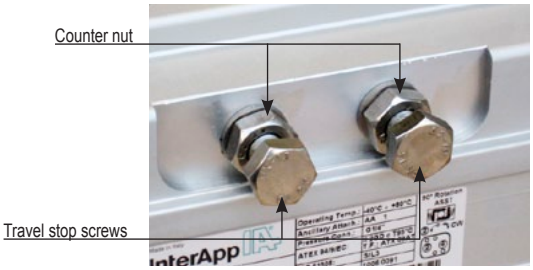
Installation

Introduction:

To guarantee the benefits of the InterApp actuator **IA motion**, proper procedures and compliance with the installation instruction are essential. The installation has to be carried out according to the state of the art and only by qualified personnel. InterApp reserves the right to decline responsibility for damage or premature failure if the recommendations contained in this instruction are not being followed. Dimension, material and application range of the **IA motion** actuator are according to the technical documentation.

Working conditions and technical data:

• Operating media: Dry or lubricated air or inert gases, provided that they are compatible with the actuator internal parts and lubricant.
The operating media must have a dew point equal to -20°C (-4°F) or at least 10°C below the ambient temperature. The maximum particle size contained into the operating media must not exceed 30 µm.
• Supply pressure: The maximum supply pressure is 8 bar (116 Psi), only for IA800 it is 7 bar (101,5 Psi). For double acting and spring return actuators the working pressure is from 2.5 bar (36 Psi) to 8 bar (116 Psi).
• Operating temperature: Standard IAmotion from -40°C (-40°F) to +80°C (+176°F) For low and high temperature service please contact InterApp. Working at high or low temperature can affect the life and the output torque of the actuator.
• Operating time (see technical data sheet): Caution: the operating time depends on several factors such as supply pressure, supply system capacity (pipe diameter, flow capacity of pneumatic accessories), valve type, valve torque and figures, applied safety factor, cycle frequency, temperature, etc.
• Rotation and stroke adjustment (see technical data sheet): For standard actuators (90° rotation). Stroke adjustment at 0°(closed pistons): +15°max/ - 5°. Stroke adjustment at 90°(open pistons): +5°/-15°max. For actuator IA045 the stroke adjustment at 90° (open pistons) is available only on request.
• Lubrication: The actuators IAmotion are factory lubricated for the life of the actuator in normal working conditions. The standard lubricant type GSTD is suitable for use from -40°C (-40°F) to +80°C (+176°F). For extreme low temperature (LLT) and high temperature (HT) service, special grease is required: please contact InterApp.
• Construction: rack and pinion actuator design suitable for both indoor or outdoor installations.
• Protection and corrosion resistance: All the actuators are supplied with corrosion protection for normal environments. For corrosion resistance of the different types of protection see technical data sheet. Before installing the actuator in aggressive environment, ensure that the selected protection level is suitable.
• Actuator designation and marking (see technical data sheets): The actuator type, size, operating pressure, output torque, direction of rotation, spring action, operating temperature and type of connections/interfaces are determined by designation.
• All IAmotion actuators are supplied with an identification label showing the serial number and all necessary information on use, service, operation and product designation. Where applicable, the label indicates the classification according to ATEX Directive 94/9/ EC.



Check before mounting:

