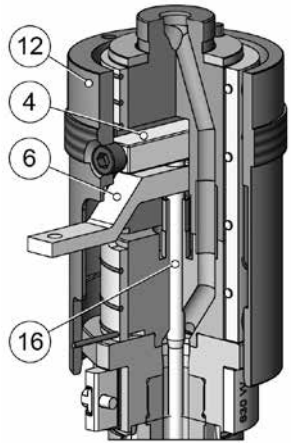


Doc007261.png

24) Place the isolation ring (2) on the nozzle head top (3).



Doc007262.png



Doc007420

25) Bring the valve pin (16) with the bridge (4) and guide sleeve (12) into the back position (see Doc007420).

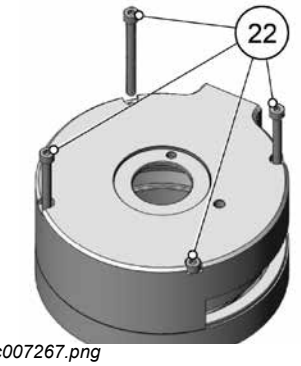
NOTICE

Now the guide sleeve (12) is in the right position on the nozzle to mount the cylinder housing.

10.22.1.3 Dismounting and Mounting the Pneumatic Cylinder Housing

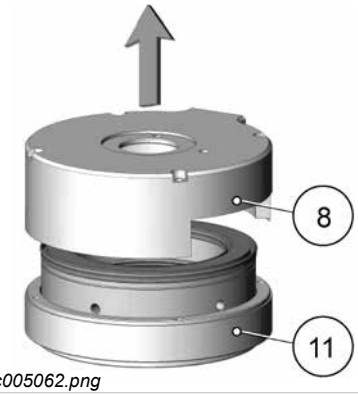
Dismounting the Cylinder Housing and Sealing

1) Remove the 4 socket head cap screws (22).



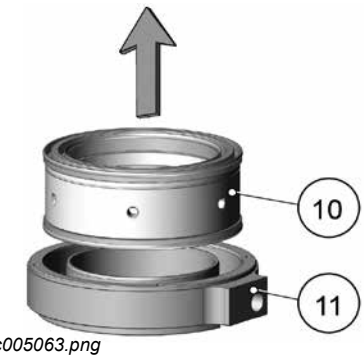
Doc007267.png

2) Lift the cylinder housing top (8) from the cylinder housing bottom (11).



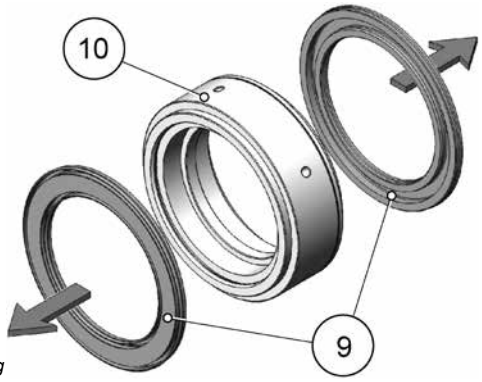
Doc005062.png

3) Lift the threaded ring (10) out of the cylinder housing bottom (11).



Doc005063.png

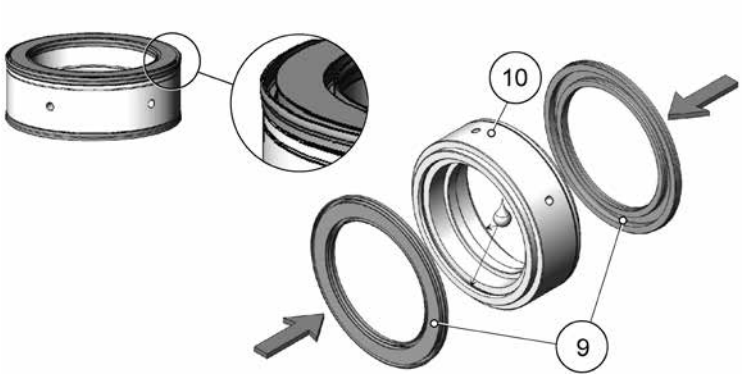
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Doc003446.png

4) Dismount the piston sealing (9) out of the threaded ring (10).

Mounting the Cylinder Housing and Sealing



Doc005065.png

NOTICE

After disassembly of the sealing elements, the original seals should be replaced as required by Synventive.

1) Lubricate the piston sealing (9) with hydraulic oil or white grease.
2) Mount the piston sealing (9) into the seal groove of the threaded ring (10).

NOTICE

Avoid damage of the piston sealing and check the correct fit. Damaged piston sealing (9) has to be replaced.

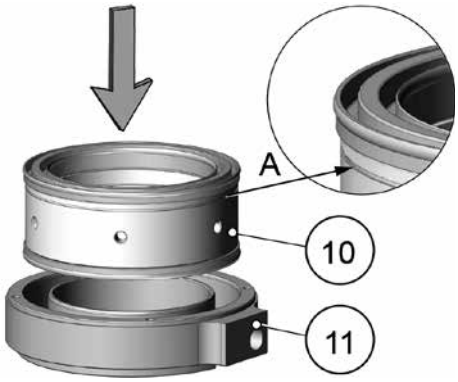
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NOTICE

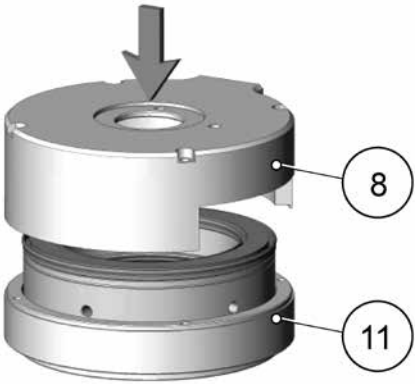
The groove at the threaded ring follows the direction of machine nozzle (A).

3) Guide the threaded ring (10) into the cylinder housing (11).



Doc005066.png

4) Assemble the cylinder housing top (8) on cylinder housing bottom (11).



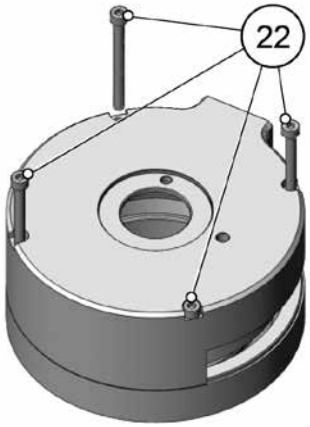
Doc005067.png

5) Attach the 4 hexagon socket cap screws (22).

NOTICE

Tighten the hexagon socket cap screws (22) crosswise.

Use torque wrench with wrench insert and the torques indicated in the torque table (Section 13).



Doc007267.png

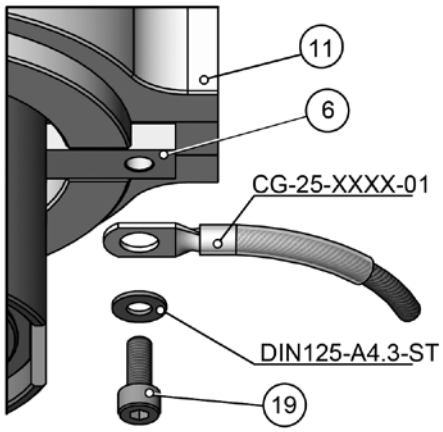
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10.22.1.4 Dismounting and Mounting the Cylinder Housing on the Nozzle

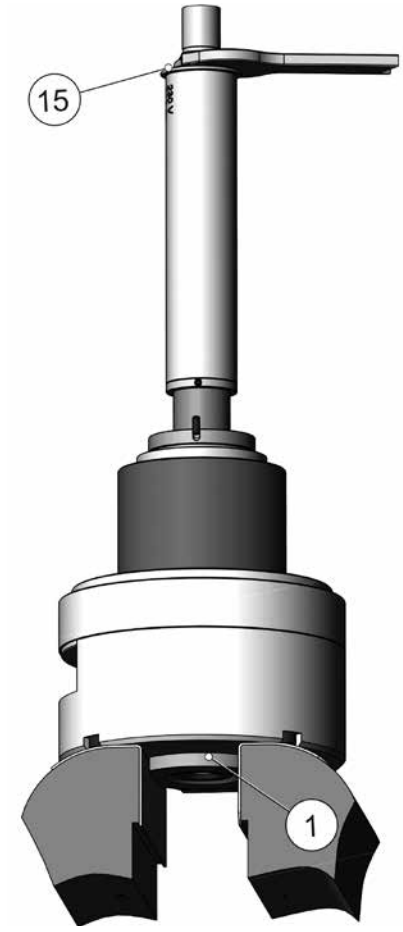
Dismounting the Cylinder Housing from the Nozzle

1) Remove the socket head cap screw (19).
2) Remove the washer (DIN125) and cable grounding (see figure of the right side).



Doc007413.png

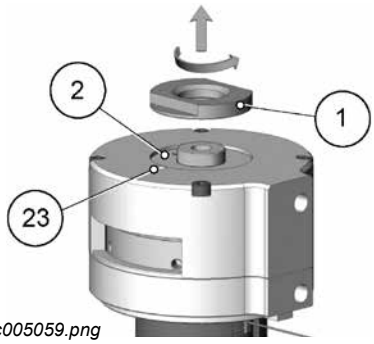
3) Fix the isolation nut (1) with a vice.
4) Loosen the isolation nut (1) via the hexagonal of the nozzle tip (15).



Doc007314.png

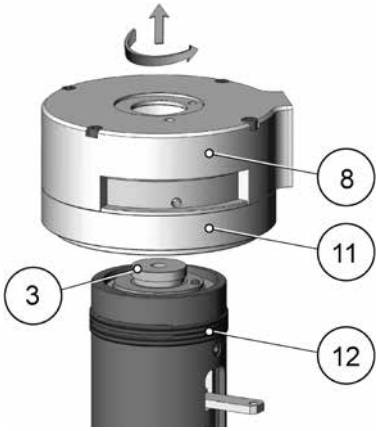
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5) Remove the isolation nut (1).
6) Loosen the hexagon socket set screw (23).



Doc005059.png

7) Uncrew the complete cylinder housing (11) (8) from the guide sleeve (12).



Doc005060.png

Mounting the Cylinder Housing on the Nozzle

NOTICE

Examine whether the isolation ring (2) at the nozzle head top (3) is placed in the right position.

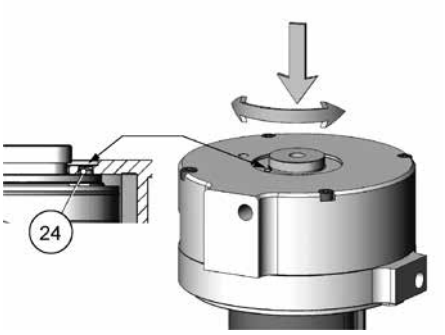
1) Screw in the pneumatic cylinder housing (11) (8) at the guide sleeve (12).



Doc005068.png

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2) Orientate the housing within parallel pin (24) and press up the pneumatic cylinder housing to the limit stop.

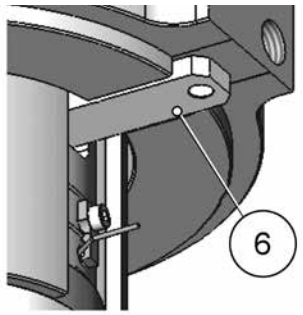


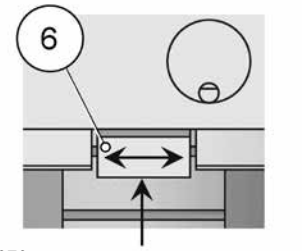
Doc005069.png

3) Check the movement of the cooling bar (6).

NOTICE

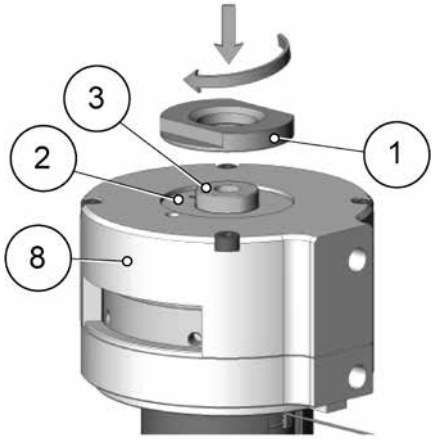
If the movement of the cooling bar (6) is restricted, contact the Synventive Customer Service or Technical Support.





Doc005070.png

4) Screw in the isolation nut (1) at the nozzle head top (3).



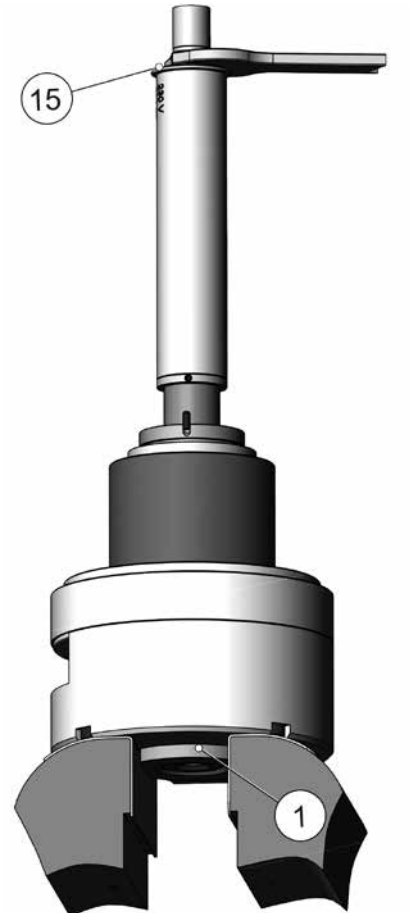
Doc005071.png

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5) Clamp the nozzle at the insulating nut (1) in a vice.
6) Tighten the insulating nut (1) via the hexagon on the nozzle tip (15).

NOTICE

Torque value - 40 Nm



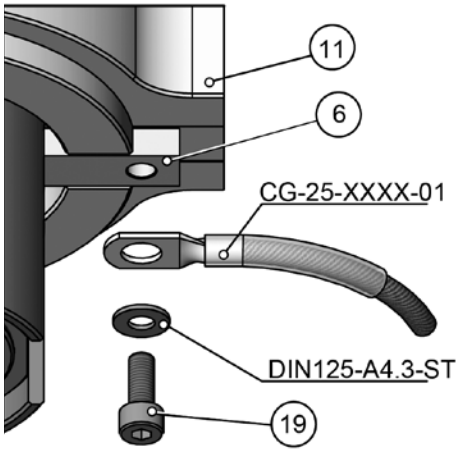
Doc007314.png

7) Check the position of the cooling bar (6) on the pneumatic cylinder housing bottom (11).

NOTICE

The cooling bar (6) must be easily movable to be positioned on the pneumatic cylinder housing bottom (11). If this is not possible, contact Synventive customer service.

8) Fix with the hexagon socket cap screw (19) the cooling bar (6) and cable grounding and DIN125 on the pneumatic cylinder housing bottom (11).



Doc007413.png

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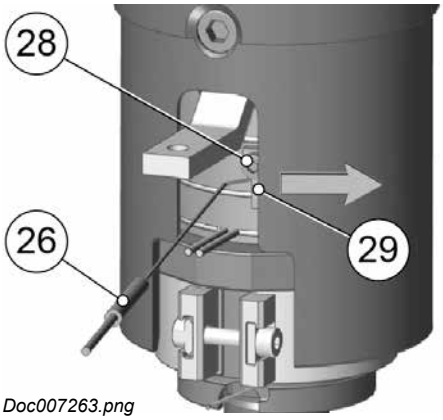
10.22.1.5 Dismounting and Mounting of the Thermocouple

Dismounting of the Thermocouple

NOTICE

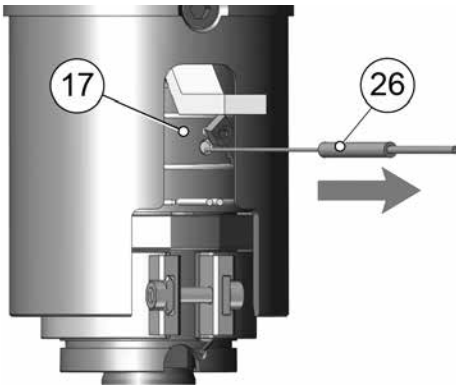
For dismounting and mounting the thermocouple, don't need to dismount the cylinder housing first.

1) Loosen the hexagon socket cap screw (28).
2) Move the terminal (29) to the side, away from the thermocouple (26).



Doc007263.png

3) Pull the thermocouple (26) out of the bore of the heater band (17) and nozzle head bottom (7).



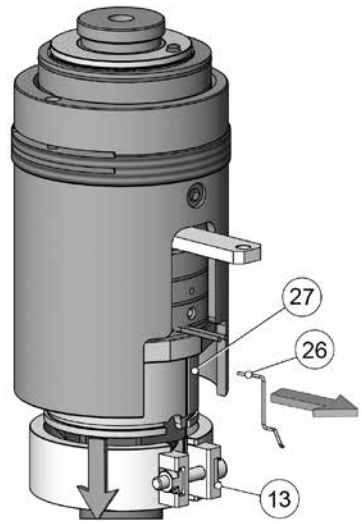
Doc007264.png

4) Dismount the 12E-06 nozzle heater.

NOTICE

Follow the heater dismounting procedure of the nozzle 12E-06 Installation Guide S+A_Guideline.

5) Move the heater band (13).
6) Pull the thermocouple (26) out of the bore of the head body (27).



Doc007322.png

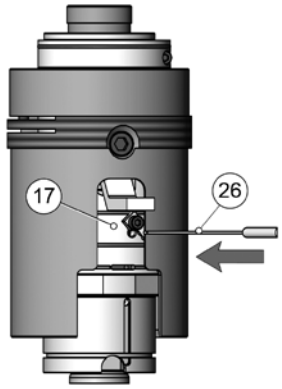
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Mounting of the Thermocouple

NOTICE

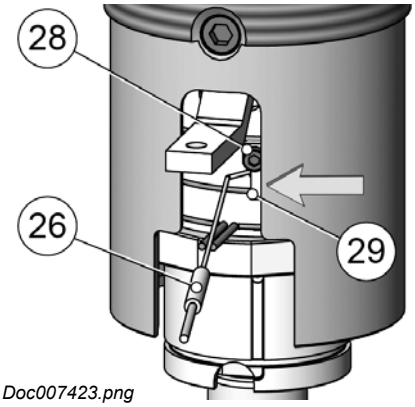
For dismounting and mounting the thermocouple, don't need to dismount the cylinder housing first.

1) Guide the thermocouple (26) through the heater band (17) into the thermocouple hole on the nozzle head.

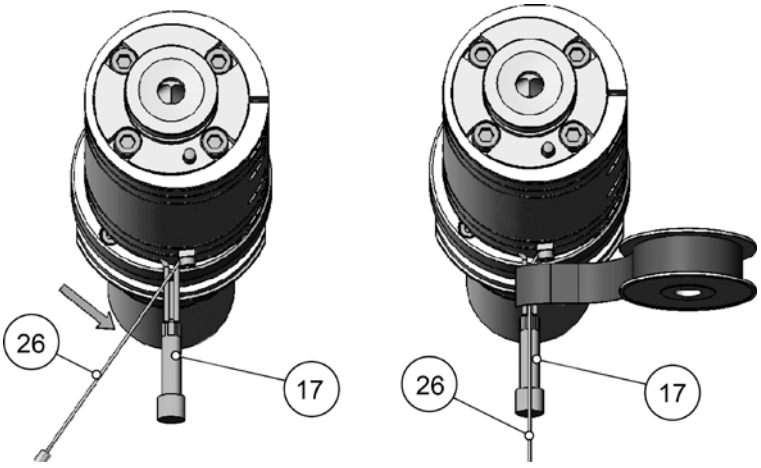


Doc007422.png

2) Bring the clamping device (29) to vertical position.
3) Fix the thermocouple (26) with the hexagon socket cap screw (28).



Doc007423.png



Doc007269.png

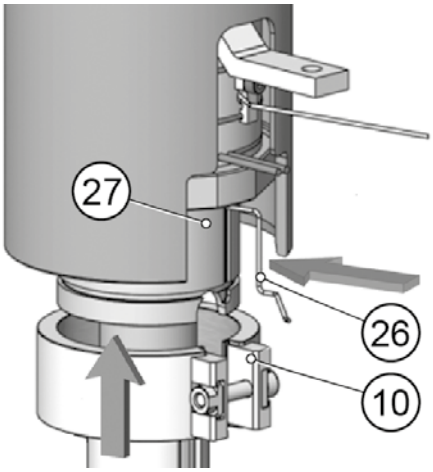
4) Align the thermocouple (26) in the nozzle heater (17) direction.
5) Fix the thermocouple (26) with heat resistant adhesive tape at the outlet of the nozzle heater (17).

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6) Guide the thermocouple (26) into the thermocouple hole of the head body (27).
7) Mount the heater band (13).
8) Complete the nozzle 12E-06.

NOTICE

Follow the mounting procedure of the nozzle 12E-06 Series Installation Guide.



Doc007265.png

10.22.2 Grounding of the Single Axis Valve Gate Nozzle

DANGER



Danger to Life by Electric Shock

The Single Axis Valve Gate Nozzle has to be properly grounded to prevent serious personal injury or death.

Electrical work must be carried out by qualified persons.

Verify that all power source connections are properly grounded.

In Emergency case - Switch all systems off.

For first aid contact your medical / safety representing.

1) Check the position of the cooling bar (6) on the pneumatic cylinder housing bottom (11).

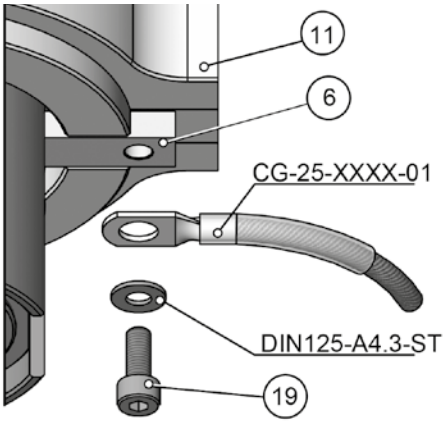
NOTICE

The cooling bar (6) must be easily movable to be positioned on the pneumatic cylinder housing bottom (11). If this is not possible, contact Synventive customer service.

2) Tighten the cooling bar (6) and ground wire with a socket cap screw (19) on the cylinder housing bottom (11).

NOTICE

See the order of the components in the image of the right side Doc007413.png



Doc007413.png

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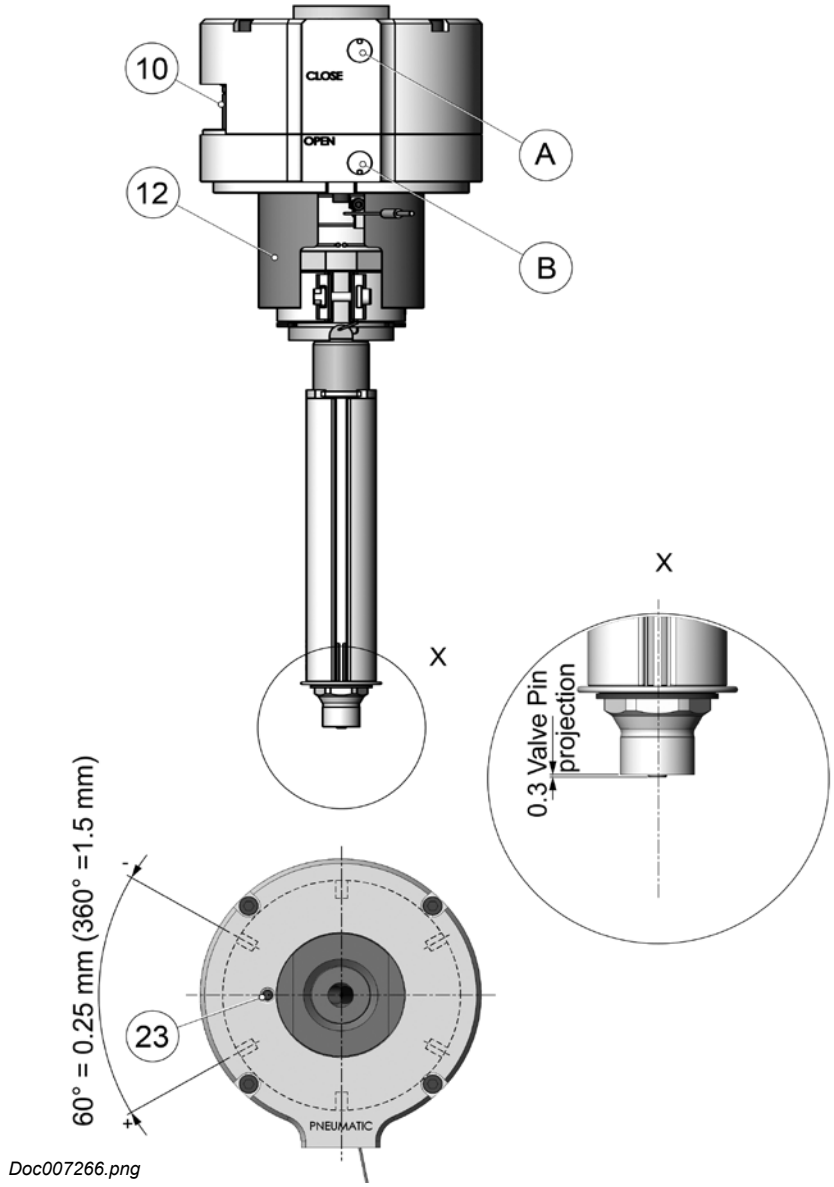
10.22.2.1 Valve Pin Height Adjustment

1) Use pneumatic pressure with reduced pressurized air of approx. 2.76 bar (40 psi) on connection (A) to drive the valve pin in closed position.
2) Unscrew the hexagon socket cap screw (23).
3) Adjust valve pin position by inserting a pin Ø 5 mm in holes of the threaded ring (10).
4) Turn the threaded ring (10) to get the valve pin front into basic position 0.3 mm.

NOTICE

Turning one hole forward results in a height adjustment of 0.25 mm at the valve pin.

5) Tighten the hexagon socket cap screw (23) - screw up to stop and then turn 90° degree to tying up.



(A) Pneumatic access “CLOSE”

(B) Pneumatic access “OPEN”

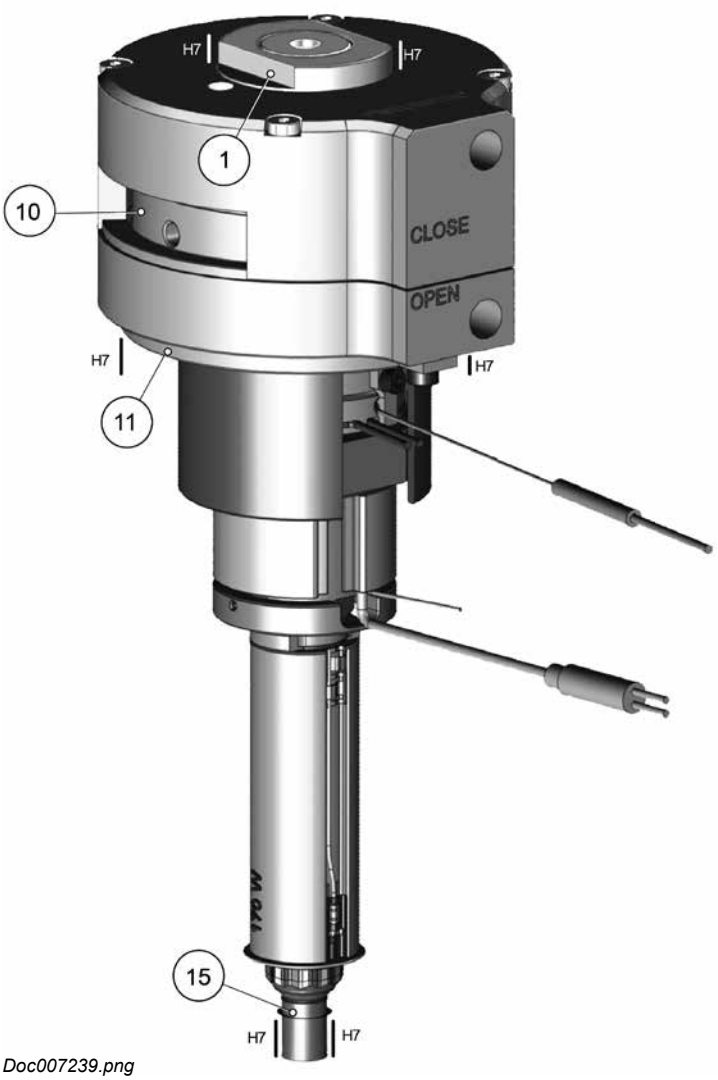
Doc007266.png

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10.22.2.2 Disassembling the Single Axis Valve Gate Nozzle out of the Mold

NOTICE

The Single Axis Valve Gate Nozzle is located on the fit diameters of the nozzle tip and the lower part of the cylinder housing in the mold.



Doc007239.png

(1) Isolation nut
(10) Threaded ring
(11) Cylinder housing bottom
(15) Nozzle tip

Disassembling the Single Axis Valve Gate Nozzle inclusive of actuator out of the mold

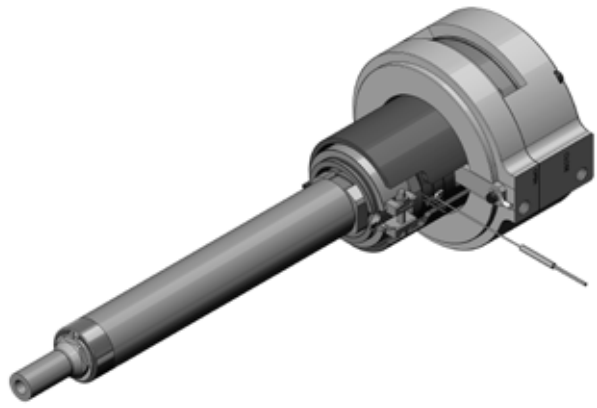
1) Cool down the Single Axis Valve Gate Nozzle and the mold to room temperature.
2) Lift the Single Axis Valve Gate Nozzle inclusive of actuator out of the mold.

NOTICE

If it is not possible to lift the Single Axis Valve Gate Nozzle inclusive of actuator out of the mold, please contact the Synventive Customer Service or Technical Support.

10.22.3 Single Axis Valve Gate Nozzle 16SVP-06

10.22.3.1 Technical data - Single Axis Valve Gate Nozzle 16SVP-06



Doc008866.png

Valve gate pin	
Diameter	Ø 8 mm
Valve Pin Adjustment	Quick coupling, anti-rotation ± 1.5 mm Via adjustment threads from outside.
Valve pin operation	
Operation medium	pneumatic
Valve pin stroke	14 mm
Pressure range	5 - 10 bar (72.5 - 145 psi)
Flowrate	10 l/min (5 bar)
Reaction time	~1.4 s
Closing force	3579 N / 6 bar (87 psi)
Opening force	3579 N / 6 bar (87 psi)
Connection	M12x1.5
Heating Power	The numbering of the heating zones starts at the nozzle tip and ends at the nozzle head.
Zone 1 (From a nozzle length of 90 mm)	285 - 450 Watt
Zone 2 (From a nozzle length of 225 mm)	735 - 785 Watt
Head	800 plus 680 Watt

NOTICE

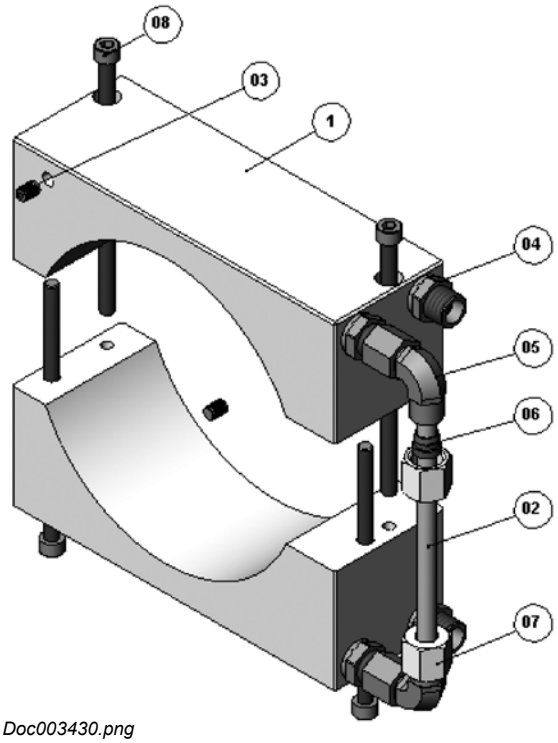
To ensure long life and continued flawless operation of the actuator, you must use filtered compressed air. Otherwise there could be a damage of the actuator.

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10.22.4 Technical Data / Exploded View - Cooling Unit CU16SVP01

NOTICE

If the mold temperature is 80 °C (176 °F) or more, the Cooling Unit CU16SVP01 is required.

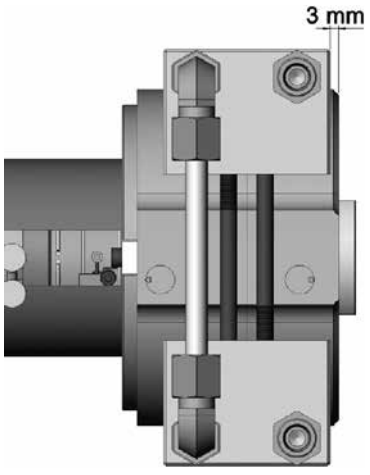


Doc003430.png

Method	Water cooling
Temperature	min. 30 °C / max. 60 °C Temp. difference IN/OUT max. 5 °C
Flow rate per unit	4 l/min
Pressure	max. 8 bar (116 psi)
Connections	M14x1.5

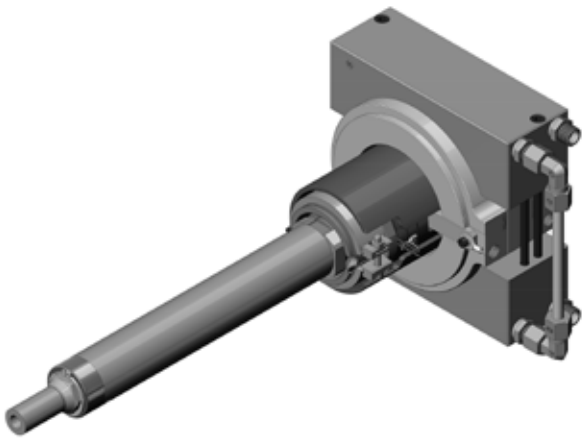
Pos.	Qty.	Part Number	Description
01	2	CU16SVPCS01	Cooling Sleeve
02	1	CU16SVPCT01	Connecting Tube
03	2	Z942/6	Sealing Plug
04	4	GE08LMEDVITOMDCF	Straight Coupling
05	2	EW08LVITOMDCF	Elbow Coupling
06	2	PSR08LX	Cutting Ring
07	2	M08LCFX	Nut
08	3	DIN912-M6x120-12.9	Hexagon Socket Cap Screw

Position of the cooling unit on the nozzle head.



Doc004922.png

CU16SVP01 mounted on
Single Axis Valve Gate Nozzle 16SVP-06



Doc008867_RIS.png

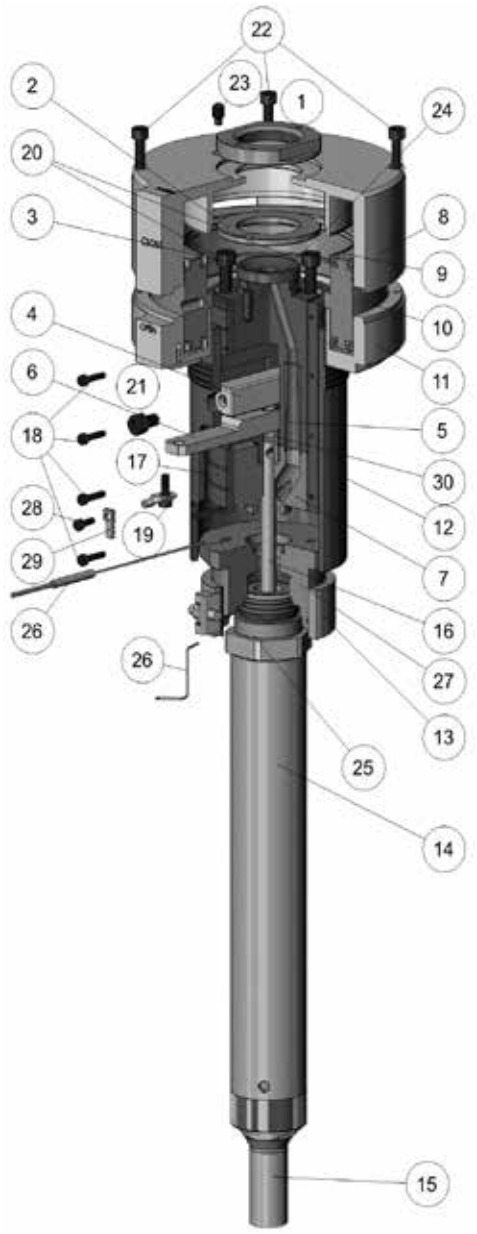
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10.22.4.1 Single Axis Valve Gate Nozzle 16SVP-06 Parts List

In this chapter the nozzle parts are identified with the numbers indicated in the following figure.

NOTICE

Always tighten the screws to the torque specified in the respective table in chapter 13.



Doc008868_RIS.png

Pos.	Qty.	Description	Part Number
1	1	Isolation nut	GBN0010S
2	1	Isolation ring	GBN0020S
3	1	Nozzle head top	GBN0031S### / GBN0032S### (varied)
4	1	Bridge	GBN0041S
5	2	Sealing sleeve	GBN0050S
6	1	Cooling bar	GBN0060S
7	1	Nozzle head bottom	GBN0074S / GBN0075S
8	1	Pneumatic cylinder housing top	GBN0081S
9	2	Piston sealing	GBN0090S
10	1	Threaded ring	GBN0100S
11	1	Pneumatic cylinder housing bottom	GBN0111S
12	1	Guide sleeve	16SVP-S-01
13	1	Heater band	HT-060-025-01
14	1	Nozzle body complete	16E-06 (varied)
15	1	Shutoff nozzle tip	(varied)
16	1	Shutoff valve pin	(varied)
17	1	Heater band	HB571071
18	4	Hexagon socket cap screw	DIN912-M3X14-12.9
19	1	Hexagon socket cap screw	DIN912-M4X12-12.9
20	4	Hexagon socket cap screw	DIN912-M6X110-12.9
21	2	Hexagon socket cap screw	DIN912-M6X10-12.9
22	4	Hexagon socket cap screw	DIN912-M5X60-12.9
23	1	Hexagon socket set screw	DIN915-M6X10-45H
24	1	Parallel pin	DIN6325-5M6X16
25	2	Parallel pin	DIN6325-3M6X8
26	2	Thermo couple	XTA00115001
27	1	Head body	16SVPHB-01
28	1	Hexagon socket cap screw	DIN912-M3X10-12.9
29	1	Clamping device	GAN0170S
30	1	Valve pin guide	SVPG-G-08-01

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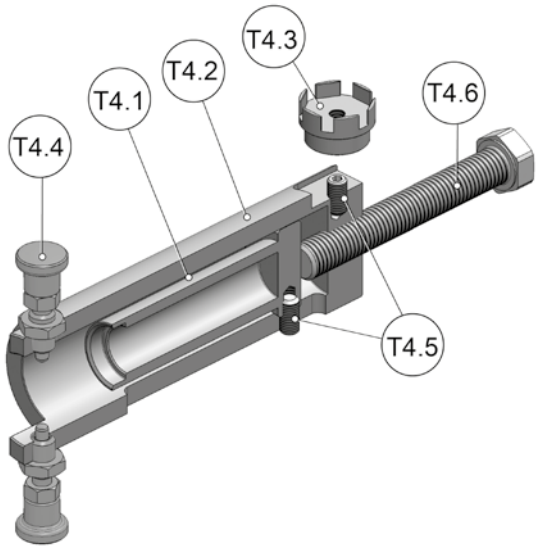
10.23 Assembly / Disassembly Tools

In this section the Stripping and Mounting Tool parts are identified with the numbers indicated in the following figure.

10.23.1 Nozzle Heater Disassembly Tool AT-FHA-032 for the Heater Type FHA#-032-###-##

The dismantling tool is required to pull the front heater from the nozzle body or from the sprue bushing.

