



# Software Manual

ComoScout  
Type 5889A...

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For all specific questions that may arise after studying this manual, please  
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# 1. Introduction

## 1.1 About this Manual

- This software manual refers to the system for process monitoring and process optimization in plastic injection processing **ComoScout Type 5889A...**
- Please read this manual carefully to get the most out of your product's versatile features.
- The manual must be kept for future use and be available on site when needed.
- Original language of this manual: German
- To the extent permitted by law, Kistler disclaims all liability if this manual is not followed or products other than those listed in the data sheet under "Accessories" are used.
- The information in this manual is subject to change without notice. Kistler reserves the right to improve and modify the product in accordance with technical progress without obligation to notify individuals and organizations of such changes.

## 1.2 Supplied documents

In addition to this software manual, the following documents must be observed:

- Datasheet ComoScout (5889A) Doc. No. 003-614
- Quick Start Installation ComoScout (5889A)
- Documentation on the injection processing machine and the process used

## 1.3 Installation and commissioning

Installation and commissioning are usually carried out by the Kistler Service.

## 1.4 Software upgrades and updates

If Kistler supplies upgrades or updates for the software, they must be installed.

Registered ComoScout users will be notified of updates by e-mail.

Kistler assumes no liability for direct or consequential damages caused by products whose software is not up to date.

## 1.5 Calibration intervals

Generally, in order to ensure correct functioning, all sensors and measuring instruments should be regularly checked and calibrated. The necessary calibration intervals depend on the application. If the measuring chain is part of a general or product-related quality assurance concept and is listed as a measuring instrument in the respective QM plan of the component, a measuring instrument check or calibration must be carried out in accordance with the QM system used (e.g. ISO 9001). The interval is specified in the regulations of the QM system. Supplementary explanations on the calibration of Kistler instruments and sensors are also explained in our general calibration guide (961-472d-2.0). If you would like a quotation for a calibration service, please contact your responsible sales representative.

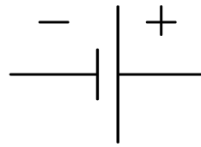
## 1.6 Disposal instructions for electronic devices



Waste electronic equipment must not be disposed of with household trash. At the end of its service life, please return the device to the nearest electronic disposal location or contact your Kistler sales outlet.

## 2. System overview

ComoScout is a compact system for process optimization and monitoring of plastic injection processing

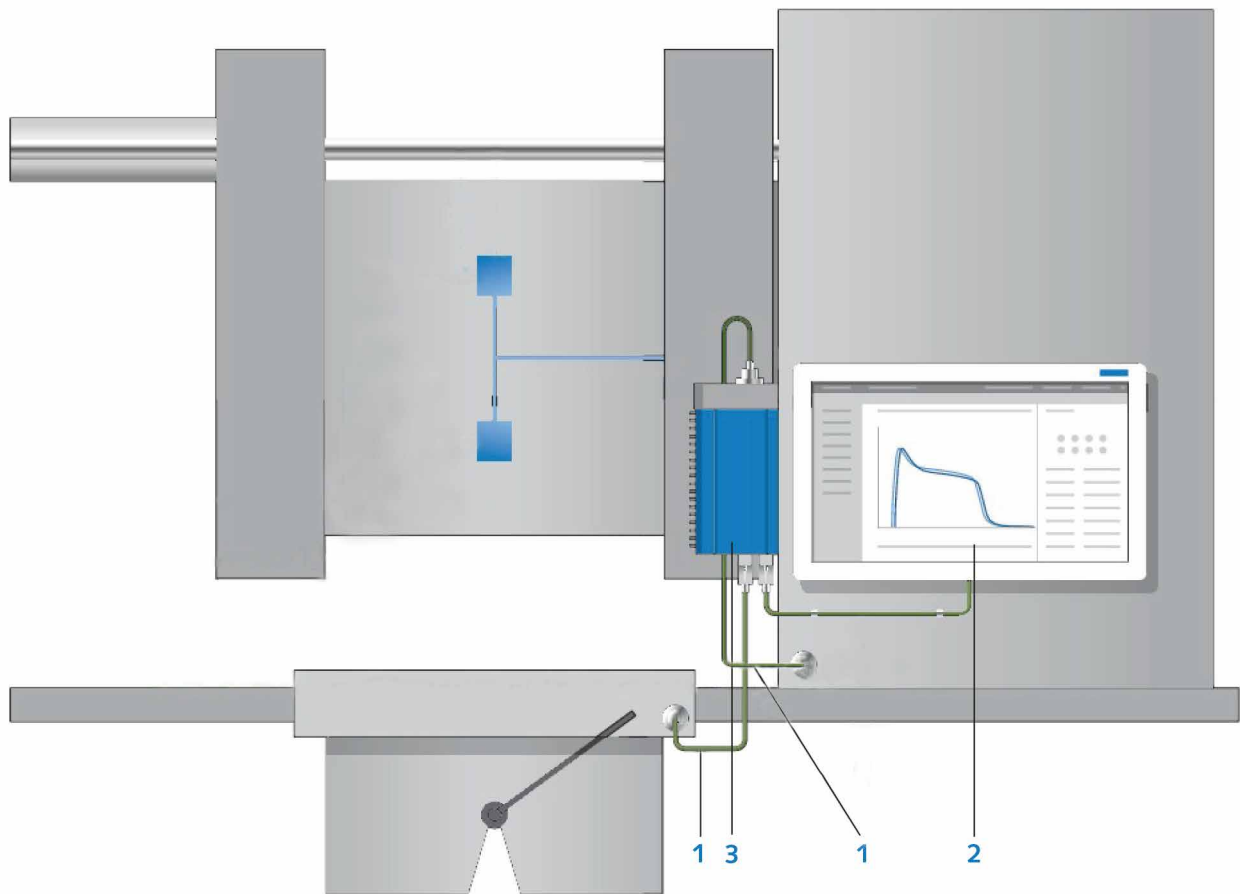


Sensor / Voltage Signal



ComoScout

- ComoScout software is specifically tailored to the requirements of operators in the injection processing environment.
- The hardware allows the following connection options:
  - Up to 16 sensor signals (voltage signals 0-10 V) on the frontside
  - Up to 4 machine signals (screw position, machine pressure, ...) on the backside
  - Proximity switch
  - 24 digital outputs
  - Other important events (e.g., switch-over time of the machine)
- Up to 128 freely distributable monitoring functions enable reliable scrap separation on the basis of the recorded data.
- On the basis of the monitoring results, injection processing machine, handling or scrap gate can be directly actuated
- The ComoScout is network capable and can easily be integrated in the existing company network.



- (1) Voltage Signals
- (2) Kistler Multi-Touch Display
- (3) ComoScout

## Operation and Configuration

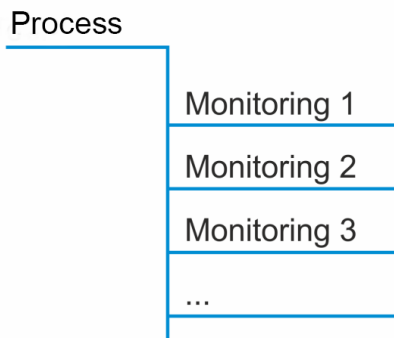
The ComoScout can be operated and configured either via the Kistler Touch Display (Type 5637A1) or via a web browser using a PC, tablet, smartphone, etc. The supported browsers are listed in the ComoScout data sheet (5889A).



## 3. Operating concept

ComoScout was designed specifically for the requirements of injection processing processes and the needs of operators working in the production environment.

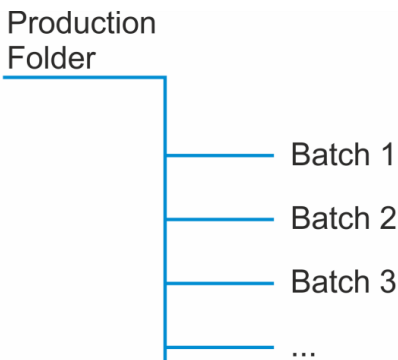
### 3.1 Configuration data



The setup of the ComoScout is divided into “Process” and “Monitoring”.

- The **process data set** contains all settings that depend on the process. This data generally needs to be configured once per process and essentially contains the sensor properties, installation information relating to the sensors (signal and position) and the required measuring time for the respective process. If this data is initially defined, measurement and process analysis can begin immediately.
- A **monitoring data set** must be created if process monitoring with part separation is to be performed. This data is item-specific. This means that if multiple items are produced with the same process, then one monitoring data set should also exist for each item. The boxes used for monitoring (EOs) and the assignment of cavities to sorting outputs are thereby defined for each item.

### 3.2 Production data

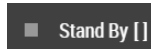


The production order contains all information necessary for production. In addition to a unique designation, this is generally the corresponding configuration data consisting of process data set and monitoring data set.

A production order is performed in batches and always contains at least one batch. In a production order, production can be performed with multiple processes and monitors. This ensures that, within a production order, the same part is always documented and compared with one another.

### 3.3 Work phases/device modes

The ComoScout can be in one of four different work phases or device modes.



Stand By []

#### Standby

- No process is loaded.
- ComoScout performs no measurements.

**Application:** Production is performed with a process that is not to be monitored or analyzed with the ComoScout



Setup [BA]

#### Setup

- Process is loaded
- ComoScout performs measurements
- If a monitor is set up, it is evaluated and the correct sorting result reproduced in the software, the physical outputs are also active for this purpose and output the correct sorting result.
- Process and monitoring settings can be changed, depending on the settings in user management
- Measurement data is saved in "default histories" with automatic naming

**Application:** Setup phase, determination of the monitoring boxes (EOs)



Production [BA]

#### Production:

- Process is loaded
- ComoScout performs measurements
- If a monitoring is set up, it is evaluated and the correct sorting result reproduced in the software, the physical outputs are also active for this purpose and output the correct sorting result.
- Process and monitoring settings as well as device settings cannot be changed.
- Measurement data is stored in batches that are directly assigned to a production. Production and batch can be named individually.

**Application:** Production



Paused [BA]

#### Paused

- Process is loaded
- ComoScout performs measurements
- If a monitoring is set up, it is evaluated and the correct sorting result reproduced in the software, though no physical outputs are active. This means that all parts are declared to be scrap regardless of the evaluation of parts.
- Process and monitoring settings as well as device settings cannot be changed.
- Measurement data is saved in "default histories" with automatic naming.
- The started batch pauses until it is resumed
- Individual cavities can be temporarily deactivated

**Application:** A signal no longer produces correctly and is manually closed, material batch change and similar.

## 3.4 User management

ComoScout has its own user management that is defined on the basis of users and roles.

### User

A user is used for identification purposes and therefore includes the full name as well as a user ID. It is thereby possible to clearly determine who made which settings on the device.

Any number of users can be created on the system.

### Roles and Rights

A role is assigned to each user. The role grants users certain rights and defines what they may view, execute or load and change.