• Please make sure that the actuator is suitable for the service conditions prevailing (air supply pressure, temperature, torque). Before mounting the **IA motion** on a valve, please check that the mounting flange and the shaft dimension of the actuator are compatible with this of the valve. Is the shaft of the valve smaller than this of the actuators, please use an adaptor. Do both flanges not fit to each other, than you have to use a bracket and a coupling piece. Actuators and valves ordered as a unit at InterApp include already the necessary adapting parts.
• Do not operate the actuator using inflammable, oxidizing, corrosive, explosive or unstable gases or liquids (use only not dangerous fluids - group 2 according to 97/26/EC directive). Moreover, for actuators installed in potentially explosive zones, make sure that the internal parts of the actuator do not come into contact with the external atmosphere.
• Referring to the Machinery Directive 2006/46/EC, the actuators can be classified as “PARTLY COMPLETED MACHINERY” (see the DECLARATION OF INCORPORATION). Therefore the actuator can not put into service until the machinery and/or the system, where the actuator is incorporated, will be declared in compliance with the requirements of the Directive 2006/42/EC.
• **IAmotion** actuators are designed, produced and classified according to the ATEX Directive 94/9/EC (see actuator label and safety instructions). The use of the actuators in potential explosive atmosphere zones has to comply with the ATEX classification indicated on the actuator label and according to the ATEX safety instructions.
• The use, the installation and the maintenance of the **IAmotion** actuators must be made by adequately trained personnel. For the use, installation and maintenance of **IAmotion** actuators it is recommended to comply to the safety notice and to use proper equipment to protect health and prevent accidents.
• It is important that the actuator is used only within the working limits indicated in the technical specifications.
• Do not operate the actuator over temperature limits: this could damage internal and external components (disassembly of spring return actuator may become dangerous).
• Do not operate the actuator over pressure limits: this could damage internal parts as well as cause damage to the housing and end-caps.
• Do not use the actuator in corrosive environments with incorrect protection: this could damage the internal and external parts.
• Do not disassemble individual spring cartridges, this may result in personal injury. If maintenance to springs is necessary, send them to **IAmotion**.
• Close and disconnect all air supply lines and make sure that air connections are vented during maintenance and installation on valve.
• Do not disassemble the actuator or remove end caps while the actuator is pressurized.
• The **IAmotion** actuators are designed to be used only on valves.
• Before installing the actuator onto the valve make sure that the rotation direction and the position indicator are in the correct position.
• If the actuator is incorporated in a system or used within safety devices or circuits, the customer shall ensure that the national and local safety laws and regulations are observed.

Operating function and direction of rotation:

The actuator is a pneumatic device for remote operation of industrial valves. The operation (90°,120°,135° or 180° rotation) may be activated by different methods:

• Direct mounting of solenoid valve (5/2 for double acting, 3/2 for spring return) to pressure connections 2 and 4, connected to supply and control lines.

• Screwed connection (to pressure connections 2 and 4) with air lines from separate control cabinet. The standard rotation (when port 4 is pressurized or for spring action) is clockwise to close. When port 2 is pressurized, counter-clockwise rotation is obtained. **IAmotion** actuators can be supplied with different types of assembly/rotation direction depending on the type of required operation and/or installation, see technical data sheets.

Standard mounting, IA...D + IA...S normal closed

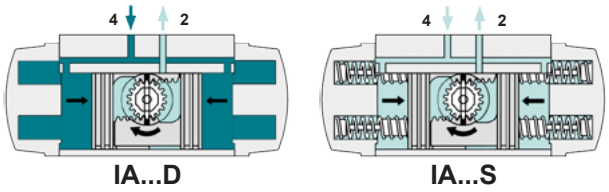
1. Close the actuator (pistons in inner position)

IA...D double acting:

The closed position is achieved by giving supply pressure to connection «4».

IA...S single acting:

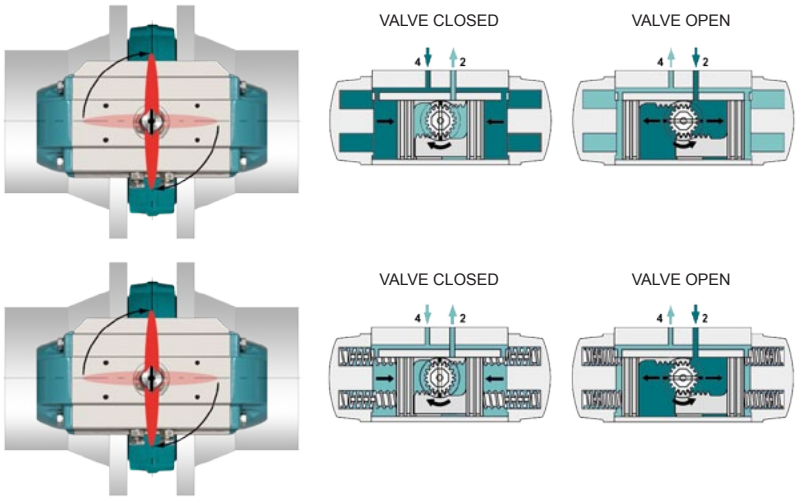
The closed position is already achieved by the springs pushing the pistons toward each other.