The adapter AT-FHA-032-C-05 is only required for the sprue bushing.

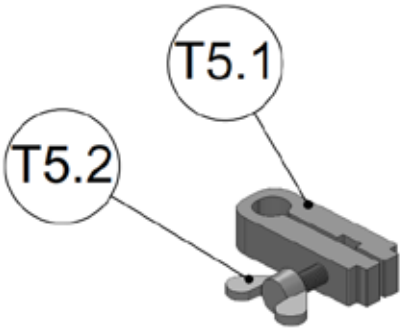


Doc008132.png

AT-FHA-032			
No.	Qty.	Item	Description
T4.1	1	AT-FHA-032-C-01	Disassembly Tool Socket
T4.2	1	AT-FHA-032-C-02	Disassembly Tool Sleeve
T4.3	1	AT-FHA-032-C-05	Disassembly Tool IB24 Adapter Nut
T4.4	1	GN817-4-4-CK	Indexing plunger; Pin Bore=4; l1=4
T4.5	2	DIN913-M6x12-45H	Flat Point Socket Set Screw 45H Alloy Steel
T4.6	1	ISO4017-M12X100-12.9	Full Thread Hexagon Screw ISO4017

10.23.2 Spreader Tool AT-HH-00 for the Head Heater Type HHA#-0##-###-##

With this tool the head heaters can be spread apart to make it easier to pull them off the nozzle body.

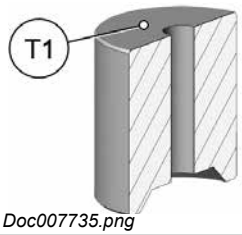


Doc008802_RIS.png

AT-HHA-00			
No.	Qty.	Item	Description
T5.1	1	AT-HHA-C-01	Head Heater Spreader
T5.2	1	DIN316-A2-M4x16	Metric DIN 316 Wing Screws M4x16

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10.23.3 Nozzle Tip Assembly tool

Tip Assembly Tool for 16E-06 Nozzle Tips TTW, TTP, TFP	
(T2) AT-16-040102	(T1) AT-16-040101
Also used for the assembly of seal caps.	
 *Doc005228.png*	 *Doc007735.png*

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Safety Instructions for the Service at the Single Axis Valve Gate Nozzle 16SVP-06

WARNING

Hot Surfaces Hazard



Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.



Hazard of Pressurized Air



Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.



NOTICE

Hazard of Material Damage



Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

Any impact against the nozzle tip may result in its damage.

Never hammer or impact the nozzle tip from the front (i.e. from the side of the mold).

Twisting could damage the nozzle tip.

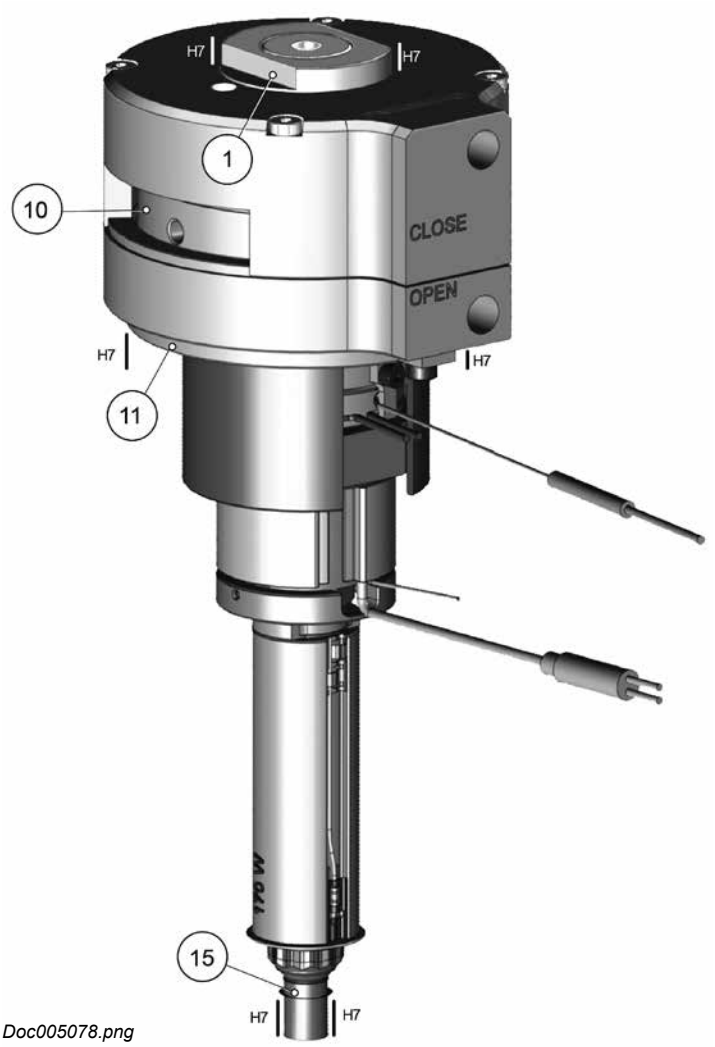
When replacing the nozzles, the sealing rings must always be replaced.

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10.24 Disassembling the Single Axis Valve Gate Nozzle out of the Mold

NOTICE

The Single Axis Valve Gate Nozzle is located on the fit diameters of the nozzle tip and the lower part of the cylinder housing in the mold.



Doc005078.png

(1) Isolation nut
(10) Threaded ring
(11) Cylinder housing bottom
(15) Nozzle tip

Disassembling the Single Axis Valve Gate Nozzle inclusive of actuator out of the mold

1) Cool down the Single Axis Valve Gate Nozzle and the mold to room temperature.
2) Lift the Single Axis Valve Gate Nozzle inclusive of actuator out of the mold.

NOTICE

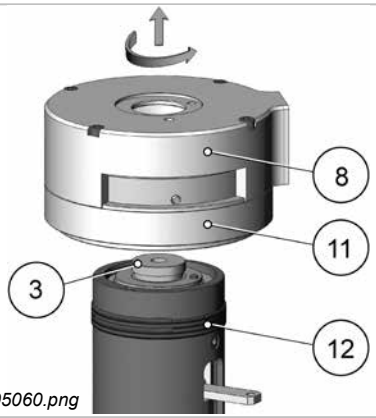
If it is not possible to lift the Single Axis Valve Gate Nozzle inclusive of actuator out of the mold, please contact the Synventive Customer Service or Technical Support.

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10.25 Dismounting and Mounting of the Nozzle

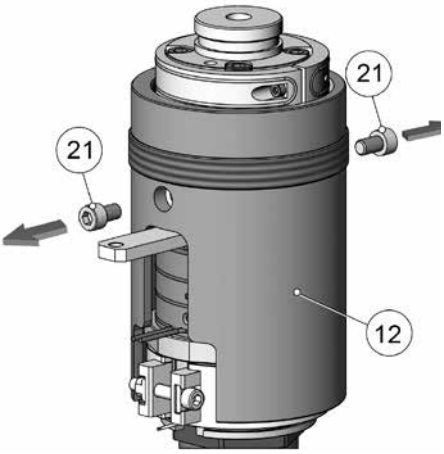
Dismounting of the Nozzle and Heater from the Head Body

1) Dismount the cylinder housing (8) (11) as discribed in the above section page <?>.



Doc005060.png

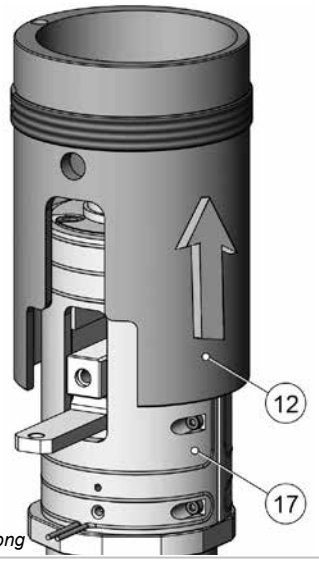
2) Screw out 2 hexagon socket screws (21).



Doc007316.png

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3) Take off the guide sleeve (12) from the heater band (17).



Doc007315.png

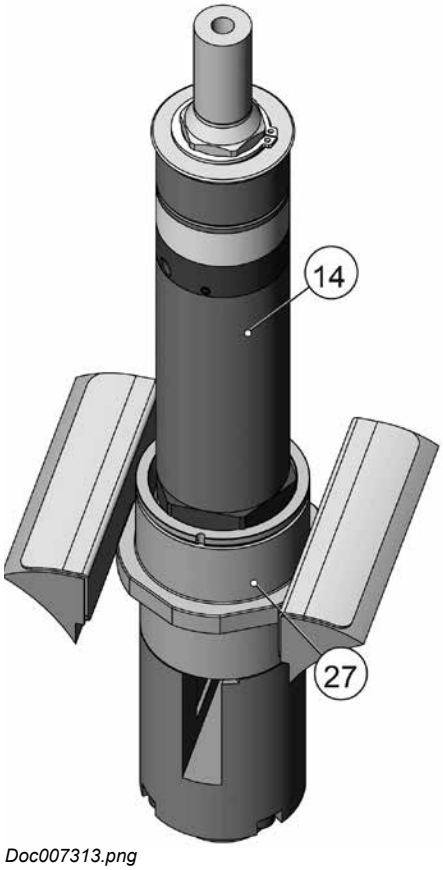
4) Fix the nozzle (14) at the head body (27) in a vice.

NOTICE

Refer to the procedure section Disassembly Nozzle 16E-06 including „Disassembling the Nozzle Heater“ and „Disassembling the Nozzle Tip and Nozzle Body“

The difference is as follow:

- The 16SVP-06 nozzle is fixed in a vice
- The 16E-06 is fixed in the manifold



Doc007313.png

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10.30.2.1 Mounting of the Nozzle and Heater on the Nozzle Housing

NOTICE

For the assembly procedure follow the section Assembling Nozzle 16E-06.

The difference is as follow:

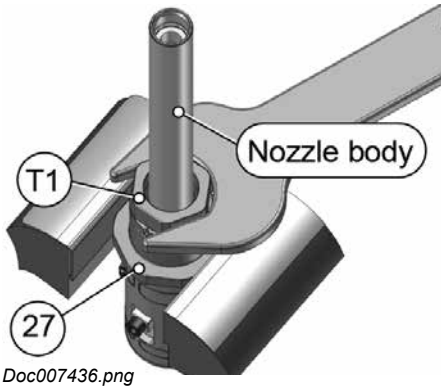
- The 16SVP-06 nozzle is fixed in a vice
- The 16E-06 is fixed in the manifold

For Mounting the Actuator Housing on the Single Axis Valve Gate Nozzle 16SVP-06, see the section above.

NOTICE

The torque value for fastening the nozzle body on the head body (27) is 340 Nm.

Setup for the Disassembly and Assembly of the Nozzle from / to the Head body



Doc007436.png

(T1) - Nozzle Disassembly Tool AT16S-01

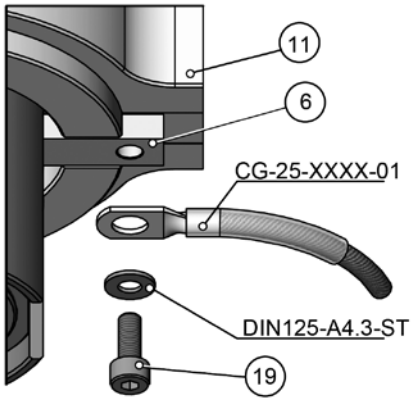
(27) - Head body

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10.31 Dismounting and Mounting the Cylinder Housing on the Nozzle

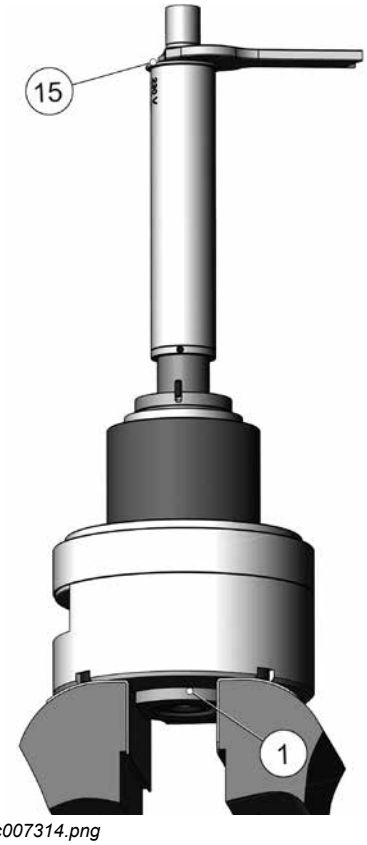
10.31.1 Dismounting the Cylinder Housing from the Nozzle

1) Remove the socket head cap screw (19).
2) Remove the DIN125 and cable grounding like the right side image.



Doc007413.png

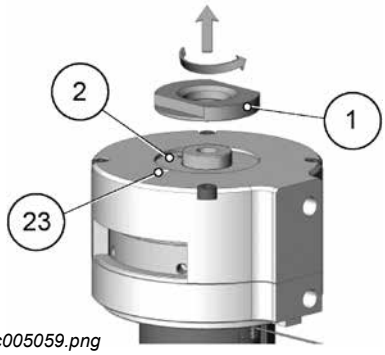
3) Fix the nozzle at the flanks of the isolation nut (1) in a vice.
4) Loosen the isolation nut (1) via the nozzle tip (15).



Doc007314.png

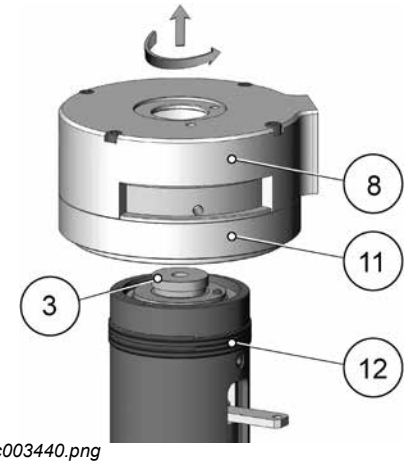
Service and Maintenance / Dismounting the Cylinder Housing from the Nozzle

5) Remove the isolation nut (1).
6) Loosen the hexagon socket set screw (23).



Doc005059.png

7) Uncrew the complete actuator housing (11) and (8) from the guide sleeve (12).

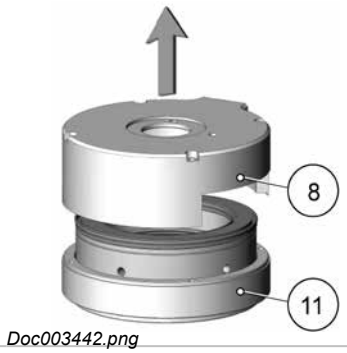


Doc003440.png

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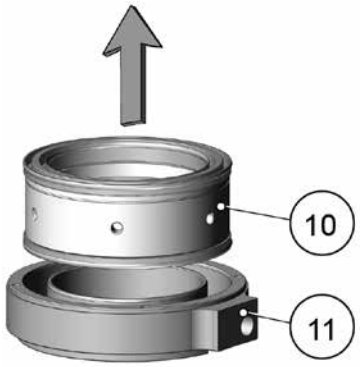
10.31.2 Replace seals

1) Lift the cylinder housing top (8) from the cylinder housing bottom (11).



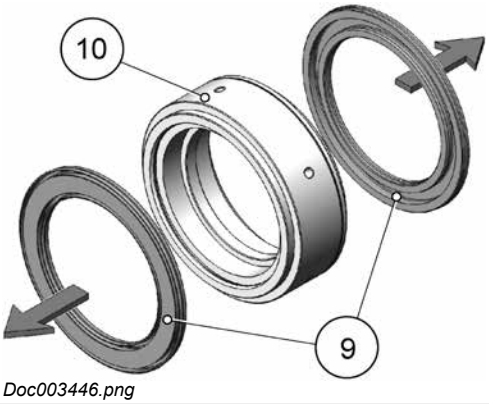
Doc003442.png

2) Lift the threaded ring (10) out of the cylinder housing bottom (11).



Doc003444.png

3) Dismount the piston sealing (9) out of the threaded ring (10).

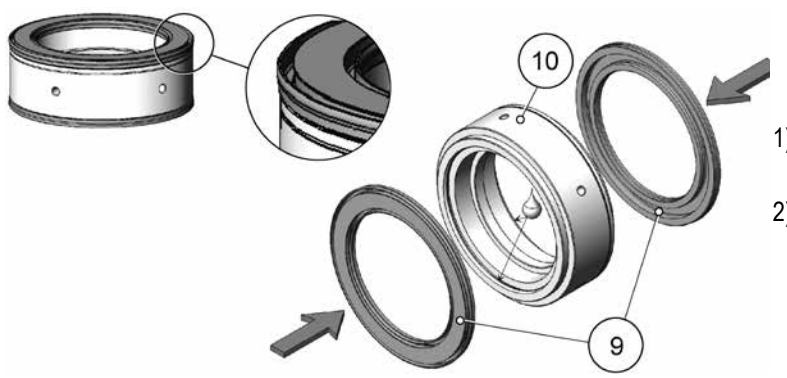


Doc003446.png

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10.31.2.1 Assembly of the Pneumatic Actuator on the Nozzle

Assembly of the Threaded Ring into the Cylinder Housing



Doc003447.png

NOTICE

After disassembly of the sealing elements, the original seals should be replaced as required by Synventive.

1) Lubricate the piston sealing (9) with hydraulic oil or white grease.
2) Mount the piston sealing (9) into the seal groove of the threaded ring (10).

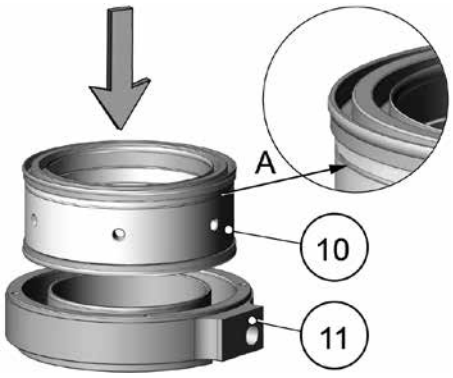
NOTICE

Avoid damage of the piston sealing and check the correct fit. Damaged piston sealing (9) has to be replaced.

NOTICE

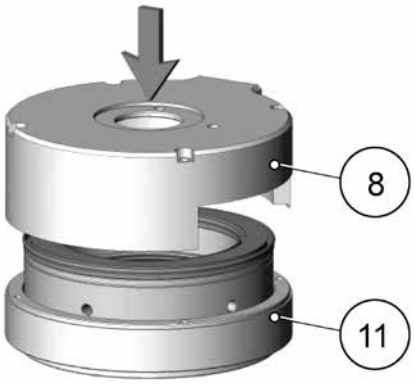
The groove at the threaded ring follows the direction of machine nozzle (A).

3) Guide the threaded ring (10) into the cylinder housing (11).



Doc003445.png

4) Assemble the cylinder housing top (8) on cylinder housing bottom (11).



Doc003443.png

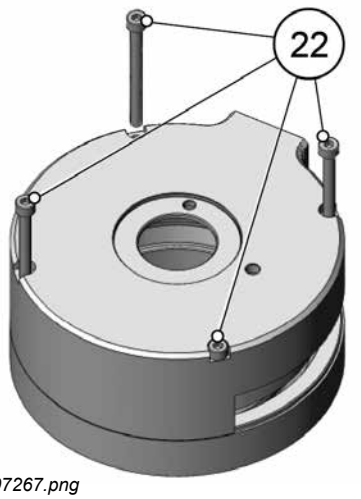
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5) Attach the 4 hexagon socket cap screws (22).

NOTICE

Tighten the hexagon socket cap screws (22) crosswise.

Use torque wrench with wrench insert and the torques indicated in the torque table (Section 13).



Doc007267.png

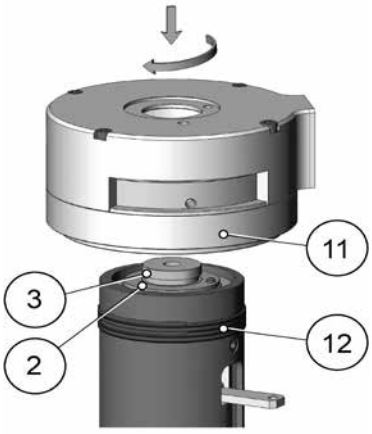
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10.31.2.2 Mounting the Pneumatic Cylinder Housing on the Nozzle

NOTICE

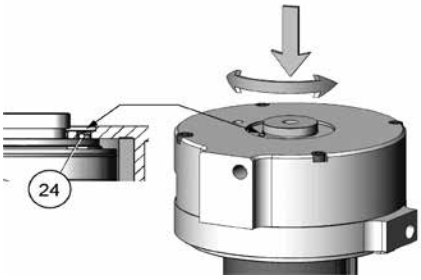
Examine whether the isolation ring (2) at the nozzle head top (3) is placed in the right position.

1) Screw in the pneumatic cylinder housing (11) at the guide sleeve (12).



Doc003441.png

2) Orientate the housing within parallel pin (24) and press up the pneumatic cylinder housing to the limit stop.



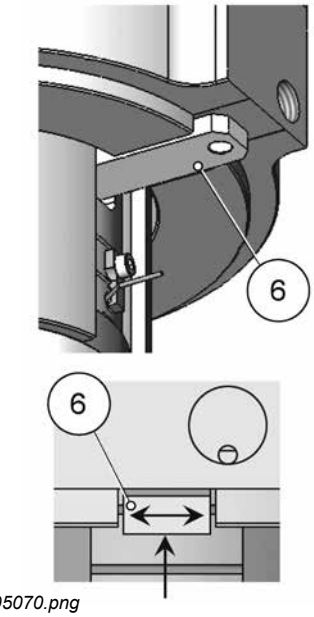
Doc005069.png

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3) Check the movement of the cooling bar (6).

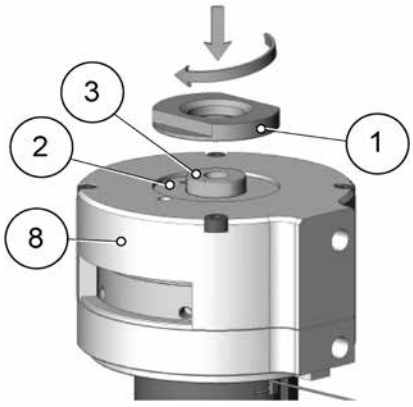
NOTICE

If the movement of the cooling bar (6) is restricted, contact the Synventive Customer Service or Technical Support.



Doc005070.png

4) Screw in the isolation nut (1) at the nozzle head top (3).



Doc005071.png

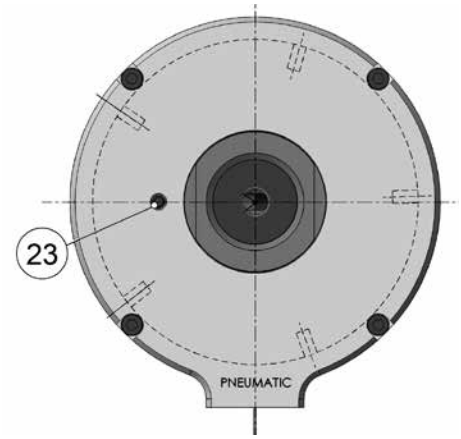
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5) Fix the nozzle at the flanks of the isolation nut (1) in a vice.
6) Tighten the isolation nut (1) at the nozzle tip (15).

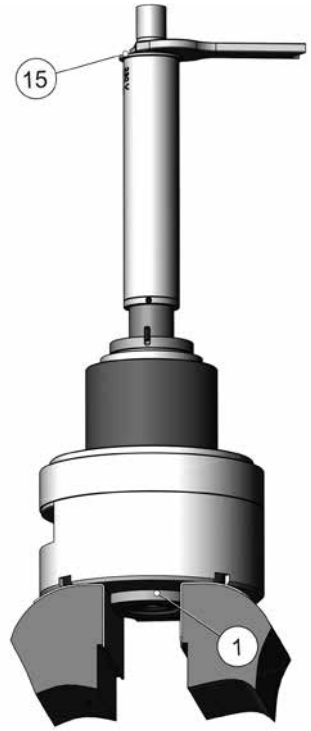
NOTICE

Torque value - 40 Nm.

7) Tighten the hexagon socket set screw (23).



Doc007319.png

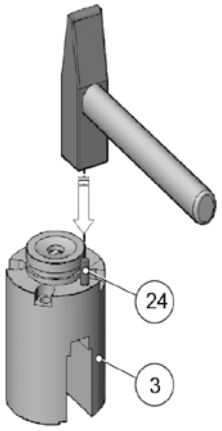


Doc007314.png

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10.26 Assembly of the Nozzle

1) Drive the parallel pin (24) into the nozzle head top (3).

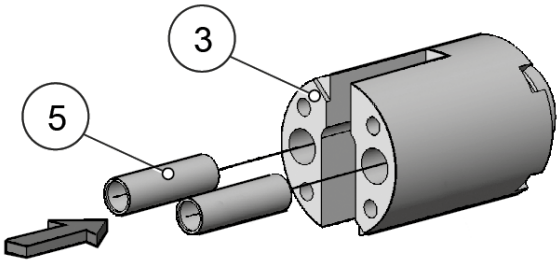


Doc007270.png

2) Put the sealing sleeves (5) into the nozzle head top (3).

NOTICE

There is an arrow on the sealing sleeves (5) that indicate the mounting direction for assembly department, because the flow bore is conical.



Doc007271.png

3) Screw nozzle head bottom (7) together with valve pin guide (30).

NOTICE

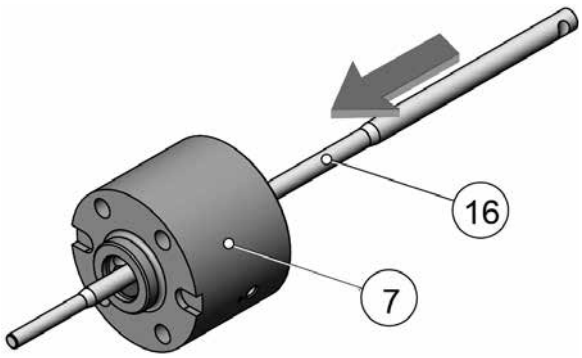
Torque value – 22 Nm.



Doc008872_RIS.png

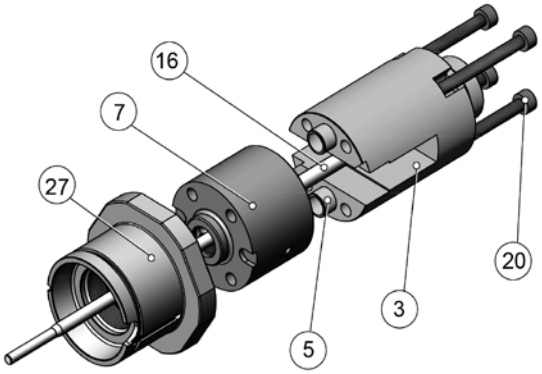
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4) Put the valve pin (16) into the nozzle head bottom (7+30) and check the easy movement.



Doc007248.png

5) Mount nozzle head top (3), nozzle head bottom (7+30) and head body (27).



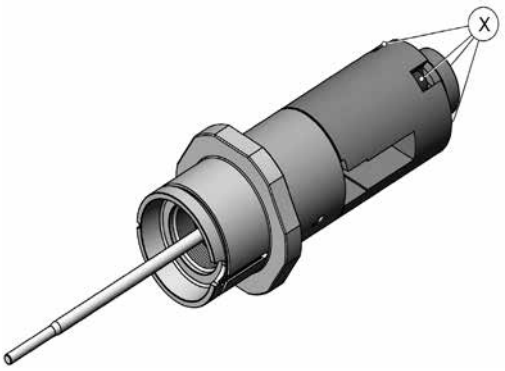
Doc007249.png

6) Tighten the assembly with four socket head cap screws (20) in an X pattern.

NOTICE

Step 1) Torque value – 8 Nm.

Step 2) Tighten the four screws in an X pattern with a torque value of 14 Nm.



Doc007250.png

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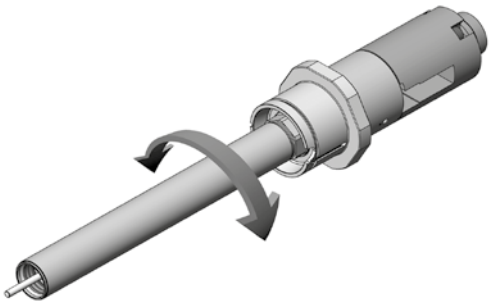
Service and Maintenance / Nozzle Tip Assembly tool

7) Apply spotting ink on the nozzle body bottom surface.



Doc004734.png

8) Screw in the nozzle body hand-tight into the head body thread until seated.
9) Unscrew the nozzle body from the head body.



Doc007251.png

10) Check the matching between the head body surfaces and the nozzle body surface.

NOTICE

The head body must bear on all surfaces uniformly and flatly, in particular on the head body contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, contact Synventive Customer Service or Technical Support

11) Clean the surfaces, if the ink test is positive and proceed to the next step.

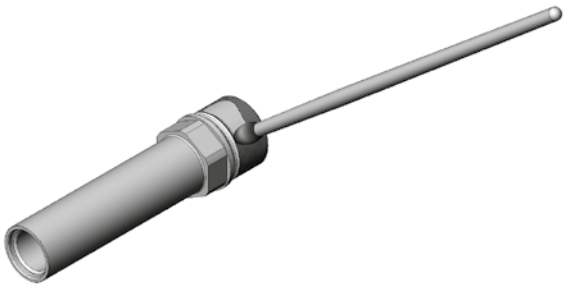


Doc007252.png

12) Lubricate the thread (not the face) of the nozzle body with high-temperature assembly paste (Anti-Seize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.



Doc003827.png

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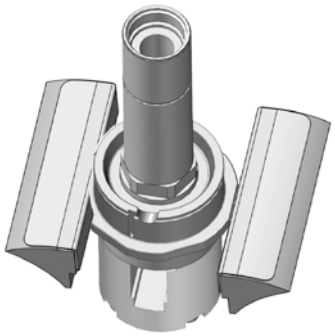
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NOTICE

For the assembly procedure follow the “Hot Runner Installation Guide for the Nozzle 16E-06”.

The difference is as follow:

- The 16SVP-06 nozzle is fixed in a vice.
- The 16E-06 is fixed in the manifold.



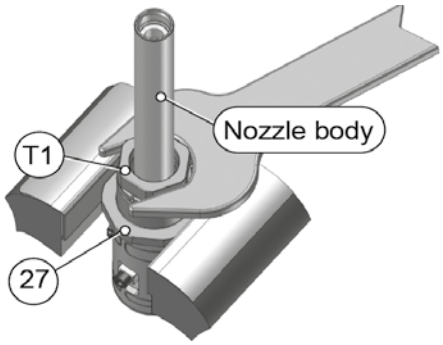
Doc007790.png

13) Tighten the nozzle body.

NOTICE

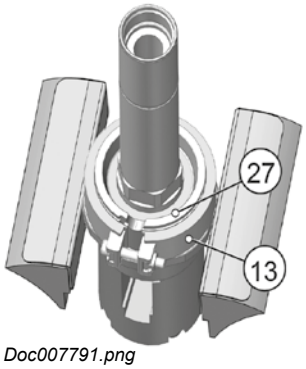
Using the tool “at16s-01” (T1).

Torque value – 340 Nm.



Doc007436.png

14) Mount the heater band (13) on the head body (27).



Doc007791.png

15) Complete the nozzle 16E-06.

NOTICE

Please refer to “Hot Runner Installation Guide for nozzle 16E-06”, Chapter 4.



Doc008864_RIS.png

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16) Put the heater band (17) above the nozzle head (3) by considering of the heater exit.

NOTICE

Same direction as the nozzle heater exit.

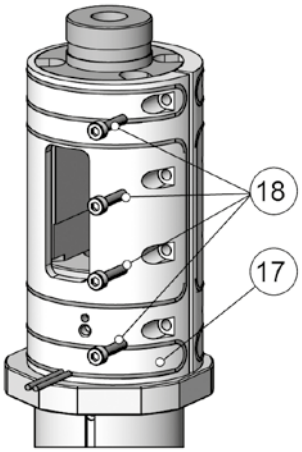


Doc008869_RIS.png

17) Fixing the heater band (17) by tighten the hexagon socket cap screws (18) in a regular way.

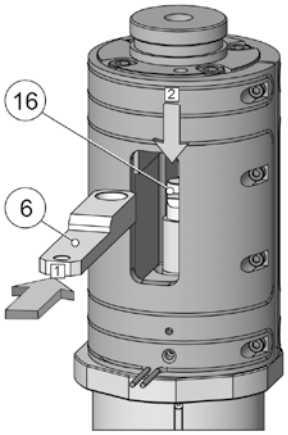
NOTICE

The torque value is 3 Nm.



Doc007255.png

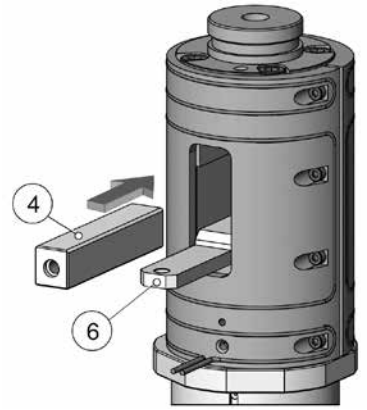
18) Put the cooling bar (6) over the valve pin (16) onto the valve pin guide.



Doc007303.png

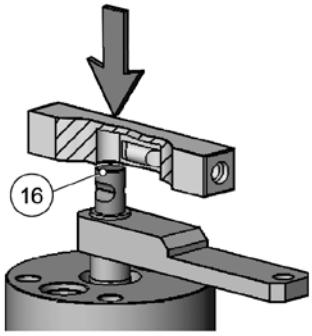
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19) Put the bridge (4) into the nozzle head.

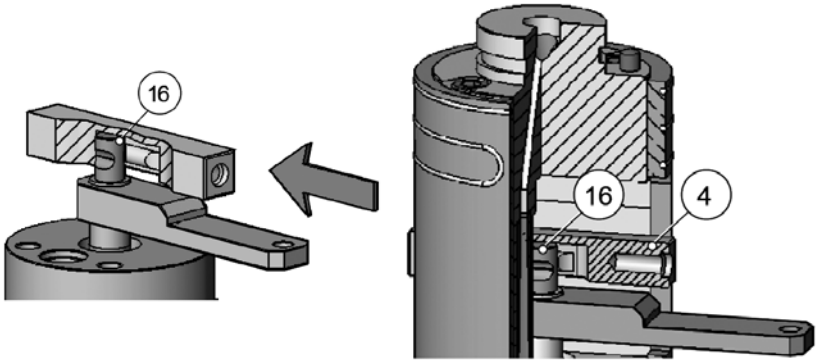


Doc007304.png

20) Take up the valve pin (16) into the bridge (4).

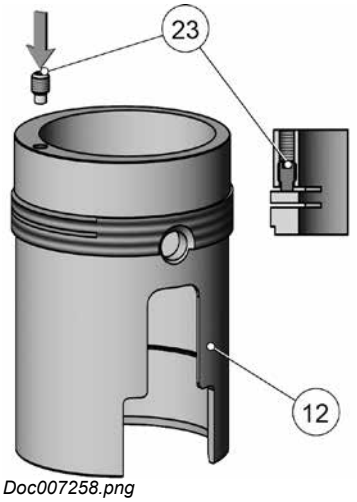


Doc007243.png



Doc007244.png

21) Screw the hexagon socket set screw (23) into the guide sleeve (12).

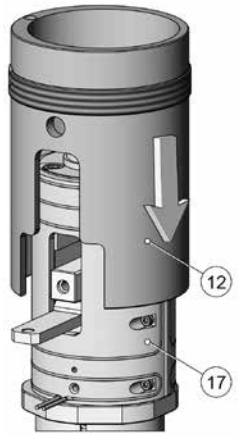


Doc007258.png

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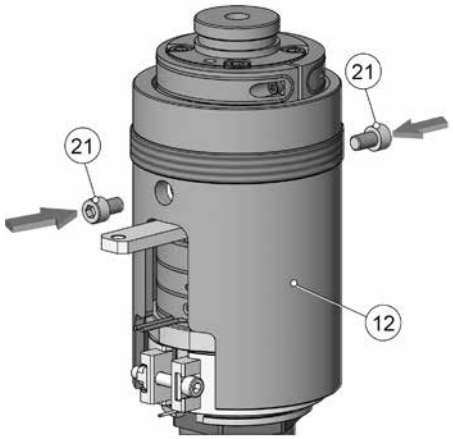
Service and Maintenance / Nozzle Tip Assembly tool

22) Sleeve the guide sleeve (12) over the heater band (17).



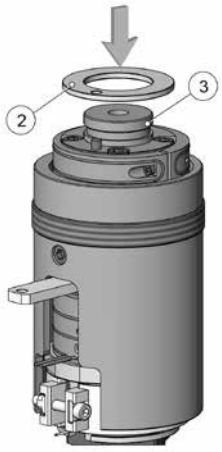
Doc007305.png

23) Screw in 2 hexagon socket screws (21) through the guide sleeve (12) and heater band into the bridge (4).



Doc007306.png

24) Place the isolation ring (2) on the nozzle head top (3).



Doc007307.png

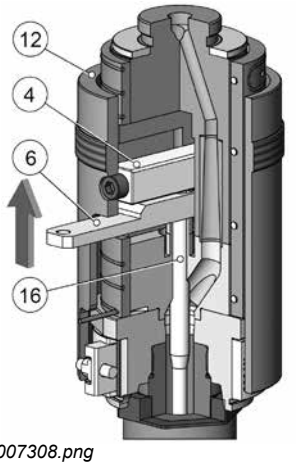
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Service and Maintenance / Nozzle Tip Assembly tool

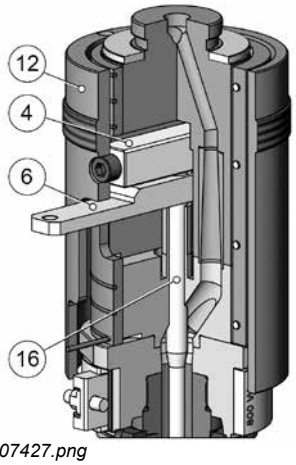
25) Bring the valve pin (16) with the bridge (4) and guide sleeve (12) into the back position (see Doc007427).

NOTICE

Now the guide sleeve (12) is in the right position on the nozzle to mount the cylinder housing.



Doc007308.png



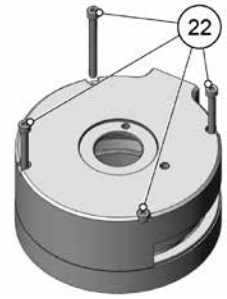
Doc007427.png

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10.27 Dismounting and Mounting the Pneumatic Cylinder Housing

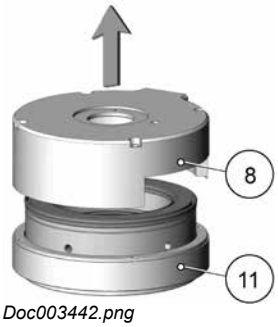
10.27.1 Dismounting the Cylinder Housing and Sealing

1) Remove the 4 socket head cap screws (22).



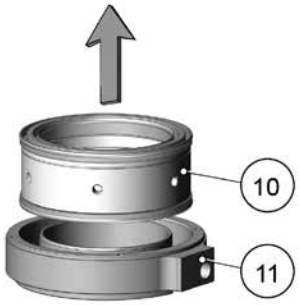
Doc008873_RIS.png

2) Lift the cylinder housing top (8) from the cylinder housing bottom (11).



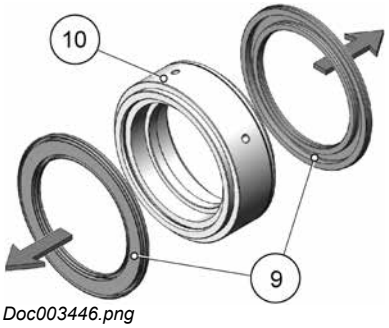
Doc003442.png

3) Lift the threaded ring (10) out of the cylinder housing bottom (11).



Doc003444.png

4) Dismount the piston sealing (9) out of the threaded ring (10).