The following roles are predefined by default:

- Administrator
- Shift supervisor
- Operator
- Guest

New roles can be added and freely defined.

The roles can be assigned the following rights, which are arranged in ascending order, with each level including the rights of the lower levels.

- Write or change
- Execute or load
- Read or view

This means that a user who may change a given menu is also automatically authorized to view and load that menu.

Creating users and roles is described in section 5.3.



### Change Log

User management also includes a change log which fully documents all changes made to the device. The change log also saves which user made the change at which time.

For more information on the change log, see section 6.4.

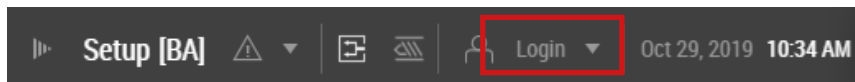
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## 3.5 Logging in/out of the system

In order to make or change settings on the ComoScout, it is necessary to log in to the system.

1. Press the [Login] field in the status bar.



The following dialog box opens:

2. Enter the user name and password.
3. Press the [Login] button.

The user is logged in. The user name is shown in the status bar.



### Logging out

To log out of the system, simply tap on the user name in the status bar and confirm the logout process. In the status bar, "Login" is displayed again.

### Login without username

If no user was yet created, the predefined user accounts can be used.



At the beginning it is recommended to log in as administrator so that all settings can be configured.

No passwords initially exist for the predefined user accounts; the password field can thus be left blank for each.

### Login with RFID



If the ComoScout is used with the Kistler Touch Display, the user can log on to the ComoScout via an RFID transponder.

The RFID reader is located on the bottom left side of the Kistler Touch Display and is marked with the adjacent symbol.

Login with RFID must be configured, see section 5.3.

## 3.6 Fundamentals of ComoScout operation

The ComoScout is designed to be operated as a web application. This means that the actual software runs on the ComoScout and is visualized via a web client. This can be either the capacitive Kistler Multi-Touch Display Type 5637A1 or a web browser. You can find details on the supported web browsers in the ComoScout data sheet.

The user interface is optimized for the use of the Kistler Multi-Touch Display. The use of this device ensures efficiency and optimum operating comfort. No keyboard is necessary for operation with the Kistler Multi-Touch Display.



The description of the ComoScout in this manual refers to operation with the Kistler Touch Display

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## 3.7 Starting the ComoScout

### 3.7.1 Start with Kistler Touch Display

→ Connect the Kistler Touch Display with the ComoScout

The home screen appears on the ComoScout. No further measures are necessary.



In network operation, only the IP addresses need to be set. The procedure is described in section 5.2.

---

### 3.7.2 Start with Web Browser

If a web browser is used, it must be informed under which IP address it can connect to the ComoScout.

→ Enter the IP address of the ComoScout in the navigation bar of the web browser.

- Factory set IP address: 192.168.101.64
- If the IP address was changed, enter the new IP address

Now the web browser starts and displays the ComoScout home screen.

## 3.8 Screen layout

The ComoScout screen is divided into 4 areas.



### (1) Status bar



All important information that should always be visible to the user is displayed in the status bar. These are from left to right:

- icon for displaying and hiding the navigation
- device name
- measurement symbol, which turns green as soon as a measurement is running
- number of measured cycles of the current history as well as the number of produced good parts
- in square brackets: the number of good and bad parts from the last cycle
- device modus
- in square brackets: name of the currently active process
- symbol for active alarms and warnings
- currently logged user
- current time and date

The enabled control functions can be seen between the alarm messages and the login field. They illuminate white when active.



- Screenshot functionality: As soon as a USB stick is used on the ComoScout, the icon for a screenshot appears in the upper right corner. The .png file is stored on the stick and is given an automatically generated name:

*device-name\_date\_time.png*



## (2) Navigation

The navigation at the left side of the screen guides through the individual pages of the ComoScout. In the figure the main topics of the navigation can be seen.

Click a main topic to open it and display all available subtopics. The navigation is adapted to the injection processing process in such a way that it is usually not necessary to jump between individual main topics to complete a workflow.

An overview page is provided for each main topic that summarizes the most important configurations of the subtopics. Each of the overview pages is displayed by clicking on a main topic.

VerticalThreshold... ▾

E0 VerticalThreshold\_1

Limits and properties of VerticalThreshold E0

top ----- 398.99 N

bottom ----- 20 N

time point ----- 3 s

Sorting ----- active

Sensor information

Sensor Type ----- Frontside

Sensor Unit ----- N

## (3) Parameter area

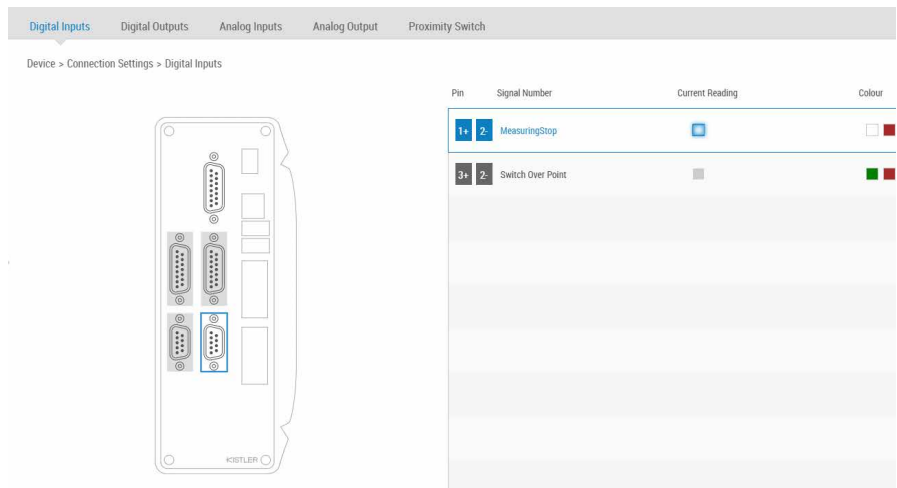
In the parameter area to the right of the screen, changes are made to parameters that refer to the selected page. To enter parameters, various input elements are used which correspond to the common standards on the PC.

The parameter area can be divided into different tabs.



The entire user interface is designed so that all parameter changes are active immediately upon exiting the input element.

#### (4) Display area



The display area shows the actual content of the selected page. Here you can see what the parameters of the selected page act on, i.e., what the effects of parameter changes are.

On some pages, selections can also be made in the display area and/or parameter changes can be made directly via touch control.

In exceptional cases, the displays may be divided over several pages for the sake of clarity. The tabs above the display area can then be used to switch between the pages. The currently active tab is shown in blue text. In addition, an arrow is visible below the labeling.

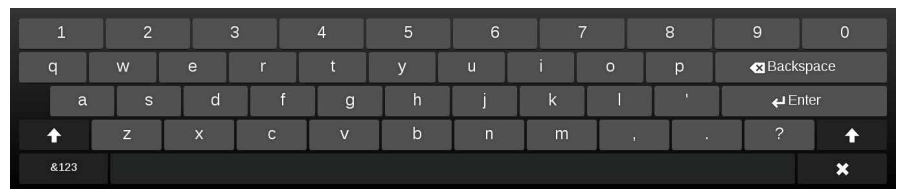
## 3.9 Input elements

The ComoScout has a number of input elements that are intended to make it as easy as possible for the user to convey the necessary information to the system. The input elements correspond to the common standards on the PC.

Input is concluded when the input element is exited. Changed parameters are stored immediately after exiting the input element and are valid for the next measuring cycle.

### 3.9.1 Virtual keyboard

If it is necessary to enter text or numbers, the virtual keyboard of the ComoScout appears on the Kistler Touch Display.

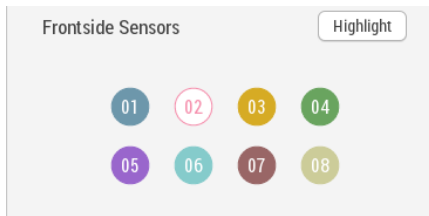


When using other touch devices, the virtual keyboard of the respective device is accessed, if available. Otherwise, an external keyboard must be connected via the USB interface.



### 3.9.2 Signal display

In the analysis of the measurement curves, the following signal display is available for displaying and hiding cavities and the associated sensor signals.

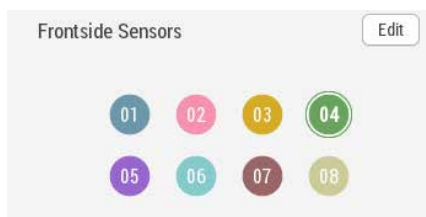


#### Show/hide cavities

→ Press the round signal symbol to show or hide the corresponding measurement curve.

→ To display a single signal, press and hold the corresponding signal symbol.

- Selected cavities are colored
- Deselected cavities are filled in with white



#### Highlight cavities

→ To highlight the measurement curve of a single signal, press the corresponding round signal symbol.

- The highlighted signal 04 has a white border.

#### [Highlight] and [Edit] buttons

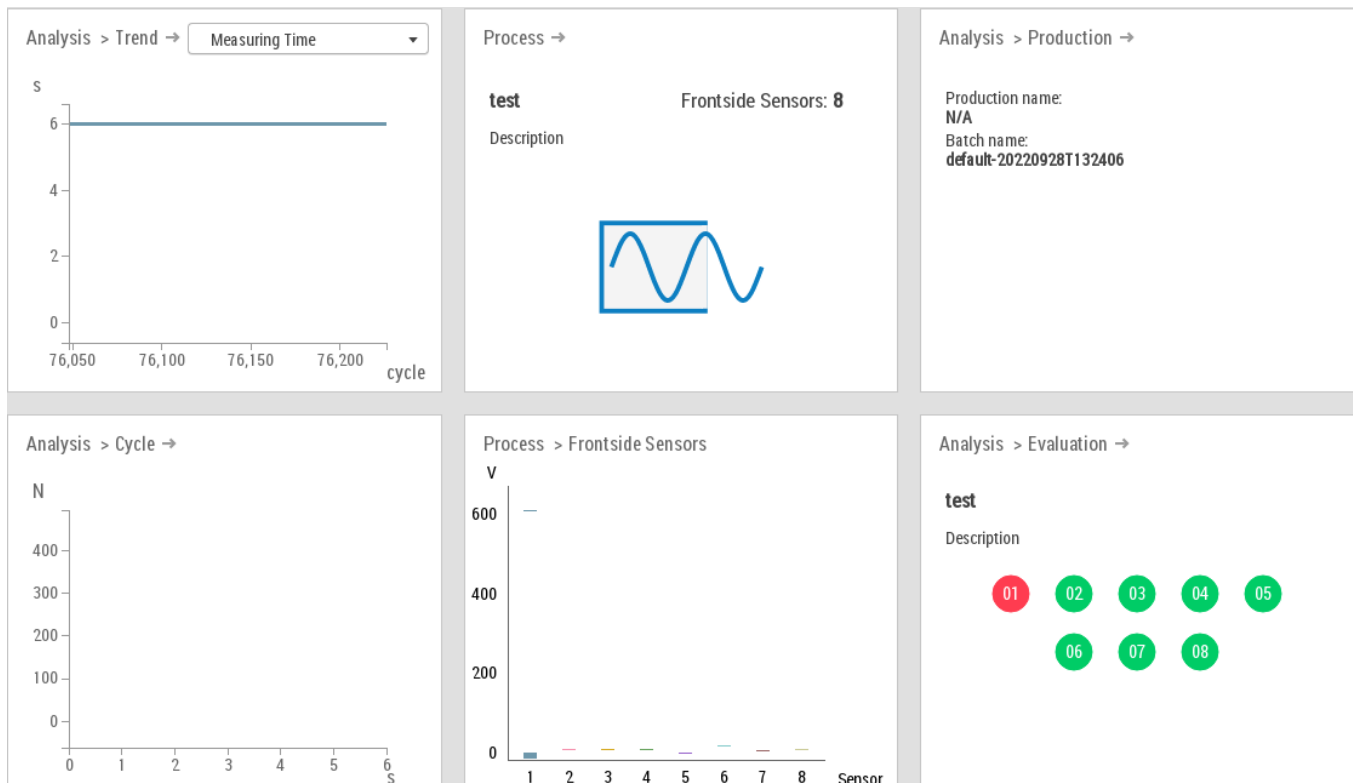
The two buttons can be used to switch to the specified signal display.