2. Close the valve

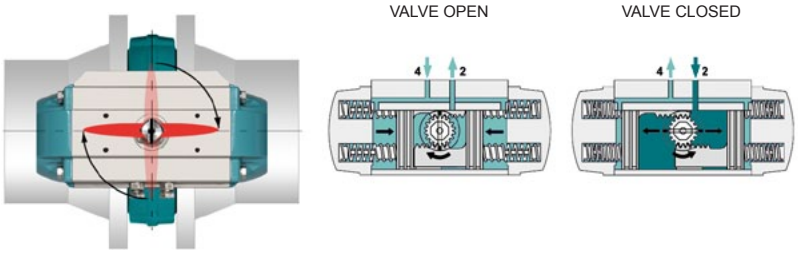
3. Mount the actuator to the valve

The actuator can be mounted either parallel to the pipe (standard) or perpendicular to it.
InterApp delivers the valves with actuators mounted parallel to the pipe.



Mounting of single acting actuator IA...S normal open

Use the same procedure as described under standard mounting, but **open the valve** before **mounting the closed actuator**.
Please note that in this case the valve is closed by counter clockwise rotation and the.slit at the top of the actuator shaft does not correspond with the valve position.

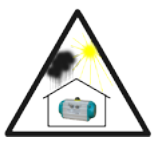


Screw stroke adjustment - turns „n“ for 1° angle:

IA motion	n
IA050 - IA200	1/6
IA250 - IA350	1/5
IA400 - IA1000	1/4

Actuator size, solenoid valve and air supply pipe according table below.

Actuator size	Solenoid valve	Air supply pipe
IA050 - 350	≥ DN 4	≥ DN 4
IA400 - 600	≥ DN 7	≥ DN 6
IA650 - 700	≥ DN 12	≥ DN 8
IA750 - 1000	≥ DN 12	≥ DN 10



Storage:

If the actuator is not for immediate use, the following precaution must be taken for storage:

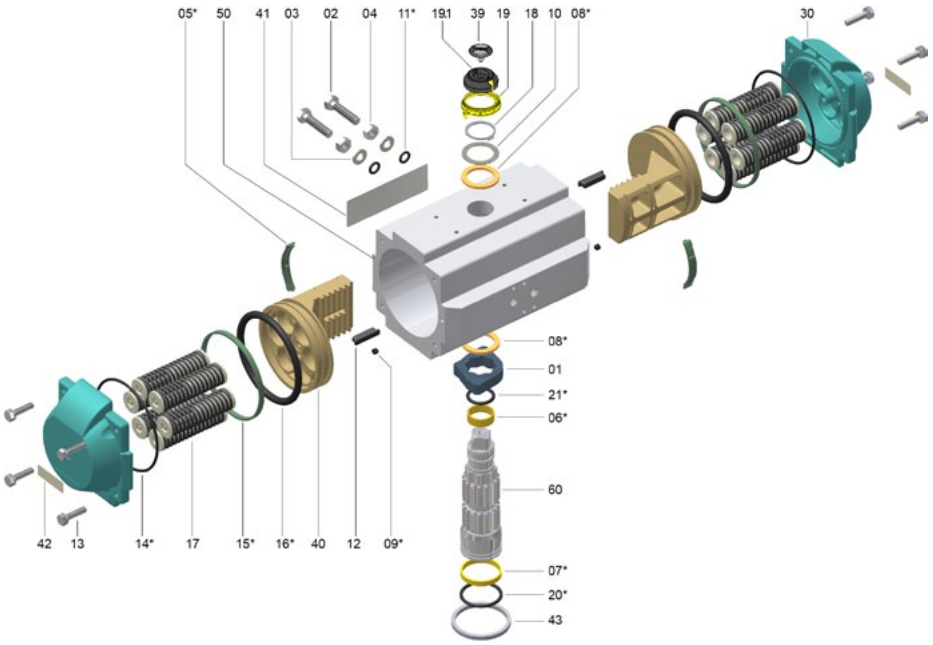
• Store the actuator in a clean and dry environment and at temperature between -20°C and +40°C.
• It is recommended that the actuator be stored in its original box.
• Do not remove the plastic plugs on air supply ports.