Doc003446.png

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10.27.2 Mounting the Cylinder Housing and Sealing

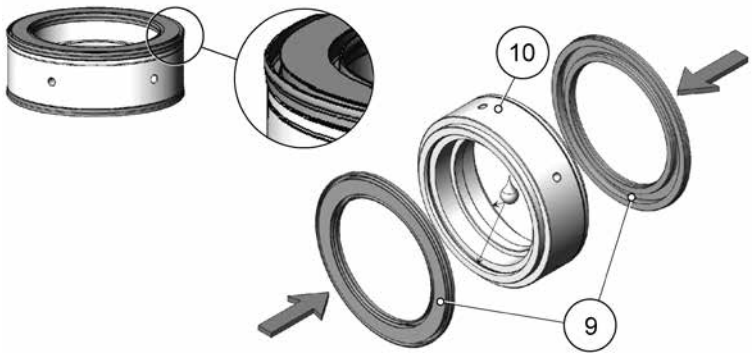
NOTICE

After disassembling of the sealing elements, the original seals must be replaced as required by Synventive.

1) Lubricate the piston sealing (9) with hydraulic oil or white grease.
2) Mount the piston sealing (9) into the seal groove of the threaded ring (10).

NOTICE

Avoid damage of the piston sealing and check the correct fit. Damaged piston sealing (9) must be replaced.

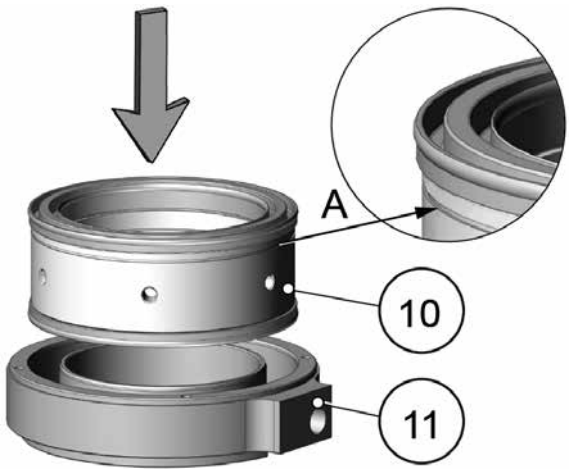


Doc003447.png

NOTICE

The groove at the threaded ring follows the direction of machine nozzle (A).

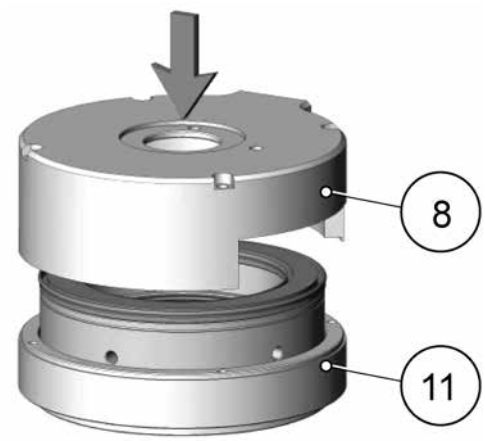
3) Guide the threaded ring (10) into the cylinder housing (11).



Doc003445.png

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4) Assemble the cylinder housing top (8) on the cylinder housing bottom (11).



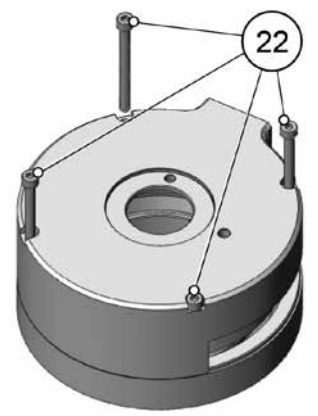
Doc003443.png

5) Attach the 4 hexagon socket cap screws (22).

NOTICE

Tighten the hexagon socket cap screws (22) crosswise.

Use torque wrench with wrench insert and the torques indicated in the torque table (chapter 13).



Doc007267.png

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10.28 Dismounting and Mounting of the Thermocouple

10.28.1 Dismounting of the Thermocouple

NOTICE

For dismounting and mounting the thermocouple there is not a need to dismount the cylinder housing first.

1) Loosen the hexagon socket cap screw (28).
2) Move the terminal (29) to the side, away from the thermocouple (26).



Doc007309.png

3) Pull the thermocouple (26) out of the bore of the heater band (17) and nozzle head bottom.



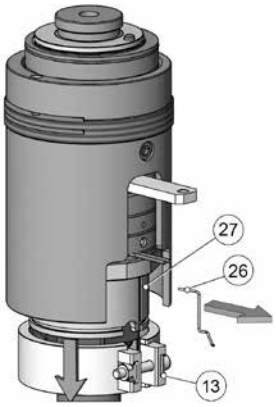
Doc007310.png

4) Dismount the 16E-06 nozzle heater.

NOTICE

Follow the heater dismounting procedure of the nozzle 16E-06.

5) Move the heater band (13).
6) Pull the thermocouple (26) out of the bore of the head body (27).



Doc007322.png

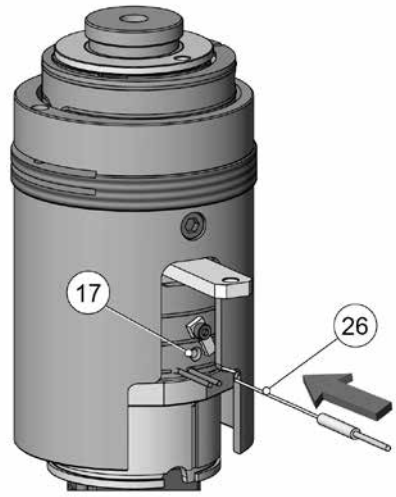
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10.28.2 Mounting of the Thermocouple

NOTICE

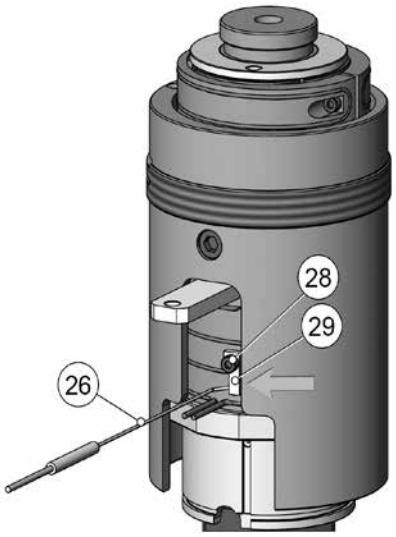
For dismounting and mounting the thermocouple there is not a need to dismount the cylinder housing first.

1) Guide the thermocouple (26) through the heater band (17) into the thermocouple hole on the nozzle head bottom (7).



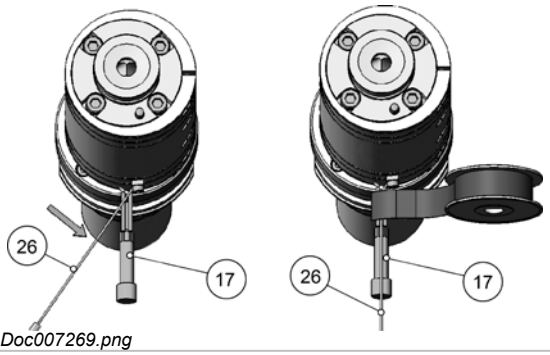
Doc007428.png

2) Bring the clamping device (29) to vertical position.
3) Fix the thermocouple (26) with the hexagon socket cap screw (28).



Doc007426.png

4) Align the thermocouple (26) in the nozzle heater (17) direction.
5) Fix the thermocouple (26) with heat resistant adhesive tape at the outlet of the nozzle heater (17).



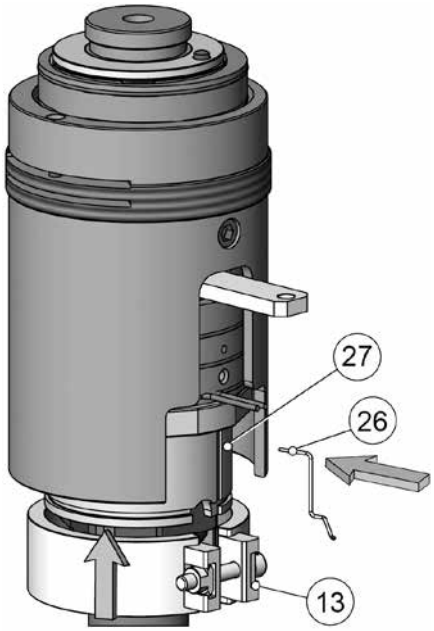
Doc007269.png

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6) Guide the thermocouple (26) into the thermocouple hole of the head body (27).
7) Mount the heater band (13).
8) Complete the nozzle 16E-06.

NOTICE

Follow the heater mounting procedure of the nozzle 16E-06.



Doc007323.png

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10.29 Grounding of the Single Axis Valve Gate Nozzle

DANGER

Danger to Life by Electric Shock

The Single Axis Valve Gate Nozzle has to be properly grounded to prevent serious personal injury or death.

Electrical work must be carried out by qualified persons.

Verify that all power source connections are properly grounded.

In Emergency case - Switch all systems off.

For first aid contact your medical / safety representing.

1) Check the position of the cooling bar (6) on the pneumatic cylinder housing bottom (11).

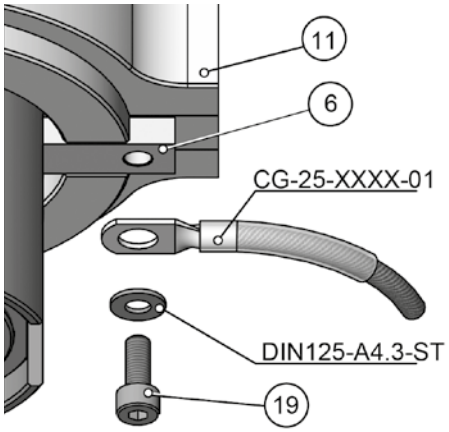
NOTICE

The cooling bar (6) must be easily movable to be positioned on the pneumatic cylinder housing bottom (11). If this is not possible, contact Synventive customer service.

2) Tighten the cooling bar (6) and ground wire with a socket cap screw (19) on the cylinder housing bottom (11).

NOTICE

See the order of the components in the image on the right side Doc007413.png.



Doc007413.png

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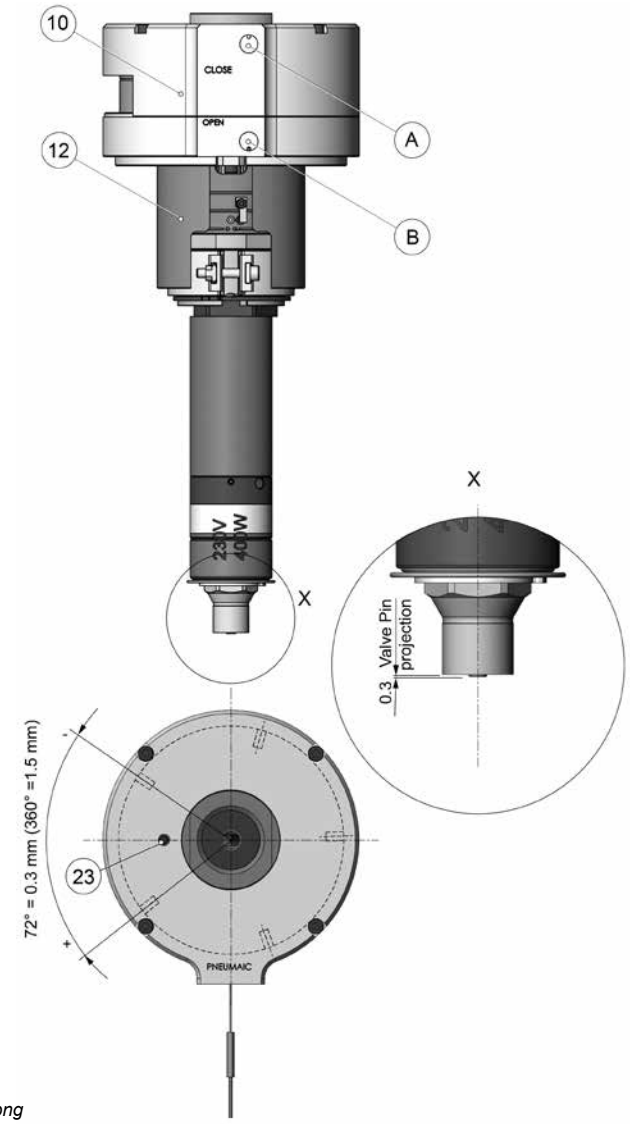
10.30 Valve Pin Height Adjustment

1) Use pneumatic pressure with reduced pressurized air of approx. 2.76 bar (40 psi) on connection (A) to drive the valve pin in valve gate closed position.
2) Unscrew the socket set screw (23).
3) Adjust valve pin position with an pin Ø 5 mm in holes of the threaded ring (10).
4) Turn the threaded ring (10) by using a pin (Ø 5 mm) to get the valve pin front into basic position 0.3 mm.

NOTICE

Turning one hole forward results in a height adjustment of 0.25 mm at the valve pin.

5) Tighten the socket set screw (23) - screw up to stop and then turn 90° degree to tying up.



(A) Pneumatic access “CLOSE”

(B) Pneumatic access “OPEN”

Doc007312.png

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10.32 Sprue Bushings

10.32.1 Sprue Bushing 06S Series

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.

⚠ WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.



Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.



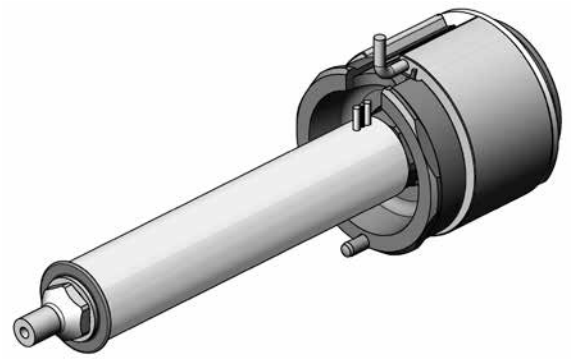
NOTICE

Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

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10.32.1.1 Technical Data - Sprue Bushing 06S



Doc004177.tif

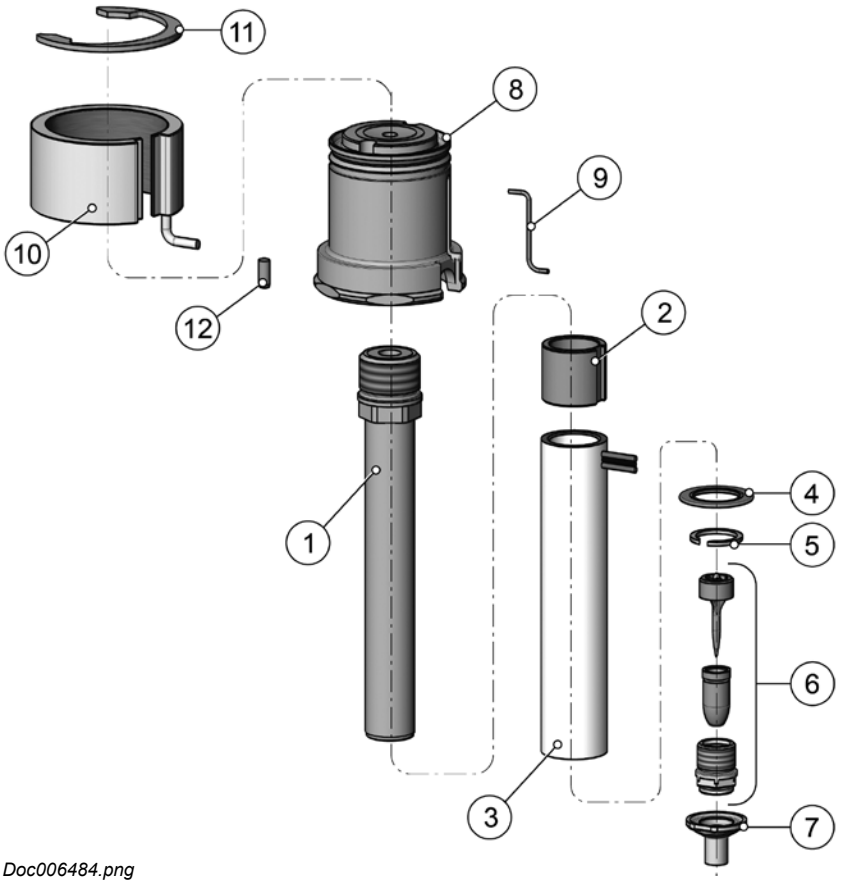
Flow Bore (J)	Ø 6 mm
Nozzle Length (L SB)	50 - 190 mm
Thermocouple	Type J, Type K
Nozzle Tips	TTP, TTW, TFP

10.32.1.2 Parts of the Sprue Bushing 06S

In this section the nozzle parts are identified with the numbers indicated in the following figure.

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.



Doc006484.png

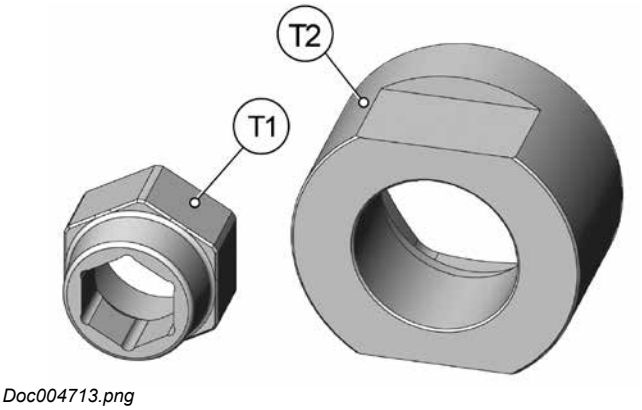
Pos.	Description
1	Nozzle body
2	Component Ring Version 01
3	Heating element
4	Component Ring Version 02
5	Nozzle circlip
6	Nozzle tip
7	Wear insert
8	Single head
9	Thermocouple
10	Head heater
11	Retaining Ring
12	Parallel Pin

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10.32.1.3 Disassembly / Assembly Tools

Nozzle Disassembly / Assembly Tools

In this section the Stripping and Mounting Tool parts are identified with the numbers indicated in the following figure.

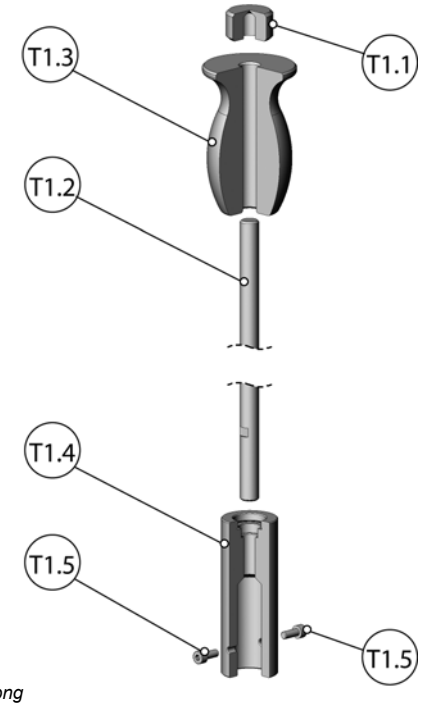


Doc004713.png

Pos.	Item	Description
T1	AT06S-01	Nut
T2	AT06S-02	Holder

Nozzle Heater Disassembly / AssemblyTool

In this section the Stripping and Mounting Tool parts are identified with the numbers indicated in the following figure.



Doc003038.png

Heater Stripping and Mounting Tool AT06E01		
Pos.	Item	Description
T1.1	ATCYL0104	Stop bolt
T1.2	ATCYL0102	Guide
T1.3	ATCYL0101	Slide Hammer
T1.4	AT06E0101	Adapter
T1.5		Socket head cap screw M4

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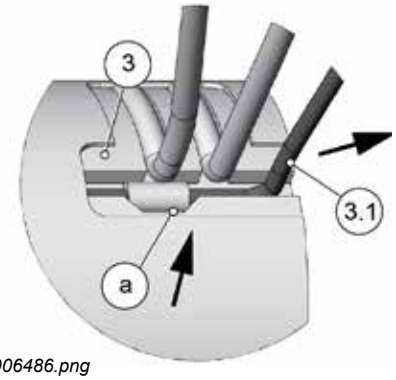
10.32.1.4 Dismounting and Mounting Nozzle Thermocouple

Dismounting Nozzle Thermocouple

1) Lift the thermocouple (3.1) at the retainer clip (a) out of the heating element (3) slot and pull it off the heating element.

NOTICE

The thermocouple (3.1) is clamped at the top of the heater element (3).



Doc006486.png

Mounting Nozzle Thermocouple

NOTICE

For mounting of the thermocouple to the nozzle heater, the nozzle heater must be dismantled from the nozzle.

Color coding of Thermocouples

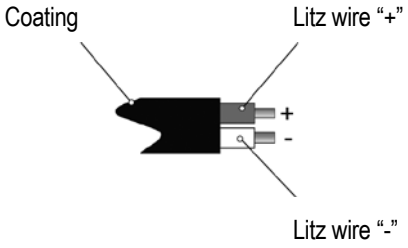
NOTICE

Take notice of the production and color identification of thermocouple cables.

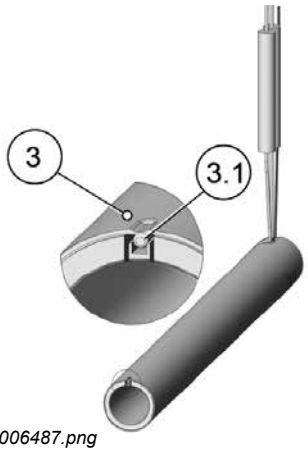
Synventive uses J and K type thermocouples Their color coding is given in the following table.

Table 1: International color coding for temperature sensors

Type	International standard IEC 584-3	
J	Black	+ Black
		- White
K	Green	+ Green
		- White



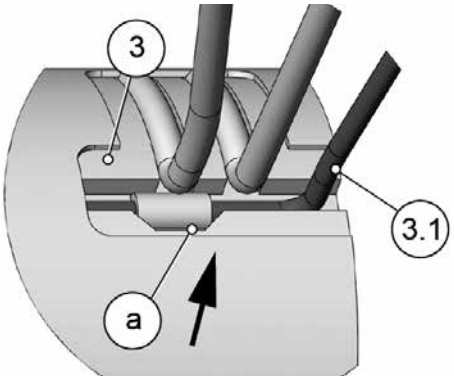
1) Slide the thermocouple (3.1) in leadership of the heating element (3) until it stops.
2) Increase the pressure until the top of the thermocouple (3.1) completely is clamped in to the final position.
3) Check the position of the thermocouple (3.1).



Doc006487.png

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4) Press the retainer clip (a) into the slot at the heating element (3).



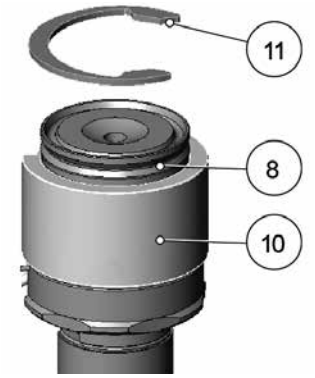
Doc006488.png

10.32.1.5 Disassembly the Nozzle 06S

NOTICE

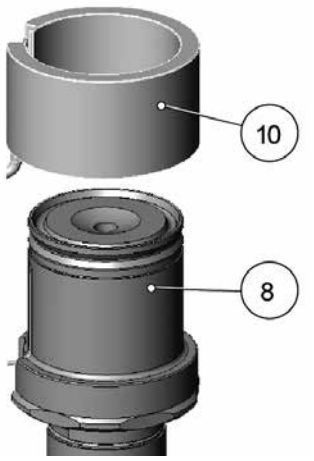
For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T2). It is not allowed to clamp the nozzle in a vice directly.

Disassembling Nozzle Head Heater



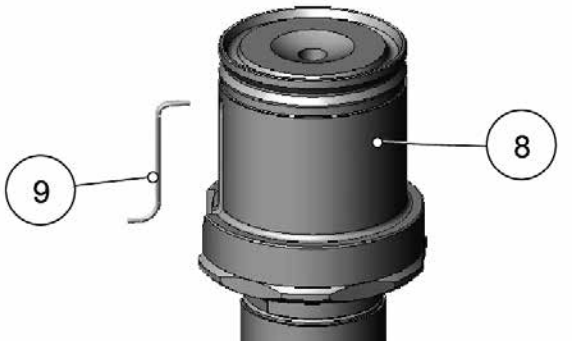
Doc006714.png

1) Dismount the retaining ring (11) from the nozzle head (8).



Doc006715.png

2) Pull the nozzle head heater (10) from the nozzle head (8)



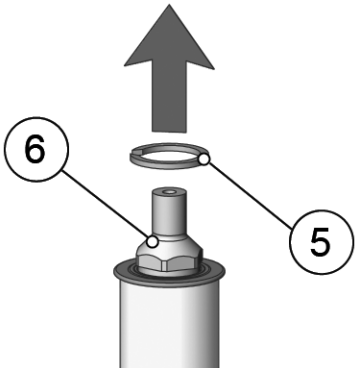
Doc006716.png

3) Pull the thermocouple (9) out of the nozzle head (8)

Disassembling the Nozzle Heater

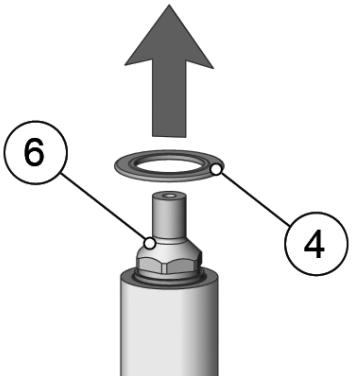
1) Dismount the nozzle head heater (10) from the nozzle head (8), as described in the above page 583.

2) Remove the circlip (5) from the nozzle tip (6).



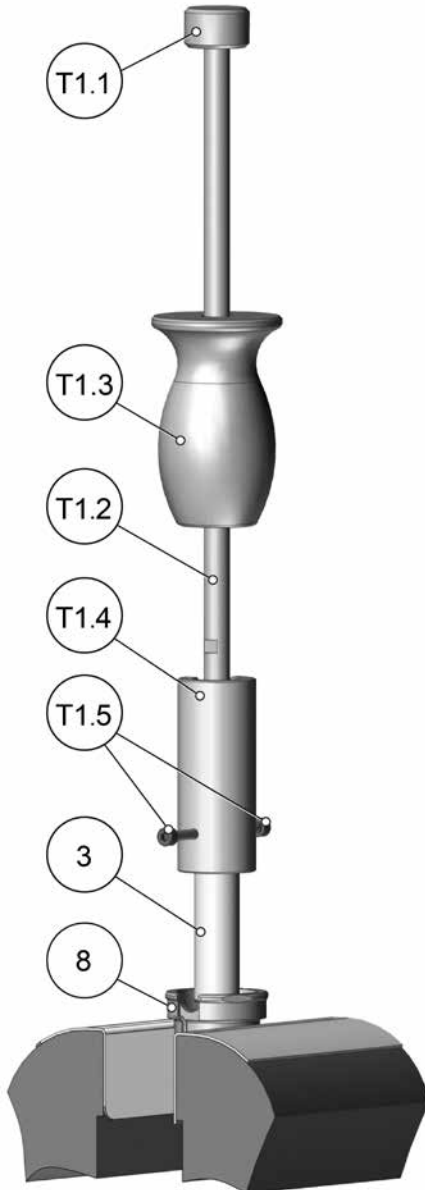
Doc006490.png

3) Remove the component ring version 02 (4).



Doc006489.png

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Doc006718.png

NOTICE

To pull the nozzle heater (3), the nozzle has to be clamped on the round nozzle head (8) surface on a vice by using protective caps. A clamping of the flats would deform the nozzle head (8).

4) Fix the nozzle head (8) in a vice.
5) Move the adapter of the dismantling tool (T1.4) over the heater (3).
6) Fix the heater (3) with 2 socket head cap screws M4 (T1.5).
7) Screw the guide (T1.2) together with the stop bolt (T1.1) and the slide hammer (T1.3) into the adapter (T1.4).
8) To remove the nozzle heater (3) slide the hammer (T1.3) against the stop bolt (T1.1) repeatedly until the nozzle heater is released.

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Disassembling the Nozzle and the Nozzle Tip

WARNING

Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

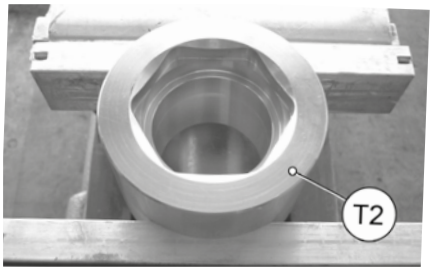
Following work must be carried out by qualified and experienced persons.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.



1) Dismount the nozzle head heater (10) from the nozzle head (8), as described in the above page 583.
2) Dismount the nozzle heater (3) from the nozzle (1), as described in the above page 584.
3) Fix the holder (T2) in a vice.

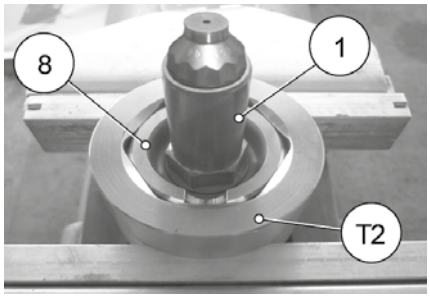


Doc004724.png

NOTICE

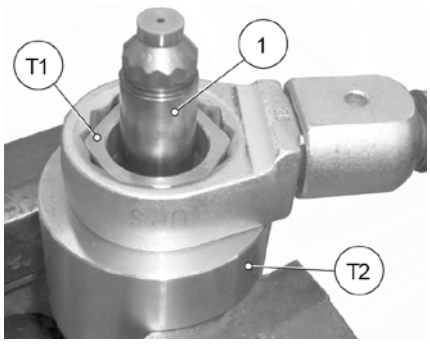
For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T2). It is not allowed to clamp the nozzle in a vice directly.

4) Place the nozzle (1) with the head side (8) in the holder (T2) to fix the nozzle against rotation.



Doc006719.png

5) Place the tool nut (T1) along the nozzle body (1) at their hexagonal shape.
6) Use a wrench to loosen the nozzle (1) from the nozzle head (8) via the tool nut (T1) by rotation (counter clockwise).



Doc006720.png

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WARNING

Hazard of Pressurized Air and Hot Surfaces

Following work must be carried out by qualified and experienced persons.

Use personal protective equipment: Face protection, hearing protection and gloves.

7) Fix the dismounted nozzle body (1) on the hexagonal shape in a vice.

WARNING

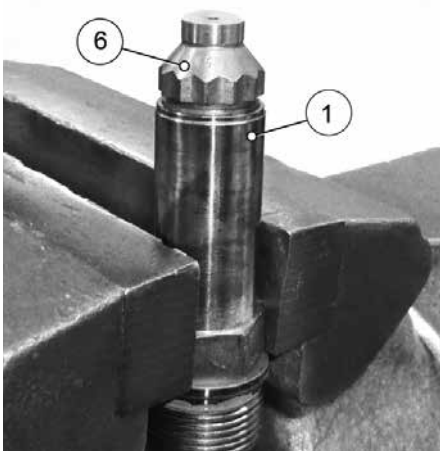
Hot Surfaces Hazard

Contact between the skin and the hot nozzle could result in burns.

NOTICE

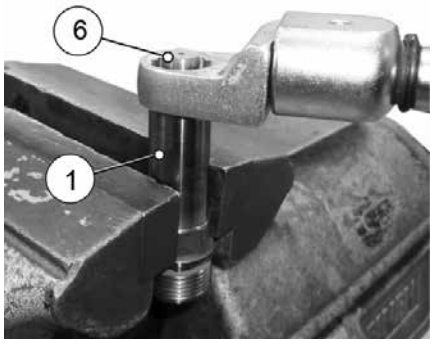
Never use an acetylene or welding torch, as severe nozzle damage can occur from over-heating.

8) To remove cold plastic in melt consistence, heat the nozzle (6) by using a heat gun, to the maximum temperature of 200 °C (392 °F).



Doc006721.png

9) Unscrew the nozzle tip (6) from the nozzle body (1) using a ring wrench.



Doc006722.png

WARNING

Hazard of Pressurized Air

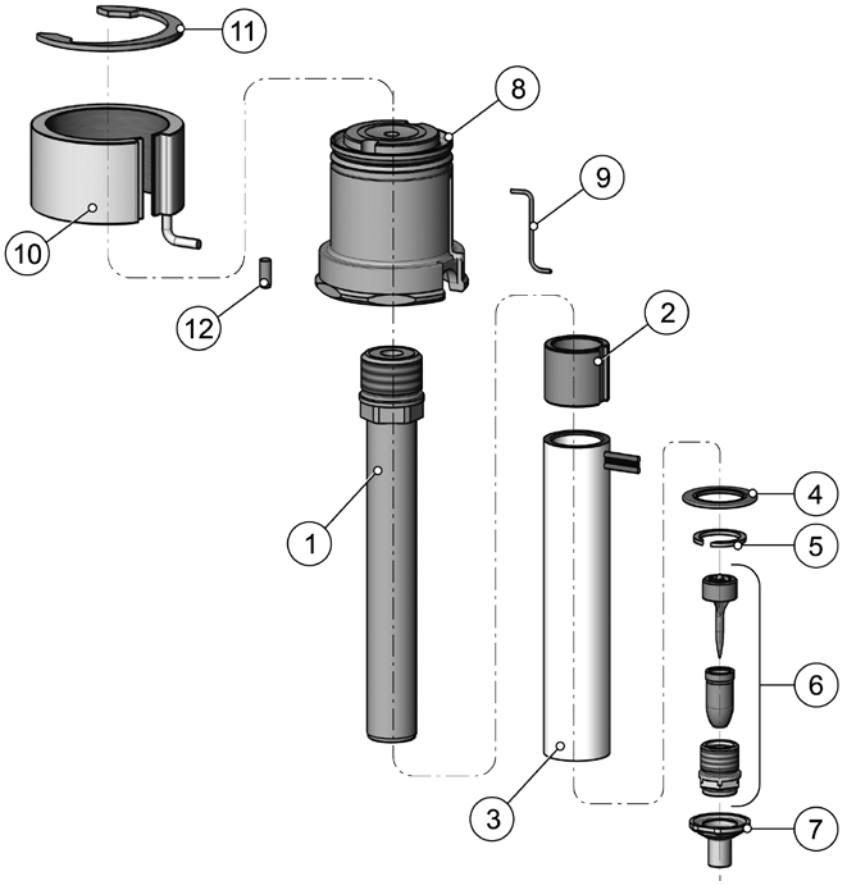
Pressurized air blow can result in hot plastic parts or foreign bodies entering the eyes, causing vision damage.

10) Clean the nozzle body (1) and nozzle tip (6) using pressurized air to remove as much residual plastic as possible.

10.32.1.6 Assembling the Nozzle 06S

NOTICE

For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T2). It is not allowed to clamp the nozzle in a vice directly.



Doc006484.png

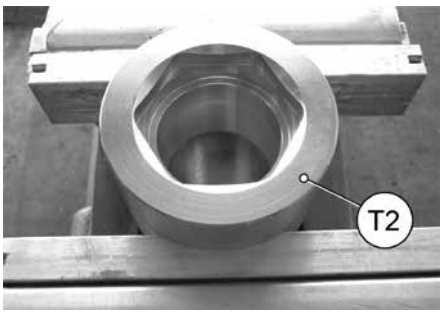
Pos.	Description
1	Nozzle body
2	Component Ring Version 01
3	Heating element
4	Component Ring Version 02
5	Nozzle circlip
6	Nozzle tip
7	Wear insert
8	Single head
9	Thermocouple
10	Head heater
11	Retaining Ring
12	Parallel Pin

Assembling the Nozzle Body

NOTICE

For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T2). It is not allowed to clamp the nozzle in a vice directly.

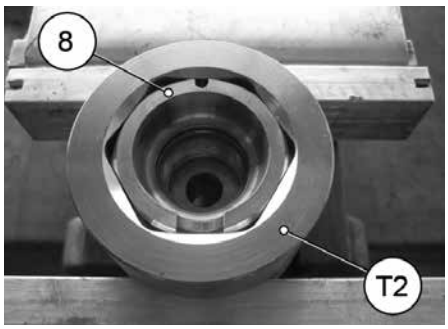
1) Fix the holder (T2) in a vice.



Doc004724.png

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2) Place the nozzle head (8) in the holder (T2).



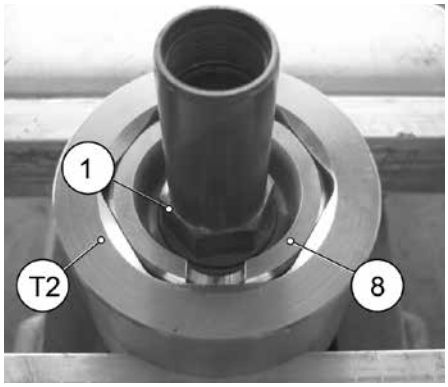
Doc006723.png

3) Apply spotting ink on the nozzle body (1) bottom surface (SF1)



Doc006724.png

4) Screw in the nozzle body (1) hand-tight into the nozzle head thread until seated.
5) Unscrew the nozzle body (1) from the nozzle head (8).



Doc006725.png

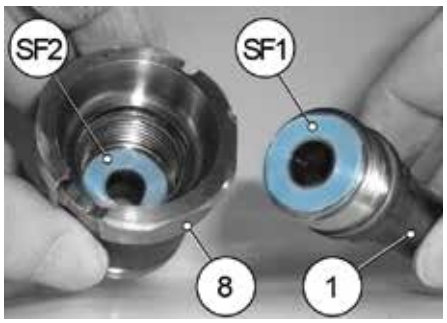
6) Check the matching between the nozzle head (8) bottom surfaces (SF2) and the nozzle body (1) surface (SF1).

NOTICE

The nozzle head must bear on all surfaces uniformly and flatly, in particular on the nozzle head contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, please - contact Synventive Customer Service or Technical Support.

7) With a positive ink test, clean the surfaces and proceed to the next step.



Doc006726.png

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8) Lubricate the thread (not the face) of the nozzle body with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

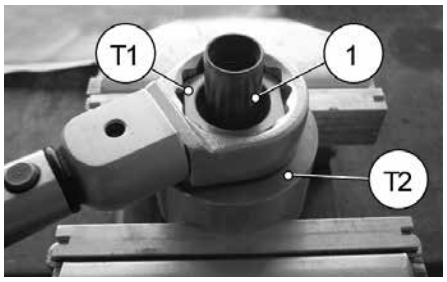


Doc003827.png

9) Tighten the nozzle body (1.1) to the nozzle head.

NOTICE

Use torque wrench with wrench insert and the torque specified in the torque table in section 13.



Doc006727.png

Mount the Nozzle Heater

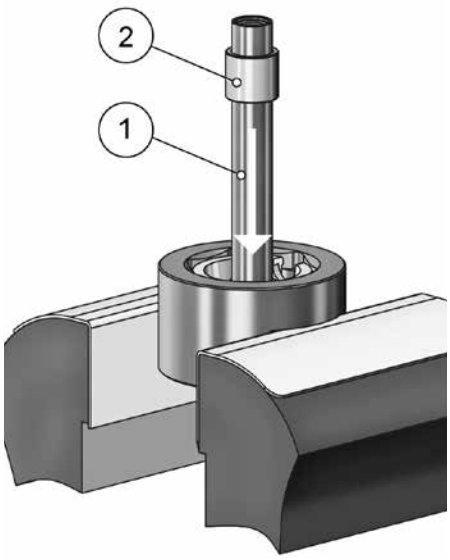
NOTICE

For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T2). It is not allowed to clamp the nozzle in a vice directly.

1) Slide the component ring version 01 (2), onto the nozzle body (1) up to the surface of the hexagon.

NOTICE

The component ring version 01 (2), is not assembled in all configurations. Reference system bill of materials.