## 4. Process overview

The process overview provides a compact summary of the most important information about the process flow.



By clicking on the corresponding tile in the process overview, you can navigate directly to the detailed views of the displayed process steps with the exception of tile (5), process balancing).

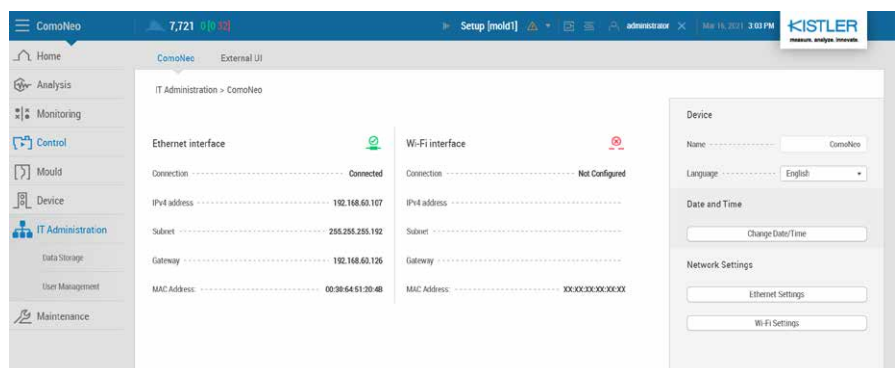


- (1) Selectable trend view (here: Measuringtime) over the entire history, see section 10.2
- (2) Active process, see chapter 7
- (3) Active production and active batch with scrap rate, production progress and calculated time of end of production, see section 10.1
- (4) Active or last measuring cycle, see section 7.4
- (5) Maximum pressure of the current measuring cycle
- (6) Active monitoring, type of sorting mode and evaluation result of the last cycle, see section 9.2

## 5. IT administration – menu [IT Administration]



### 5.1 Overview page



The [IT Administration] menu contains all fundamental settings regarding data storage and user management. These are usually settings that are defined when the device is put into operation.

#### 5.1.1 Tab [ComoScout]

On the overview page of the IT Administration the status of the ethernet and Wi-Fi interface is displayed. The following information are displayed for both:

- Connection status
- IPv4 address
- Subnet
- Gateway
- MAC Address

##### Parameter area "Device"

The following settings are possible in the parameter area:

- Assigning a name to the ComoScout
- Language selection



### Parameter area "Unit"

In this parameter area, the units of pressure, temperature and length can be changed independently of the language selection.

### Parameter area "Date and Time"

With this setting, a user-defined time and a time server can be selected.

In order to get the correct time later when exporting data (e.g. to ComoData-Center), it is recommended to select the correct time zone in both cases.

### Selection "Custom time"

1. Enter the date in the format "dd.mm.yyyy".
2. Enter the time in the format "hh.mm".
3. Select time zone.
4. Press the [Apply] button.

The application is restarted to apply the changed time.

### Selection "Time server (NTP)"



The unit can be connected to a time server (NTP). In this way, the system time of several units can be kept synchronised.

1. Enter the address of the time server.
2. Select time zone.
3. Press the [Apply] button

Now the time is obtained from the specified time server.

### Parameter area "Network Settings"



#### Connection problems

Change network settings only when a new network connection is to be setup.

### Setting a static IP address for the ComoScout:

1. Press the [Ethernet Settings] button in the "Network Settings" parameter area.

2. Enable the ethernet network adapter
3. Enter IPv4 address, Subnet Mask and Gateway
4. Press the [Apply] button

ComoScout can now be reached at the newly assigned IPv4 address.

---

### Setting a dynamic IP address for the ComoScout:

1. Press the [Ethernet Settings] button in the “Network Settings” parameter area.
2. Enable the ethernet network adapter
3. Enable DHCP with the respective slide bar
4. Press the [Apply] button



A dynamic IP address is only advisable when using ComoScout in conjunction with the touch display. Access via a web browser is no longer possible.

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### Setting a Wi-Fi connection

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A Wi-Fi connection can be used in parallel with an Ethernet connection or as a single connection.

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ComoScout can be connected to a Wireless network in combination with a USB-Wifi-stick. For a recommendation of a suitable USB-Wifi-stick, please contact your Kistler contact.

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Information about the EAP method and authentication method used must be provided by customer IT

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1. Plug the USB-Wi-Fi-Stick into the ComoScout
2. Press the [Wi-Fi Settings] button in the “Network Settings” parameter area.
3. Enable the Wi-Fi network adapter with the respective slide bar
4. Select the Wi-Fi Security Type (ePSK and eEAP are available)

Wi-Fi Connection Settings - Authentication

⚠ Changes can lead to loss of connection!  
Changing the IP Address might lead to losing the connection to the ComoNeo.

Enable Wi-Fi network adapter ☒

Wi-Fi Security Type  Wi-Fi interface  eEAP

Wi-Fi Name / SSID  Connection  Not Configured

EAP Method  192.168.60.107 IPv4 address  ePEAP

Authentication Method  255.255.255.192 Subnet  eTLS

Enable Identity ☒ 192.168.60.126 Gateway

Username  00:30:64:51:20:4B MAC Address

Password

Cancel Next

For ePSK:

5. Enter Wi-Fi Name / SSID and WPA2 Security Key

For eEAP:

5. Enter Wi-Fi Name / SSID and select the EAP Method (PEAP / TILS)

Select the Authentication Method (MSCHAP / GTC / PAP / TLS / CHAP) and enter the according username and password

6. Confirm with “Next”

7. If a dynamic IP-address is to be used, enable DHCP with the corresponding slider. If a static IP-address is to be used, enter IPv4-address, subnet mask and gateway in the corresponding fields

If a static IP address is to be used, enter the IPv4 address, subnet mask, and gateway in the appropriate fields.

8. With “Apply” the connection is set.

ComoNeo External UI

IT Administration > ComoNeo

Ethernet interface	Wi-Fi interface
Connection: Connected	Connection: KWLAN
IPv4 address: 192.168.76.244	IPv4 address: 192.168.41.125
Subnet: 255.255.255.0	Subnet: 255.255.252.0
Gateway: 192.168.76.254	Gateway: 192.168.43.254
MAC Address: 00:30:64:60:11:F7	MAC Address: D0:37:45:0E:66:CF

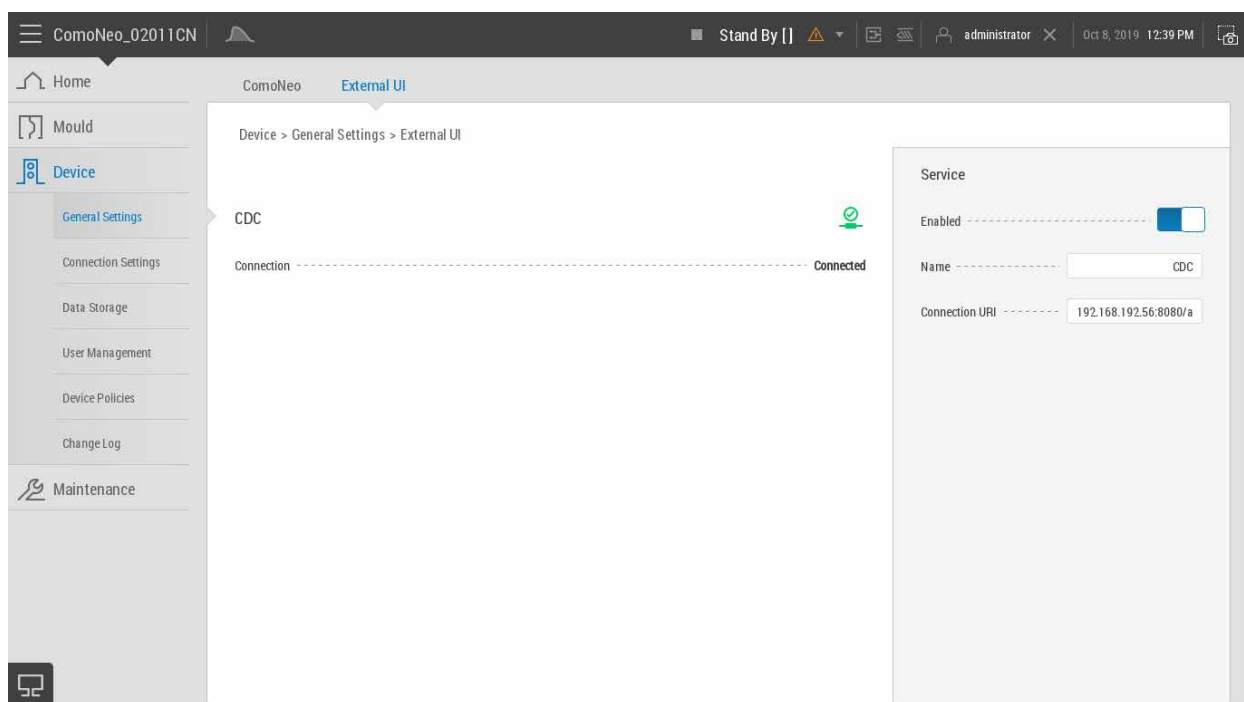


The following table shows via which gateway the ComoScout can be reached when it is connected via cable/Wi-Fi. Basically, the cable bound gateway has priority. In addition, a manually configured gateway is more important than one via DHCP.