Lifting and handling:

It is recommended to lift the actuators with proper, adequate and permitted systems in relation to the actuator weight and by following the ruling laws in terms of safety and health protection. The weight of the actuators is indicated on the Air Torque catalogue and on the related technical data-sheets. During the lifting and the handling of the actuators, it is recommended to avoid clashes and/or accidental falls in order to avoid irreparable damages to the actuators and to compromise the functionality. Contact InterApp for any information and technical data-sheets.

Maintenance instruction

Parts list:



	Pcs	Description
01	1	OCTI-CAM (Stop arrangement)
02	2	STOP CAP SCREW
03	2	WASHER
04	2	NUT (Stop screw)
05*	2	BEARING (Piston back)
06*	1	BEARING (Pinion top)
07*	1	BEARING (Pinion bottom)
08*	2	THRUST BEARING (Pinion)
09*	2	PLUG
10	1	THRUST WASHER (Pinion)
11*	2	O-RING (Stop screw)
12	2	PISTON GUIDE
13	8-16	CAP SCREW (End cap)
14*	2	O-RING (End cap)
15*	2	BEARING (Piston head)
16*	2	O-RING (Piston)
17	5-12	SPRING (Cartridge)
18	1	SPRING CLIP (Pinion)
19	1	GRADUATED RING
19.1	1	POSITION INDICATOR
20*	1	O-RING (Pinion bottom)
21*	1	O-RING (Pinion top)
30	2	END CAP
39	1	CAP SCREW (Indicator)
40	2	PISTON
41	1	IDENTIFICATION LABEL
42	2	END CAP LABEL
43	1	SPIGOT (Only on request)
50	1	BODY
60	1	DRIVE SHAFT

* Suggested spare parts for maintenance

DISASSEMBLY

When disassembly of actuator is required for maintenance, firstly remove the actuator from the valve. Before performing any disassembly operations it is important to verify that the actuator is not pressurised.

Always use caution and double check that the ports 2 and 4 are vented and are free from any accessory and/or device. When the actuator is a spring return unit, make sure that the actuator is in the failed position and with pistons completely inwards before disassembling.

A) Removal of position indicator and graduated ring (Part N° 19,19.0,19.1), figure 01:

• Remove cap screw (39) if fitted.

• Lift position indicator (19 or 19.1) off shaft, it may be necessary to pry gently with a screwdriver.

• Lift, if necessary, the graduated ring (19.0) off the body, it may be necessary to pry gently with a screwdriver.

B) Removal of stop cap screws (Part N° 02), figure 02:

• Remove both stop cap screws together with nut (04) and washer (03).

• Remove stop screw o-rings (11) and discard if replacing all soft parts.

C) End caps disassembly (Part N° 30), figure 03:

• End caps disassembly for spring return actuators (disassemble one end cap at a time).

Unscrew the end cap bolts (13) in the sequence shown in figure 03, until the end-caps are free from springs force (for IA050 20-23 turns of the screws, for IA100 to IA800 4-5 turns of the screws). Then completely unscrew the screws and remove the end-cap and the springs. If there is still force on the end-caps after unscrewing as indicated above, this may indicate that spring cartridge is damaged or that the pistons are not completely closed, so any further disassembly should be discontinued. Further disassembly of the end caps may result in injury.

• End caps disassembly for double acting actuators (disassemble one end cap at a time). Unscrew the end cap bolts (13) in the sequence shown in figure 03, until the screws are completely unscrewed and the end caps are free.

• Remove the o-rings (14) using a screwdriver. Discard soft parts if replacing.

• Only for actuators with adjustment 50% or 100%, remove the nut 04R, the washers 03R and o-rings 11R and discard soft parts if replacing.

D) Pistons disassembly (Part N° 40), figure 04:

• Holding the body (50) in a vice or similar device, rotate the drive shaft (60) until the pistons (40) are released. Caution: air pressure should not be used to remove the pistons from the body.

• Remove o-rings (16) using a screwdriver. Remove the piston back (05) and piston head (15) bearings.

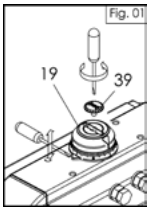
• Discard bearings when replacing all soft components.