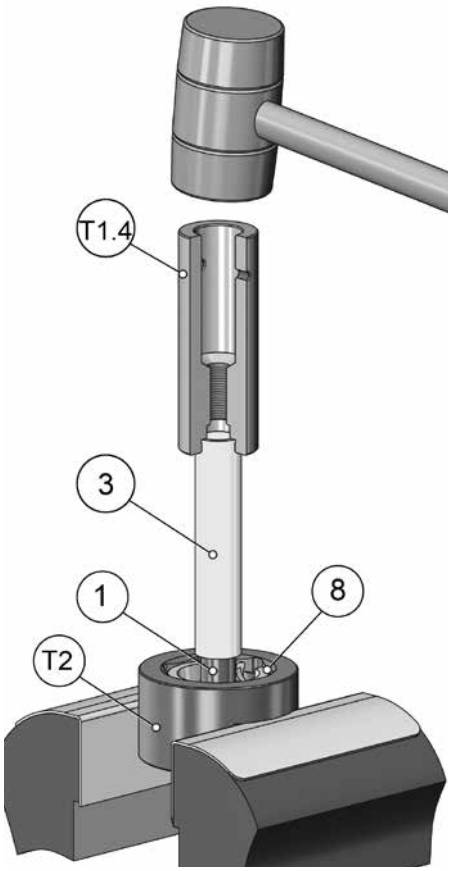
Doc006728.png

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NOTICE

Ensure the orientation of the wire leads matches opening in nozzle head (8).

2) Push the nozzle heater (3) onto the nozzle (1).



Doc006729.png

NOTICE

To ensure the temperature control of the nozzle tip, the heater must be flush with the nozzle body.

3) Control the position of the heater.



Doc003047.png

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4) Bend the heater and thermocouple (ex) leads.

NOTICE

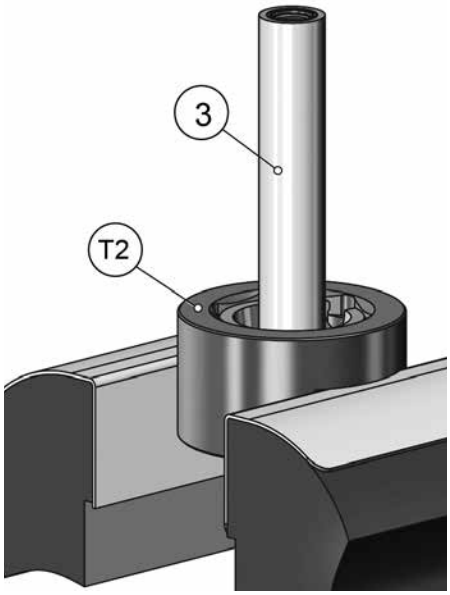
Use round-nosed pliers only.



Doc004739.tif

Assembling the Nozzle Tip

1) The nozzle heater (3) must be mounted on the nozzle, and the nozzle inserted with the head side in the holder (T2), as described in the above page 590.
2) The holder (T2) is fixed in a vice.



Doc006730.png

NOTICE

The Nozzle head is still placed in the holder, fixed in a vice.

3) Apply spotting ink on the nozzle tip (6) bottom surface (SF1).
4) Screw in the nozzle tip (6) hand-tight into the nozzle body (1) until seated.
5) Unscrew the nozzle tip (6) from the nozzle body (1).



Doc004786.png

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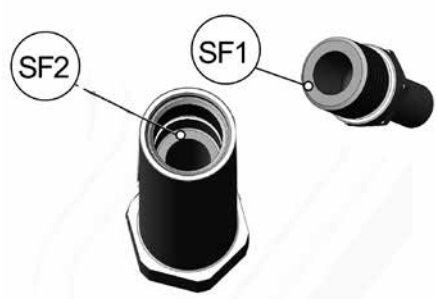
6) Check the matching between the nozzle body surface (SF2) and the nozzle tip surface (SF1).

NOTICE

The nozzle must bear uniformly on the outer surfaces uniformly and flatly, in particular on the nozzle tip contact face.

NOTICE

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory - please contact Synventive Customer Service or Technical Support.



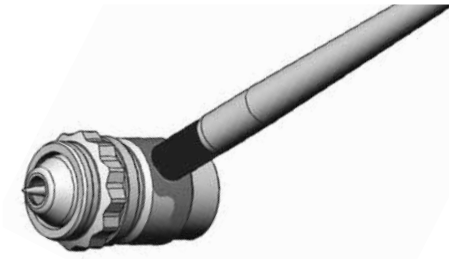
Doc004787.png

7) With a positive ink test clean the surfaces and proceed to the next step.

8) Lubricate the thread (not the face) of the nozzle tip body with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

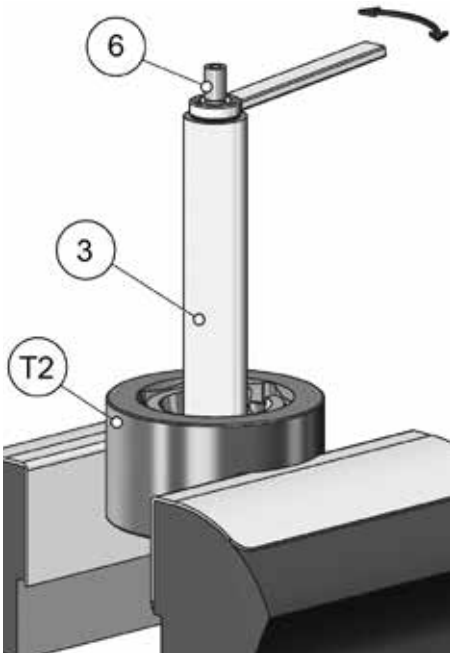

Doc003833.png

9) Screw in the nozzle tip (6) into the nozzle body (1) hand-tight.

10) Tighten the nozzle tip (6) to nozzle body(1) at room temperature.

NOTICE

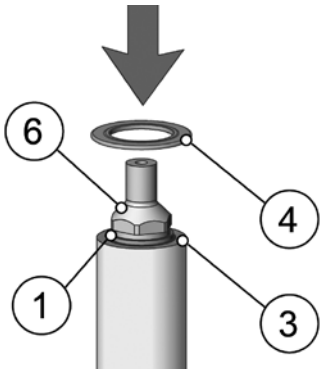
Use torque wrench with wrench insert and the torque specified in the respective table in section 13.



Doc006731.png

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11) Add the component ring version 02 (4) on the nozzle body (1).



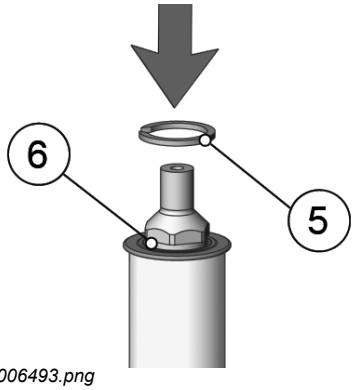
Doc006491.png

WARNING

Hot Surfaces Hazard

Contact between the skin and the hot nozzle could result in burns.

12) Cool the nozzle to approximately 25 °C (77 °F).
13) Mount the circlip (5) on nozzle tip (6).



Doc006493.png

Mount the Nozzle Head Heater

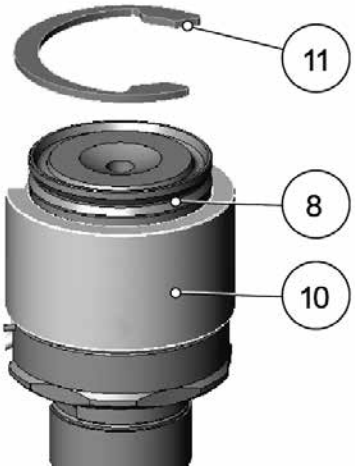
1) Align the nozzle head thermocouple and supply line in the same direction as the heater wire leads.
2) Install the thermocouple, ensuring it is seated correctly in the internal nozzle head groove.
3) Place the nozzle head heater (10) on the nozzle head (8).

NOTICE

The nozzle head heater secures the thermocouple by covering it in the vertical groove.

The heating wire must exit through the central recess of the nozzle head.

4) Mount the retaining ring (11) on the nozzle head (8).



Doc006714.png

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10.32.1.7 Grounding of the Sprue Bushing

DANGER

Danger to Life by Electric Shock

The Sprue Bushing has to be properly grounded to prevent serious personal injury or death.

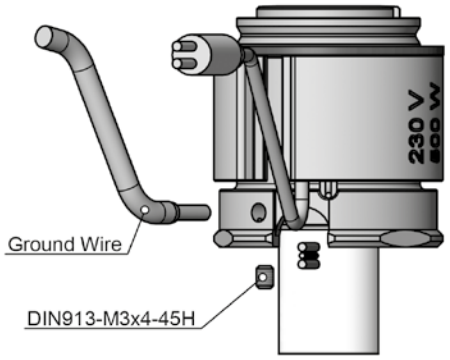
Electrical work must be carried out by qualified persons.

Verify that all power source connections are properly grounded.

In Emergency case - Switch all systems off.

For first aid contact your medical / safety representing.

1) Guide the ground wire into the hole of the single head (8).
2) Tighten the ground wire with a socket set screw (DIN 913).



Doc007409.png

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10.32.2 Sprue Bushing 09S-02 Series

NOTICE

Always tighten the screws to the torque specified in the respective table in chapter 13.

WARNING

Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Following work must be carried out by qualified and experienced persons.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.



Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.



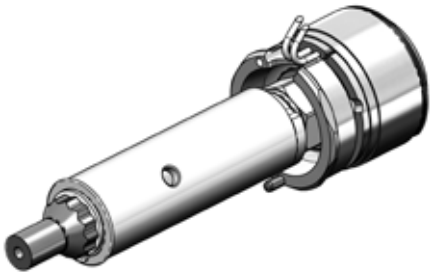
NOTICE

Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

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10.32.3 Technical Data - Sprue Bushing / Single Nozzle 09S-02



Doc008915_RIS.png

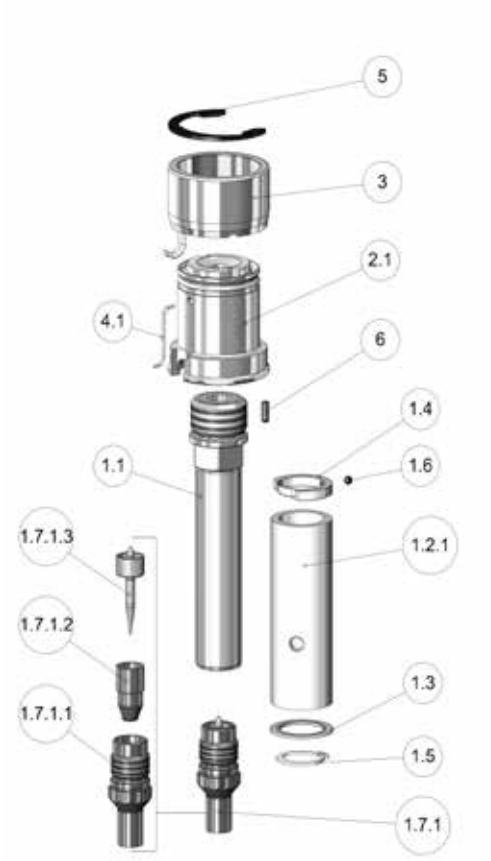
Flow Bore (J) diameter	9 mm
Nozzle Length (L SB)	60 - 400 mm
Thermocouple	Type J, Type K
Nozzle Tips	S10T, K01P, K01N, K01T, W10T

10.32.4 Parts of the Sprue Bushing 09S-02 Series

In this section the nozzle parts are identified with the numbers indicated in the following figure.

NOTICE

Always tighten the screws to the torque specified in the respective table in chapter 13.



Doc008906_RIS.png

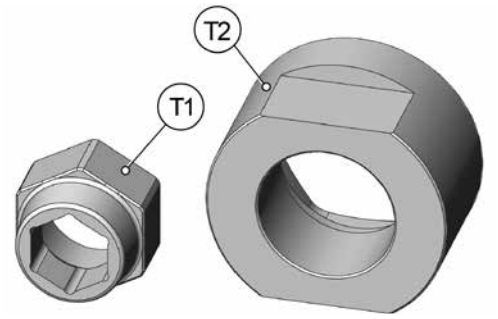
Pos.	Part No.	Description
1.1	09E###-NB-01	Nozzle body
1.2.1	09NH-###-04	Nozzle heater
1.3	09NC-R-04	Nozzle component ring (Front ring)
1.4	09NC-R-02	Nozzle component ring (Heater locating ring)
1.5	DIN471-16X1	Retaining Ring
1.6	DIN914-M3X3-45H	Socket set screw
1.7.1	09NT_####-20	Nozzle tip (Example S10T)
1.7.1.1	09TN-S-##-03	Tip nut
1.7.1.2	09TI-N-02	Full flow insert
1.7.1.3	09TI-T-01	Torpedo
2.1	09SHB-##-01-###	Nozzle Head
3	FHA0-032-022-01	Nozzle Head Heating
4.1	XTA00115001	Thermocouple Type J
4.1	XTA00130003-150	Thermocouple Type K
5	M1800H35	Retaining Ring DIN471
6	DIN6325-3M6X8	Parallel Pin

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10.32.5 Assembly Tools

In this chapter the Stripping and Mounting Tool parts are identified with the numbers indicated in the following figure.

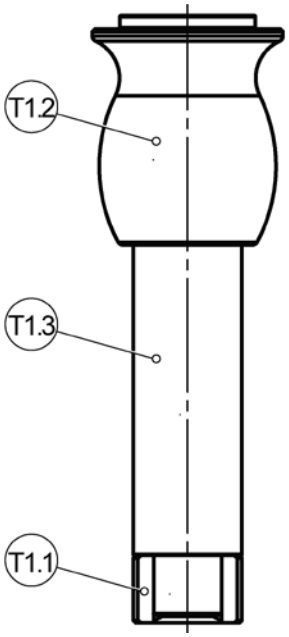
10.32.5.1 Nozzle Assembly / Disassembly Tool



Doc004713.png

Pos.	Part No.	Description
T1	AT09S-01	Nut
T2	AT06S-02	Holder

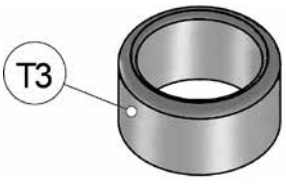
10.32.5.2 Heater Disassembly Tool Compl. 09E AT09E03



Doc003818.png

Pos.	Part No.	Description
T1.1	AT09E0301	Heater Disassembly Tool 09E Type 01
T1.2	AT09E0302	Heater Disassembly Tool 09E Type 02
T1.3	AT09E0303	Heater Disassembly Tool 09E Type 03

10.32.5.3 Wire Bending Tool For Heater Exit



Doc007577.png

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10.33 Nozzle Thermocouple

10.33.1 Dismounting Nozzle Thermocouple

NOTICE

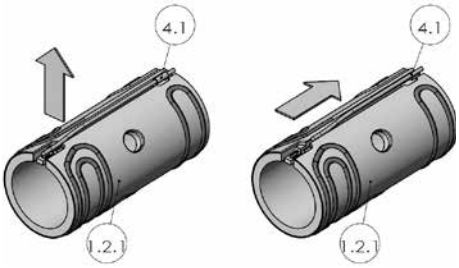
For dismounting of the thermocouple from the heater, the nozzle heater must be dismantled from the nozzle.

1) Lever the bracket of the heating element (1.2.1) with a screwdriver and pull the thermocouple (4.1) from its seat.
2) Pull the top of the thermocouple (4.1) from the bracket of the nozzle heater (1.2.1).

NOTICE

The thermocouple is pressed in.

09S-02 Brass Heater



Doc007558.jpg

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10.33.2 Mounting Nozzle Thermocouple

NOTICE

For dismounting of the thermocouple from the heater, the nozzle heater must be dismantled from the nozzle.

Color Coding of Thermocouples

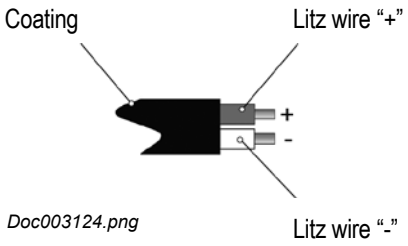
NOTICE

Take notice of the production and color identification of thermocouple cables.

Synventive uses J and K type thermocouples. Their color coding is given in the following table.

Table 1: International color coding for temperature sensors

Type	International standard IEC 584-3	
J	Black	+ Black
		- White
K	Green	+ Green
		- White



Doc003124.png

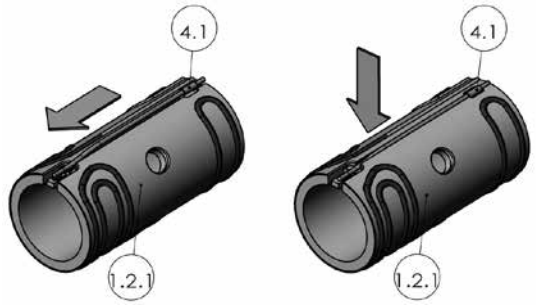
09S-02 Brass Heater

1) Push the nozzle thermocouple (4.1) under the bracket of the nozzle heater (1.2.1).

NOTICE

The fixing is needed to secure the position. A thermocouple (well-fixed in the holder) causes correct measured values.

2) Lever the clamp of the nozzle heater with a screwdriver and fix the thermocouple (4.1) below the clamp at the nozzle heater.



Doc007559.jpg

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10.34 Disassembly the Nozzle 09S-02

NOTICE

For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T2). It is not allowed to clamp the nozzle in a vice directly. Otherwise the nozzle could be damaged.

10.34.1 Disassembling Nozzle Head Heater



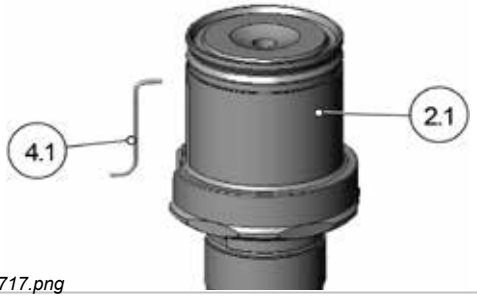
Doc008907_RIS.png

1) Dismount the retaining ring (5) from the nozzle head (2.1).



Doc008908_RIS.png

2) Pull the nozzle head heater (3) from the nozzle head (2.1).



Doc004717.png

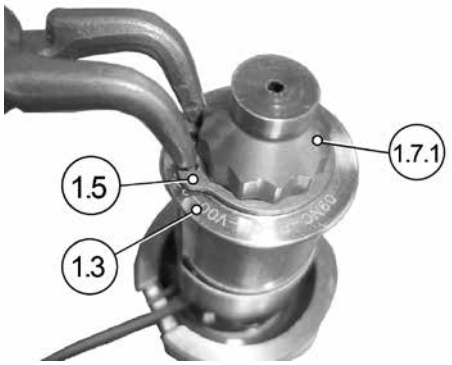
3) Pull the thermocouple (4.1) out of the nozzle head (2.1).

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10.34.2 Disassembling the Nozzle Heater

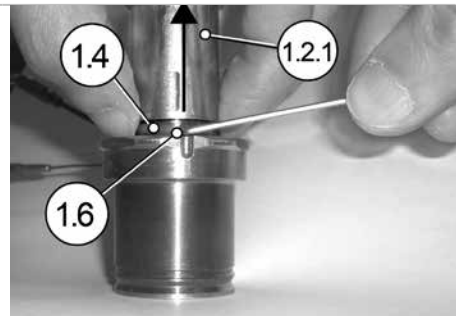
1) Dismount the head heater (3) from the nozzle head (2.1), as described in the above page 601.

2) Remove the retaining ring (1.5) from the nozzle tip (1.7.1).
3) Remove the nozzle component ring - frontring (1.3).



Doc004731.png

4) Unscrew and remove the socket set screw (1.6) from the nozzle heater locating ring (1.4).



Doc004740.png

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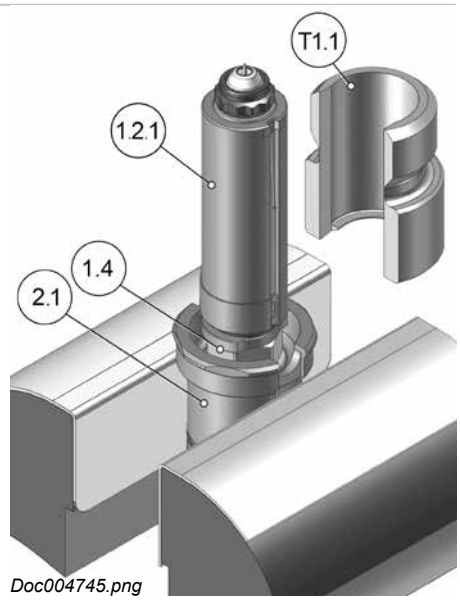
NOTICE

To pull the nozzle heater (1.2.1), the nozzle has to be clamped on the round nozzle head (2.1) surface on a vice by using protective caps. A clamping of the flats would deform the head (2.1).

5) Fix the nozzle head (2.1) in a vice.
6) Mount the heater disassembly tool Type 01 (T1.1).

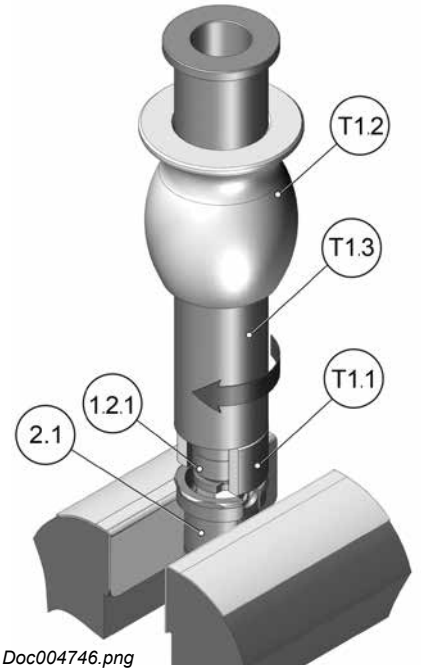
NOTICE

The lower edge of the heater removal tool type 01 (T1.1) must be set below the nozzle heater (1.2.1) include.



Doc004745.png

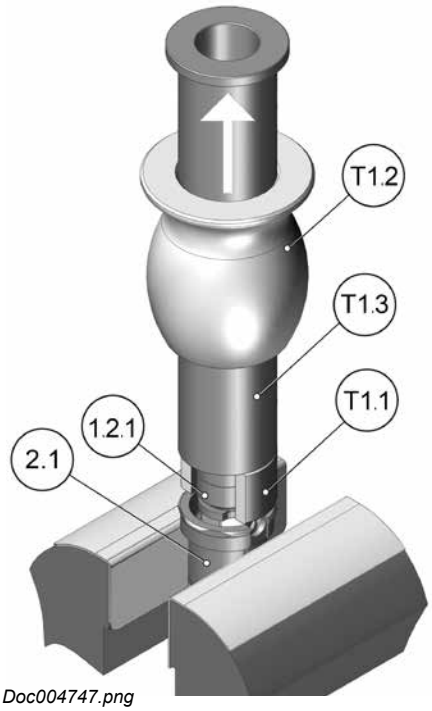
7) Slide disassembly tool Type 02 (T1.2) along the disassembly tool Type 03 (T1.3).
8) Screw disassembly tool Type 03 (T1.3) onto disassembly tool Type 01 (T1.1).



Doc004746.png

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9) To remove the nozzle heater (1.2.1), slide the disassembly tool Type 02 (T1.2) against the disassembly tool Type 03 (T1.3) repeatedly until the nozzle heater (1.2.1) including nozzle component ring (1.4) is released.



Doc004747.png

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10.35 Disassembling the Nozzle Body and the Nozzle Tip

WARNING

Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Following work must be carried out by qualified and experienced persons.

Use personal protective equipment: Face protection, hearing protection and gloves.

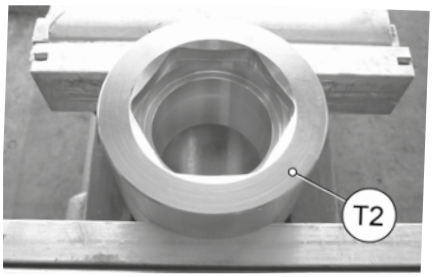
For first aid contact your medical / safety representing.



NOTICE

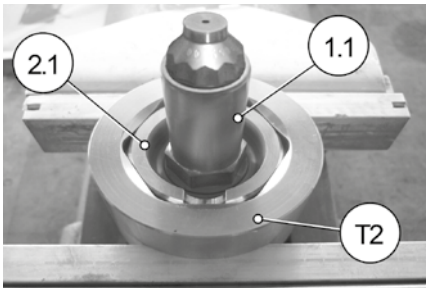
For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T2). It is not allowed to clamp the nozzle in a vice directly. Otherwise the nozzle could be damaged.

1) Dismount the nozzle head heater (3) from the nozzle head (2.1), as described in the above page 284.
2) Dismount the nozzle heater (1.2.1) from the nozzle (1.1), as described in the above page 287.
3) Fix the holder (T2) in a vice.



Doc004724.png

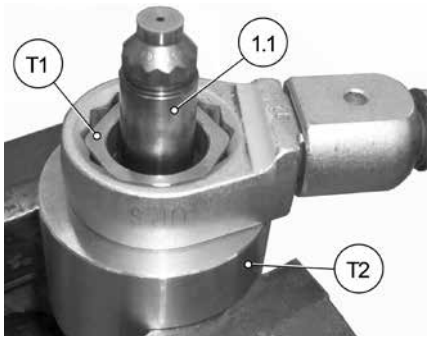
4) Place the nozzle (1.1) with the head (2.1) side in the holder (T2) to fix the nozzle against rotation.



Doc004748.png

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5) Place the tool nut (T1) over the nozzle body (1.1) at the hexagonal shape.
6) Use a wrench to loosen the nozzle (1.1) from the nozzle head (2.1) via the tool nut (T1) by rotation (counter clockwise).



Doc004718.png

WARNING

Hot Surfaces Hazard

Following work must be carried out by qualified and experienced persons.

Use personal protective equipment: Face protection, hearing protection and gloves.

7) Fix the dismounted nozzle body on the hexagonal shape in a vise.

WARNING

Hot Surfaces Hazard

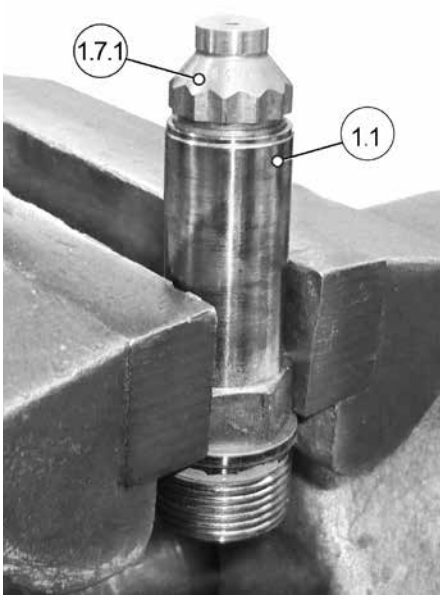
Contact between the skin and the hot nozzle could result in burns.

NOTICE

If there is plastic compound in the nozzle, it must be heated to disassemble the nozzle tip.

Never use an acetylene or welding torch, as severe nozzle damage can occur from over-heating.

8) To remove cold plastic in melt consistence, heat the nozzle tip (1.7.1) and nozzle body (1.1) by using a heat gun, to the maximum temperature of 200 °C (392 °F).



Doc004779.png

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9) Unscrew the nozzle tip (1.7.1) from the nozzle body (1.1) using a ring wrench.

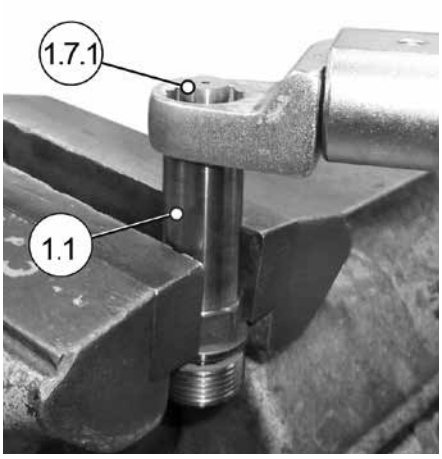
WARNING

Hazard of Pressurized Air

Pressurized air blow can result in hot plastic parts or foreign bodies entering the eyes, causing vision damage.

Wear face protection, hearing protection, protective gloves - PPE.

10) Clean the nozzle body (1.1) and nozzle tip (1.7.1) using pressurized air to remove as much residual plastic as possible.



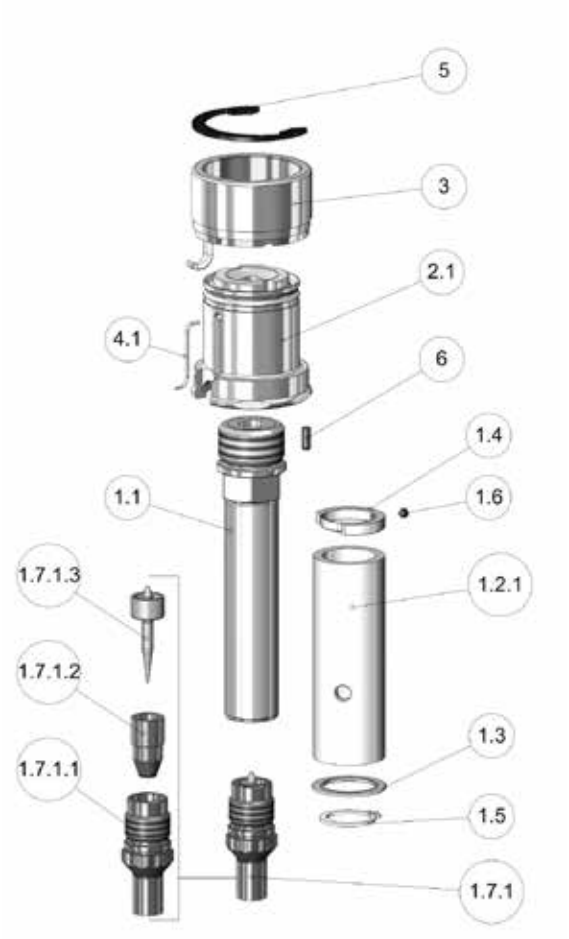
Doc004723.png

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10.35.2.1 Assembling the Nozzle 09S-02

NOTICE

For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T2). It is not allowed to clamp the nozzle in a vice directly.



Doc008906_RIS.png

Pos.	Part No.	Description
1.1	09E###-NB-01	Nozzle body
1.2.1	09NH-###-04	Nozzle heater
1.3	09NC-R-04	Nozzle component ring (Front ring)
1.4	09NC-R-02	Nozzle component ring (Heater locating ring)
1.5	DIN471-16X1	Retaining Ring
1.6	DIN914-M3X3-45H	Socket set screw
1.7.1	09NT_####-20	Nozzle tip (Example S10T)
1.7.1.1	09TN-S-##-03	Tip nut
1.7.1.2	09TI-N-02	Full flow insert
1.7.1.3	09TI-T-01	Torpedo
2.1	09SHB-##-01-###	Nozzle Head
3	FHA0-032-022-01	Nozzle Head Heating
4.1	XTA00115001	Thermocouple Type J
4.1	XTA00130003-150	Thermocouple Type K
5	M1800H35	Retaining Ring DIN471
6	DIN6325-3M6X8	Parallel Pin

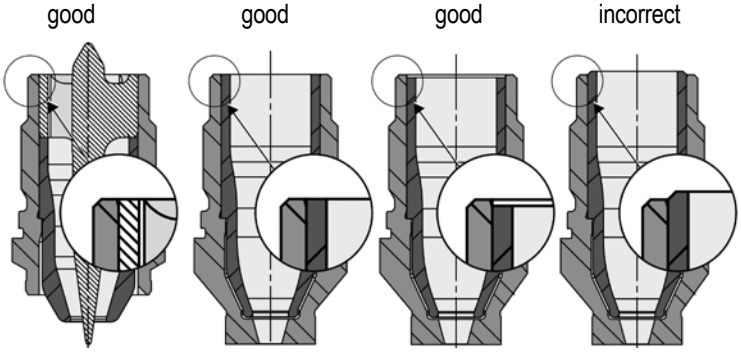
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10.36 Assembling the Nozzle Tip

1) Fix the nozzle body on the hexagonal shape in a vice.



Doc004778.png



Doc004688.png

NOTICE

See examples (Doc004688) of good and incorrect insert installations.

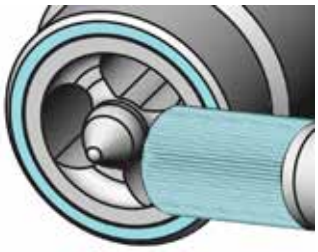
Make sure the insert must not exceeds the height of the nozzle tip head.

Incorrect items should not be further processed.

NOTICE

The Nozzle head is still placed in the holder, fixed in a vice.

2) Apply spotting ink on the nozzle tip (1.7.1) bottom surface (SF1).
3) Screw in the nozzle tip (1.7.1) hand-tight into the nozzle body (1.1) until seated.
4) Unscrew the nozzle tip (1.7.1) from the nozzle body (1.1).



Doc004736.tif

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5) Check the matching between the nozzle body (1.1) surface (SF2) and the nozzle tip (1.7.1) surface (SF1).

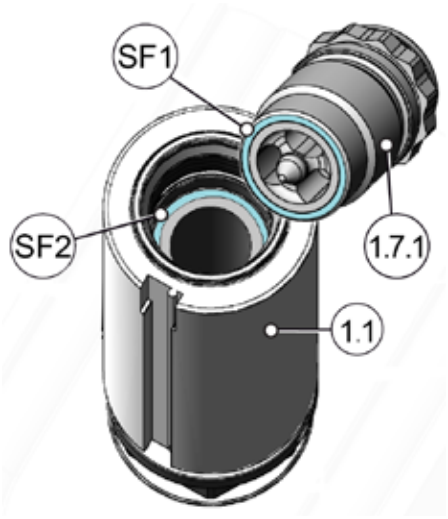
NOTICE

The nozzle must bear uniformly on the outer surfaces uniformly and flatly, in particular on the nozzle body contact face.

NOTICE

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory - contact Synventive Customer Service or Technical Support.

6) With a positive ink test clean the surfaces and proceed to the next step.

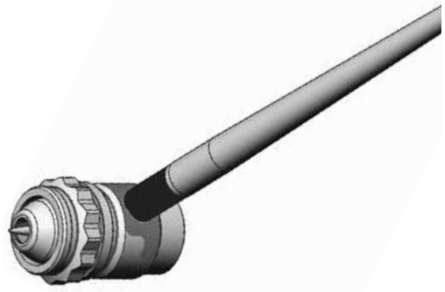


Doc004737.png

7) Lubricate the thread (not the face) of the nozzle tip body with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

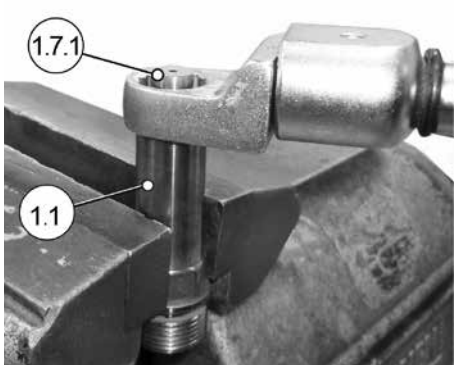


Doc003833.png

8) Fix the nozzle body on the hexagonal shape in a vise.
9) Tighten the nozzle tip (1.7.1) at the nozzle by room temperature.

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in chapter 13.



Doc004723.png

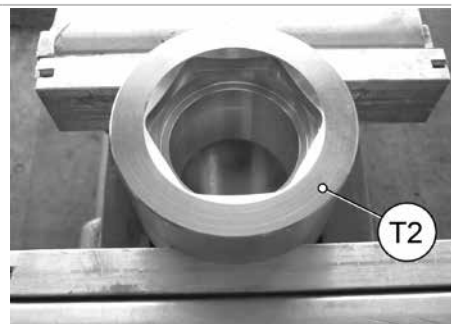
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10.37 Assembling the Nozzle Body

NOTICE

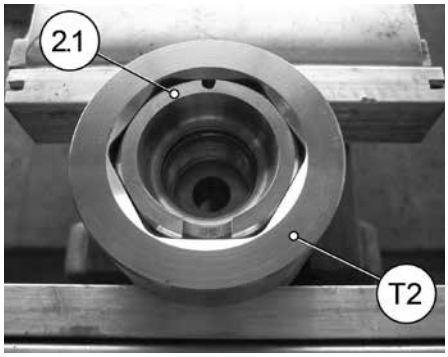
For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vise via using the tool holder (T2). It is not allowed to clamp the nozzle in a vise directly. Otherwise the nozzle could be damaged.

1) Fix the holder (T2) in a vise.



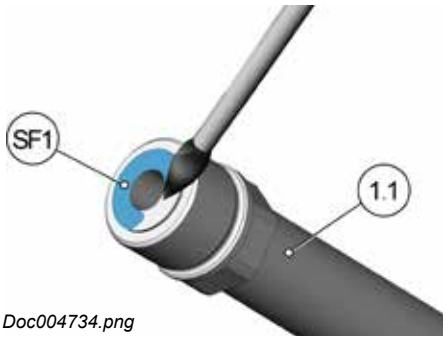
Doc004724.tif

2) Place the nozzle head (2.1) in the holder (T2).



Doc004725.png

3) Apply spotting ink on the nozzle body (1.1) bottom surface (SF1).

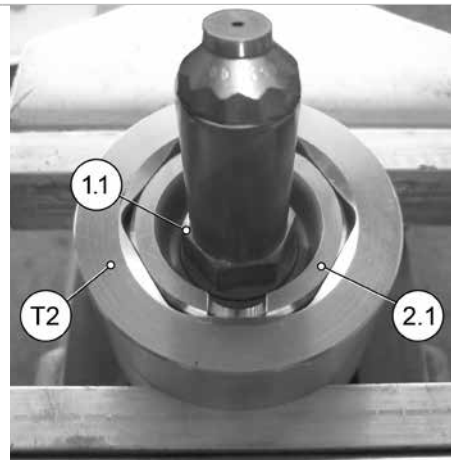


Doc004734.png

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Service and Maintenance / Disassembling the Nozzle Heater

4) Screw in the nozzle body (1.1) hand-tight into the nozzle head thread until seated.
5) Unscrew the nozzle body (1.1) from the nozzle head (2.1).



Doc004726.png

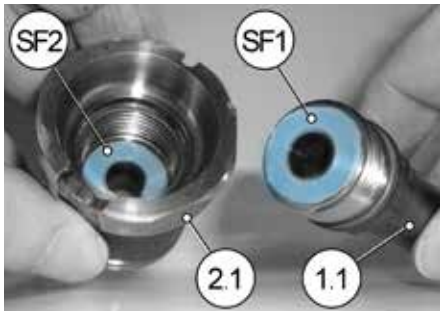
6) Check the matching between the nozzle head (2.1) bottom surfaces (SF2) and the nozzle body (1.1) surface (SF1).

NOTICE

The nozzle head must bear on all surfaces uniformly and flatly, in particular on the nozzle head contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, please - contact Synventive Customer Service or Technical Support.

7) With a positive ink test, clean the surfaces and proceed to the next step.



Doc004733.png

8) Lubricate the thread (not the face) of the nozzle body with high-temperature assembly paste (antiseize compound).

NOTICE

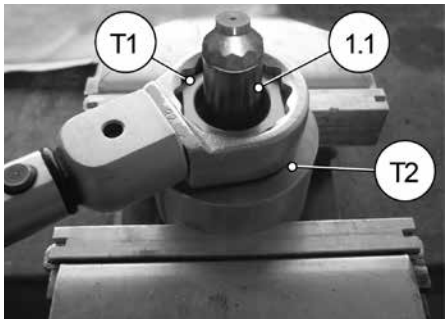
This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.


Doc003827.png

9) Tighten the nozzle body (1.1) to the nozzle head.

NOTICE

Use torque wrench with wrench insert and the torque specified in the torque table in chapter 13.



Doc004729.png

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10.38 Mounting the Nozzle Head Heater

NOTICE

Align the nozzle head thermocouple and supply line in the same direction as the heater wire leads.

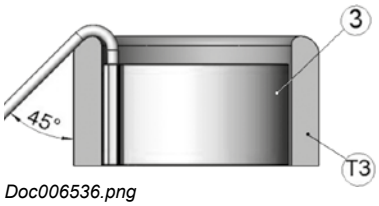
1) Bend the heater (3) wire with the tool (T3) to about 45°.
2) Install the thermocouple, ensuring it is seated correctly in the internal heater groove and nozzle head groove.
3) Place the nozzle head heater (3) on the nozzle head (2.1).

NOTICE

The nozzle head heater secures the thermocouple by covering it in the vertical groove.

The heating wire must exit through the central recess of the nozzle head.