Ethernet	Wi-Fi	Default Gateway
Disabled	Enabled	Wi-Fi
Enabled	Disabled	Ethernet
Static IP + Yes gateway	Static IP + Yes gateway	Ethernet
Static IP + Yes gateway	Static IP + No gateway	Ethernet
Static IP + Yes gateway	DHCP	Ethernet
Static IP + No gateway	Static IP + Yes gateway	Wi-Fi
Static IP + No gateway	DHCP	Wi-Fi
DHCP	DHCP	Ethernet
DHCP	Static IP + No gateway	Ethernet
DHCP	Static IP + Yes gateway	Wi-Fi

### 5.1.2 Tab [External UI]

An external user interface can be included in this submenu.



1. enter a name
2. enter IP adress and port
3. enable

As soon as the connection is active, the symbol for the external user interface appears in the lower left corner.

After pressing the button, a status bar appears with the buttons of the respective devices.



The icon / status bar remains visible when switching to the external user interface, so that you can switch back at any time.





The function "External user interface" works with web-based, local installations of a software, such as ComoDataCenter.

## 5.2 [IT Administration] – [Data Storage]

In this menu the entire data storage can be configured.

### 5.2.1 Tab [Local Storage]

IT Administration > Data Storage > Local Storage

Local Storage



In this menu the data storage can be configured.

#### Area "Local Storage"

The bar indicates how far the local memory is occupied.

The local memory can be configured as a ring buffer, see section 5.2.

### 5.2.2 Tab [Storage Mode]

#### Ring Buffer

In the [Storage] tab, you can set the ComoScout to use the remaining 20% internal memory in ring buffer mode when the internal memory of the ComoScout is 80% full. If this mode is enabled, the device will stop recording if there is insufficient memory. A new batch is started in production mode, a new history in setup mode.

#### Activating the ring buffer in setup mode

If this option is activated, the data is not permanently recorded in start-up mode, but evaluated. Changes are applied to a new history. The last 500 cycles are stored temporarily for this purpose. Afterwards, the ring buffer principle is used.

#### Activating the ring buffer for productions

If this option is activated, the data is not recorded in production mode, but evaluated. Changes will be applied to a new batch.

## 5.3 [IT Administration] – [User Management]

The user management concept of the ComoScout is based on users and roles. User management with LDAP is also available.

**Users**    Local Roles    LDAP

Each user is assigned a specific role; the access rights are defined for each role. Both standard users as well as standard roles are predefined. Users and roles are defined on different page.

### 5.3.1 Tab [Local Roles]

The table in the display area provides an overview of the roles that already exist. It shows the role name and the assigned rights.

The standard roles have assigned with the following rights.

Role	Description	Configurable
Administrator	▪ execute/write all menus	–
It-admin	▪ write maintenance and it-administration menus ▪ read all further menus	yes
Production-admin	▪ read it-administration menu ▪ write all further menus	yes
Shift-supervisor	▪ read the device and maintenance menus ▪ write all further menus	yes
Operator	▪ execute process menu ▪ read all further menus	yes
Guest	▪ read all menus	–

### Edit user role / Add user role

For the selected user role, rights for different application areas can be assigned in the parameter area.

Right	Meaning	Not valid
Read	see information	overwrite or load/execute information
Execute	see and execute information	overwrite information
Write	see, execute and overwrite all information and settings	–

### 5.3.2 Tab [Local Users]

The screenshot shows the 'Users' tab in the IT Administration interface. The breadcrumb trail is 'IT Administration > User Management > Users'. There are three tabs: 'Users' (selected), 'Local Roles', and 'LDAP'. A 'Create Local User' button is in the top right. The main area contains a table with columns: LDAP User, First Name, Last Name, User Name, Role, and RFID. The table lists five users: administrator, it-admin, operator, production-admin (highlighted), and shift-supervisor. To the right of the table is a form for creating a new local user. It includes fields for First Name, Last Name, and Role (set to 'production-admin'). There are buttons for 'Change Password' and 'Change RFID'. A warning message states: 'Change RFID not available. This functionality is only available on the device screen'. A 'Delete User' button is also present.

The table in the display area provides an overview of the users that already exists. It shows the first name, last name, user name, role and RFID, if present.

- By default 5 users are configured with the user names "administrator", "it-admin", "operator", "production admin" and "shift-supervisor".
- No names and first names are stored for the standard users.

### 5.3.3 Tab [Local Users]

The screenshot shows the 'Create Local User' dialog box. It has a title bar 'Create Local User' and a close button. The dialog contains a 'Username' field and a 'Create Local User' button. Below this is a table with columns: First Name, Last Name, User Name, Role, and RFID. The table lists five users: administrator, it-admin, operator, production-admin, and shift-supervisor. The 'Role' field is set to 'guest'. There are fields for 'Password' and 'Retype Password'. The 'RFID' field is empty. At the bottom are 'Cancel' and 'Create Local User' buttons.



If a Kistler touch display is used for the ComoScout, the user can log on to the ComoScout via an RFID transponder. The RFID reader is located on the bottom left-hand side of the display and is symbolized by the adjacent symbol.

---

#### Create new user

1. Press the [Create Local User] button in the upper right corner of the display area. The input window shown above appears.
2. Make the following settings for the new user:
  - Username, First- and Last Name
  - Select Role
  - Enter and repeat the password
3. If desired, assign RFID transponder
  - Place the user's RFID transponder at the marked position on the Kistler Touch Display.
  - If the symbol is green, the RFID transponder is assigned to the user.
4. Press the [Create Local User] button to save the new user.



#### Edit existing user

In the parameter area, an existing user can be edited as follows

- delete user
- change First Name, Last Name and Role
- change Password
- change RFID



The button [Change RFID] can be used to assign RFID transponders to existing users. The procedure is the same as for creating a user..

---

### 5.3.4 Tab [LDAP]

With the LDAP option, the ComoScout can be accessed with a LDAP user management.



The ComoScoutLDAP function is a chargeable option and must be activated via a license key. Information about the used LDAP server must be provided by customer IT.

#### Configure LDAP connection:

1. The ComoScoutLDAP license is activated
2. Enter the following information:

<div>Configuration</div> <div>Enable LDAP <input type="checkbox"/></div> <div>LDAP Server <input type="text"/></div> <div>Port <input type="text"/></div> <div>Root DN <input type="text"/></div> <div>Manager DN <input type="text"/></div> <div>Manager Password <input type="password"/></div> <div>User Name Attribute <input type="text" value="sAMAccountName"/> <small>The attribute field to use on the user object. Examples: cn, sAMAccountName</small></div> <div>User Object Filter <input type="text" value="(objectCategory=Person)"/> <small>The filter to use when searching user objects. Parentheses are required. Example: (objectCategory=Person)</small></div> <div>Method <input type="text" value="eLDAP"/></div> <div><input type="button" value="Test connection"/></div>	LDAP Server	IPv4 address of the LDAP server
	Port	Port number where the LDAP server is listening
	Root DN	Root domain name. Definition of the root node where the users are searched for. It is defined in specific LDAP format.
	Manager DN	Full domain name of the user that has the right to traverse the LDAP tree.
	Manager Password	Password of the used manager user.
	User Name Attribute	Set which user attribute in the LDAP will be used as login name on the ComoScout device. This can be for example cn (common name), sAMAccountName (login name), mail (user's email address), surname and any other attribute the user has in LDAP.
	User Object Filter	Attribute used to suggest the algorithm which nodes in the LDAP directory tree are important. Default: <i>objectCategory=Person</i>
	Method	Selection between LDAP and LDAPS

3. With the [Test connection] button the connection to the LDAP server is tested. If the connection is not successful, an error message appears.
4. After all settings are filled in correctly, the LDAP function can be enabled with the "Enable LDAP" slider

#### Add LDAP Users:



After the connection to the LDAP server is successfully established, the [Add LDAP User] button appears on the [Users] page and LDAP users can be added.



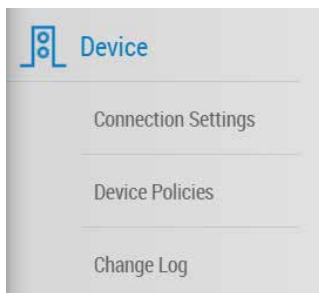
5. Click the [Add LDAP User] button in the upper right corner of the display area. The following input window appears:

6. Make the following settings for the user to be added:
  - Username: The username must be entered according to the specified user name attribute.
  - Select Role.
  - The password is automatically set from the LDAP.
7. Press the [Add LDAP User] button



LDAP users can login to the device if LDAP is enabled. If the user has not been added to the ComoScout users, he can still login as a guest.

## 6. Device configuration – menu [Device]



The [Device] menu contains all machine-related setting for the ComoScout that can be configured in 3 submenus. These are usually settings that are defined when the instrument is put into operation and are rarely or never changed later.

### 6.1 Overview page

The most important configurations and their current settings are summarized on the overview page of the Device configuration.

- Device name
- IPv4 address
- Language
- Assignment of the connected digital inputs
- Assignment of the connected digital outputs
- Assignment of the connected analog inputs
- Assignment of the connected analog output

#### Parameter area “Import/Export Device settings”

This area offers the possibility to import or export complete configurations except the general settings via a USB stick or as download via a web browser.

1. Insert a USB stick into the ComoScout. (This step is not necessary, if the file is downloaded via a web browser)
2. Press the [Import] or [Export] button.
3. Follow the instructions on the device.
4. When the import/export is complete, remove the USB stick from the ComoScout.

Imported configurations are now ready for use, exported configurations can be transferred to other ComoScouts, for example.

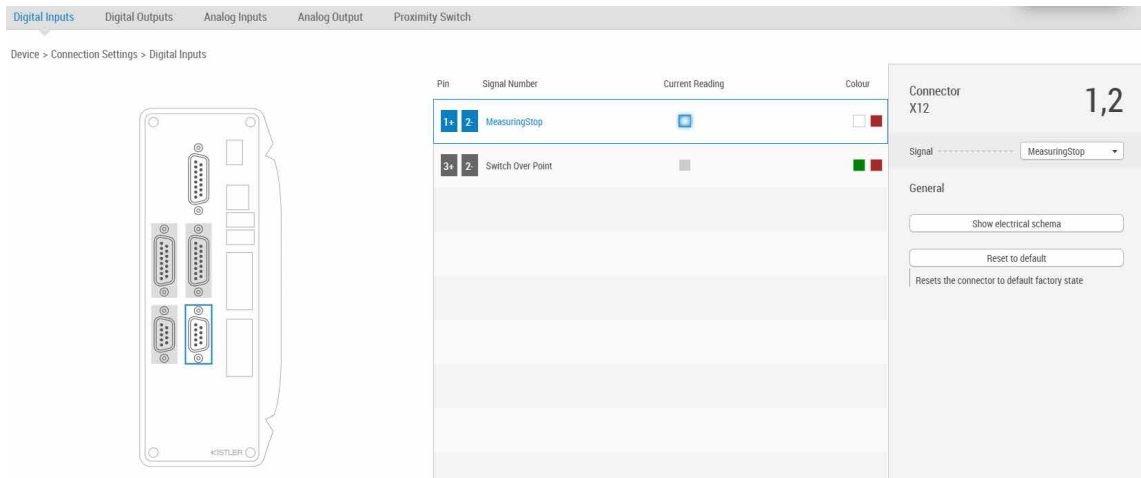
### 6.2 [Device] – [Connection Settings]

The menu for machine communication is used to define all inputs and outputs that interact with injection processing machines or handling devices. The proximity switch can also be configured in this menu. This is used if the start of measurements is to be triggered with a button when the process is closed.