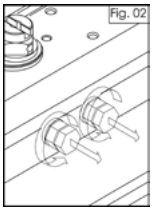
E) Drive shaft disassembly (Part N° 60), figure 05:

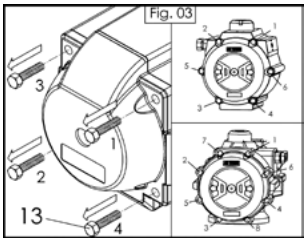
• If necessary, remove the graduated ring (19.0) with a screwdriver, remove the spring clip (18) using snap-ring pliers or screwdriver for spiral rings, remove the thrust washer (10) and the external thrust bearing (08). Apply downward force to top of drive shaft (60), until it is partially out of the bottom of the body when it is possible to remove the internal thrust bearing (08) and the octi-cam (01), then push the pinion (60) completely out of the body. If pinion is not easily removed, gently tap the top of the shaft with a plastic hammer.

• Remove top (06) and bottom (07) pinion bearings and top (20) and bottom (21) pinion o-rings.

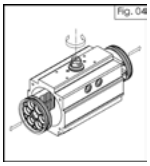
• Discard bearings (06) and (07), internal and external thrust washer (08) and o-rings (20) and (21) if replacing the soft components. All the components disassembled and not replaced will have to be cleaned and inspected for wear and before reassembly, if necessary, also replace the plugs (09).

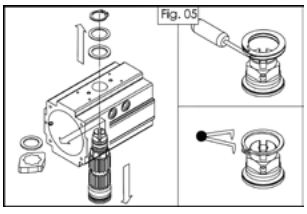






	SW1	SW2
IA050	10	8
IA100	10	10
IA200-250	13	10
IA300	17	13
IA350	19	13
IA400	19	17
IA450	22	17
IA500	22	19
IA550	24	19
IA600	30	22
IA650	30	24
IA700	36	22
IA750-800	46	24





ASSEMBLY

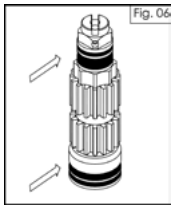
A) Drive shaft assembly (Part N° 60), figures 06, 07 and 07A:

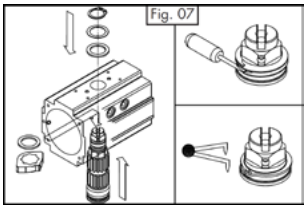
• Install top (06) and bottom (07) bearings, grease and insert the bottom (20) and top (21) pinion o-rings onto the shaft.

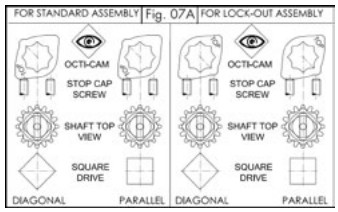
• Grease the outside surface of the drive shaft as shown in figure 06.

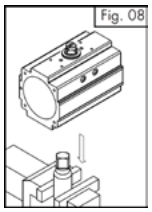
• Insert partially the drive shaft (60) in the body (50), install octi-cam (01) in the correct position (for standard assembly or for lock-out) as shown in figures 07 and 07A, related to the bottom and top of the drive shaft and the rotation of the actuator when energised. Install the internal thrust bearing (08). Insert completely the drive shaft in the body.

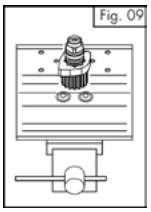
• Fit external thrust bearing (08), thrust washer (10) and then external spring clip (18) using snap ring pliers or screwdriver for spiral rings.











B) Pistons assembly (Part N° 40), figures 08, 09, 10 and 11:

• Grease and install o-rings (16), piston back (05) and piston head (15) bearings.

• Grease the internal surface of the body (50) and the piston (40) rack teeth.

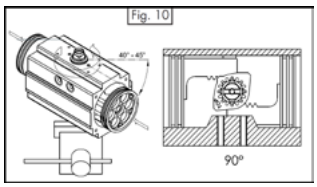
• Insert the female connection of the drive shaft (60) in a properly fixed coupling.

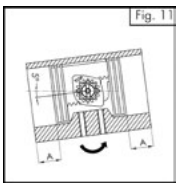
• Ensure that the octi-cam is in the right position as shown in figure 09.