4) Mount the retaining ring (5) on the nozzle head (2.1).



Doc006536.png



Doc008907_RIS.png

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10.39 Mounting the Nozzle Heater

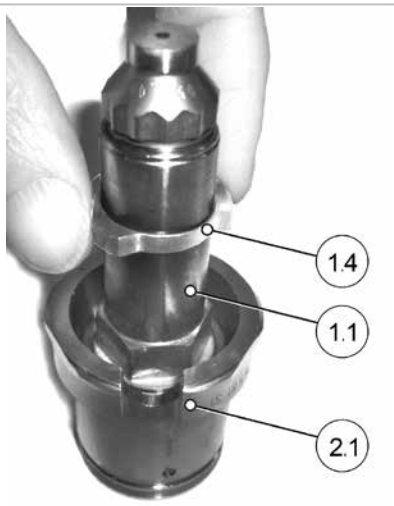
NOTICE

For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vise via using the tool holder (T2). It is not allowed to clamp the nozzle in a vice directly. Otherwise the nozzle could be damaged.

1) Slide component ring version 02 (1.4), onto the nozzle body (1.1) up to the surface of the hexagon.

NOTICE

The opening of the component ring version 02 (1.4), must be line up with the cable connections (see customer drawing).



Doc004735.png

2) Bend the leads of the nozzle heater about 90 degrees.

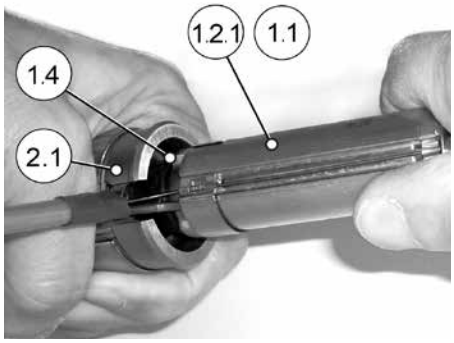
NOTICE

Use round-nosed pliers only.

3) Push the nozzle heater (1.2.1) onto the nozzle (1.1).

NOTICE

Ensure the orientation of the wire leads matches opening in component ring version 02 (1.4) and nozzle head (2.1).



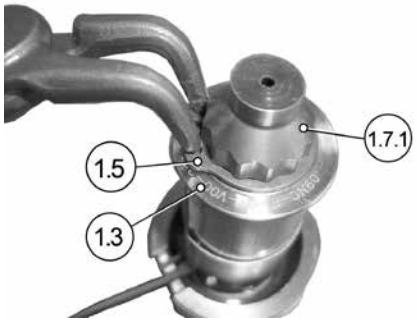
Doc004738.png

4) Place the component ring - front ring (1.3) on the nozzle heater (1.2.1).

NOTICE

The component ring (1.3) is for holding the nozzle heater.

5) Mount the retaining ring (1.5) at the nozzle tip (1.7.1).

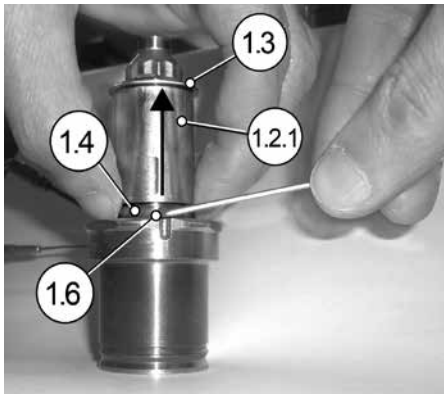


Doc004731.png

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Service and Maintenance / Disassembling the Nozzle Heater

6) Move the nozzle component ring version 02 (1.4) and nozzle heater (1.2.1) tight to the nozzle component ring version 04 - front ring (1.3).
7) Fix the nozzle component ring version 02 (1.4) with the socket set screw (1.6) by a ½ up to ¾ turn.



Doc004740.png

8) Unit the heater and thermocouple (ex) leads.



Doc004739.tif

10.40 Grounding of the Sprue Bushing

DANGER

Danger to Life by Electric Shock

The Sprue Bushing has to be properly grounded to prevent serious personal injury or death.

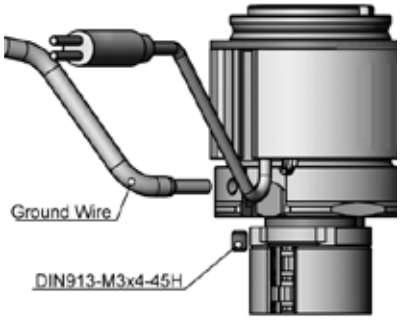
Electrical work must be carried out by qualified persons.

Verify that all power source connections are properly grounded.

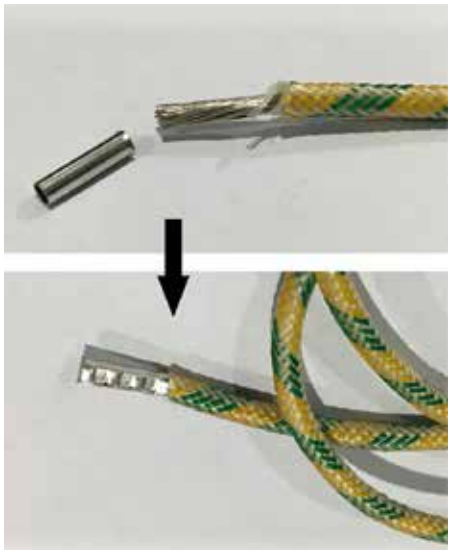
In Emergency case - Switch all systems off.

For first aid contact your medical / safety representing.

1) Use a crimping tool to fix the wire end ferrules at the grounding wire.
2) Guide the ground wire through the hole.
3) Tighten the ground wire with a socket set screw (DIN 913).



Doc008909_RIS.png



Doc007408.png

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10.40.1 Sprue Bushing 12S-06 Series

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.

WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.



Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.



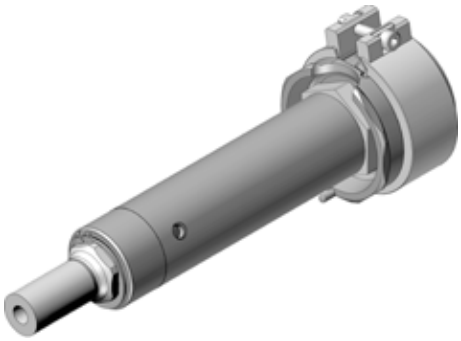
NOTICE

Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

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10.40.1.1 Technical Data - Sprue Bushing 12S-06



Doc008163.png

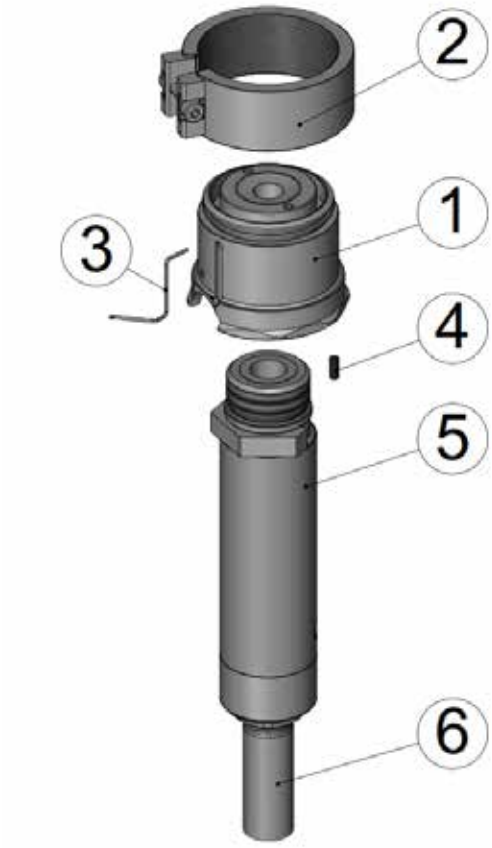
Flow Bore (J)	Ø 12 mm
Nozzle Length (L)	50 - 640 mm
Nozzle Cutout (D)	Ø 35 mm
Thermocouple	Type J, Type K
Nozzle Tips	TFP, TTP, TTW

10.40.1.2 Parts of the Sprue Bushing 12S-06

In this section the nozzle parts are identified with the numbers indicated in the following figure.

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.



Doc008218.png

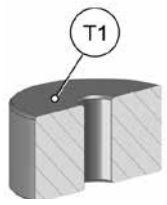
Pos.	Part No.	Description
1	12SHB-10-01-###	Nozzle Head
2	HT-045-022-01	Nozzle heater
3	XTA00115001	Thermocouple Type J
	XTA00130003-150	Thermocouple Type K
4	DIN6325-3M6X8	Parallel Pin DIN6325 03m6x08
5	-	Nozzle body complete
6	(varied)	Nozzle tip

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Assembly Tools

In this section the Stripping and Mounting Tool parts are identified with the numbers indicated in the following figure.

Nozzle Tip Assembly Tools



Doc005227.png



Doc005228.png



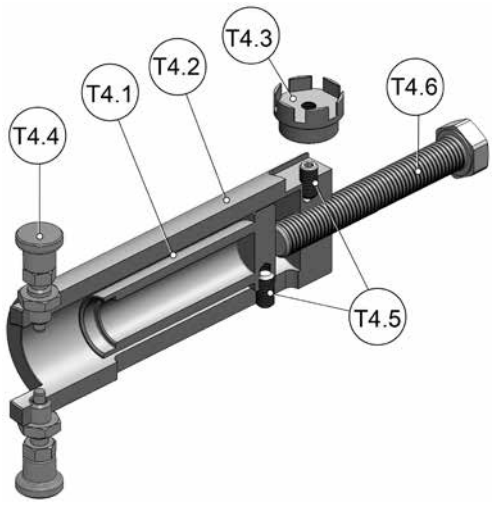
Doc005209.png

Pos.	Part No.	Description
T1	AT12E-0104	Nozzle Tip assemble tool, also used for TTW Seal Cap assembly.
T2	AT12E-0103	Nozzle Tip assemble tool
T3	AT12E-0105	Seal Cap assemble tool

Heater Disassembly Tool AT-FHA-024 for the Heater Type FHA#-024-###-##

The dismantling tool is required to pull the heater from the nozzle body or the sprue bushing.

The adapter AT-FHA-024-C-05 is only required for the sprue bushing.



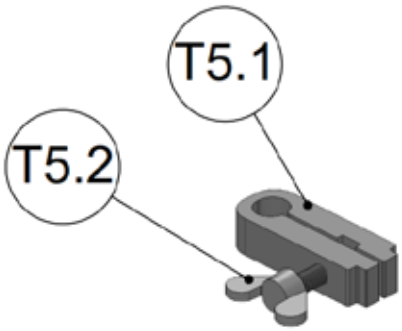
Doc008132.png

AT-FHA-024			
Pos.	Qty.	Part No.	Description
T4.1	1	AT-FHA-024-C-01	Disassembly Tool Socket
T4.2	1	AT-FHA-024-C-02	Disassembly Tool Sleeve
T4.3	1	AT-FHA-024-C-05	Disassembly Tool IB24 Adapter Nut
T4.4	1	GN817-4-4-CK	Indexing plunger
T4.5	2	DIN913-M6x12-45H	Flat Point Socket Set Screw
T4.6	1	ISO4017-M12X100-12.9	Full Thread Hexagon Screw

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Spreader Tool Head Heater Type HHA#-0##-###-##

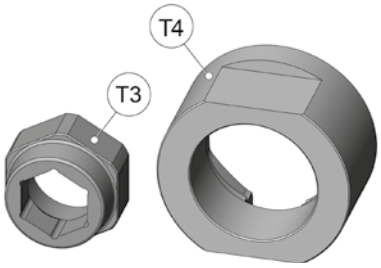
With this tool the head heaters can be spread apart to make it easier to pull them off the nozzle body.



Doc008150.png

AT-HHA-00			
No.	Qty.	Item	Description
T5.1	1	AT-HHA-C-01	Head Heater Spreader
T5.2	1	DIN316-A2-M4x16	Metric DIN 316 Wing Screws M4x16

Nozzle Disassembly Tool



Doc005472.png

Pos.	Part No.	Description
T3	AT12S-01	Nut
T4	AT06S-02	Holder

10.40.1.3 Thermocouples

Only the thermocouple at the nozzle head can be replaced separately. The thermocouples on the nozzle are pressed into the heating element.

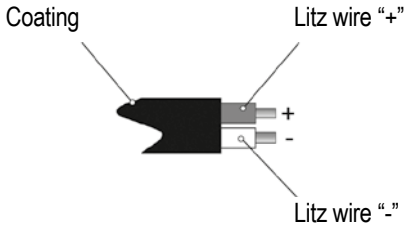
Color Coding of Thermocouples

NOTICE

Take notice of the production and color identification of thermocouple cables. Synventive uses J and K type thermocouples. Their color coding is given in the following table.

Table 1: International color coding for temperature sensors

Type	International standard IEC 584-3	
J	Black	+ Black
		- White
K	Green	+ Green
		- White



Doc003124_en.png

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10.40.1.4 Disassembly of the Nozzle 12S-06

NOTICE

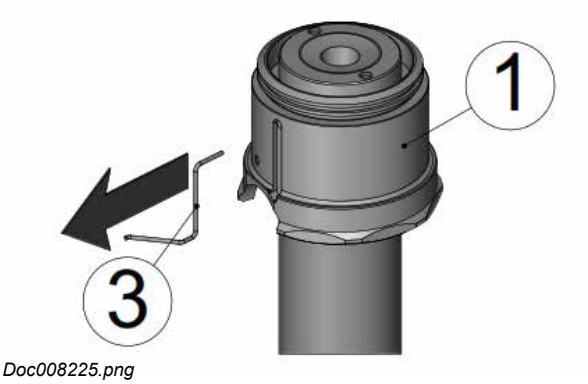
For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T4). It is not allowed to clamp the nozzle in a vice directly.

Disassembling Nozzle Head Heater



Doc008219.png

1) Loosen the screws Head heater (2) clamp band.
2) Pull the nozzle head heater (2) from the nozzle head.



Doc008225.png

3) Pull the thermocouple (3) out of the nozzle head (1).

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Disassembly of the screwed-in nozzle

WARNING

Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Following work must be carried out by qualified and experienced persons.

Use personal protective equipment: Face protection, hearing protection and gloves.

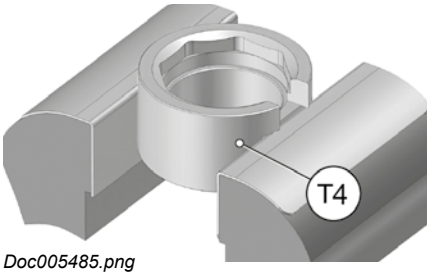


1) Dismount the nozzle head heater (2) from the nozzle head (1), as described in the above page 621.

NOTICE

For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T4). It is not allowed to clamp the nozzle in a vice directly.

2) Fix the holder (T4) in a vice.

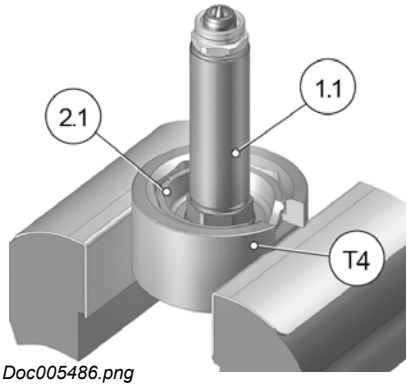


Doc005485.png

3) Dismount the 12E-06 nozzle.

NOTICE

Follow the heater dismounting procedure of the nozzle 12E-06 Installation Guide.



Doc005486.png

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10.40.1.5 Assembling Nozzle 12S-06

NOTICE

For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T4). It is not allowed to clamp the nozzle in a vice directly.



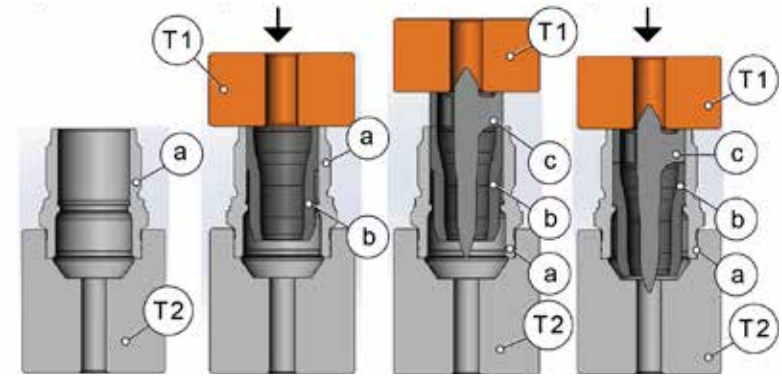
Doc008218.png

Pos.	Part No.	Description
1	12SHB-10-01-###	Nozzle Head
2	HT-045-022-01	Nozzle heater
3	XTA00115001	Thermocouple Type J
	XTA00130003-150	Thermocouple Type K
4	DIN6325-3M6X8	Parallel Pin DIN6325 03m6x08
5	-	Nozzle body complete
6	(varied)	Nozzle tip

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Assembling the Nozzle Tip

1) 2) 3) 4)

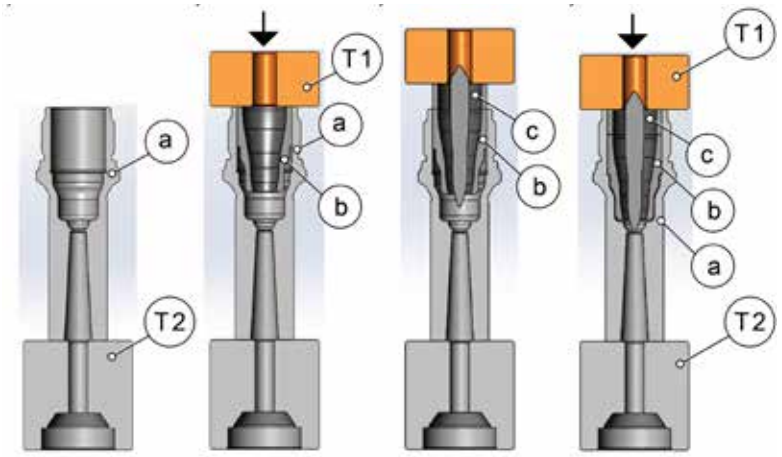


Doc005230.png

TTW Nozzle Tip Assembly

1) Place the tip nut (a) into the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).
3) Place the torpedo (c) on the tip insert (b).
4) Using the tool (T1) to push the torpedo (c) and the tip insert (b) into the tip nut (a).

1) 2) 3) 4)

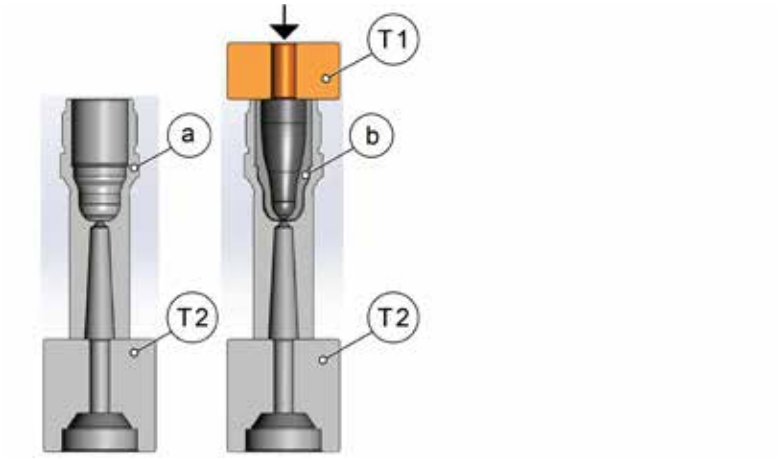


Doc005231.png

TTP Nozzle Tip Assembly

1) Place the tip nut (a) on the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).
3) Place the torpedo (c) on the tip insert (b).
4) Using the tool (T1) to push the torpedo (c) and the tip insert (b) into the tip nut (a).

1) 2)



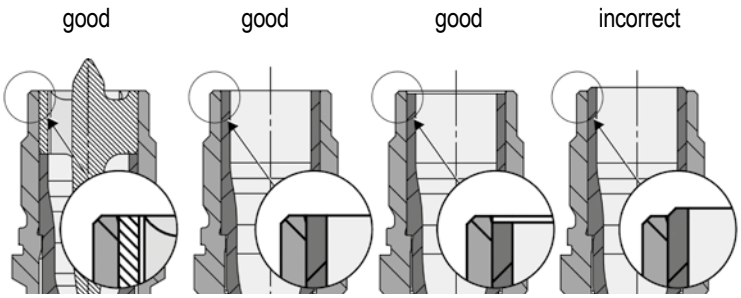
Doc005232.png

TFP Nozzle Tip Assembly

1) Place the tip nut on the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).

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Shown are the tip nuts, for checking the correct seating of the tip inserts



Doc004688.png

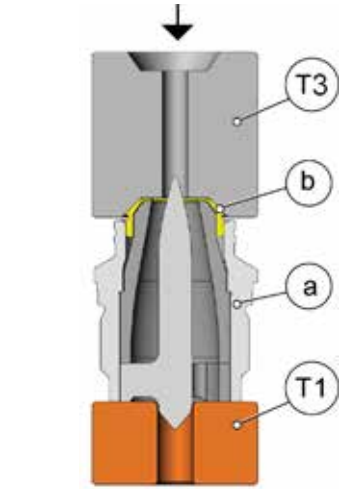
NOTICE

See examples of good and incorrect insert installations.

Make sure the insert must not exceeds the height of the nozzle tip head.

Incorrect items should not be further processed.

Assemble the Seal Cap on TTW Nozzle Tips



Doc007732.png

1) Place the tip nut (a) on the tool (T1).
2) Place the seal cap (b) on the tip nut (a).
3) Using the tool (T3) to push the seal cap (b) on the tip nut (a).

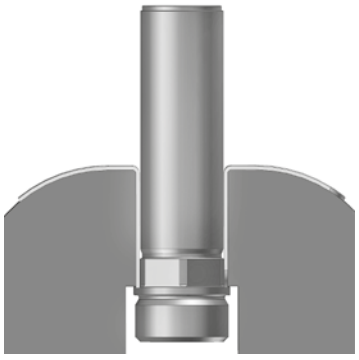
NOTICE

The assembly tool (T3) has an engraved note on both sides (VW / TW).

Use the side marked TW in the facing direction of the seal cap (b)

Assembling the Nozzle Tip on the Nozzle

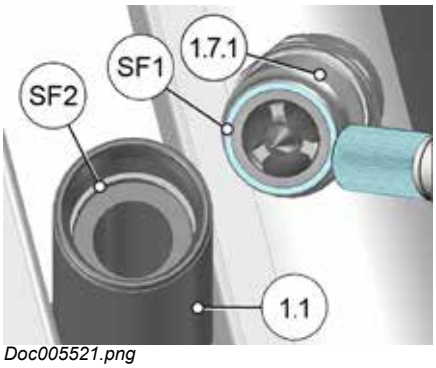
1) Fix the nozzle body on the hexagonal shape in a vice.



Doc005520.png

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2) Apply spotting ink on the nozzle tip (1.7.1) bottom surface (SF1).
3) Screw in the nozzle tip (1.7.1) hand-tight into the nozzle body (1.1) until seated.
4) Unscrew the nozzle tip (1.7.1) from the nozzle body (1.1).



Doc005521.png

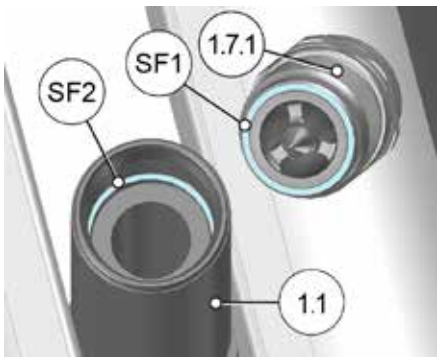
5) Check the matching between the nozzle body (1.1) surface (SF2) and the nozzle tip (1.7.1) surface (SF1).

NOTICE

The nozzle must bear uniformly on the outer surfaces uniformly and flatly, in particular on the nozzle body contact face.

NOTICE

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory - please contact Synventive Customer Service or Technical Support.



Doc005522.png

6) With a positive ink test clean the surfaces and proceed to the next step.

7) Lubricate the thread (not the face) of the nozzle tip body with high-temperature assembly paste (antiseize compound).

NOTICE

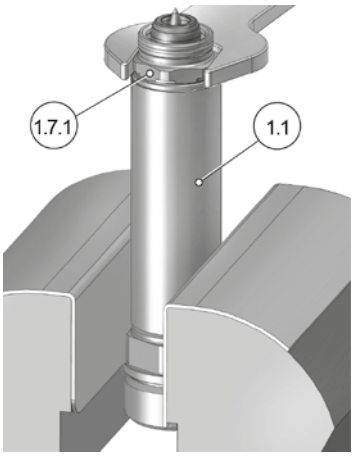
This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.


Doc005247.png

8) Tighten the nozzle tip (1.7.1) at the nozzle by room temperature.

NOTICE

Use torque wrench with wrench insert (HEX21) and a torque of 100 Nm.



Doc005489.png

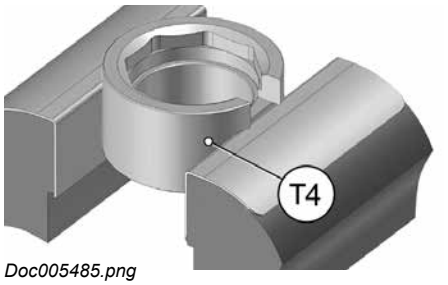
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Assembling the Nozzle Body

NOTICE

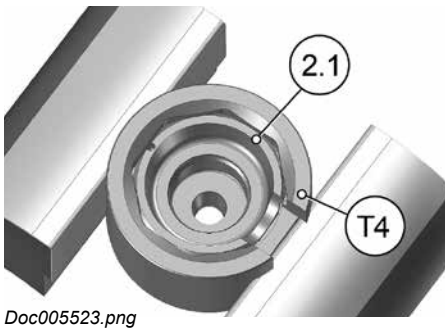
For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T4). It is not allowed to clamp the nozzle in a vice directly.

1) Fix the holder (T4) in a vice.



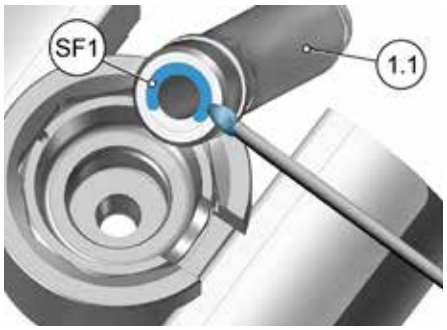
Doc005485.png

2) Place the nozzle head (2.1) in the holder (T4).



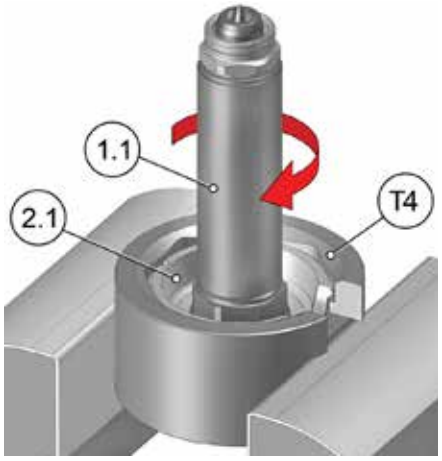
Doc005523.png

3) Apply spotting ink on the nozzle body (1.1) bottom surface (SF1).



Doc005524.png

4) Screw in the nozzle body (1.1) hand-tight into the nozzle head thread until seated.
5) Unscrew the nozzle body (1.1) from the nozzle head (2.1).



Doc005525.png

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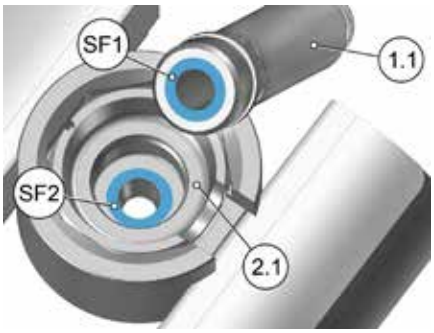
6) Check the matching between the nozzle head (2.1) bottom surfaces (SF2) and the nozzle body (1.1) surface (SF1).

NOTICE

The nozzle head must bear on all surfaces uniformly and flatly, in particular on the nozzle head contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, please - contact Synventive Customer Service or Technical Support.

7) With a positive ink test, clean the surfaces and proceed to the next step.

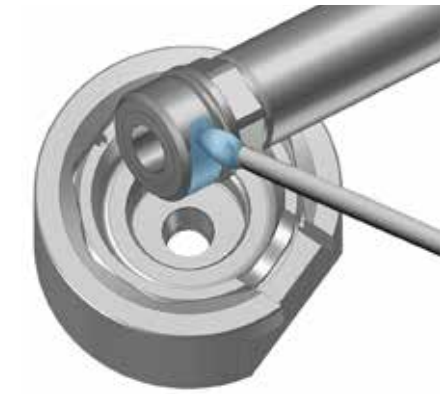


Doc005526.png

8) Lubricate the thread (not the face) of the nozzle body with high-temperature assembly paste (antiseize compound).

NOTICE

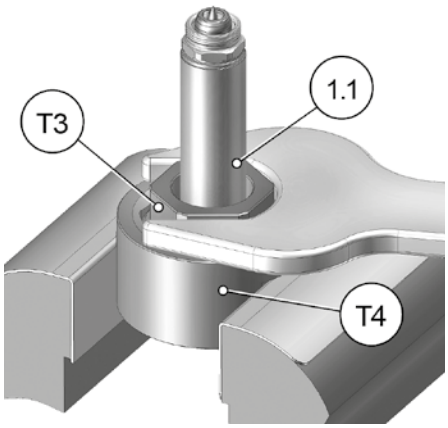
This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.


Doc005527.png

9) Tighten the nozzle body (1.1) to the nozzle head.

NOTICE

Use torque wrench with wrench insert and the torque specified in the torque table in section 13.



Doc005487.png

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Mounting the Nozzle

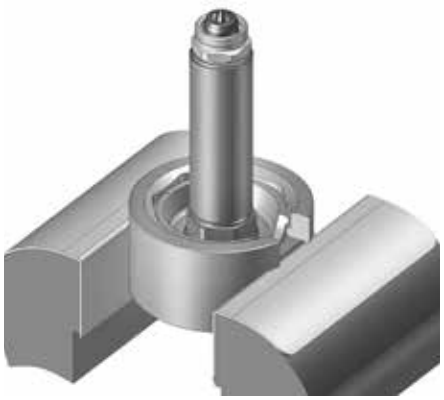
NOTICE

For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T4). It is not allowed to clamp the nozzle in a vice directly.

1) Complete the nozzle 12E-06.

NOTICE

Please refer to “12E-06 Installation Guide”



Doc005486.tif

2) Bend the leads of the nozzle heater about 90 degrees.

NOTICE

Use round-nosed pliers only.



Doc008566.png

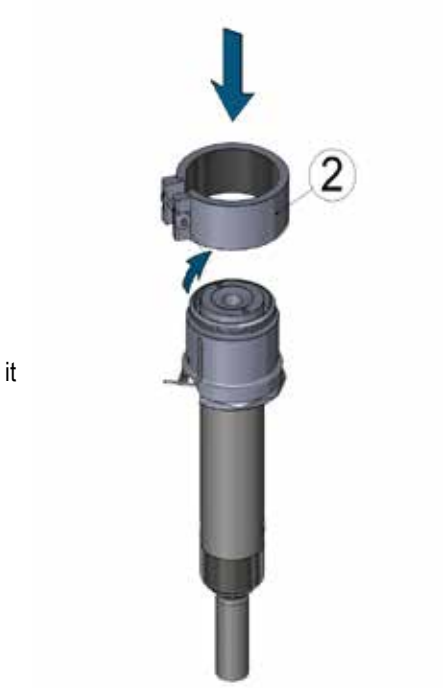
Mounting the Nozzle Head Heater

1) Install the thermocouple, ensuring it is seated correctly in the internal heater groove and nozzle head groove.
2) Place the nozzle head heater (2) on the nozzle head.

   NOTICE

   The nozzle head heater secures the thermocouple by covering it in the vertical groove.

   The heating wire must exit through the central recess of the nozzle head.
3) Attach the head heater (2) with the socket set screw.



Doc008654_RIS.png

10.40.1.6 Grounding of the Sprue Bushing

DANGER

Danger to Life by Electric Shock

The Sprue Bushing has to be properly grounded to prevent serious personal injury or death.

Electrical work must be carried out by qualified persons.

Verify that all power source connections are properly grounded.

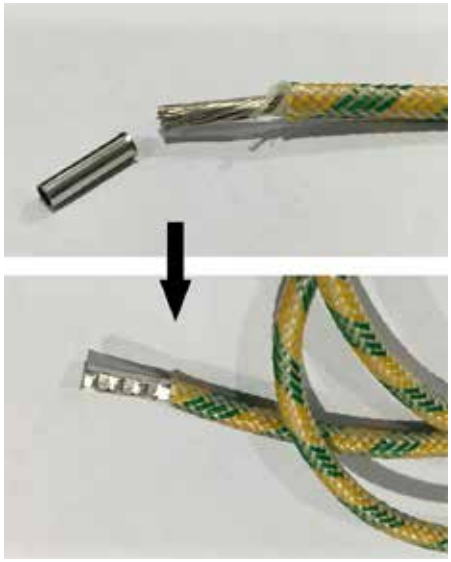
In Emergency case - Switch all systems off.

For first aid contact your medical / safety representing.

1) Use a crimping tool to fix the wire end ferrules at the grounding wire.
2) Guide the ground wire into the hole.
3) Tighten the ground wire with a socket set screw (DIN 913).



Doc008655_RIS.png



Doc007408.png

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10.40.2 Sprue Bushing 16S-06 / 22S-06 Series

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.

WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.



Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.



NOTICE

Hazard of Material Damage

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.

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10.40.2.1 Technical Data - Sprue Bushing 16S-06 / 22S-06 Series



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Sprue Bushing 16S-06	
Flow Bore (J)	Ø 16 mm
Nozzle Length (L SB)	80 - 650 mm
Nozzle Cutout (D)	Ø 45 mm
Thermocouple	Type J, Type K
Nozzle Tips	TFP, TTP, TTW
Sprue Bushing 22S-06	
Flow Bore (J)	Ø 22 mm
Nozzle Length (L SB)	90 - 665 mm
Nozzle Cutout (D)	Ø 55 mm
Thermocouple	Type J, Type K
Nozzle Tips	TFP, TTP, TTW

10.40.2.2 Parts of the Sprue Bushing 16S-06 / 22S-06

In this section the nozzle parts are identified with the numbers indicated in the following figure.

NOTICE

Always tighten the screws to the torque specified in the respective table in section 13.



Doc008800_RIS.png

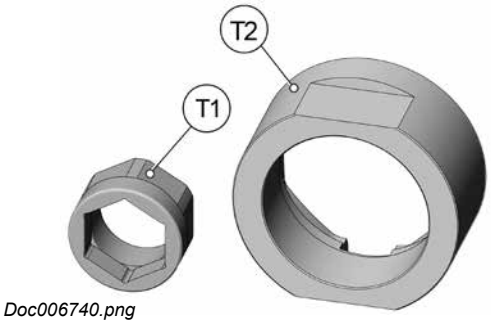
Pos.	Description
1	Nozzle body
2	Head ring
3	Head heater (optional)
4	Retaining ring
5	Front heater
6	Retaining ring
7	Cover tube
8	Tip
9	Wear insert (optional)
10	Cooling bushing (optional)
11	Single head
12	Thermocouple
13	Head heater
14	Parallel pin

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Assembly Tools

In this section the Stripping and Mounting Tool parts are identified with the numbers indicated in the following figure.

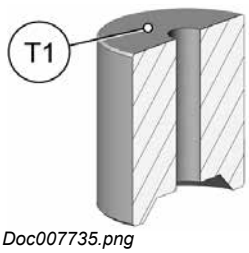
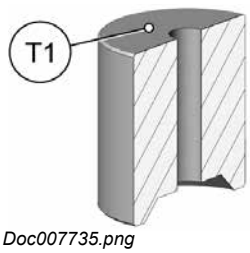
Nozzle Disassembly Tool



Doc006740.png

Mounting Tool for 16S-06		
Pos.	Part No.	Description
T1	AT16S-01	Nut
T2	AT16S-03	Holder
Mounting Tool for 22S-06		
Pos.	Part No.	Description
T1	not provided	-
T2	AT22S-01	Holder

Assembly Tools for TTP, TFP TTW Nozzle Tips

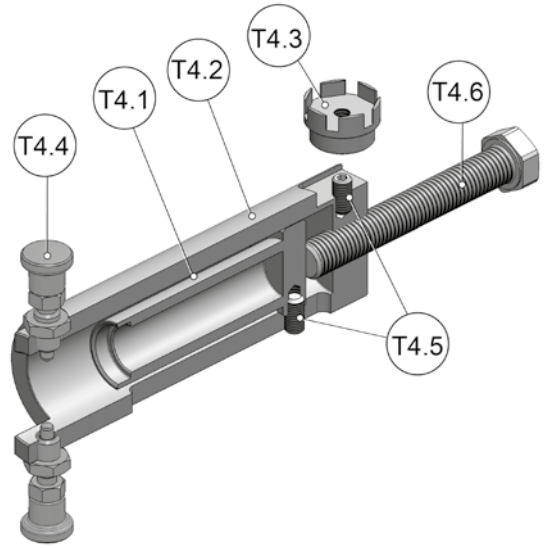
Assembly Tools for 16S-06 Nozzle Tips		Assembly Tools for 22S-06 Nozzle Tips	
(T2) AT-16-040102	(T1) AT-16-040101	(T2) AT-22-040102	(T1) AT-22-040101
Also used for TTW Seal Cap assembly		Also used for TTW Seal Cap assembly	
 Doc005228.png	 Doc007735.png	 Doc005228.png	 Doc007735.png

10.40.2.3 Nozzle Heater Disassembly Tool AT-FHA-032 for the Heater Type FHA#-032-

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###-##

The dismantling tool is required to pull the front heater from the nozzle body or the sprue bushing. The adapter AT-FHA-032-C-05 is only required for the sprue bushing.

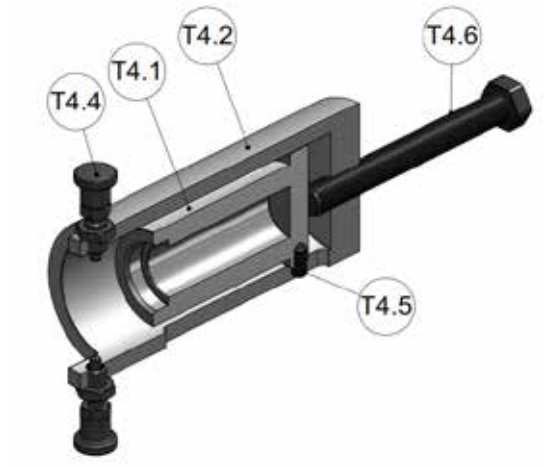


Doc008132.png

AT-FHA-032			
No.	Qty.	Item	Description
T4.1	1	AT-FHA-032-C-01	Disassembly Tool Socket
T4.2	1	AT-FHA-032-C-02	Disassembly Tool Sleeve
T4.3	1	AT-FHA-032-C-05	Disassembly Tool IB24 Adapter Nut
T4.4	1	GN817-4-4-CK	Indexing plunger
T4.5	2	DIN913-M6x12-45H	Flat Point Socket Set Screw
T4.6	1	ISO4017-M12X100-12.9	Full Thread Hexagon Screw

10.40.2.4 NozzleHeaterDisassemblyToolAT-FHA-041fortheHeaterTypeFHA#-041-###-##

The dismantling tool is required to pull the front heater from the nozzle body.