The [Connection Settings] submenu is divided into the following tabs:



### 6.2.1 Tab [Digital Inputs]



- ComoScout is equipped with 12 digital inputs distributed over 4 connectors
  - Small connectors (D-Sub 9-pin): 2 digital inputs each available
  - Large connectors (D-Sub 15-pin): 4 digital inputs each available
- The respective connectors can be selected in the ComoScout graphic.
- The table next to the graphic shows the inputs available for the selected connector.

Pin	Pin numbers of the ComoScout connector to which the input refers.
Signal Number	Selected type of input If several inputs of the same type are used, a signal number can be assigned.
Current Reading	Current status of the input: 0 (grayed out) or 1 (blue)
Color	The color of the wire that must be connected when using the standard Kistler cables. Voltage: 0V/24V



### Available input types

Type	Availability
MeasuringStart	only 1x
MeasuringStop	only 1x
Switch Over Point	only 1x
Cycle Event	multiple



- Once types that are only available once are assigned to an input, they no longer appear in the selection.
- Types that are available more than once are assigned a signal number.
- If one of the types that can only exist once has been assigned incorrectly, the assignment must first be undone before the type can be assigned correctly.
- Unassigned pins are marked "Unassigned".

Connector X12

1,2

Signal ----- MeasuringStart ▼

Signal Number ----- 4 ▼

Start Delay ----- 0 ms

General

Show electrical schema

Reset to default

Resets the connector to default factory state

### Configure Digital Inputs

1. Select connector in the graphic.

The possible inputs are displayed in the table in the display area.

2. Select the desired input.

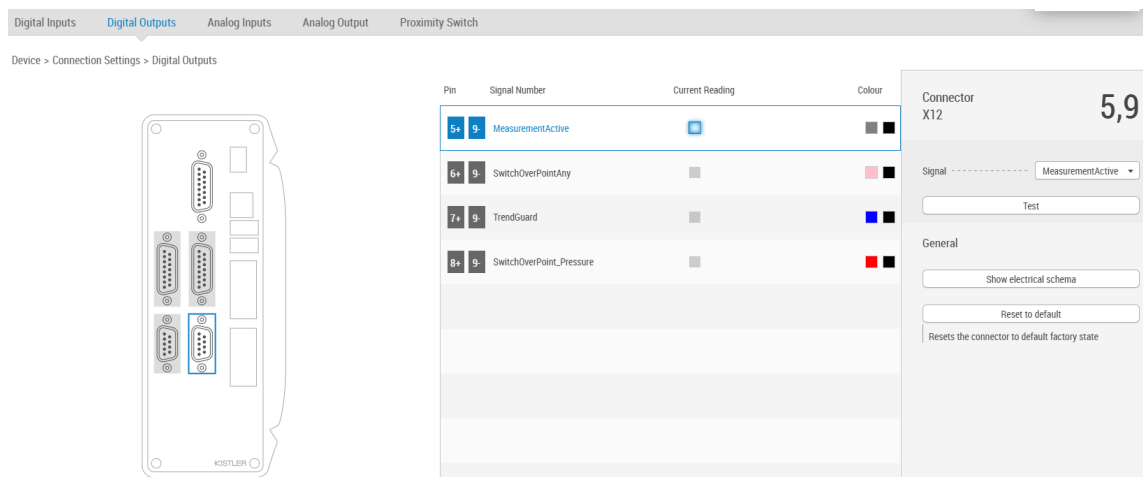
The details of the input appear in the parameter area.

3. Select the desired signal
4. If necessary, assign a signal number.
5. If desired, enter a start delay for the "MeasuringStart" type, e.g. to compensate for different machine response times.

### Parameter area "General"

Show electrical schema	Opens the electrical schema of the selected connector.
Reset to default	All inputs of a connector, independent of the selection in the table in the display area, are reset.

## 6.2.2 Tab [Digital Outputs]



- ComoScout is equipped with 24 digital outputs distributed over 4 connectors
  - Small connectors (D-Sub 9-pin): 4 digital outputs each available
  - Large connectors (D-Sub 15-pin): 8 digital outputs each available
- The respective connectors can be selected in the ComoScout graphic.
- The table next to the graphic shows the inputs available for the selected connector.

Pin	Pin numbers of the ComoScout connector to which the output refers.
Signal Number	Selected type of output If several outputs of the same type are used, a signal number can be assigned
Current Reading	Current status of the output: 0 (grayed out) or 1 (blue)
Color	The color of the wire that must be connected when using the standard Kistler wires. Voltage: 0V/24V

### Available output types

Type	Availability
SortOutput	multiple
DeviceReady	only 1x
Message divided into "Notification", "Warning", "Alarm" depending on severity level	only 1x per severity
SortResultValid	multiple
Rtth	23x
MeasurementActive	only 1x
TrendGuard	only 1x



- Once types that are only available once are assigned to an input, they no longer appear in the selection.
- Types that are available more than once are assigned a signal number.
- If one of the types that can only exist once has been assigned incorrectly, the assignment must first be undone before the type can be assigned correctly.
- Unassigned pins are marked "Unassigned".

### Configure digital outputs



- The basic logic of all outputs is "1" if the event is active and "0" if the event does not occur.
- For sorting outputs, the output shows "0" as default for a bad part and "1" for a good part.
- Selecting the "Invert Signal" option inverts the logic.

Connector X14 7,5

Signal ----- SwitchOverPoint\_P... ▾

General

Resets the connector to default factory state

1. Select connector in the graphic.

The possible outputs are displayed in the table in the display area.

2. Select the desired output.

The details of the output appear in the parameter area.

3. Select the desired signal

4. If necessary, perform further signal-dependent settings.

5. Press the [Test] button to check whether the desired information is received by the counterpart.

#### Parameter area "General"

Show electrical schema	Opens the electrical schema of the selected connector.
Reset to default	All outputs of a connector, independent of the selection in the table in the display area, are reset.

Sort outputs settings

Reset signal after 0% of the measuring time.

If there is no new cycle within the timespan of the previous cycle time and this extension, then the output will be reset.

☐

#### Parameter area "Sort outputs settings"

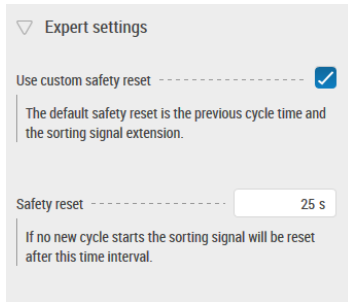
For sort outputs, it can be defined when they are to be reset. This usually happens at the start of a new measurement, which corresponds to the selection "Reset signal after 0% of the measuring time".

→ Move the slider to adjust the setting between 0% and 100%.

**Example:** If the setting "Reset signal after 50% of the measuring time" is selected for a measuring time of 10 seconds, the sorting output is reset 5 seconds after the start of the next measurement.



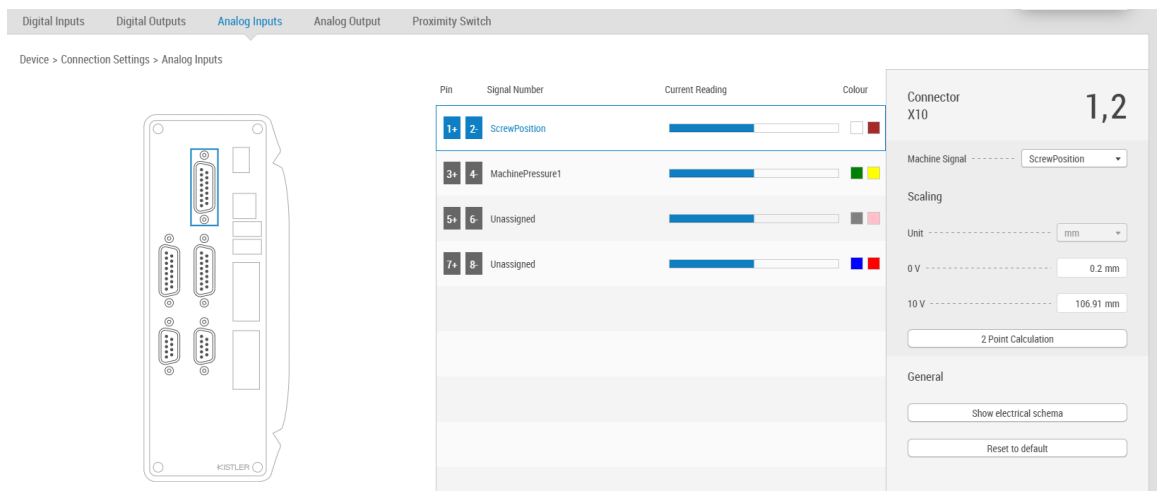
It is strongly recommended to use the "Device ready" signal and connect it to the machine.



### Expert settings sort output

A user-defined safety reset of the sort outputs can be applied here. The sorting signal will be extended and only reset after the entered time if no new "Start measurement" signal is sent.

## 6.2.3 Tab [Analog Inputs on backside]



- ComoScout can record and evaluate up to 4 analog inputs on backside.
- The connection is made via the connector X10.
- The table next to the graphic shows the inputs available for connector X10.

Pin	Pin numbers of the connector on the ComoScout to which the input (+) and its earthing (–) refer.
Signal Number	Selected type of machine signal.
Current Reading	Current status of the input between 0 and 10 Volt (guide value).
Color	The color of the wire that must be connected when using the standard Kistler wires. The first color represents the input (+), the second represents its grounding (–).

### Available input signals

Type	Unit
ScrewPosition	mm
MachinePressure1	bar (EU)
MachinePressure2	
General/MachineSignal1	selectable(EU):
General/MachineSignal2	bar, mm, °C, mm <sup>3</sup> /s, min <sup>-1</sup> , mm/s, V, N, Ohm*cm



Unassigned pins are marked with "Unassigned".

Connector X10 **1,2**

Machine Signal ----- ScrewPosition ▾

Scaling

Unit ----- mm ▾

0 V ----- 0 mm

10 V ----- 162 mm

General

Show electrical schema

### Configure analog inputs

1. Select the desired input in the table in the display area.  
The details of the input appear in the parameter area.
2. Select the desired signal.
3. Enter the scaling.
  - Only for "GeneralMachineSignal": Select unit.
  - Enter the display value at 0V.
  - Enter display value at 10V

### Parameter area "General"

Show electrical schema	Opens the electrical schema of the selected connector.
Reset to default	All outputs of a connector, independent of the selection in the table in the display area, are reset. 2 Point calculation is available (Details see chapter 7.3.2 page 46)

## 6.2.4 Tab [Analog Output]

Device > Connection Settings > Analog Output

Pin Signal Number Current Reading Colour

Pin	Signal Number	Current Reading	Colour
10+	11: Machine Signal		

Connector X10 **10,11**

Active ----- ☐

Signal type ----- Machine Signal ▾

Signal index ----- None ▾

General

Show electrical schema

- ComoScout is equipped with an analogue output at connector X10.
- The table next to the graphic shows the available output.