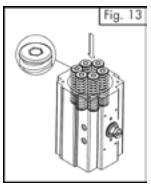
• For standard rotation assembly type “ST” (clockwise to close), rotate the body (50) about 40-45° clockwise from top view, as shown in figure 10.

• Insert and press the two pistons (40) simultaneously inside the body (50) until the pistons are engaged, then rotate the body anticlockwise from top view until the stroke is completed.

• Ensure that with pistons completely closed, the rotation obtained referred to the axis of the body is about over 0° and that the dimension “A” on both sides is the same as shown in figure 11.







C) End cap assembly (Part N° 30), figures 12, 13 and 14:

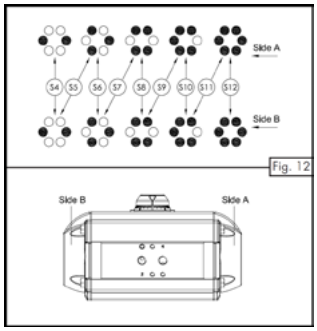
• Assemble one end cap at a time.

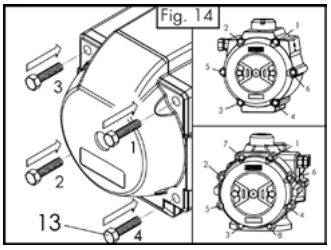
• Lubricate the body.

• For spring return actuators, insert the springs in each end cap according to the desired configuration, as shown in figure 12 and related tables. For models IA100→IA800 B insert spring cartridges as shown in figure 13.

• Fit end cap o-ring seal (14) into the groove on both end caps.

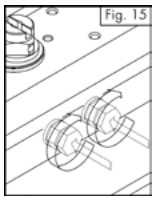
• Fit end caps onto the body (50), verifying that the o-ring remains in the groove.





• Only for actuators with 50% or 100% stroke adjustment, ensure that the adjustment screws 221G/222G are completely screwed into the end-cap.

• Insert the cap screws (13) and tighten each only partially. Complete tightening by making 1-2 turns for each screw in the sequence shown in figure 14 until tightening is completed. See the table for screw tightening torque.



D) Assembly of stop cap screws (Part 02) **and stroke adjustment** for models ia050 B→ IA800 B, figures 15 and 16:

• Insert on both stop screws (02) the nut (04), the washer (03) and the o-ring (11).

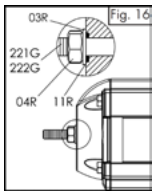
• Fit the stop cap screws (02) in the body.

• Stroke adjustment for actuators with standard type “ST” rotation / assembly (clockwise to close).

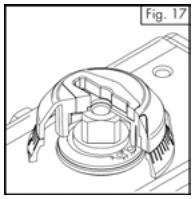
Stroke adjustment in close position: with the actuator in close position 0°, screw or unscrew the right (from top view) stop cap screw until the desired stop position is achieved. Then tighten the stop adjustment nut (04) to lock it in place.

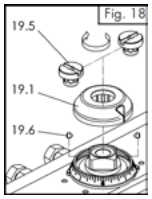
Stroke adjustment in open position: with the actuator in open position 90°, screw or unscrew the left (from top view) stop cap screw until the desired stop position is achieved. Then tighten the stop adjustment nut (04) to lock it in place.

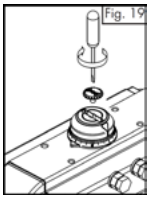
For spring return actuators, it could be necessary to make rotation tests to verify the correct stroke adjustment in open position.



• Only for actuators with adjustment 50% or 100%, fit on end-cap adjustment screws 221G/222G the o-rings 11R, the washers 03R and the nuts 04R. To adjust the stroke in open position: with the actuator in partially or totally open position, screw or unscrew the end-cap adjustment screw 221G/222G until the desired position is achieved. It is important that the two end-cap adjustment screws are both in contact with the pistons. Then lock the nuts 04R.







E) Assembly of graduated ring and position indicator (Part N° 19,19.0,19.1), figures 17,18 and 19:

• Fix the graduated ring (19.0) to the body.

• If necessary, correctly position the “Top Adaptor” (19.5) and lock it with the proper screws (19.6).

• Insert the indicator (19 or 19.1) making sure that it indicates the correct actuator position.

• Screw the indicator screw (39) if assembled.

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