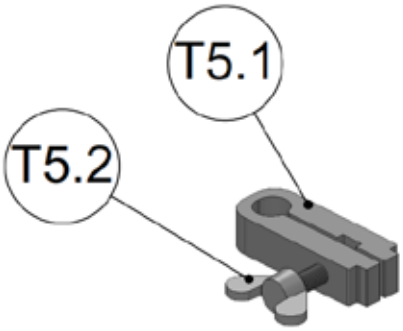
Doc008801_RIS.png

AT-FHA-042			
No.	Qty.	Item	Description
T4.1	1	AT-FHA-041-C-01	Disassembly Tool Socket
T4.2	1	AT-FHA-041-C-02	Disassembly Tool Sleeve
T4.3	-	-	-
T4.4	1	GN817-4-4-CK	Indexing plunger
T4.5	2	DIN913-M6x12-45H	Flat Point Socket Set Screw
T4.6	1	ISO4017-M12X100-12.9	Full Thread Hexagon Screw

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10.40.3 Spreader Tool Head Heater Type HHA#-0##-###-##

With this tool the head heaters can be spread apart to make it easier to pull them off the nozzle body.



Doc008802_RIS.png

AT-HHA-00			
No.	Qty.	Item	Description
T5.1	1	AT-HHA-C-0-01	Head Heater Spreader
T5.2	1	DIN316-A2-M4x16	Metric DIN 316 Wing Screws M4x16

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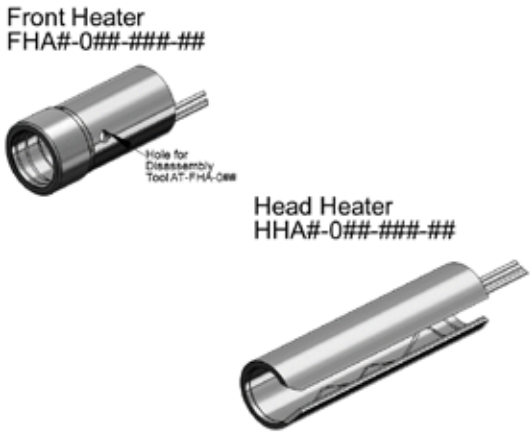
10.40.3.1 Nozzle Thermocouple

There are two types of **M**olding **S**olution heaters.

Front Heaters **F**HA#-0##-###-## and Head Heaters **H**HA#-0##-###-##.

The thermocouple is pressed in firmly and cannot be replaced.

All heaters are available either with a thermocouple type J (#HA**J**-0##-###-##) or a thermocouple type K (#HA**K**-0##-###-##).



Doc008803_RIS

Color Coding of Thermocouples

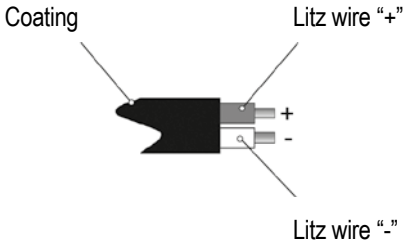
NOTICE

Take notice of the production and color identification of thermocouple cables.

Synventive uses J and K type thermocouples. Their color coding is given in the following table.

Table 1: International color coding for temperature sensors

Type	International standard IEC 584-3	
J	Black	+ Black
		- White
K	Green	+ Green
		- White



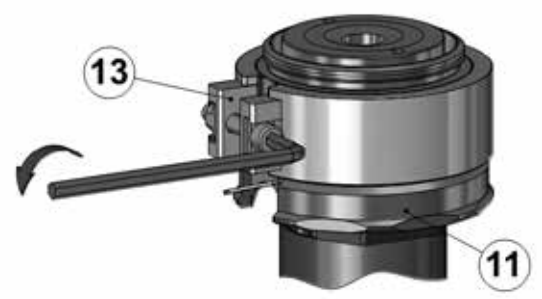
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10.40.4 Disassembly the Nozzle 16S-06 / 22S-0S Series

NOTICE

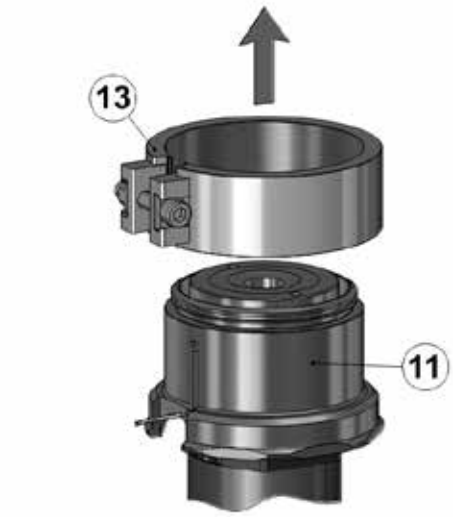
For the following work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T2). It is not allowed to clamp the nozzle in a vice directly. A clamping of the flats would deform the head.

10.40.4.1 Disassembling Nozzle Head Heater



Doc008820_RIS.png

1) Loosen the screws head heater (13) clamp band.



Doc008821_RIS.png

2) Pull the nozzle head heater (13) from the nozzle head (11).



Doc008822_RIS.png

3) Pull the thermocouple (12) out of the nozzle head (11).

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10.40.4.2 Disassembling the Nozzle Front Heater

1) Dismount the head heater (13) from the nozzle head (11), as described in the above page 638.

2) Remove the circlip (6) from the nozzle tip (8).



Doc008804_RIS.png

NOTICE

To pull the front heater, the nozzle must be clamped on the round nozzle head surface on a vice by using protective caps. A clamping of the flats would deform the head.

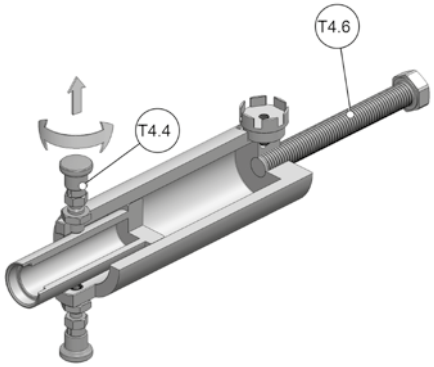
3) Fix the nozzle with the head (11) in a vice by using protective caps.



Doc008805_RIS.png

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4) Turn the hexagon screw (T4.6) of the disassembly tool completely backwards.
5) Pull the button from indexing plungers (T4.4) and fix the position by turning the button (T4.4) by 90°.

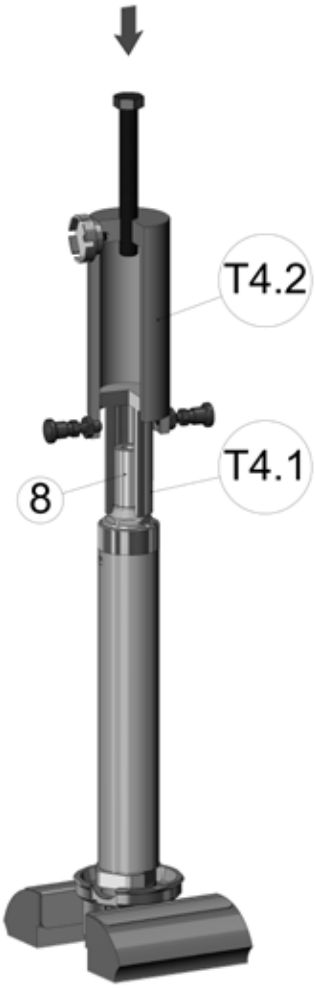


Doc008806_RIS.png

6) Guide the socket (T4.1) of the disassembly tool over the nozzle insert (8).

NOTICE

The socket (T4.1) is seated onto the nozzle tip (8) and slides into the sleeve (T4.2).



Doc008807_RIS.png

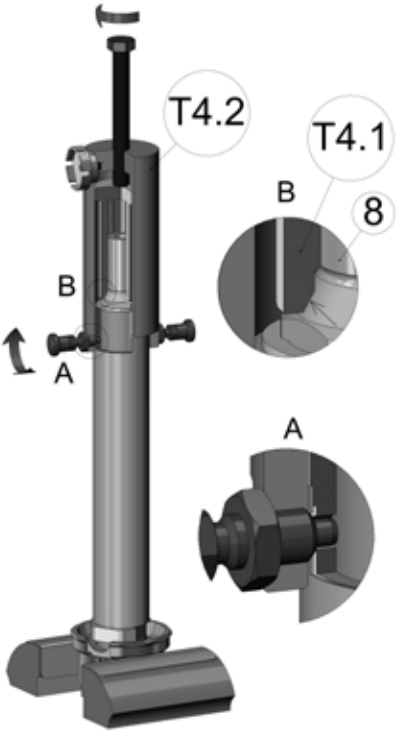
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7) Loosen the indexing plungers (T4.4), by turning the button 90°.
8) Position the disassembly tool until the indexing plungers (T4.4) smaps into the hole of the cover tube (7) and the heater (5).
9) Turn the hexagon head screw (T4.6) clockwise.

NOTICE

By turning the hexagon head screw (T4.6) the heater (5) together with the cover tube (7) is pulled of the nozzle body (1).

10) Turn down the hexagon head (T4.6) completely.



Doc008808_RIS.png

11) Remove the front heater (5).
12) Remove the cover tube (7).



Doc008809_RIS.png

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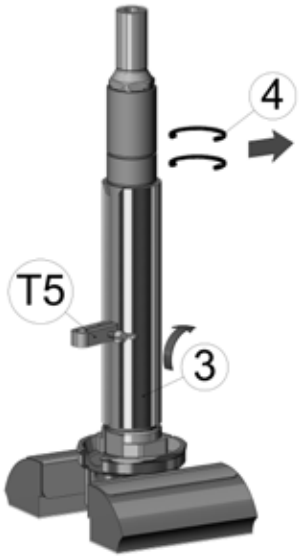
Disassembling the Nozzle Rear Heater

NOTICE

Depending of the nozzle length, has the nozzle a rear heater (3) or not.

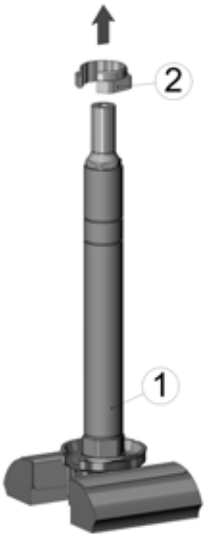
1) The nozzle front heater (5) must be dismounted from the nozzle body (1), as described in the above page 639.

2) Remove the retaining rings (4).
3) Spread the head heater (3) with the spreading tool (T5).
4) Remove the head heater (3).



Doc008810_RIS.png

5) Remove the head ring (2).



Doc008811_RIS.png

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Disassembly the Nozzle Tip

⚠ WARNING

Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Following work must be carried out by qualified and experienced persons.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.

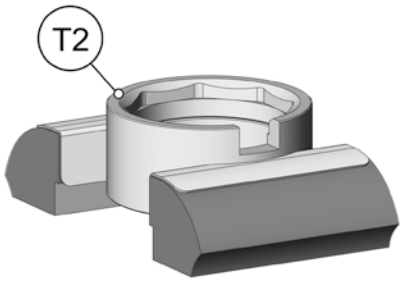


NOTICE

To install or remove the nozzle tip (8), the tool holder (T2) and adapter (T1) is required.

The nozzle head can get damaged when we do not use these tools.

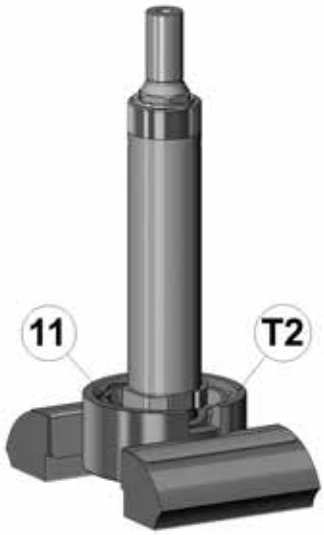
Only with the tools holder (T2) and adapter (T1) it is ensured that the nozzle body (1) is attached properly torqued to the hot runner manifold.



Doc006751.png

1) The nozzle head heater (13) must be dismounted from the nozzle head (11), as described in the above page 638.
2) Fix the holder (T2) in a vice.

3) Place the nozzle with the head (11) in the holder (T2) to fix the nozzle against rotation.



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4) Remove the circlip (6) from the nozzle tip (8).



Doc008804_RIS.png

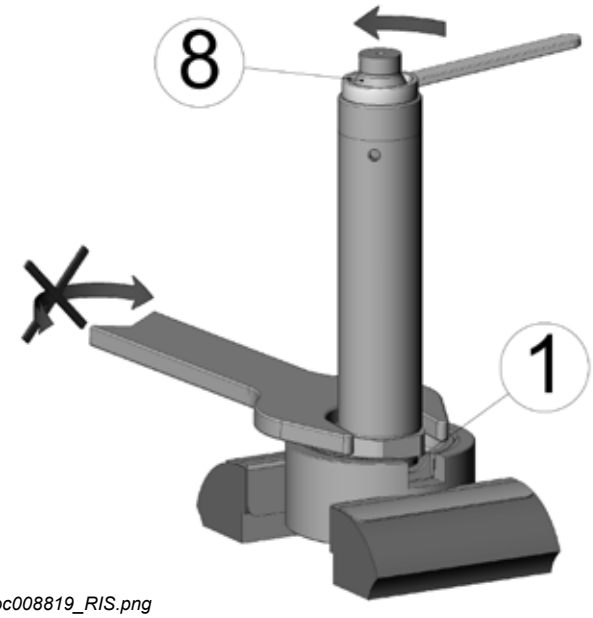
WARNING

Hot Surfaces Hazard

Contact between the skin and the hot nozzle could result in burns.

Following works must be carried out by qualified persons.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.



Doc008819_RIS.png

NOTICE

To dismount the nozzle tip (8) from the nozzle, if there is plastic material in the nozzle, the tip (8) must be heated-up.

Never use an acetylene or welding torch, as severe nozzle damage can occur from over-heating.

5) Heat the nozzle tip (8) using a heat gun to the maximum temperature of 200 °C (392 °F).

6) Fix the nozzle body (1) with a wrench and loosen the nozzle tip (8) from the nozzle body (counter clockwise).

WARNING

Hazard of Pressurized Air

Pressurized air blow can result in hot plastic parts or foreign bodies entering the eyes, causing vision damage.

Use personal protective equipment: Face protection, hearing protection and gloves.

7) Clean the nozzle tip (8) using pressurized air to remove as much residual plastic as possible.

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Disassembling the Nozzle Body

WARNING

Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Following work must be carried out by qualified and experienced persons.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.

Hot Surfaces Hazard

Contact between the skin and the hot nozzle could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

For first aid contact your medical / safety representing.

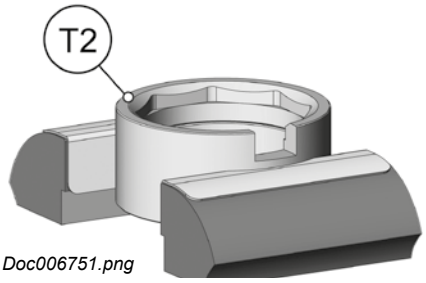
NOTICE

For disassembly and assembly of the nozzle body (1) of the holder (T2) and adapter (T1) is required.

The nozzle head can get damaged when we not use these tools.

Only with the holder (T2) and the nut (T1) we are able to torque the nozzle body (1) correctly.

1) Dismount the nozzle head heater (13) from the nozzle head (11), as described in the above page 638.
2) Dismount the nozzle front heater (5) and rear heater (3) , as described in the above page 639.
3) Dismount the nozzle tip (8) from the nozzle body (1), as described in the above page 597.



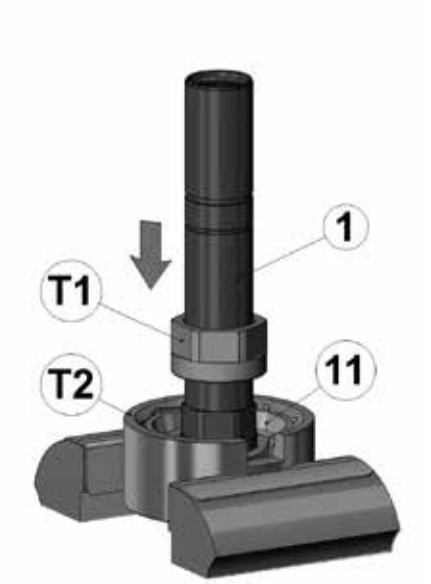
Doc006751.png

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NOTICE

The tool nut (T1) is only available for the 16S-06 nozzle.

4) Place the nozzle body (1) with the nozzle head (11) in the holder (T2) to fix the nozzle against rotation.
5) Place the tool nut (T1) along the nozzle body (1) at their hexagonal shape.



Doc008823_RIS.png

NOTICE

The tool nut (T1) is only available for the 16S-06 nozzle.

6) Use a wrench to loosen the nozzle body (1) from the nozzle head (11) via the tool nut (T1) by rotation (counter clockwise).
7) Heat the nozzle body (1) using a heat gun to the maximum temperature of 200 °C (392 °F).

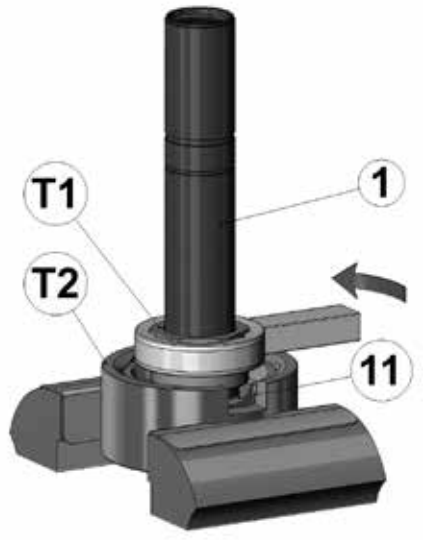
WARNING

Hazard of Pressurized Air

Pressurized air blow can result in hot plastic parts or foreign bodies entering the eyes, causing vision damage.

Use personal protective equipment: Face protection, hearing protection and gloves.

8) Clean the nozzle body (1) using pressurized air to remove as much residual plastic as possible.



Doc006753.png

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10.40.4.3 Assembling Nozzle 16S-06 / 22S-06 Series

NOTICE

For the following work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T2). It is not allowed to clamp the nozzle in a vice directly.



Doc008800_RIS.png

Pos.	Description
1	Nozzle body
2	Head ring
3	Head heater (optional)
4	Retaining ring
5	Front heater
6	Retaining ring
7	Cover tube
8	Tip
9	Wear insert (optional)
10	Cooling bushing (optional)
11	Single head
12	Thermocouple
13	Head heater
14	Parallel pin

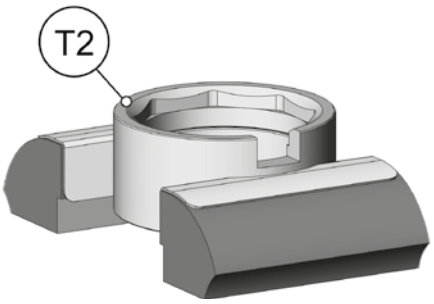
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Assembling the Nozzle Body

NOTICE

For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T2). It is not allowed to clamp the nozzle in a vice directly.

1) Fix the holder (T2) in a vice.



Doc006751.png

2) Place the nozzle head (11) in the holder (T2).

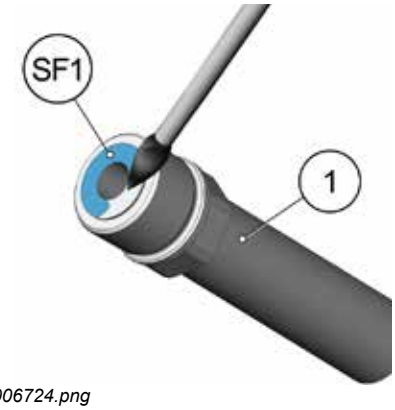
NOTICE

The position of the opening on the nozzle head (11) for the cable must coincide with the opening at the holder (T2).



Doc008825_RIS.png

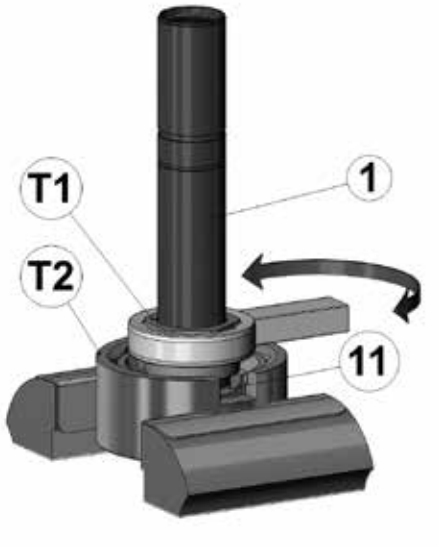
3) Apply spotting ink on the nozzle body (1) bottom surface (SF1).



Doc006724.png

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4) Screw in the nozzle body (1) hand-tight into the nozzle head thread until seated.
5) Unscrew the nozzle body (1) from the nozzle head (11).



Doc008826_RIS.png

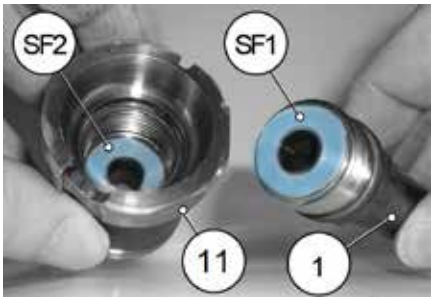
6) Check the matching between the nozzle head (11) bottom surfaces (SF2) and the nozzle body (1) surface (SF1).

NOTICE

The nozzle head must bear on all surfaces uniformly and flatly, in particular on the nozzle head contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, please - contact Synventive Customer Service or Technical Support.

7) With a positive ink test, clean the surfaces and proceed to the next step.

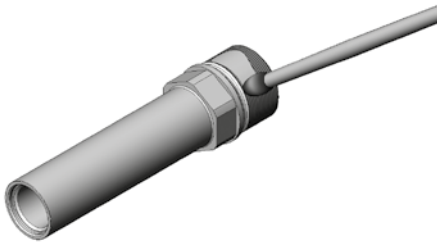


Doc008827_RIS.png

8) Lubricate the thread (not the face) of the nozzle body (1) with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.



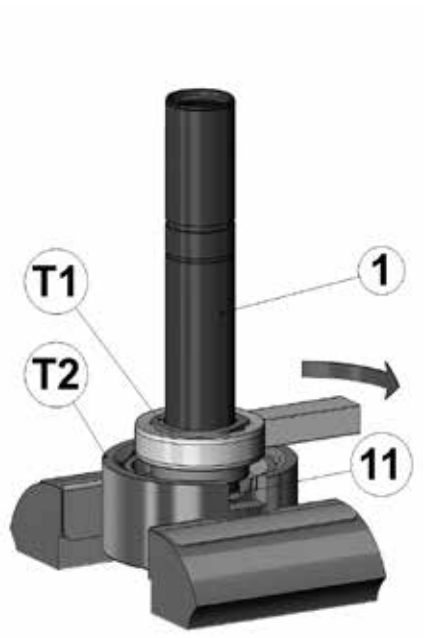
Doc003827.png

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9) Tighten the nozzle body (1) to the nozzle head (11).

NOTICE

Use torque wrench with wrench insert and the torque specified in the torque table in section 13.



Doc008828_RIS.png

Mounting the Nozzle Rear Heater

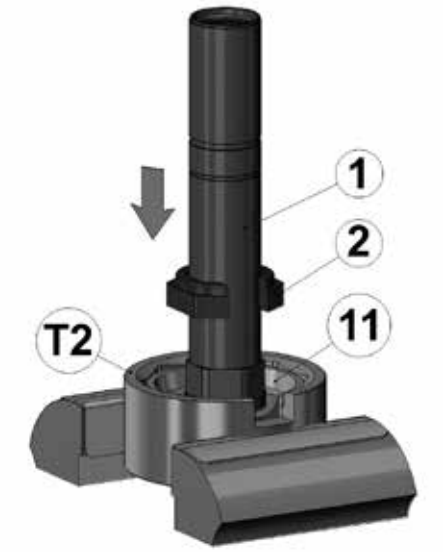
NOTICE

For the following work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T2). It is not allowed to clamp the nozzle in a vice directly.

1) Assemble the nozzle body (1) on the nozzle head (11), as described in the above page 648.
2) Slide the head ring (2), onto the nozzle body (1) up to the surface of the hexagon.

NOTICE

The opening at head ring (2) (for the cable), must coincide with the opening at the nozzle head (11).



Doc008829_RIS.png

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Service and Maintenance / Disassembly the Nozzle 16S-06 / 22S-0S Series

3) Bend the cable at the rear heater (3) corresponding to the opening at the nozzle head (11), about 90° away from the nozzle.

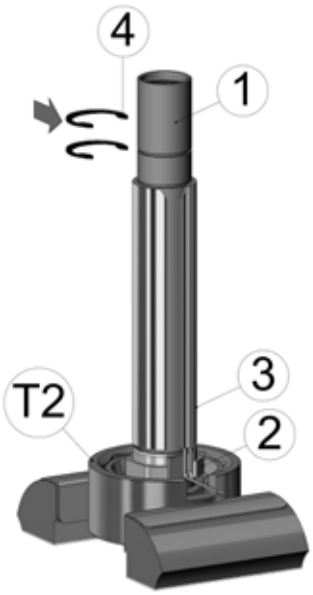


Doc008813_RIS.png

4) Slide the rear heating element (3), onto the nozzle body (1) up to the surface of the hexagon.
5) Fit the retaining ring (4) into the groove at the nozzle body (1).

NOTICE

The opening from the retaining ring (4) must match with the opening from rear heating element (3).

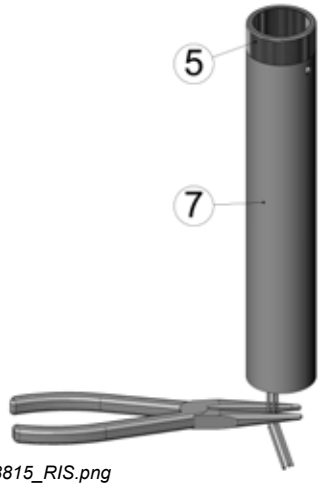


Doc008814_RIS.png

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Mounting the Nozzle Front Heater

1) Assemble the nozzle body (1) on the nozzle head (11), as described in the above page 648.
2) Assemble the rear heater (3) on the nozzle body (1), as described in the above page 650.
3) Lead the cable of the front heater (5) through the cover tube (7).
4) Hold the cover tube (7) to the front heater (5).
5) Bend the cable at the front heater (5) corresponding to the opening at the nozzle head (11) about 90 degrees.

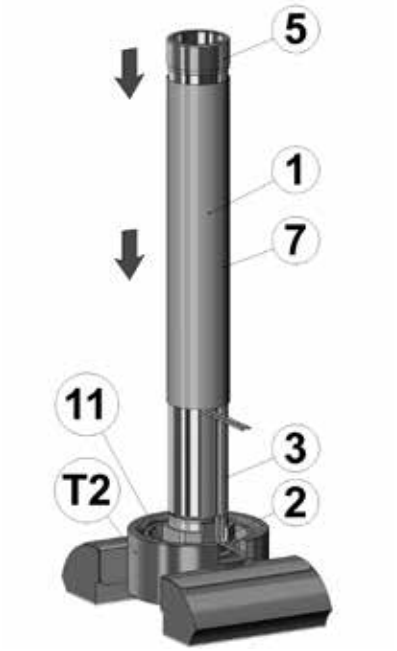


Doc008815_RIS.png

6) Slide the cover tube (7) together with the front heater (5) over the nozzle body (1).

NOTICE

The wire from the front heater (5) must be at the opening from the rear heater (3).



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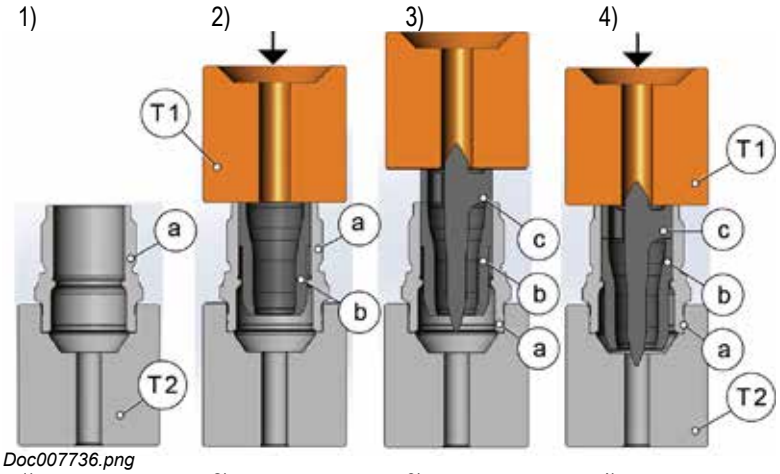
7) Mount the circlip (6) at the nozzle tip (8).



Doc008817_RIS.png

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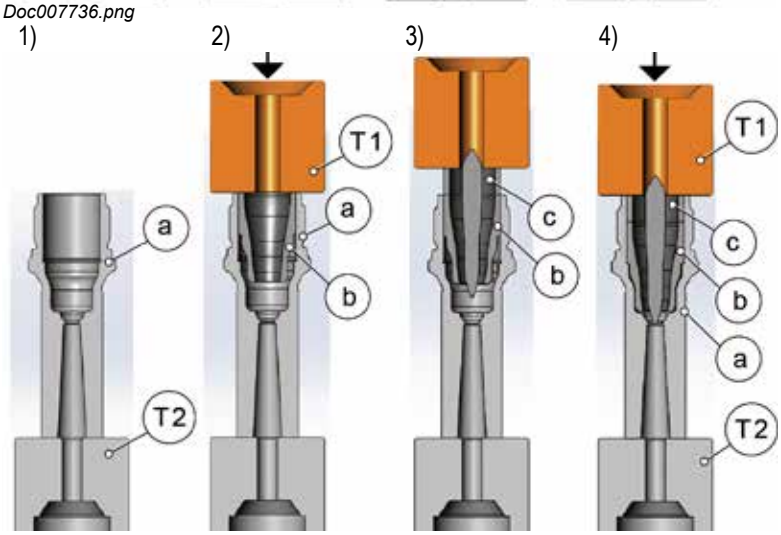
Assembling the Nozzle Tips TTW, TTP, TFP



Doc007736.png

TTW Nozzle Tip Assembly

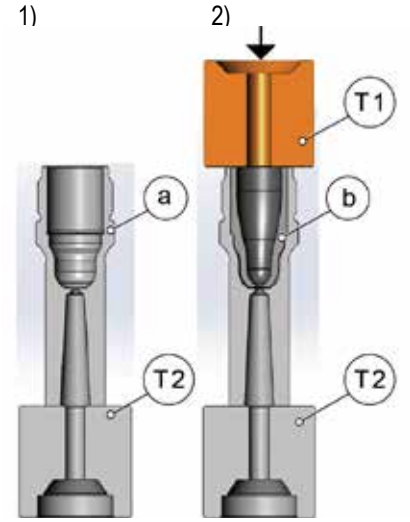
1) Place the tip nut (a) into the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).
3) Place the torpedo (c) on the tip insert (b).
4) Using the tool (T1) to push the torpedo (c) and the tip insert (b) into the tip nut (a).



Doc007737.png

TTP Nozzle Tip Assembly

1) Place the tip nut (a) on the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).
3) Place the torpedo (c) on the tip insert (b).
4) Using the tool (T1) to push the torpedo (c) and the tip insert (b) into the tip nut (a).



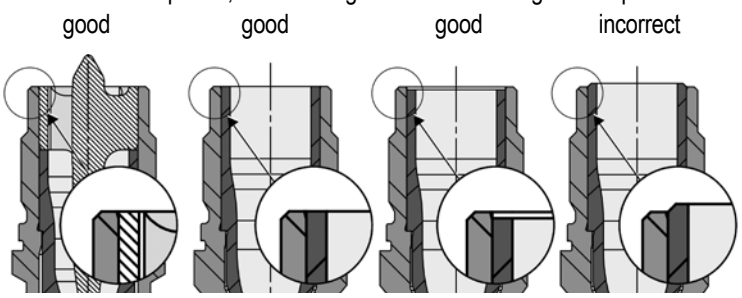
Doc007738.png

TFP Nozzle Tip Assembly

1) Place the tip nut (a) on the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).

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Shown are the tip nuts, for checking the correct seating of the tip inserts



Doc004688.png

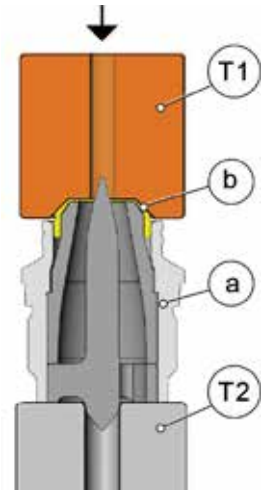
NOTICE

See examples of good and incorrect insert installations.

Make sure the insert must not exceeds the height of the nozzle tip head.

Incorrect items should not be further processed.

Assembling the Seal Cap on TTW Nozzle Tip



Doc007734.png

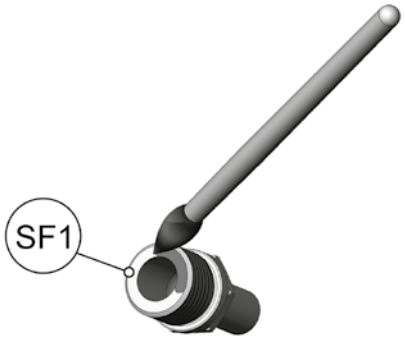
1) Place the tip nut (a) on the tool (T2).
2) Place the seal cap (b) on the tip nut (a).
3) Using the tool (T1) to push the seal cap (b) on the tip nut (a).

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Assembling the Nozzle Tip on the Nozzle Body

1) Assemble the nozzle body (1) on the nozzle head (11), as described in the above page 648.
2) Assemble the rear heater (3) on the nozzle body (1), as described in the above page 650.
3) Assemble the front heater (5) on the nozzle body (1), as described in the above page 652.

4) Apply spotting ink on the nozzle tip (8) bottom surface (SF1).
5) Screw in the nozzle tip (8) hand-tight into the nozzle body (1) until seated.
6) Unscrew the nozzle tip (8) from the nozzle body (1).



Doc006767.png

7) Check the matching between the nozzle body (1) surface (SF2) and the nozzle tip (8) surface (SF1).

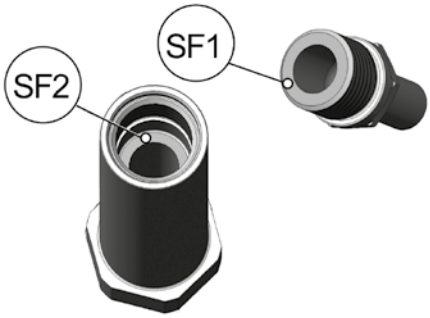
NOTICE

The nozzle must bear uniformly on the outer surfaces (SF2) (SF1) uniformly and flatly, in particular on the nozzle body contact face (SF1).

NOTICE

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory - please contact Synventive Customer Service or Technical Support.

8) With a positive ink test clean the surfaces and proceed to the next step.



Doc006768.png

9) Lubricate the thread (not the face) of the nozzle tip (8) body with high-temperature assembly paste (antiseize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.


Doc006769.png

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10) Screw in the nozzle tip into the nozzle body (1) hand-tight.

11) Tighten the nozzle tip to nozzle.

NOTICE

Use torque wrench with wrench insert and the torque specified in the respective table in section 13.

WARNING

Hot Surfaces Hazard

Contact between the skin and the hot nozzle could result in burns.

Cool the nozzle to approximately 25 °C (77 °F).

12) Mount the retaining ring (6) on nozzle tip (8).

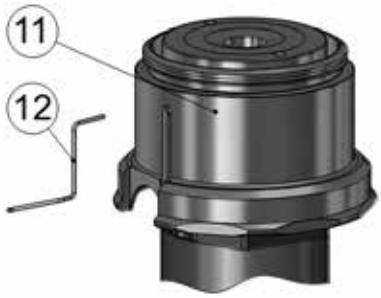


Doc008817_RIS.png

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Mount the Nozzle Head Heater

1) Bend the thermocouple (12).
2) Install the thermocouple (12), ensuring it is seated correctly in the internal nozzle head (11) groove.



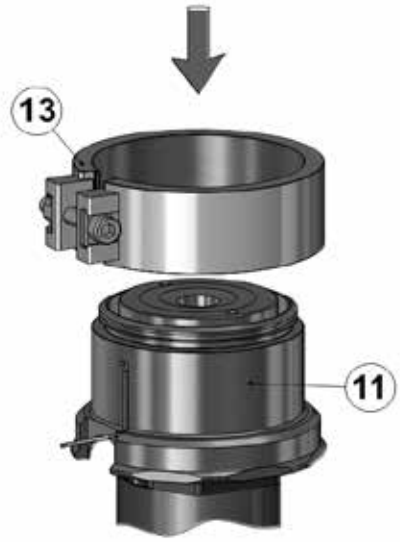
Doc008822_RIS.png

3) Slide the nozzle head heater (13) over the nozzle head (11).

NOTICE

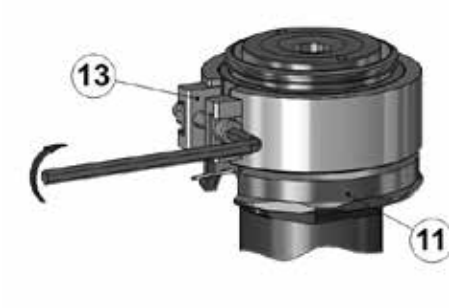
The nozzle head heater secures the thermocouple by covering it in the vertical groove.

The heating wire must exit through the central recess of the nozzle head.



Doc008830_RIS.png

4) Tighten the screw from the head heater (13).



Doc008831_RIS.png

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10.40.4.4 Grounding of the Sprue Bushing

DANGER

Danger to Life by Electric Shock

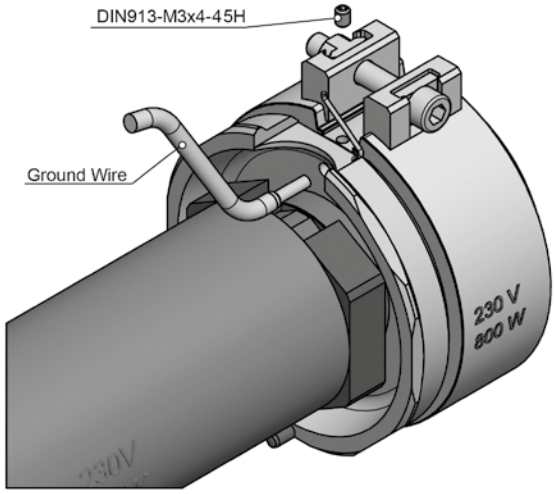
The Sprue Bushing has to be properly grounded to prevent serious personal injury or death.

Electrical work must be carried out by qualified persons.

Verify that all power source connections are properly grounded.

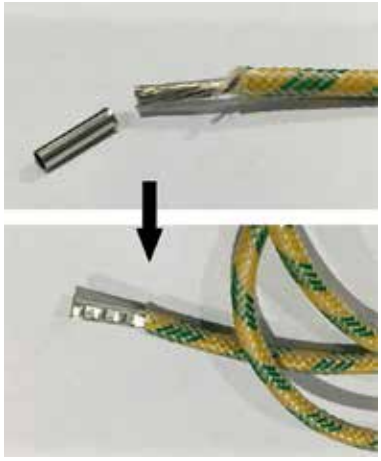
In Emergency case - Switch all systems off.

For first aid contact your medical / safety representing.



Doc007412.png

1) Use a crimping tool to fix the wire end ferrules at the grounding wire.
2) Guide the ground wire through the hole.
3) Tighten the ground wire with DIN913 socket set screw.



Doc007408.png

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10.41 Inlet Bushings

10.41.1 Inlet Bushing IB24-05 / IB32-05 Series

NOTICE

Use torque wrench with wrench insert and the torques indicated in the torque table (section 13).

⚠ WARNING

Hot Surfaces Hazard

Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.



Hazard of Pressurized Air

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Use personal protective equipment: Face protection, hearing protection and gloves.

For first aid contact your medical / safety representing.



10.41.1.1 Thermocouple

Color Coding of Thermocouples

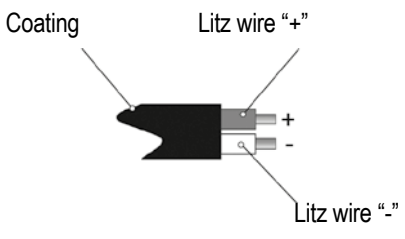
NOTICE

Take notice of the production and color identification of thermocouple cables.