Pin	Pin numbers of the connector on the ComoScout to which the output refers.
Signal Number	Selected type of output
Current Reading	Current status of the output between 0 and 10 Volt (guide value).
Color	The color of the wire that must be connected when using the standard Kistler wires. Voltage: 0V / 24V

### Configure the analog output

The analog output can be configured in the parameter area.

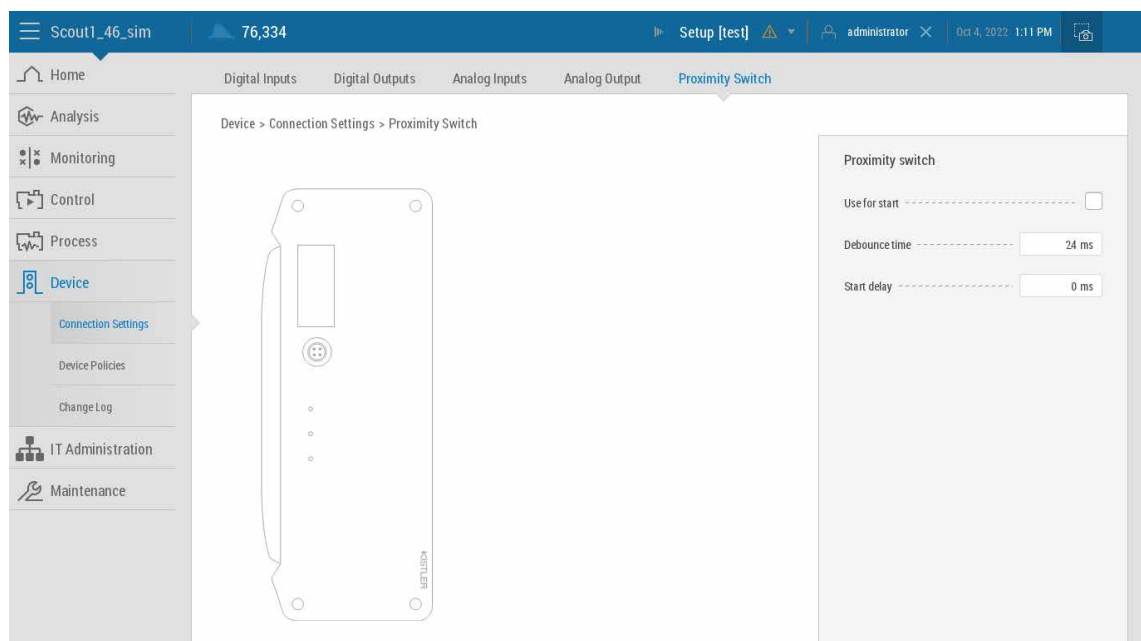
1. If desired, activate output.
2. Choose the signal type from frontside or backside.
3. Assign Signal index.

Signal type	Signal index
Backside Signal	ScrewPosition
	MachinePressure1
	MachinePressure2
	GeneralMachineSignal1
	GeneralMachineSignal2
Frontside	None
Configured	1 ... 9

### Parameter area "General"

Show electrical schema	Opens the electrical schema of the selected connector.
------------------------	--

## 6.2.5 Tab [Proximity Switch]



The proximity switch is an alternative way of starting a measurement if no digital outputs are available on the injection processing machine.

In general, the proximity switch is mounted on the process and triggers the start signal when the process is closed.

### Configure the proximity switch

The proximity switch can be configured in the parameter area.

Use for start	To use the proximity switch as a start trigger, a check mark must be set for this setting.
Debounce time	The debouncing time is intended to prevent the proximity switch from triggering several times during a closing process. Usually the standard value can be retained.
Start delay	As with the digital inputs, the start delay can be used to delay the actual start of the measurement after the start signal has been triggered. This functionality can be used, for example, to compensate for different response times between several processes.

## 6.3 [Device] → [Device Policies]

Login   Visualisation   Setup Mode   Services   Production

The Guidelines page contains all settings that may differ on a company level and influence certain behaviors of the device.

### 6.3.1 Tab [Login]

In the Login area, the administrator can define whether the current user is automatically logged out after a certain amount of time with no activity.

### 6.3.2 Tab [Visualization]

In the tab [Visualization] the display of the part counter in the status bar and the resolution of the curve display can be set.

- In the status bar, you can display good parts or bad parts or all parts as required. The operator can see the evaluation result of the production immediately.
- The curve resolution can be divided into four resolutions. The resolution only affects the display of the curve in the ComoScout, not the curve data that can be exported from the device.

### 6.3.3 Tab [Setup Mode]

#### Enable sorting in setup mode

If this option is activated, parts are already sorted in setup mode. However, sorting errors may occur if the EO limits have not yet been fully evaluated.

### 6.3.4 Tab [Services]

#### OPCUA service

If this option is activated, new ComoScout cycle data are published on the OPCUA interface via `opt.tcp://"ip-address ComoScout":4840`. The ComoScout serves as server in the OPCUA communication.

With the OPCUA service, the following values can be provided as examples:

- cycle time
- maximum pressure and temperature
- multiple integral values
- channel-, signal- and sort group results
- process parameters
- EO results
- switch over value
- event, as soon as a configuration or relevant setting is changed
- historical data
- ...

## CONNECT



The CONNECT function for providing complete signal pressure curves is a chargeable option (2834A7) and must be activated via a license key.

Details about the OPCUA service and the CONNECT feature can be found in the specification.

CONNECT provides complete curve data in addition to the standard OPCUA service. ComoScout serves as a server in the OPCUA communication.

Resolution: approx. 1000 points per signal curve

## VNC service

If this option is activated, the ComoScout user interface is available via "VNC: 5900" and can be displayed on another hardware. The ComoScout serves here as a VNC server and provides the image with the selected resolution.

The resolution can be selected at the "Scaled VNC resolution" dropdown. Five different resolutions are available for selection: 1024x600, 1280x720, 1366x768, 1920x1080 and 2560x1440.

## 6.3.5 Tab [Production]

### After interruption: dispose of parts for the next ### cycles

After a production interruption, parts are evaluated as bad parts for the specified number of cycles.

### Discard parts from cavities without sensors

If this option is activated, parts from cavities to which no sensors are assigned are evaluated as bad parts.

### Disable production when signal is without sensors

If this option is activated, productions can only be started if sensors are assigned to all cavities.



### Deactivate production when channel is without EO

If this option is activated, productions can only be started if all sensors are monitored with EOs.

## 6.4 [Device] → [Change Log]

Device &gt; Change Log

Export ComoScoutLOG Load logs

Timestamp	Serial number	User Name	Changed
Oct 4, 2022 5:38:42 PM	simulator-20220928T111205	administrator	Device
Oct 4, 2022 5:38:22 PM	simulator-20220928T111205	administrator	Device
Oct 4, 2022 5:37:57 PM	simulator-20220928T111205	administrator	Device
Oct 4, 2022 5:17:32 PM	simulator-20220928T111205	administrator	Device
Oct 4, 2022 5:16:47 PM	simulator-20220928T111205	administrator	Device
Oct 4, 2022 4:42:20 PM	simulator-20220928T111205	administrator	Production
Oct 4, 2022 4:42:14 PM	simulator-20220928T111205	administrator	Process
Oct 4, 2022 4:42:14 PM	simulator-20220928T111205	administrator	Process

All changes made to the ComoScout are logged in the [Change Log] sub-menu.

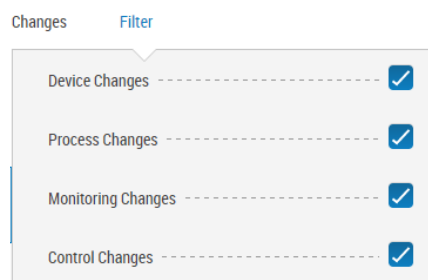
### Button [Load changes]

→ Press the [Load Changes] button in the upper right corner of the display area to display the updated log.

From the table it can be read which user changed which settings at which time.

### Parameter area – Tab [Changes]

Clicking an event in the table in the display area displays the previous setting and the changed setting in the [Changes] tab.



### Parameter area – Tab [Filter]

In the [Filter] tab it is possible to filter for specific changes:

## LOG Feature

In addition to the change log, there is the enhancement LOG. Here the changes in the additional areas Login and Production are logged.



The function LOG for extended logging of changes on the device for e.g. audit trails is an option with costs (2834A8) and has to be activated by a license key.

Changes **Filter**

Device Changes	<input type="checkbox"/>
Process Changes	<input type="checkbox"/>
Monitoring Changes	<input type="checkbox"/>
Control Changes	<input type="checkbox"/>
Login	<input checked="" type="checkbox"/>
Production	<input checked="" type="checkbox"/>

## Parameterbereich – Tab [Filter]

The new areas appear in the [Filter] tab

Login

Production

Here you can filter for specific changes.

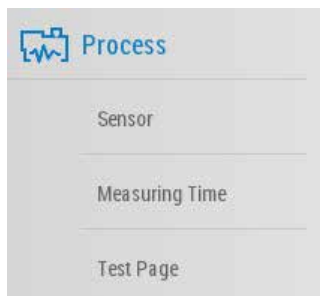
## Button [Export ComoScoutLOG]

→ Press the button [Export ComoScoutLOG] in the upper right corner of the display area to export all changes as .csv file. The export is possible with the ComoScout Display as well as via browser.