Synventive uses J and K type thermocouples. Their color coding is given in the following table:

Table 1: International color coding for thermocouples

Type	International standard IEC 584-3	
J	Black	+ Black
		- White
K	Green	+ Green
		- White



Doc003124.png

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10.41.1.2 Dismounting and Mounting of the Inlet Bushing on the Manifold

In this section the inlet bushing parts are identified with the numbers indicated in the following figure.

Technical Data IB24-05, IB32-05



Doc008198.png

Inlet Bushing Parts IB24-05 Series			
Inlet Bushing without Heater (only short Inlet Bushing)			
Pos.	Qty.	Description	Item
1	1	IB24 Inlet Bushing Body	IB24-B-##-##-015-0#-R##
Inlet Bushing with Heater			
1	1	IB24 Inlet Bushing Body	IB24-B-##-##-###-0#-R##
2	1	Head Ring-IB24 Series	NC-IB24HR
3	1	Nozzle Heater Cover Tube 12E & IB24 Series	NC-HCT-024-MOD
4	1	Front Heater Assembly with TC	FHAJ-024-###-00 (J-Type) FHAK-024-###-00 (K-Type)
5	1	Retaining ring	M1800H25



Doc008201.png

Inlet Bushing Parts IB32-05 Series			
Inlet Bushing without Heater (only short Inlet Bushing)			
Pos.	Qty.	Description	Item
1	1	IB32 Inlet Bushing Body	IB32-B-##-##-015-0#-R##
Inlet Bushing with Heater			
1	1	IB32 Inlet Bushing Body	IB32-B-##-##-###-0#-R##
2	1	Head Ring-IB32 Series	NC-IB32HR
3	1	Nozzle Heater Cover Tube 16E & IB32 Series	NC-HCT-032-MOD
4	1	Front Heater Assembly with TC	FHAJ-032-###-00 (J-Type) FHAK-032-###-00 (K-Type)
5	1	Retaining ring	M1800H35

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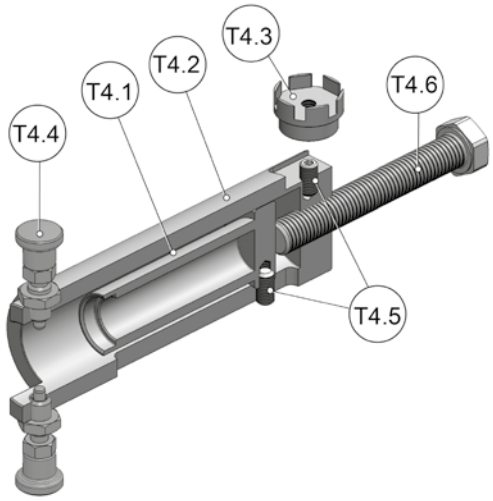
Disassembly Tools IB24-05 / IB32-05

In this section, all parts of the assembly tools are indicated in the following images with the part numbers.

Heater Disassembly Tool AT-FHA-024 for the Heater Type FHA#-024-###-##

The dismantling tool is required to pull the heater from the nozzle body or the sprue bushing.

The adapter AT-FHA-024-C-05 is only required for the sprue bushing.



Doc008132.png

AT-FHA-024			
Pos.	Qty.	Part No.	Description
T4.1	1	AT-FHA-024-C-01	Disassembly Tool Socket
T4.2	1	AT-FHA-024-C-02	Disassembly Tool Sleeve
T4.3	1	AT-FHA-024-C-05	Disassembly Tool IB24 Adapter Nut
T4.4	1	GN817-4-4-CK	Indexing plunger, Pin Bore=4; l1=4
T4.5	2	DIN913-M6x12-45H	Flat Point Socket Set Screw 45H Alloy Steel
T4.6	1	ISO4017-M12X100-12.9	Full Thread Hexagon Screw ISO4017

Heater Disassembly Tool AT-FHA-032 for the Heater Type FHA#-032-###-##

The dismantling tool is required to pull the heater from the nozzle body or the sprue bushing.

The adapter AT-FHA-032-C-05 is only required for the sprue bushing.



Doc008234.png

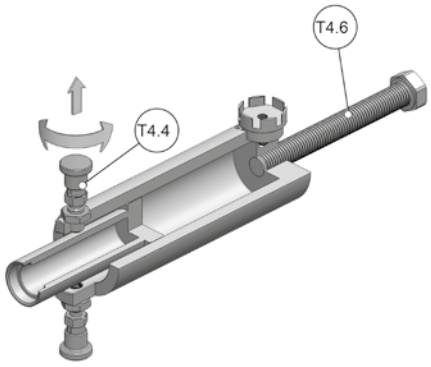
AT-FHA-032			
Pos.	Qty.	Part No.	Description
T4.1	1	AT-FHA-032-C-01	Disassembly Tool Socket
T4.2	1	AT-FHA-032-C-02	Disassembly Tool Sleeve
T4.3	1	AT-FHA-032-C-05	Disassembly Tool IB32 Adapter
T4.4	1	GN817-4-4-CK	Indexing plunger
T4.5	2	DIN913-M6x12-45H	Flat Point Socket Set Screw
T4.6	1	ISO4017-M12X100-12.9	Full Thread Hexagon Screw

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Dismounting of the Inlet Bushing IB24-05 / IB32-05

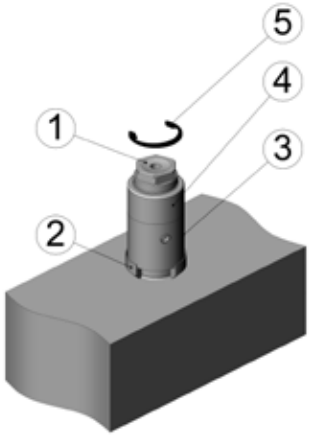
Sticking heaters can be pulled off the inlet bushing body by using the disassembly tool.

1) Turn the hexagon head screw (T4.6) of the disassembly tool completely backwards.
2) Pull the button from indexing plungers (T4.4) and fix the position by turning the button (T4.4) by 90°.



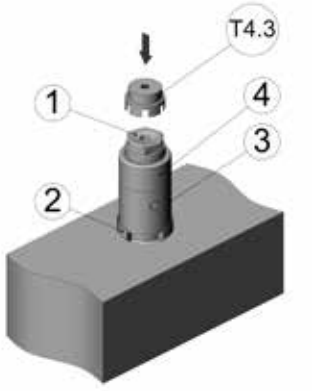
Doc008136.png

3) Disassemble the retaining ring (5) from the inlet bushing body (1).



Doc008235.png

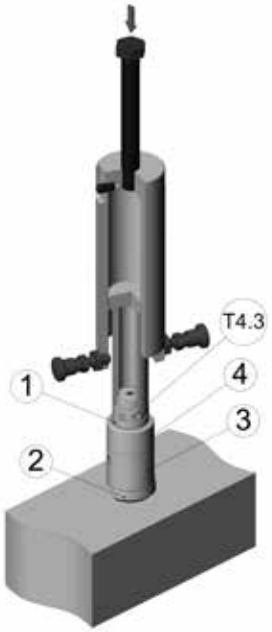
4) Unscrew the adapter (T4.3) from the disassembly tool.
5) Place the adapter (T4.3) on the inlet bushing body (1).



Doc008236.png

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6) Place the disassembly tool on the adapter (T4.3).



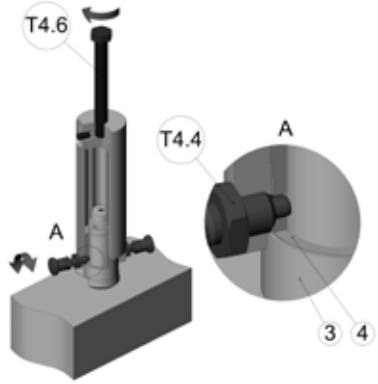
Doc008237.png

7) Loosen the indexing plungers (T4.4), by turning the button 90°.
8) Position the disassembly tool until the indexing plungers (T4.4) snaps into the hole of the cover tube (3) and the heater (4).
9) Turn the hexagon head screw (T4.6) clockwise.

NOTICE

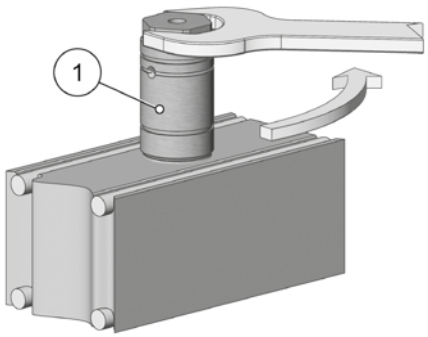
By turning the hexagon head screw (T4.6) the heater (4) together with the cover tube (4) is pulled off the inlet bushing body (1).

10) After the hexagon head screw (T4.6) has been turned down completely, the heater can be removed by hand.



Doc008238.png

11) Unscrew the inlet bushing body (1) from the manifold.

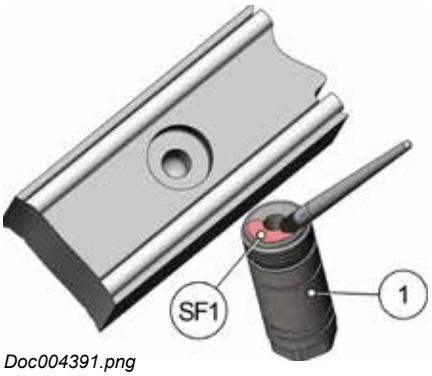


Doc004390.png

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Mounting of the Inlet Bushing IB24-05 / IB32-05

1) Apply spotting ink on the inlet bushing body (1) bottom surface (SF1).
2) Screw in the inlet bushing body (1) hand-tight into the manifold thread until seated.
3) Unscrew the inlet bushing body (1) from the manifold.



Doc004391.png

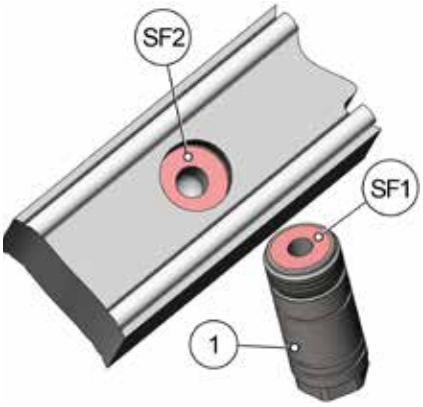
4) Check the matching between the manifold bottom surfaces (SF2) and the inlet bushing body (1) surface (SF1).

NOTICE

The manifold must bear on all surfaces uniformly and flatly, in particular on the inlet bushing body contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, please - contact the Synventive Customer Service or Technical Support.

5) With a positive ink test clean the surfaces and proceed to the next step.

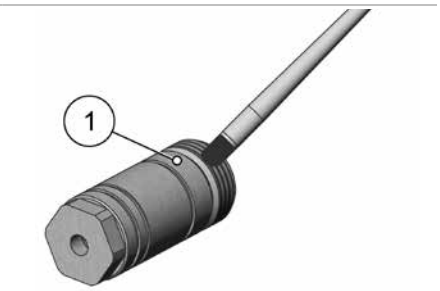


Doc004392.png

6) Lubricate the thread (not the face) of the inlet bushing body with high temperature assembly paste (anti-seize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

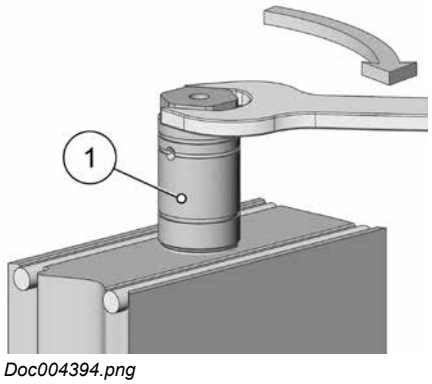


Doc004393.png

7) Tighten the inlet bushing body (1) on the manifold.

NOTICE

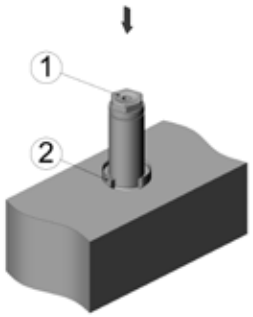
Use torque wrench with wrench insert and the torques indicated in the torque table (section 13).



Doc004394.png

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8) Place the head ring (2) on the manifold.



Doc008239.png

9) Bend the heater and thermocouple leads from the front heater (4).

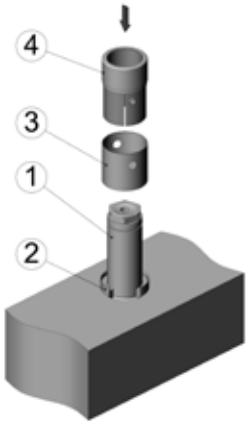
NOTICE

Use round-nosed pliers only.

10) Mount the front heater (4) together with the cover tube (3) onto the inlet bushing body (1).

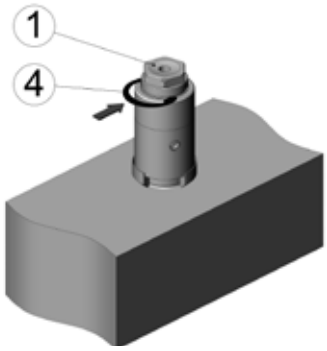
NOTICE

The heating leads of the front heater (4) have to be led into the openings of the head ring (2).



Doc008240.png

11) Fix with the retaining ring (5) the inlet bushing heater (4) on the inlet bushing body (1).



Doc008241.png

10.41.2 Inlet Bushing IB-50

NOTICE

Use torque wrench with wrench insert and the torques indicated in the torque table (section 13).

WARNING

Hot Surfaces Hazard



Contact between the skin and hot surfaces could result in burns.

Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.

When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.

For first aid contact your medical / safety representing.



Hazard of Pressurized Air



Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Use personal protective equipment: Face protection, hearing protection and gloves.

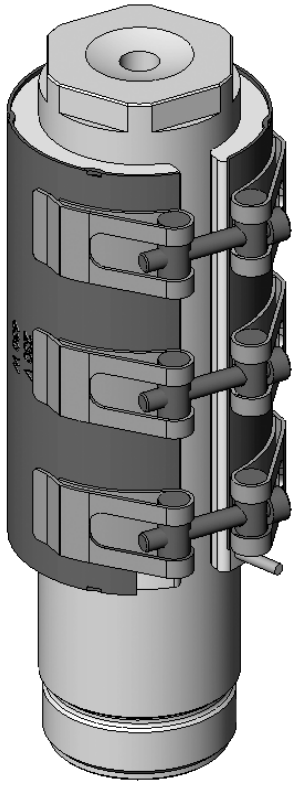
For first aid contact your medical / safety representing.



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10.41.2.1 Technical Data IB-50

In this section the inlet bushing parts are identified with the numbers which are indicated in the following figure.

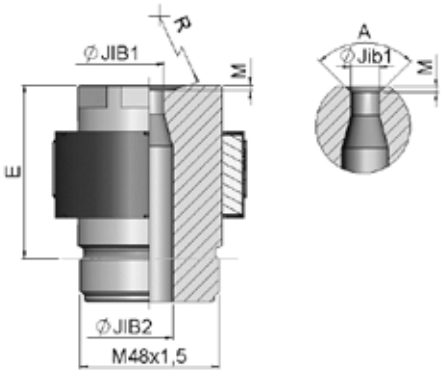


Doc004750.png

General Information

Inlet Bushing for hot runner systems, installed on manifold.

Can specify the touching shape to Machine nozzle.

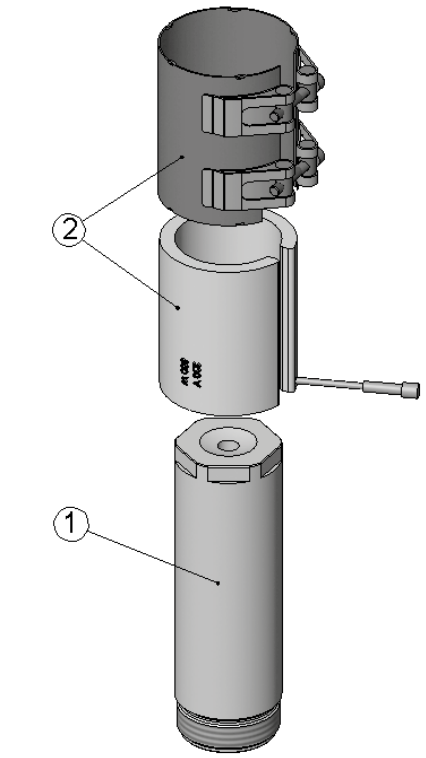


Doc004753.png

Specification

Inlet geometry for the machine nozzle:	
Radius (R)	0~50 mm
Angle (AD)	90°~120°
Flow Bore:	
ØJIB1	6; 7; 8; ..... 23; 24 mm
ØJIB2	10; 11; 12; ..... 24; 25 mm
Length:	
E	25; 50; modifiable 50<E≤200 mm

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Doc004754.png

Inlet Bushing parts IB50 Series

Inlet Bushing without Heater

No.	Qty.	Description	Item
(1)	1	Inlet Bushing IB50 Body Version 01 M48X1.5 Modificable	IB50B02501-MOD

Inlet Bushing with Heater

No.	Qty.	Description	Item
(1)	1	Inlet Bushing IB50 Body Version 01 M48X1.5 Modificable	IB50BXXX01-MOD XXX=060, 100, 140, 200
(2)	1	Heater Band ID 50 Version 5 Type J	HB50XXX05 XXX=030; 040; 080; 120
or	1	Heater Band ID 50 Version 6 Type K	HB500XX06 XXX=030; 040; 080; 120

10.41.3 Color Coding of Thermocouples

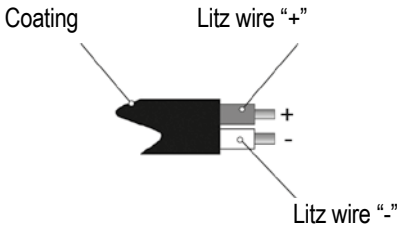
NOTICE

Take notice of the production and color identification of thermocouple cables.

Synventive uses J and K type thermocouples. Their color coding is given in the following table:

Table 1: International color coding for thermocouples

Type	International standard IEC 584-3	
J	Black	+ Black
		- White
K	Green	+ Green
		- White

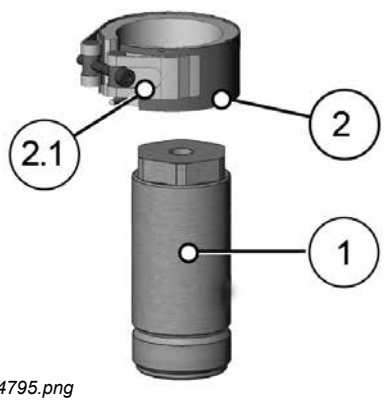


Doc003124.png

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10.41.3.1 Dismounting and Mounting of the Inlet Bushing on the Manifold

In this section the inlet bushing parts are identified with the numbers indicated in the following figure.



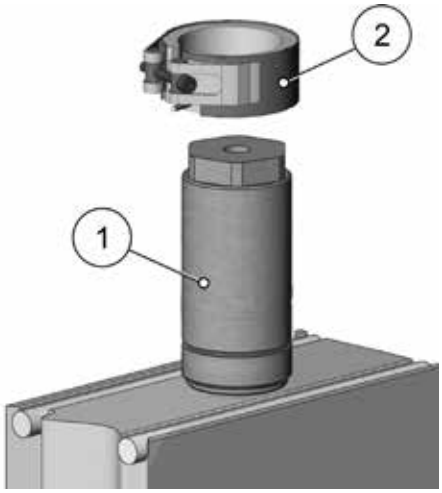
Doc004795.png

Inlet Bushing Parts IB-50

Pos.	Qty.	Description	Item
1	1	Inlet bushing body	IB50B###01
2	1	Inlet bushing heater	HB50###
2.1	1	Heater Band J-Type	HB50###5
2.1	1	Heater Band K-Type	HB50###6

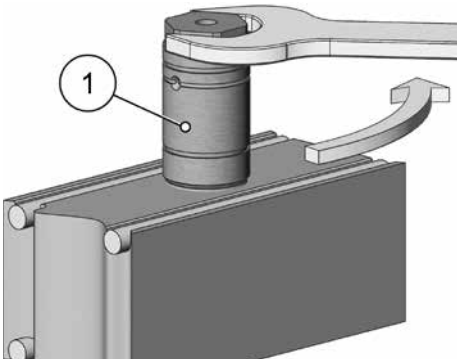
Dismounting of the Inlet Bushing IB-50

1) Loosen the socket cap screw from the inlet bushing heater (2).
2) Lift up the inlet bushing heater (2) from the inlet bushing body (1).



Doc004649.png

3) Unscrew the inlet bushing body (1) by using a wrench (HEX46) from the manifold.

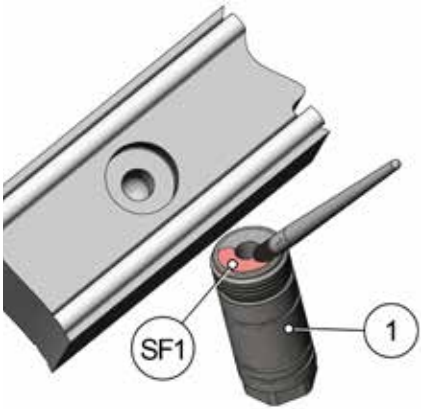


Doc004390.png

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Mounting of the Inlet Bushing IB50

1) Apply spotting ink on the inlet bushing body (1) bottom surface (SF1).
2) Screw in the inlet bushing body (1) hand-tight into the manifold thread until seated.
3) Unscrew the inlet bushing body (1) from the manifold.



Doc004391.png

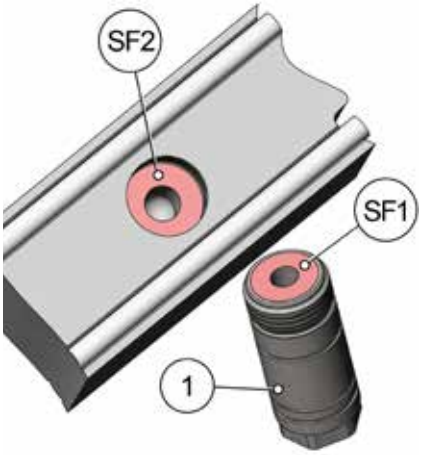
4) Check the matching between the manifold bottom surfaces (SF2) and the inlet bushing body (1) surface (SF1).

NOTICE

The manifold must bear on all surfaces uniformly and flatly, in particular on the inlet bushing body contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, please - contact the Synventive Customer Service or Technical Support.

5) With a positive ink test clean the surfaces and proceed to the next step.

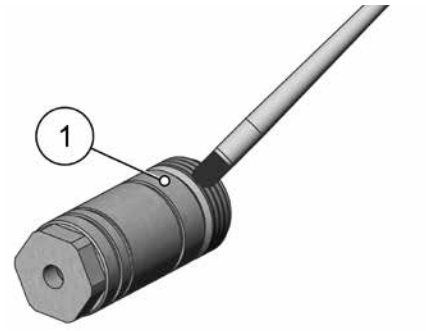


Doc004392.png

6) Lubricate the thread (not the face) of the nozzle body with high-temperature assembly paste (anti-seize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.



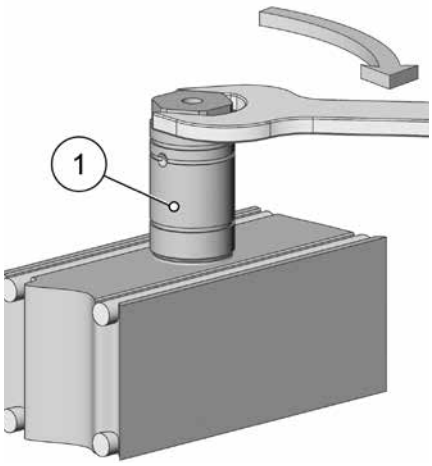
Doc004393.png

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7) Tighten the inlet bushing body (1) on the manifold.

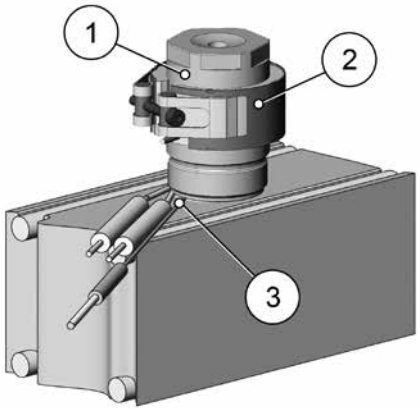
NOTICE

Use torque wrench with wrench insert and the torques indicated in the torque table (section 13).



Doc004394.png

8) Push the inlet bushing heater (2) along the Inlet bushing body (1).
9) Tighten the heater (2) at the Inlet bushing body (1) with the socket cap screw.



Doc004658.png

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11 Dismounting and Mounting Manifold Plugs

There are two kinds of manifold plugs from Synventive Hot Runner Systems:

- Standard manifold plugs which have to be replaced only by Synventive.
- Replaceable manifold plugs which the user can dismantle and install.

This chapter describes dismantling and installation of replaceable manifold plugs.

NOTICE

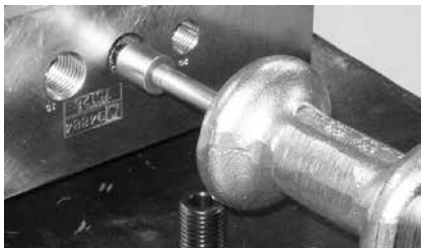
If your Hot Runner System has not replaceable manifold plugs, please contact Synventive Customer Services for dismantling and installing the manifold plugs.

11.1 Dismounting Manifold Plugs (APT)

1) Remove the heat shields if necessary.
2) Unscrew the set screw.



Doc003342.png



Doc003343.png

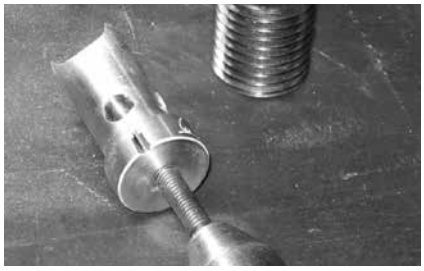
3) Using a slide hammer, thread into the head of the runner plug.
4) Remove the plug (according to size use a M5, M6, M8 or M12 screw).

NOTICE

Be careful not to misplace the dowel.



Doc003344.png



Doc003345.png

11.1.1 Cleaning the Flow Bores

1) Damages at the Hot Runner System's flow bores can cause material degradation and leakage.

NOTICE

To prevent this do not damage the contact surface between nozzle and manifold. Use a brass brush or Scotch-Brite ®.

11.2 Mounting Manifold Plugs (APT)

1) Set the manifold plug into the bore.



Doc003346.png

2) Set the dowel into the appropriate bore.

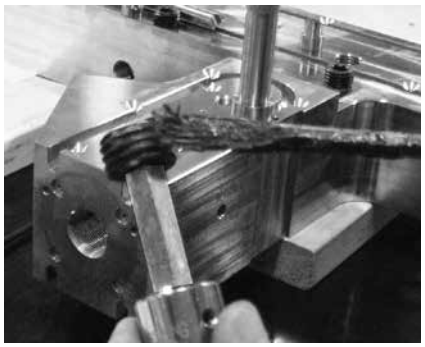


Doc003347.png

3) Lubricate the set screw with high-temperature assembly paste (anti-seize compound).

NOTICE

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

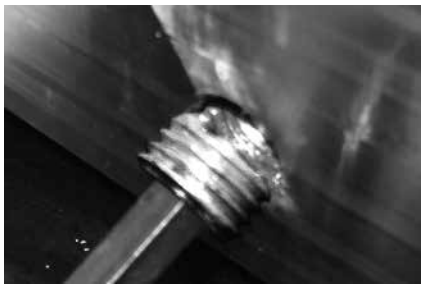


Doc003340.png

4) Screw the set screw into the thread.

NOTICE

Use torque wrench with wrench insert and the torques indicated in the torque table (section 13).



Doc003341.png

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12 Accessories and Tools

This section describes the disassembly and assembly process to replace accessories

Position Sensor

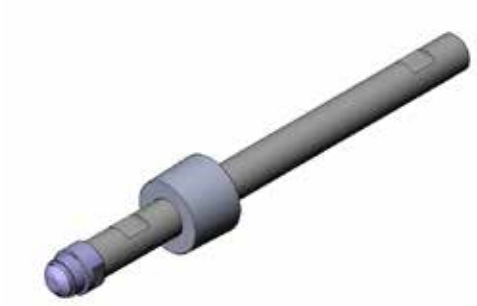
HESASSY03 (with 3 m cable)

HESASSY05 (with 5 m cable)



Doc004864.tif

W Gate Detail Inspection Procedure & Tools



Doc006930.tif

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12.1 Service for the Position Sensor

DANGER		
	**Danger to Life by Electric Shock** Electrical work must be carried out by qualified persons. For any work on the Hot Runner System, check that the system is properly grounded. **For first aid contact your medical / safety representing.**	

12.1.1 Tools for the Position Sensor Service

Use the Position Sensor Tester Kit - HESTK01, each toolkit contains:

- Magnetic polarity indicator - EPID
- Position Sensor Tester - HESTU01 incl. DC power supply - 490-SM16-12-V-P5
- Position Sensor Assembly, 1 m Cable - HESASSY01
- Carrying Case - 2340406C5

The Position Sensor Service Toolkit is used by Synventive Service Technicians to confirm that system wiring is correct and all signals are working. Contact Synventive to determine if the Toolkit can be purchased or borrowed for your application.



Doc004860.png

Magnetic polarity indicator

Used to search for a magnet and detect magnet polarity.



Doc004862.png

Position Sensor Tester

Basic Position Sensor Operation can be confirmed with the Position Sensor Tester

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12.1.2 Basic Position Sensor Information

Position Sensor - Part Number

HESASSY03 (with 3 m Cable)
HESASSY05 (with 5 m Cable)

Position Sensor Temperature Rating

- Sensor: 150 °C
- Cable: 200 °C

Position Sensor has internal temperature change compensation.

12.1.3 Installing the Position Sensor

NOTICE

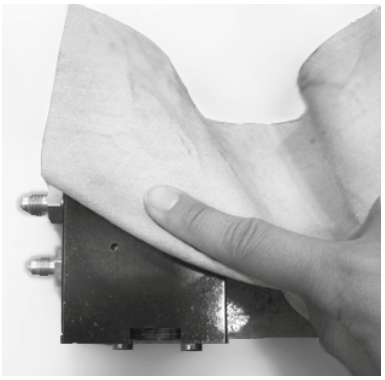
Danger of Material Defects

Do not pinch signal wire.

NOTICE

Keep surfaces in contact with the Position Sensor clean.

1) Wipe down surface where Position Sensor is to be attached



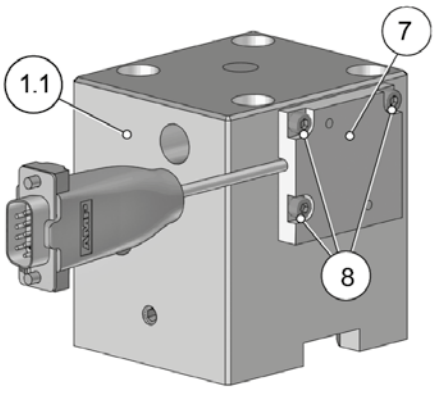
Doc004845.png

2) Attach Position Sensor (7) with four DIN7985-M3x3 screws (8) to the actuator housing (1.1).

NOTICE

Torque value is 1.5 Nm

Do not touch the printed circuit board, instead handle the steel enclosure.



Doc004844.png

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Doc004878.png

NOTICE

Ensure the sensor does not protrude past the face of the Actuator.

Check the Operation of the Position Sensor

NOTICE

Connect the Position Sensor to the tester.

The output should be within the range of 0.0 v to 5.0 v.

The voltage should be high when the valve gate is in the closed position and low when the valve gate is open.

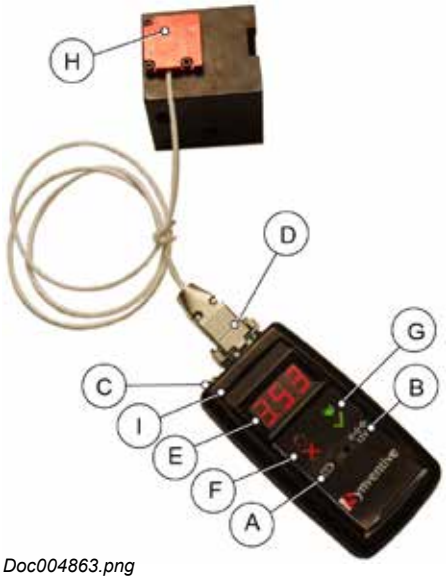
Basic sensor operation can be confirmed with

- Position Sensor Tester powered up by either
  - Switching to the battery setting (A) to the left.
  - or switching to the outlet setting 12V (B) on the right and plugging in DC Power supply (C)
- Attach Position Sensor (H) into the H Tester (I) and to a cylinder mounted sensor (K)

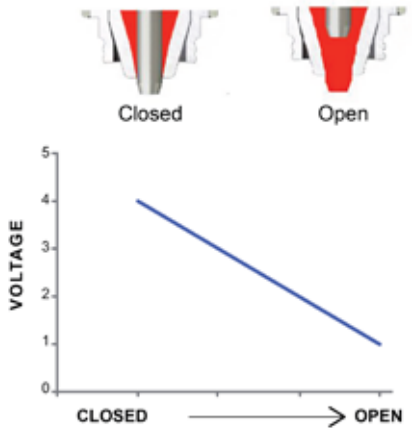
NOTICE

The output of the sensor as read by the tester should change at every position.

The output should be high when the valve gate is closed and low when the valve gate is open.



Doc004863.png



Doc005149.png

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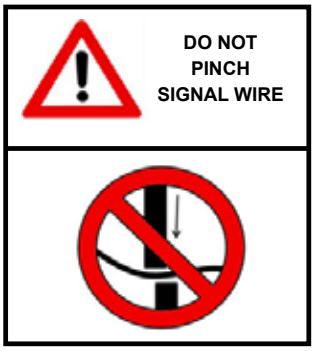
12.1.4 Installing of the Actuator with Position Sensor on the Hot Runner

1) The sensor cable must be routed to the wire-guard.

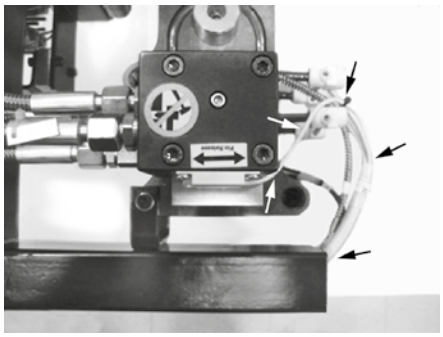
NOTICE

An awareness of the cutout in the top clamp plate is necessary to avoid the cable being damaged during assembly.

Wire ties or fiberglass tape can be used to secure the cable to a safe path.



Doc005325.ai



Doc004848.png

12.1.4.1 Operation with SynFlow®

NOTICE

The Position Sensor should be used with water cooling while the manifold heater is in operation and requires SynCool® to protect it during shut-down.

The temperature rating of the Position Sensor is 150 °C.

NOTICE

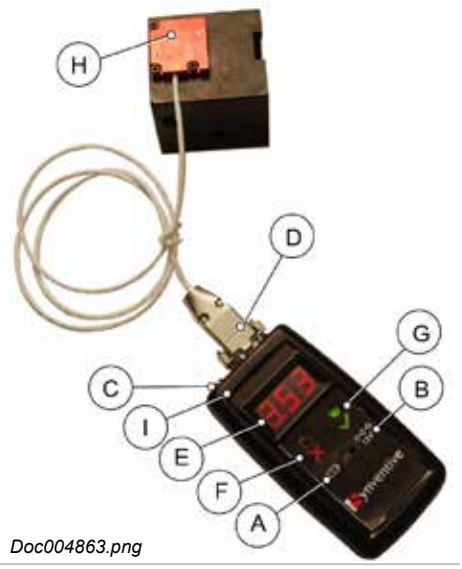
The Synflow system must be calibrated in the hot condition, allow hot runner system to reach temperature set point before calibrating. An additional calibration 1 hour after operation is recommended for improved sensor accuracy.

Refer to Synflow user manual for further detail about the overall operation of the Synflow system with the Position Sensor actuator.

12.1.5 Position Sensor Troubleshooting Guide

Use the Position Sensor Service Toolkit, each toolkit contains a magnetic polarity indicator, a Position Sensor tester and spare Position Sensor.

Position Sensor Test Setup



Doc004863.png

1) Turn on the tester by switch to the battery setting (A) or outlet setting 12V (B) and plugging in DC Power supply (C)
2) Connect the Position Sensor dSub (D) to the tester.
3) Read the voltage on the Tester Readout (E).
4) Red LED (F) indicates a short in the sensor and should be replaced with a new sensor.
5) Green LED (G) indicates proper operation of the sensor and testing can continue.

NOTICE

The output of the sensor as read by the tester should change at every position.

The output should be high when the valve gate is closed and low when the valve gate is open.

Some Potential Issues may be:

Magnetic polarity indicator



Doc004860.png

Use the magnetic polarity indicator to scan the surface facing the sensor position, by touching the cylinder.



Doc004861.png

1) Issue

Sensor output is not changing with any piston move.

a) Check that sensor cable for obvious damage.

b) Use Magnetic polarity indicator to confirm that a magnet is present and correct magnet polarity is aimed towards the sensor assembly (North in the actuator).

After Position Sensor removal have the Magnetic polarity indicator touch the cylinder and scan the surface facing the sensor position.

i) If magnet is incorrect or missing, replace piston with magnetized piston.

ii) If magnet is present, use the spare sensor in the service toolkit to confirm bad sensor.

Position Sensor Spare Kit



Doc004864.png

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2) **Issue**

Sensor output changes for some of the stroke but not the whole stroke. There is a "dead band."

a) Confirm the position of the sensor and that sensor is properly torqued into position.

b) Cycle the actuator assembly with top clamp plate removed.

If it is still not performing, confirm with the magnetic polarity indicator that a magnet is present and correct magnet polarity (North in the actuator) is aimed towards the sensor assembly.

Use the magnetic polarity indicator to scan the surface facing the sensor position, by touching the cylinder.



Doc004861.png



Doc004878.png

3) **Issue**

Sensor voltage output is reversed

a) The sensor may have been flipped mounted at the actuator housing, verify that the sensor is not rotated 180°.

i) If it is not flipped, try the spare sensor.

b) Confirm that the magnet polarity is correct by using the magnet tester.

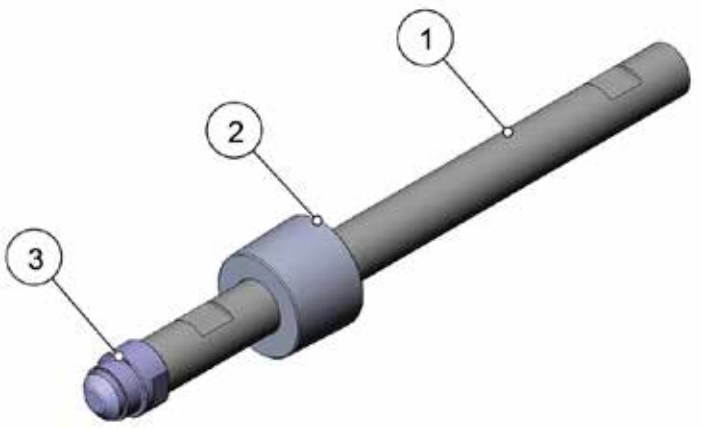
i) If magnet polarity is incorrect, replace the piston.

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12.2 W Gate Detail Inspection Procedure & Tools

The tools for inspecting the mold cutout at the front of the nozzle for “W” gate to make sure the accurate dimension, get the expect result for molding.