The .csv file is given an automatically generated name:

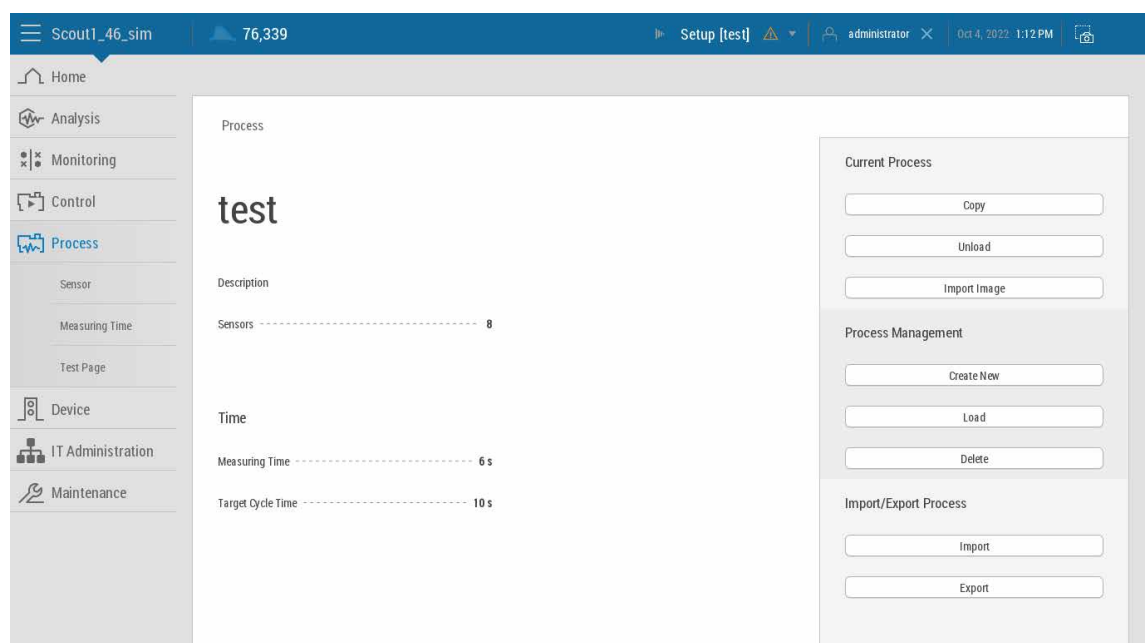
*audit-trail-SN-device\_name-date+time.csv*

## 7. Creating Processes – Menu [Process]



The [Process] menu contains all process-related settings of ComoScout that can be configured in 6 submenus. A process must first be created in this menu before it can be used.

### 7.1 Overview page



On the overview page of the [Process] menu, the most important data of the current process are summarized in 4 areas.

Description	Content of description
Sensors	Amount of sensors
Time	Measuring Time, Target Cycle Time
Connectors used	List of connections used by this process

## 7.1.1 Parameter area "Current Process"

### Button [Copy]

This allows copying the current process settings for the creation of a new process. Copying a process consists of the following steps:

1. Select which process properties should be copied: "Sensor Sensitivity" and/or "Monitoring Settings".
2. Enter the name and optionally a description for the new process.
3. If selected in step 1, load a monitoring setting.
4. If selected in step 2, load a process control (sensor sensitivity).

### Button [Unload]

When the [Unload] button is pressed, ComoScout automatically switches to standby mode. The message "No process setup loaded" appears. The process can now be dismantled.

### Button [Import Image]

For each process an image of the process can be loaded from a USB stick, which is displayed on the overview page.

→ Press the [Import Image] button and follow the instructions on the device.

## 7.1.2 Parameter area "Process Management"

### Button [Create New]

This allows a process to be created from scratch, see section 7.2.

### Button [Load]

Loading an existing process consists of the following steps:

1. Select the process from the list.
2. If configured, load the corresponding monitoring.
3. If configured, load the corresponding process control.

### Button [Delete]

To delete a process it must be closed first.

## 7.1.3 Parameter area "Import/Export Process"

Processes can be exchanged via a USB stick. Please note the following:

- Import/export operations can only be applied to inactive processes.
- If a process data set is to be exported, the process must first be closed.
- If a process data set is imported, it must first be loaded before measurements can be performed with the process.

→ Press the [Import] or [Export] button and follow the instructions on the device.

## 7.2 Create new process

### General settings

→ Enter the following process information:

- Name
- Number of sensors
- Some Description (not mandatory)

Create Process - General Settings

Name: \_\_\_\_\_

Number of Sensors: \_\_\_\_\_ 8

Description: \_\_\_\_\_

Cancel Create

### Create process

→ Click [Create] button

- The new Process settings are solved. The new Process is shown as "Current Process"

## 7.3 [Process] → [Sensor]

Sensor

Process > Sensor

Multi selection

1 Sensor 1 Range 0 - 100 N	2 Sensor 2 Range 0 - 10 N	3 Sensor 3 Range 0 - 10 N	4 Sensor 4 Range 0 - 10 N	5 Sensor 5 Range 0 - 10 N	6 Sensor 6 Range 0 - 10 N	7 Sensor 7 Range 0 - 10 N
8 Sensor 8 Range 0 - 10 N						

Input Channel 1

Unit: N

Value at 0V: 0 N

Value at 10V: 100 N

2 Point Calculation

Description: Sensor 1

This page displays all active sensors, those previously assigned to a signal of the process.

### 7.3.1 Editing sensor

1. Select the sensor in the sensor overview.
2. Edit the sensor in the parameter area depending on the sensor type.



To edit several sensors simultaneously, the [Multi selection] button can be used (top right in the display area).  
This selects all sensors. The selection can be edited by deselecting and selecting individual sensors

### 7.3.2 Configuration of sensors

Input Channel **1**

Unit ----- °C

Value at 0V ----- 0 °C

Value at 10V ----- 10 °C

2 Point Calculation

Description ----- Sensor 1

The following settings are available for sensors:

Unit	Selection between the units: metric system: "mm", "bar", "°C", "V", "N", "Ohm*cm", "min <sup>-1</sup> ", "mm/s", "mm <sup>3</sup> /s" US system: "inch", "psi", "°F", "V", "N", "Ohm*cm", "min <sup>-1</sup> ", "inch/s", "inch <sup>3</sup> /s"
Value at 0V	display value at 0V calibration certificate For direct sensors the calibration value is given in pC/bar, for indirect sensors in pC/N
Value at 10V	display value at 10V
Description	A free text can be entered for a more precise description of the sensor.

#### 2 Point Calculation

If values at 0 and 10V are unknown, the 2 point calculation can be used to define the values.

2 Point Calculation

Sensor 3 Range 0 - 10 °C

Sensor 4 Range 0 - 10 °C

Sensor 5 Range 0 - 10 °C

Sensor 6 Range 0 - 10 °C

Voltage at Point

Machine Value

Point 1 0.5 V 10 °C

Point 2 9.5 V 45 °C

Calculated value 1 0 V 8 °C

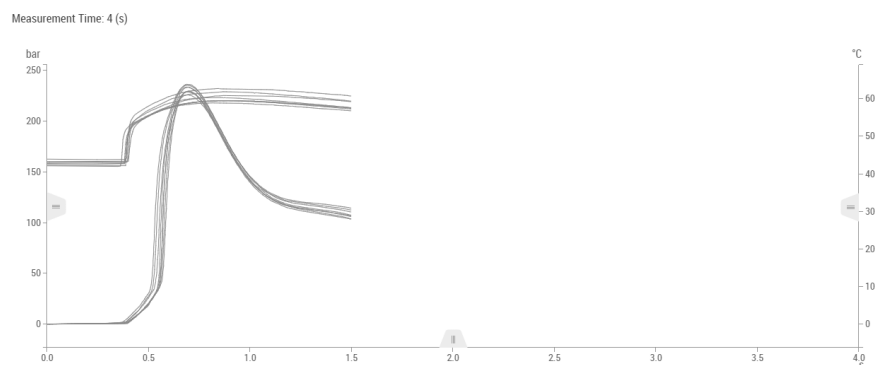
Calculated value 2 10 V 47 °C

Cancel Use values

## 7.4 [Process] → [Measuring Time]

In order to start a measurement with ComoScout, a digital input signal is required, which becomes active either in the states "Close process" or "Start injection".

The digital input signal is defined in the connection settings; see section 6.2.



### 7.4.1 Parameter area

Measurement Stop

Time ☒

Start Signal ☐

Stop Signal ☐

Measuring Time

#### Area "Measurement Stop"

This area determines how the measurement is ended. One of 3 methods must be selected:

Time	The measurement runs over the period of time entered under "Measurement time" and then stops.
Start Signal	The measurement starts as soon as the start signal is present at the corresponding input and stops immediately when the input signal disappears again.

#### CAUTION: No or incorrect measurement

If the injection processing machine only sends a peak as an input signal, selecting this option means that the ComoScout never really measures, since the measurement is stopped again immediately after starting.

Stop Signal	An additional signal from the injection processing machine signals when the measurement is complete. This could, for example, be a signal for the states "end holding pressure" or "open process".
-------------	--

Cycle Time

Target Cycle Time

#### Area "Cycle Time"

The target cycle time must be compared with the cycle time in the injection processing machine and will later be used at the following points:

- Detection of production interruptions (machine stopped) during production mode
- Target value visualization in the cycle time trend

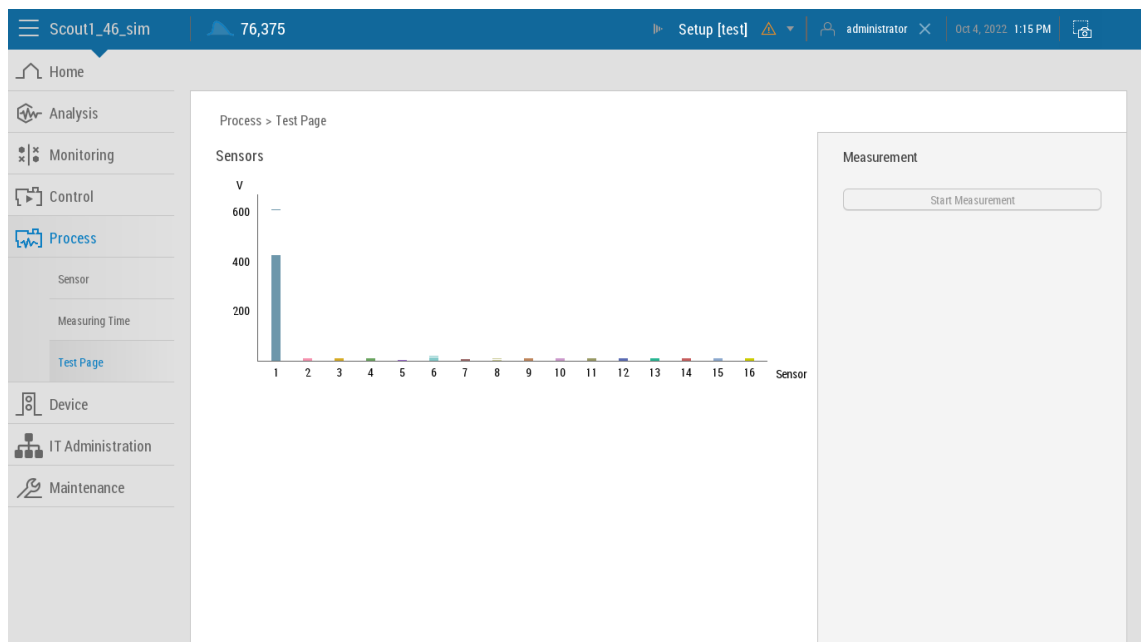


Even if the measurement is to be stopped on the basis of a start or stop signal, an expected average value for the measurement time should still be entered.

The entered value will not be used for actively stopping the measurement, but as a guide for data reduction and definition of the standard measuring points.