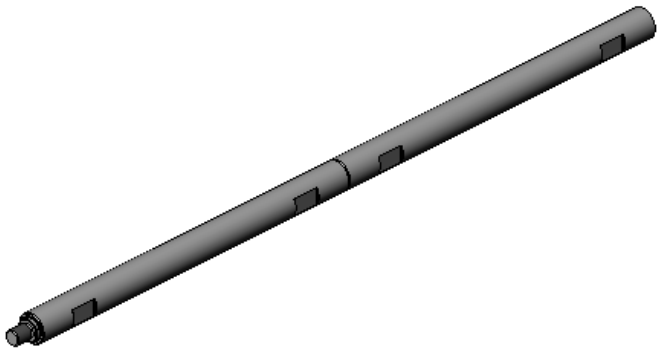
12.2.1 Inspection Tool Introduction



1) Extension Bar
2) Fix Disk
3) Inspection tips

Doc006930.png

12.2.2 Extension Bar



Item	L
ITOOL-BAR-16-200	200
ITOOL-BAR-16-300	300

Doc006931.png



Item
ITOOL-BAR-16-050

Used for lapping the injection gate on mold

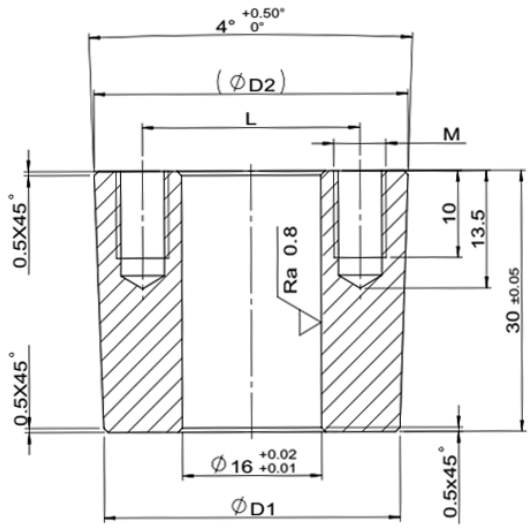
Doc006932.png

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12.2.3 Fix Disk

Fix disk with the tapered shape to fix the extension bar on the mold.

ITEM	D1	D2	M	L
ITOOL-DISK-20	19	21.1	-	-
ITOOL-DISK-27	26	28.1	-	-
ITOOL-DISK-35	34	36.1	M6	25
ITOOL-DISK-40	39	41.1	M6	28
ITOOL-DISK-42	41	43.1	M6	30
ITOOL-DISK-45	44	46.1	M6	30
ITOOL-DISK-50	49	51.1	M8	35
ITOOL-DISK-55	54	56.1	M8	35
ITOOL-DISK-60	59	61.1	M8	40

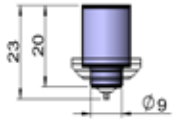
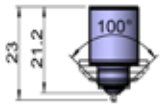
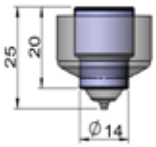
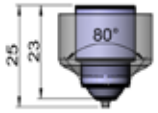
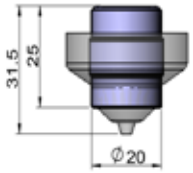
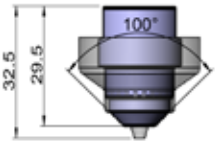
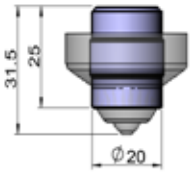
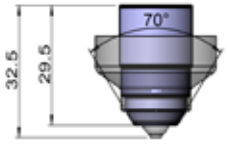
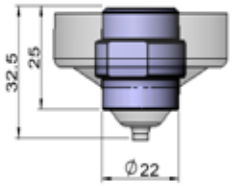
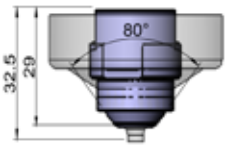
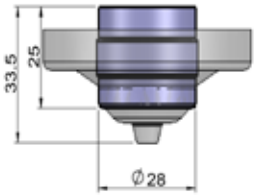
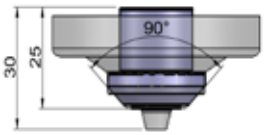


Doc006933.png

For example: ITOOL-DISK-27 can be fixed in the mold with the 09E nozzle cutout

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12.2.4 Inspection Tools for Gate Checking

Gate Type	Sealing Diameter Check	Taper Shape Check
06E-VSW / VTW	 ITOOL-DC-09-GO ITOOL-DC-09-NOGO	 ITOOL-06E-WV-GO ITOOL-06E-WV-NOGO
09E-W10V / W25V / W10T	 ITOOL-DC-14-GO ITOOL-DC-14-NOGO	 ITOOL-09E-W-GO ITOOL-09E-W-NOGO
12E-VTW / VSW	 ITOOL-DC-20-GO ITOOL-DC-20-NOGO	 ITOOL-12E-VW-GO ITOOL-12E-VW-NOGO
12E-TTW	 ITOOL-DC-20-GO ITOOL-DC-20-NOGO	 ITOOL-12E-TTW-GO ITOOL-12E-TTW-NOGO
16E-W10V / W25V / W10T	 ITOOL-DC-22-GO ITOOL-DC-22-NOGO	 ITOOL-16E-WV-GO ITOOL-16E-WV-NOGO
22E-VTW / VSW	 ITOOL-DC-28-GO ITOOL-DC-28-NOGO	 ITOOL-22E-VW-GO ITOOL-22E-VW-NOGO

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12.2.5 Inspection Procedure

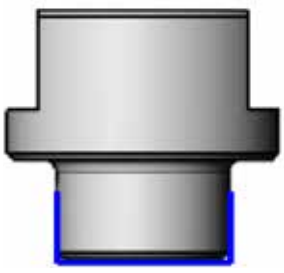
12.2.5.1 Preparation



Doc006936.png

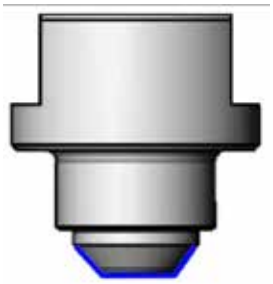
1) Prepare the tools which you need, add the check blue on the checking face for the tips.
2) Remove the mold back plate and hot runner system from the mold, remove the manifold plate also if possible.

Sealing diameter check



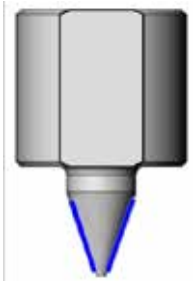
Doc006937.png

Taper shape check



Doc006938.png

Gate taper check



Doc006935.png



Doc006939.png

3) Put the tools into the nozzle cutout and rotate the bar to the end of the seat.

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12.2.5.2 Sealing Diameter Check

GO gauge



Doc006940.png

NOGO gauge



Doc006941.png

Expected result:

GO gauge can touch the face of the cylinderical counter bore.

NOGO can't insert into the sealing cylinderical counter bore.

Defective result:

GO gauge can't insert into the counter bore.

NOGO can insert into the counter bore.

NOTICE

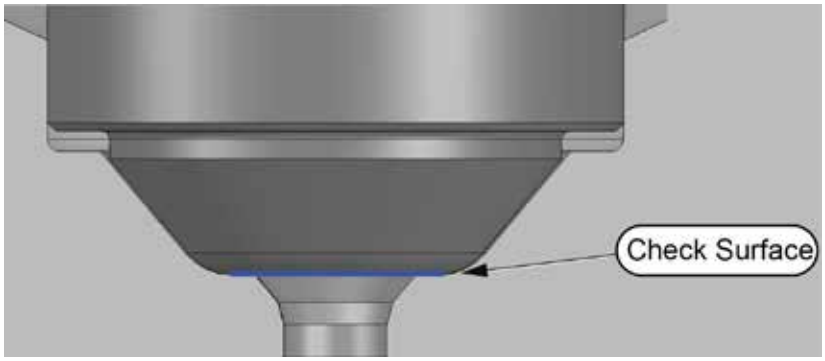
Depth check can refer 12.2.5.5

Clean the Check Blue off the all surfaces of the mold and the tools.

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12.2.5.3 Taper Shape Check

GO gauge



Doc006942.png



Doc006943.png



Doc006944.png

Expected result:

GO gauge can touch the end of the taper counter bore.

Defective result:

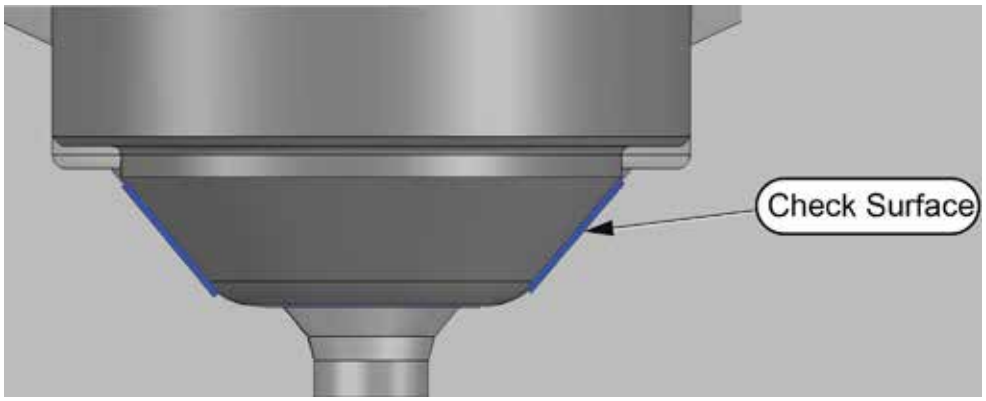
GO gauge can't touch the end of the taper counter bore..

NOTICE

Depth check can refer 12.2.5.5

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NOGO gauge



Doc006945.png



Doc006946.tif



Doc006947.tif

Expected result:

NOGO gauge can't touch the end of the taper counter bore, but can touch most of the taper surface.

Defective result:

NOGO gauge can touch the end of the taper counter bore, and can't touch the taper surface.

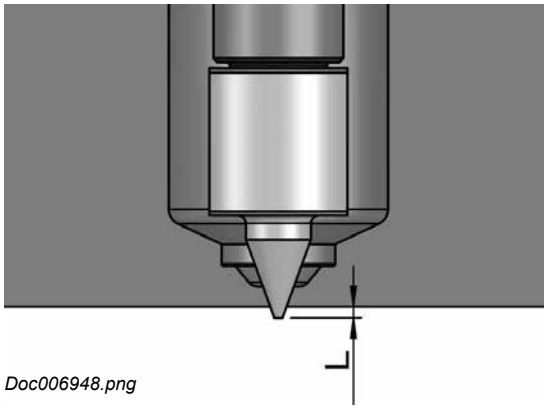
NOTICE

Depth check can refer 12.2.5.5

Clean the Check Blue off the all surfaces of the mold and the tools.

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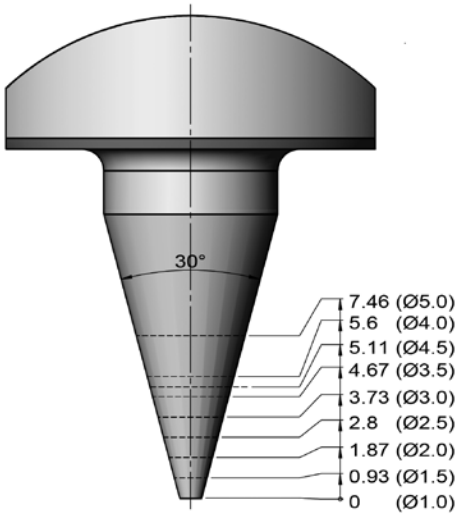
12.2.5.4 Gate Taper Check



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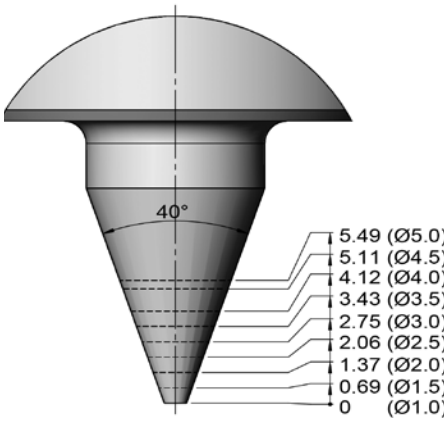
Measure the protruding part of the inspection tool to verify the conical gate dimension.

ITOOL-W25V-30



Doc006949.png

ITOOL-W25V-40



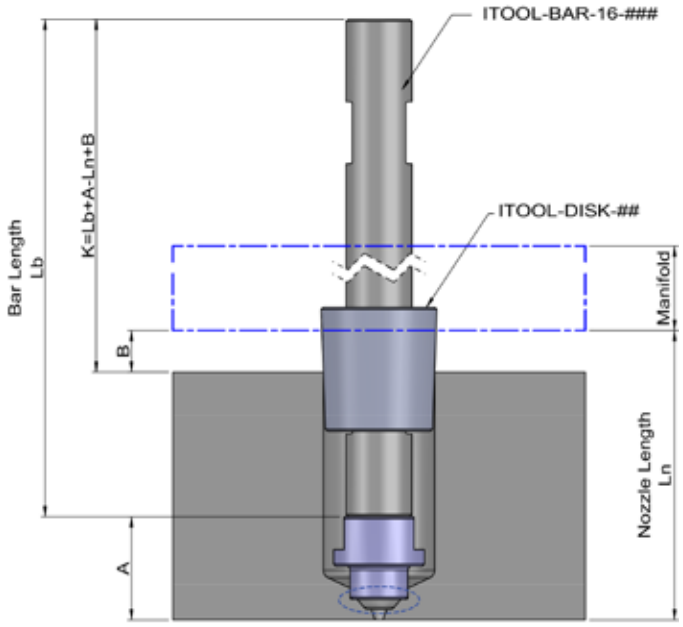
Doc006950.png

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12.2.5.5 Depth Check

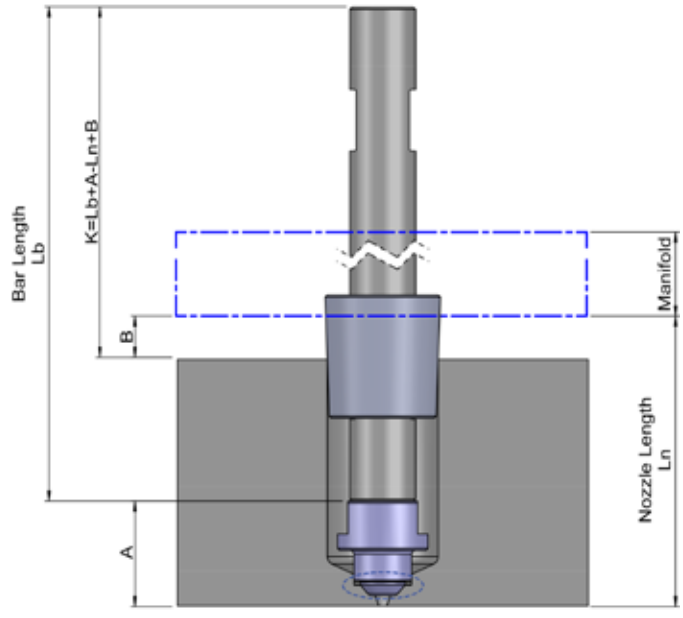
You can calculate the K dimension to check the nozzle tip cutout depth, B and L value can be found on the customer hot runner 2D drawing.

Sealing Diameter Check



Doc006951_en.png

Taper Shape Check



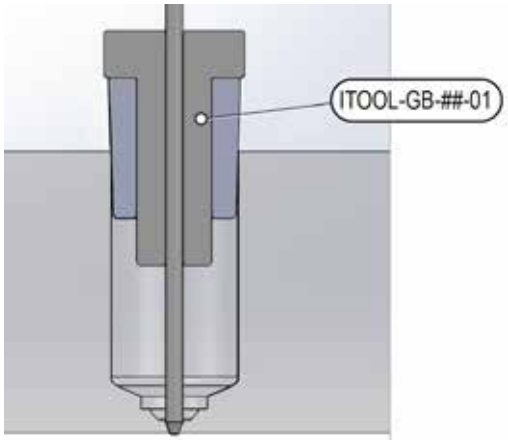
Doc006952_en.png

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12.2.6 Valve Pin Verification

The valve pin can work with the guide bushing for verification or lapping the gate.

NOGO gauge



Doc006953.png

Valve Pin Guide bushing

D = Valve pin diameter

Item	D
ITOOL-GB-30-01	3.0
ITOOL-GB-38-01	3.8
ITOOL-GB-50-01	5.0
ITOOL-GB-60-01	6.0
ITOOL-GB-80-01	8.0

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13 Torques

All Synventive parts are to be tightened to the prescribed torques specified in the following table.

The values given in the table refer to a cold condition (room temperature).

13.1 Relevant Parts attached with Screws pursuant to ISO 4762 (DIN 912)

- All screw connections of the actuators with socket head cap screws.
- All screw connections on the manifold and the mold.
- All screw connections of the A series inlet bushings (e.g. ABK etc.).
- All other components, such as protective heat shields, tie-down straps etc. are not deemed to be the subject of this manual, and therefore are not included. Information on these torques, not specified herein, shall be given to the workers by qualified professional personnel as needed.

NOTICE

A list of torque values is contained on each customer drawing and is binding upon all departments using the drawing.

13.2 Tool Specifications

A properly calibrated torque wrench must be used for the components in the list on the next page.

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13.3 Instructions on Torques for Synventive parts

Table 9: List of torques for Synventive part

Torques – Nozzles					
API					
	Parts	**Thread size**	**Wrench size**	**Nm**	**ft-lbs**
06E-02	Nozzle body	M16x1	HEX 15	45	33
06S-02	Nozzle body	M16x1	HEX 32 via Adapt.	45	33
06E-02 / 06S-02	Nozzle tip	M10x0.75	HEX 10	18	13
09E	Nozzle body	M22x1.5	HEX 19	100	74
09S	Nozzle body	M22x1.5	HEX 32 via Adapt.	100	74
09E / 09S	Nozzle tip	M15x1	HEX 15	35	26
12E-06 /12S-06	Nozzle body	M27x1	HEX 24	175	130
12E-06 / 12S-06	Nozzle tip	M20x1	HEX 21	100	74
16E-06 /16S-06	Nozzle body	M32x1.5	HEX 32t	340	250
16E-06 / 16S-06	Nozzle tip	M27x1	HEX 24/27	200	148
12EX16-03	Nozzle tip	M20x1	HEX 21	100	74
22E-06 / 22S-06	Nozzle body	M42x1.5	HEX 41	440	325
22E-06	Nozzle tip	M34x1.5	HEX 32	400	292
16EX22-03	Nozzle tip	M27x1	HEX 24/27	200	148
22E-06 / 22S-06	Nozzle tip	M34x1.5	HEX 32	400	295
APT					
	Parts	**Thread size**	**Wrench size**	**NM**	**ft-lbs**
SR-8	Nozzle tip	M12x1	HEX 14	30	22
T-16	Nozzle body	M45x2	HEX 41	400	300
T-16	Nozzle tip	M27x1	HEX 26	200	148
SR-16	Nozzle tip	M27x1	HEX 26	200	148
T-20	Nozzle body	M52x3	HEX 46	470	350
T-20	Nozzle tip	M36x2	HEX 36	340	250
SR-20	Nozzle tip	M25x1.5	HEX 27	270	200
T-24	Nozzle body	M60x3	HEX 57	675	500
T-24	Nozzle tip	M40x1.5	HEX 38	340	250
SR-24	Nozzle tip	M33x2	HEX 38	270	200
Torques – Manifold Parts and Others					
	Parts	**Thread size**	**Wrench size**	**Nm**	**ft-lbs**
IB24 Inlet bushing		M24x1.5	HEX 21	120	89
IB32 Inlet bushing		M32x1.5	HEX 27	260	192
IB50 Inlet bushing		M48x1.5	HEX 46	400	295
Valve pin guide NG20 / NG30 / NG38		M14x1	HEX 16	30	22

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Torques

Valve pin guide NG05 / NG06 / NG08 / VPG - M22	M22x1	HEX 27	100	74
Valve pin guide nut 47-85-101	M27x1	HEX 27	170	125
Screw connections cylinder housing PNC7518M	M6	HEX 5	9	7

Torques – Dynamic Feed® Components

Parts		Thread size	Wrench size	Nm	ft-lbs
Transducer block DFTB12	Socket head cap screw ISO 4762 - 12.9 (DIN912)	M10	HEX 8	50	37
Transducer block DFTB16	Socket head cap screw ISO 4762 - 12.9 (DIN912)	M16	HEX 14	180	133
Transducer block DFTB22	Socket head cap screw ISO 4762 - 12.9 (DIN912)	M16	HEX 14	180	133
Melt pressure sensor DFMPS		1/2"- 20 UNF	HEX 13	45	33

Torques for Screws and Nuts

Parts	Thread size	Wrench size	Nm	ft-lbs
Socket head cap screw ISO 4762 - 12.9 (DIN912)	M4	HEX 3	4	3
Socket head cap screw ISO 4762 - 12.9 (DIN912)	M5	HEX 4	8	6
Socket head cap screw ISO 4762 - 12.9 (DIN912)	M6	HEX 5	14	10
Socket head cap screw ISO 4762 - 12.9 (DIN912)	M8	HEX 6	34	25
Socket head cap screw ISO 4762 - 12.9 (DIN912)	M10	HEX 8	67	50
Socket head cap screw ISO 4762 - 12.9 (DIN912)	M12	HEX 10	115	85
Socket head cap screw ISO 4762 - 12.9 (DIN912)	M14	HEX 12	185	136
Socket head cap screw ISO 4762 - 12.9 (DIN912)	M16	HEX 14	290	214
Threaded pin DIN913-45H/ISO4026	M8	HEX 4	10	7

NOTICE

Torque values for screws and nuts < M4 are not specified in the torque list.

Torques - Manifold Plug Set Screw

for APT Manifolds

Parts	Thread size	Wrench size	Nm	ft-lbs
62-PD-002 Removable manifold plug	M12 M14 M16 M20 M22 M24 M27 M33		40 60 100 130 230 245 270 475	30 45 75 130 170 180 200 350
62-PD-006 Removable manifold plug	M16 M20 M24 M27 M33		100 175 300 375 475	75 130 220 275 350
62-PD-007 Removable manifold plug	M16 M20 M24 M27 M33		100 175 300 375 475	75 130 220 275 350
Indicates torque specification provided for special oversized endwork that does not appear in 62-PD-002, 62-PD-006 or 62-PD-007.	M45 M48		680* 850*	500* 625*

for API Manifolds

Parts		Thread size	Wrench size	Nm	ft-lbs
MP02	Removable manifold plug (Thread bold MPT141502)	M14x1	HEX 6	15	11
MP02	Removable manifold plug (Thread bold MPT161502)	M16x1	HEX 8	25	18.5
MP02	Removable manifold plug (Thread bold MPT181502)	M18x1	HEX 10	45	33
MP02	Removable manifold plug (Thread bold MPT201502)	M20x1	HEX 10	65	48

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Torques

MP02	Removable manifold plug (Thread bold MPT222002)	M22x1	HEX 12	90	67
MP02	Removable manifold plug (Thread bold MPT242002)	M24x1	HEX 12	125	92
MP02	Removable manifold plug (Thread bold MPT262002)	M26x1	HEX 14	165	122
MP02	Removable manifold plug (Thread bold MPT282002)	M28x1	HEX 14	215	160
MP02	Removable manifold plug (Thread bold MPT302002)	M30x1	HEX 17	275	203
MP02	Removable manifold plug (Thread bold MPT332002)	M33x1	HEX 17	380	280

Torques - No Current Series

Parts		Thread size	Wrench size	Nm	ft-lbs
C	Outside body	M27x1.5	HEX 22	80	59
C	(CW00) Outside body	M27x1.5	HEX 22	50	37
EA	Nozzle body	M27x1	HEX 24	120	89
T-5, HT-5, T-10, HT-10	Nozzle body			135	100
T-5, HT 5	Nozzle tip			65	50
T-10, HT-10	Nozzle tip			120	90
SRP-20, TP-20	Nozzle tip			200	150
SRP-24, TP-24	Nozzle tip			270	200
EG-10	Nozzle tip			65	50
HTP-10	Nozzle tip			120	90

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14 Shutdown

14.1 Returning the Hot Runner System

Certain requirements have to be met when the Hot Runner System is returned. If these requirements are not met, all warranty claims will cease to exist. The requirements related to the dispatch of the Hot Runner System are set as follows:

- When shipping overseas, the manifolds shall be treated with a protective anti-corrosion agent.

  NOTICE

  Spray the anti-corrosion agent on the Hot Runner System or the injection mold.

  We recommend the multipurpose spray CC80 by Metaflux as an anti-corrosion agent.
- Manifold heavier than 15 kg must be packed in foam before transport.
- Specify gross weight (total package weight pursuant to EU rules).
- Use assembly pillars, to protect against damage e.g. of the actuator.
- If a Hot Runner System was received in a wooden box, it must be returned to Synventive in a wooden box.
- Disassemble the nozzles and actuators from Hot Runner Systems with support ring / face fit nozzles and pack them separately.
- Secure actuators and nozzles from Hot Runner Systems with support ring / face fit nozzles against movement.

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14.2 Disposal

Disposal of hot runner manifold systems should involve the recycling of basic materials. Synventive rejects any responsibility for health and safety risks to personnel or other damages caused by the re-use of individual parts for a purpose other than the originally specified purpose.

1) Disconnect the system from supply sources.
   - Power
   - Hydraulics
   - Pressurized air
   - Cooling

2) Release oil from distribution systems and actuators in the hydraulic system.

   NOTICE

   Dispose the oil in accordance with local environmental regulations.

3) Remove electrical components (heating, temperature sensors) and process through your recycling program.

4) Dismantle cables and dispose of them in accordance with local environmental regulations.

NOTICE

Metal parts must be separated for recycling (scrapping, collection points).

It is necessary to comply with the instructions from competent firms authorized to dispose of the specific materials.

15 Annex

15.1 Units used

Symbol	Name	Physical quantity
Electricity		
Ω	Ohm	Resistance
KΩ	Kiloohm	Resistance
MΩ	Megaohm	Resistance
W	Watt	Power
Time		
min.	Minute	Time
s	Second	Time
Temperature		
°C	Degree Celsius	Temperature
K	Kelvin	Temperature
°F	Fahrenheit	Temperature
Length		
mm	Millimeter	Length
m	Meter	Length
“	Inch	Length
Pressure		
psi	Pounds per square inch	Pressure
bar	Bar	Pressure
Torque		
Nm	Newton meter	Torque
Foot-pounds	foot pounds	Torque

15.2 Glossary and List of Abbreviations

A	
activeGate®	activeGate® technologies are designed to facilitate perfect surface quality, stability and repeatability of injected molded parts by precisely controlling the flow. Elements of the activeGate® Control Systems are synflow, eGate, DynamicFeed, hGate, nuGate, VMI Monitoring.
Actuator cooling	See Temperature control of the Hot Runner System
A - Dimension	Distance between the top of the spacer plate and the top of the manifold
API nozzles	See section 2.1.1
APT nozzles	See section 2.1.2
B	
Balancing	Processing optimization, consisting in the determination of optimum parameters for the Hot Runner System and the injection molding machine.
C	
Cavity	Hollow space in the injection mold in the shape of the molded parts. It is filled with plastics during the injection process.
Cavity plate	Internal space of the injection mold in which the cavity is located.
Clamping plate	Steel plate used to attach the mold to the injection molding machine. The QCVG actuator is placed inside the clamping plate.
Coolant	Cooling fluid used to cool down the actuator. The coolant used should be properly modified, e.g. filtered water with an anti-corrosion and frostproof agent.

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Annex

Cutout / cavity	Cutout (matrix) into which the Hot Runner System is incorporated. Also mold cavity, or cutout for the nozzle.
D	
Dimension A	See A-dimension
E	
eGate®	Equipment for valve gate systems to realize and control electrically a defined open/ close and motion/position profile for each nozzle.
ELA series	Electric operated actuators for valve gate systems
EVOH	Ethylene vinyl alcohol copolymer
Expansion gap Z	See dimension z
F	
F0 point	F0 point is the nozzle reference point. The nozzle tip may be cut to this point, but not beyond.
G	
H	
HB Hydraulic Actuator series	The HB Hydraulic Actuator series is available with optional thermocouple, valve pin position sensor and SynCool3.
Heated inlet bushing	(see: Inlet bushing, heated)
Heater	Resistor element heating the Hot Runner System.
High-temperature assembly paste	Temperature resistant assembly paste which enables resolvability of all threads.
Hot half	Hot Runner System including the applicable cavity plates. They are already complete with cables, or hoses, fully assembled and ready for mounting.
Hot Runner manifold	Steel block distributing the plastic. It forms the Hot Runner System together with nozzles, actuators, supply hoses and heating.
Hot Runner System	Hot runner system, see section 2
HR manifold	Hot runner manifold
HRC	Hardness Rockwell Cone
Hydraulic operating fluid	Operating fluid for hydraulic actuators that complies with requirements under classification 21/18/13 pursuant to ISO 4406.
HYC series	Hydraulic operated actuators for valve gate systems
I	
Inlet bushing, heated	Hot runner nozzles where the contact surface for the machine nozzle is located directly on the nozzle head – either as a manifold or as a single nozzle.
Inlet bushing, unheated	Short inlet bushing – in some cases heating is not necessary.
J	
J-Type temperature sensor (thermocouple)	Temperature sensor (thermocouple), type J.
K	
L	
List of adjustment values	Sheet with values for the optimum setting of the injection molding machine and the Hot Runner System.
Dimension L	The nominal dimension between the nozzle face (support ring nozzles) respectively the bottom of the manifold (threaded nozzles) and the F0 point.
Dimension Lc	Depth of center support in mold plate
Dimension Lcs	Length of center support
Dimension Lsp	Spacer ring length
Dimension Lms	Support pad length
M	
Machine	Injection molding machine
Manifold V-37	Manifold 37 mm (1.46“) thickness and a width of 36 mm (1.42“)
Manifold V-42	Manifold 42 mm (1.65“) thickness and a width of 50 mm (1.97“)
Manifold V-45	Manifold 45 mm (1.77“) thickness and a width of 50 mm (1.97“)
Manifold V-50	Manifold 50 mm (1.97“) thickness and a width of 60 mm (2.36“)

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Manifold V-55	Manifold 55 mm (1.97“) thickness and a width of 80 mm (3.15“)
Manifold V-65	Manifold 65 mm (2.56“) thickness and a width of 80 mm (3.15“)
Manifold VH	Manifold 80 mm (3.15“) thickness and a width of 87 mm (3.43“)
Manifold VI	Manifold 85 mm (3.35“) thickness and a width of 97 mm (3.82“)
Manifold channel	Drilled channel in the manifold that conveys the melt.
Mold temperature control	Mold heating or cooling using a fluid pump or similar control unit.
Material safety data sheet (MSDS)	Contains data typical for a specific plastic, such as processing temperature, specified health and safety information etc.
N	
Nominal dimension	See Dimension L
O	
Open (thermal gate) system	System without a moving valve pin, with thermally controlled gate.
P	
PB Pneumatic Actuator series	The PB Pneumatic Actuator series is available with optional thermocouple, valve pin position sensor and SynCool3.
Plastification unit	Screw and barrel of the injection molding machine
Plate actuation	Plate actuation is a synchronized needle opening and is ideal for high cavitation molds.
PLUG´N PLAY® Hot Runner System	The PLUG´N PLAY® hot runner system is supported by the thrust pads, center support and positioning dowels. It is not screwed to the cavity plate. The system can be assembled without adjustment.
PNC series	Pneumatic operated actuators for valve gate systems.
PPE	Personal protective equipment
Pre-chamber isolation	The nozzle tip does not pass through the cavity plate and is located in a pre-chamber. The plastic in the pre-chamber isolates the melt flow.
Q	
QCVG	”Quickcouple valve gate” actuator, placed inside mold plate.
R	
Ra	Mean roughness value, surface roughness after machining
S	
Screwed (threaded) manifold nozzles	Hot runner nozzles screwed into the manifold.
Single valve gate nozzles	Single valve gate nozzles are hot runner nozzles with the inlet bushing directly mounted on the nozzle head. The Single Valve Gate system closes the nozzle tip using a moving valve pin.
Sprue bushing	Hot runner nozzles sprue bushing are hot runner nozzles with the inlet bushing directly mounted on the nozzle head.
Support ring nozzles	Support ring nozzles are hot runner nozzles whose connection to the manifold consists of a face fit, so that during heating the thermally expanding manifold can “slide” over the nozzle heads.
Spacer plate	Steel plate in which a cutout for the Hot Runner System is located.
SynCool®	The SynCool® technology provides passive actuator cooling which may eliminate the need for dedicated cooling lines. It also allows the operator on certain applications at <280°C operating & <80°C mold temperature, to switch off the complete system including the mold and actuator cooling without the risk of decomposing the hydraulic oil.
synflow®	synflow® equipment enables valve pin opening velocity and intermediate pin holding control for hydraulic valve gate hot runner systems.
T	
Temperature control of the Hot Runner System	Cooling and heating of the Hot Runner System, maintaining temperature within a specified range.
Temperature controller	Temperature control of the machine
Temperature sensor (thermocouple)	Sensor that measures temperature in specific heated zones of the Hot Runner System, allowing temperature control. Synventive Hot Runner Systems use almost exclusively J type sensors, unless specifically requested by the customer.
Temperature sensor (thermocouple), type J	Temperature sensor whose (+) cable is made of ferrous metal and (-) cable of copper and nickel.
Torque table	List of torques for Synventive parts. See section 13
U	
V	

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Valve gate system	System that closes the nozzle tip using a moving valve pin.
VP series	Pneumatically controlled actuators located in mould plate.
W	
X	
Dimension x1	Depth of the center support in VC/VD Manifold
Y	
Z	
Dimension z	Expansion joint Z on manifolds with support ring nozzles due to thermal expansion. If set correctly, it creates the seal between the nozzle face and the manifold.

15.3 Patents

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15.4 Global Offices / Sales Agencies

Australia & New Zealand
Contact: Andrew Dovey
Mobile : +61 415 532 895
Email: adovey@synventive.com

Brazil
Synventive Molding Solutions Ltda.
Rua Walace Barnes, 301 - Distrito Industrial
Campinas - Sao Paulo
CEP 13054-701
Tel.: +55 (19) 3725 1092
Fax: +55 (19) 3725 1096
Email: contato@synventive.com

Canada
Synventive Molding Solutions Canada Inc.
Windsor Service Center
5350 Pulleyblank Street
Oldcastle, ON N0R 1L0
Tel.: +1 978 646 3482
Email: info@synventive.com

China - Suzhou
Synventive Molding Solutions (Suzhou) Co. Ltd.
12B Gang Tian Industrial Square
Suzhou Industrial Park, China 215021
Tel.: +86 512 6283 8870
Fax: +86 512 6283 8890
Email: infohrcn@synventive.com

China - Shenzhen
Synventive Molding Solutions (Suzhou) Co. Ltd.
Shenzhen Branch
No.712-715, 7th Floor Information Tower
Baoyunda Logistics Center
QianJin 2nd road, Bao'an District, Shenzhen
Tel.: + 86 755 3311 9297
Fax: + 86 755 3311 9296
Email: infohrhk@synventive.com

Czech Republic
Synventive Molding Solutions s.r.o
Sezemická 2757/2
193 00 Praha 9 - Horní Počernice
Tel.: +420 226 20 30 00
Fax: +420 226 20 30 11
Email: infohrcz@synventive.com

France
Synventive Molding Solutions SAS
23, Boucle de la Ramée
38070 Saint Quentin-Fallavier
Tel.: +33 (0) 4 7499 1600
Fax: +33 (0) 4 7494 3481
Email: infohrfr@synventive.com

Germany
Synventive Molding Solutions GmbH
Heimrodstraße 10
64625 Bensheim
Tel.: +49 (0) 6251 93 320
Fax: +49 (0) 6251 93 3290
Email: infohrde@synventive.com

India
Synventive Molding Solutions JBJ Pvt. Ltd.
Suite #10, Vatika Business Centre, Level-5
Baner Road, Baner
Pune 411045, Maharashtra, India
Tel.: +91 20 40111 313
Tel.: +91 20 40111 250
Email: lkurup@synventive.com

Italy
Synventive Molding Solutions Srl.
Via Carlo Viola, 74
11026 Pont St. Martin (AO)
Tel.: +39 0125 193 1110
Email: infohrit@synventive.com

Japan
Synventive Molding Solutions K.K.
6F of Masuni No. 1 Building
2-4-6 Shin-Yokohama
Kouhoku-ku, Yokohama City, Kanagawa Pref.
Japan 222-0033
Tel: +81 45 472 1239
Fax: +81 45 472 1163
Email: infohrjp@synvnetive.com

Mexico
Ramos Arizpe
Coahuila
Tel.: +528 44 181 2581
Fax: +1 978 646 3600
Email: jgomez@synventive.com

Netherlands
Synventive Molding Solutions B.V.
Windmolen 5
4751 VM Oud Gastel
Tel.: +31 (0) 85 2733 742
Fax: +31 (0) 85 2733 744
Email: infohrnl@synventive.com

Poland
Synventive Molding Solutions
s.r.o. Sp. Z o.o. Oddzial w Polsce
ul. Dworcowa 76, 85-010 Bydgoszcz
Tel.: +48 (0) 22 401 75 31
Fax: +48 (0) 22 401 75 32
Email: infohrpl@synventive.com

Portugal
Synventive Molding Solutions Lda
Rua Dr. Manuel Ribeiro de Oliveira R/C
2400-178 Leiria
Tel.: +351 244 829 790
Fax: +351 244 829 799
Email: infohrpt@synventive.com

Russia
Intos - Service LLC.
nab. Chernoy rechki, 41
197342 St. Petersburg
Tel.: +7(812)702-50-14
Fax: +7(812)702-50-14
info@intos-spb.ru

Scandinavia
Contact:
Synventive Molding Solutions
Heimrodstraße 10
64625 Bensheim / Germany
Tel.: +45 33 93 1629
Fax: +45 33 93 6130
Email: infohrsc@synventive.com

Singapore
Synventive Molding Solutions Pte Ltd.
Block 5000, Techplace II
#04-10, Ang Mo Kio Ave 5
Singapore 569870
Tel.: +65 6536 8093
Fax: +65 6536 5660
Email: infohrsg@synventive.com

Slovakia
Synventive Molding Solutions s.r.o.-org. zl.
Gogol'ova 18, 851 01 Bratislava
Tel.: +421 2 63 82 92 48
Fax: +421 2 63 82 92 48
Email: infohrsk@synventive.com

South Africa
Sync Tooling
2, Cradock Road
6021 Uitenhage
Tel : +27 72 2112269
Email: infohrde@synventive.com

South Korea
Synventive Molding Solutions South Korea Office.
#606, 104Prugio 1Cha, No. 661
Gyeong in-Ro, Guro-gu,
Seoul 152-887 Korea
Tel : +82 2 3439 7242
Fax: +82 2 3439 7243
Email: infohrkr@synventive.com

Thailand
Synventive Thailand.
Unit A3, 3rd Floor, Goldenland Pavilion Building
153/3 Soi Mahardlekluang 1,
Rajdamri Road Lumpini,
Pathumwan, Bangkok 10330 Thailand
Tel: +66 (0) 2 652 1411
E-Mail: infohrth@synventive.com

Turkey
Türkiye Istanbul Irtibat Bürosu
Bagdat Cad. 49/6
34724 Feneryolu – Kadıköy, Istanbul
Tel: +90 216 541 43 14
Fax: +90 216 541 43 17
E-Mail: infohrtr@synventive.com

United Kingdom
Synventive Molding Solutions Ltd.
The Pinnacle 160 Midsummer Boulevard
Milton Keynes MK9 1FF
Tel.: 00800 7968 3684
Fax: 00800 3297 9683
Email: uk@synventive.com

USA - Peabody, MA
Synventive Molding Solutions
10 Centennial Drive
Peabody, MA 01960
Tel.: +1 978 750 8065
Fax: +1 978 646 3600
Email: info@synventive.com

USA - Livonia, MI
Synventive Molding Solutions
Michigan Service Center
37487 Schoolcraft Rd
Livonia, MI 48150
Tel.: +1 734 591 2129
Fax: +1 978 646 3600
Email: info@synventive.com

www.synventive.com

The Americas
Synventive Molding Solutions Inc.
10 Centennial Drive
Peabody, MA 01960, USA
Tel.: +1 978 750 8065
Fax: +1 978 646 3600
E-Mail: info@synventive.com

Europe
Synventive Molding Solutions GmbH
Heimrodstraße 10
P. O. Box 3123
64625 Bensheim
Tel.: +49 (0) 6251 / 9332-0
Fax: +49 (0) 6251 / 9332-90
E-Mail: infohrde@synventive.com

Asia
Synventive Molding Solutions (Suzhou) Co.Ltd.
12B Gang Tian Industrial Square
Suzhou Industrial Park, China 215021
Tel.: +86 512 6283 8870
Fax: +86 512 6283 8890
E-Mail: infohrcn@synventive.com

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