## 7.5 [Process] → [Test Page]

The Test page is available at the end of the process configuration for testing all process signals.



All sensor signals from the process are shown in the respective bar graphs. The bars only indicate a guide value and show whether a signal is applied on the respective sensor channel.

The display functions synchronously with the standard measurements.

If the signals are to be tested independently of the machine start, a manual measurement can be started using the [Start measurement] button. The button is only active if no measurement is currently running, since ComoScout cannot perform two measurements in parallel.

The measurement started manually via the [Start measurements] button is terminated after the defined measurement time has elapsed.

Kistler recommends carrying out the following checks in particular to determine whether the connected sensors are working.

- Testing for drift
  - Manual start of the measurement when the process is open
  - The signal should remain stable at 0
  - The temperature signals should be stable at process temperature



- Testing whether sensors may be jammed
  - Manual start of the measurement when the process is closed (no injection of plastic)
  - The signals should remain stable at 0
- Check whether sensors are assigned to the correct cavities
  - Manual start of the measurement
  - Use a T-handle or piece of soft metal to press on the pressure sensor in signal 1
  - The bar for the corresponding sensor signal should rise and leave a marker at the highest position
  - Check if the right bar has reacted
  - Temperature signals can be tested the same way. A temperature change must take place, possible for example with compressed air.

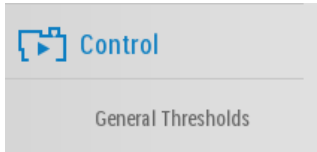
Further information about the test options of the sensor technology and the corresponding troubleshooting can be found in the operating instructions of the sensor technology.



If a manual measurement is started, visualization occurs in the cycle and trend view. These can be used for further examinations and tests.

---

## 8. Control settings – menu [Control]



In this menu switch-over points, balancing and thresholds for controlling the injection processing process can be configured.

### 8.1 Overview page

The overview page of the [Control] menu displays a description and the active control functions of the loaded control.

#### 8.1.1 Parameter area "Current Process Control"

##### [Copy] button

The current control settings can be copied for the creation of a new control. Copying a control consists of the following steps:

1. Enter the name and, if desired, a description of the control copy.
2. Trigger the copy operation with the [Copy Process Control] button.

##### [Unload] button

When this button is pressed, ComoScout automatically switches to standby mode. The message "No process control setup loaded" appears.

#### 8.1.2 Parameter area "Other Process Controls"

##### [Create New] button

To create a control from scratch, first create a control with name and description before configuring the settings in the submenu.

##### Button [Load]

→ Select the desired control from the list and activate it with the [Load] button.

## 8.2 [Control] → [General Thresholds]

In this submenu real time threshold values can be configured. There are two options:

- **Simple:** Horizontal threshold with selectable start and end time. As soon as the curve falls below or exceeds the threshold, a trigger signal is output. The option can be set to monitor for overload or to control other processes during processing.
- **On/Off:** Combination of two real time thresholds on one channel. It is thereby possible to switch a digital output on and back off again. This option can be used to control needle valve nozzles, for example.

Each of the thresholds can be assigned either to cavities and thus to the relevant sensors or to a machine signal



When using the real time threshold, safety measures on the injection molding machine (such as monitoring time, pressure or screw travel) are recommended.

### 8.2.1 Configuring the thresholds

1. Press the [Add Threshold] button in the upper right corner of the display area.
2. Select the threshold type: "Simple" or "On/Off" and confirm with the [Next] button
3. Select the type to monitor: "Cavities" or "Machine Signal"

#### Configuring threshold based on "Cavities"

4. Choose the type and position of the sensor and confirm with the [Next] button
5. Assign cavities to the threshold and close with the [Create] button.

#### Configuring threshold based on "Cavities"

6. Select machine signal and close with the [Create] button.

### Settings in the parameter area – threshold type "Simple"

The following settings can be made in the parameter area:

Enable	Enable/ disable the threshold
Threshold Type	Display of the selected threshold type
Output Signal	Select output signal
Threshold	Enter the threshold value
Crossing	The threshold must be crossed either from below or from above to trigger the event.
Left Limit Active Right Limit Active	This allows the duration of the threshold to be set.
Delay signal by	If necessary, enter a delay time
Enforce trigger	Automatic time trigger as safety
Sensor information	Display of sensor type and sensor position
[Edit Cavities]	Deleting or adding cavities
[Delete]	Deletes the threshold. A confirmation prompt appears.

### Settings in the parameter area – threshold type "On/Off"

The parameter area is divided into two areas: "On" and "Off".

The On/Off thresholds are configured in the same way as the simple thresholds.

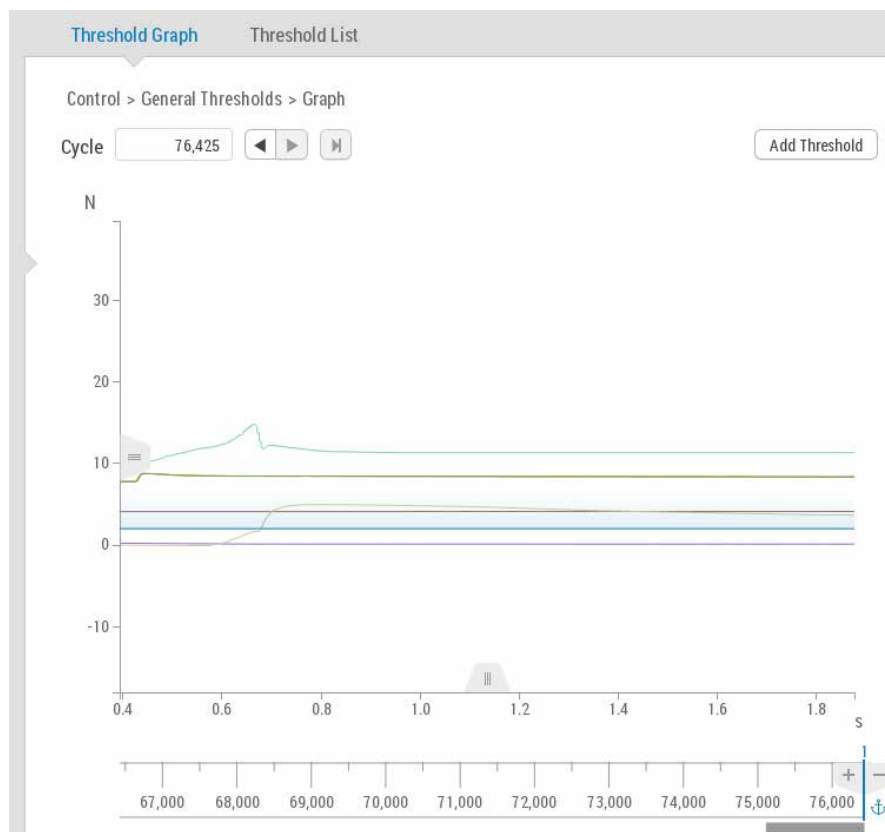
## 8.2.2 Display of the thresholds

### Threshold Graph

### Threshold List

The [Threshold Graph] and [Threshold List] tabs provide different representations of the thresholds.

#### [Threshold Graph] tab



The current/last measurement curve is displayed in the display area. The threshold is shown as a blue line

[Threshold List] tab

Threshold Graph

Threshold List

Control > General Thresholds > List

Add Threshold

Cavity	Thresholds
01	
02	Simple_0
03	Simple_0
04	Simple_0
05	Simple_0
06	Simple_0
07	Simple_0
08	Simple_0
09	Simple_0

This view shows which thresholds are assigned to which cavities or machine signals.

## 9. Setting up a monitoring management – menu [Monitoring]

### 9.1 Overview page

The overview page of the [Monitoring] menu displays a description and the active monitoring functions of the loaded process monitoring.

#### 9.1.1 Parameter area "Active Monitoring"

##### [Copy] button

The current monitoring settings can be copied to create a new monitoring. Copying a monitoring consists of the following steps:

1. Enter the name, and optionally a description, of the monitoring copy.n.
2. Use the [Copy Monitoring] button to trigger the copy process.

##### [Unload] button

When this button is pressed, the ComoScout automatically switches to standby mode. The message "No monitoring setup loaded" appears.

#### 9.1.2 Parameter area "Monitoring Management"

##### [Create New] button

To create a monitoring from scratch, first create a monitoring with name and description before configuring the settings in the submenus.

##### [Load] button

→ Select the desired monitoring from the list and activate it with the [Load] button.

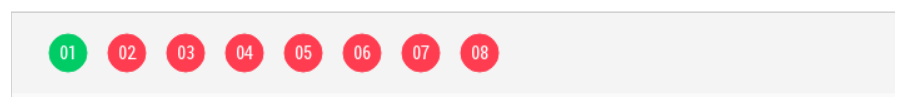
### 9.2 [Monitoring] → [Sorting]

ComoScout generates one sorting signals per cycle that needs to be assigned to a digital output that switched on for the evaluation. The configuration of which digital output belongs to which sort group is performed in the device settings (see section 6.2).

Monitoring > Sorting

Sorting Outputs

Sensors



## 9.3 [Monitoring] → [EO Monitoring]

ComoScout evaluates the quality of the parts in the individual cavities using Evaluation Objects (EOs).

An EO is a monitoring function (usually in the form of a box) which is based on certain evaluation criteria in order to evaluate the course of the measurement curve. EOs can be generated for any type of measurement channel, regardless of whether pressure, temperature or machine signals are to be evaluated.

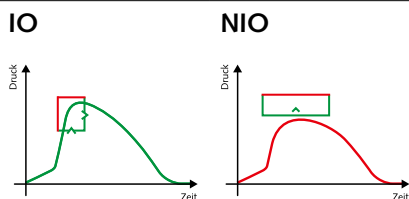


- An EO can never be used across multiple sensor types or sensor positions. In this case it is necessary to generate several EOs, possibly of the same type.
- Each signal must be assigned an EO.
- An EO can refer to several cavities. Whether this makes sense depends largely on how well the process is balanced and how close the measurement curves are to each other.
- If a separate EO is created for each signal, any deviations between the measurement curves can be evaluated more accurately.
  - On the one hand, fewer good parts may be incorrectly sorted out later as bad parts.
  - On the other hand, the evaluation effort increases, because each signal must be considered and evaluated separately.

### 9.3.1 Available EO types



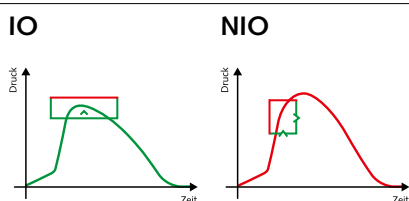
- In the selection list of the EOs, a short description and the necessary process values are displayed for the selected EO.
- Process values can later be used to generate EO trends that give an idea of the process flow and capability based on the EO boundaries used.



#### Max

The max function is used to check whether the curve reaches a certain value (green line) or does not exceed it (red line).

Typically, this function is used to determine whether the signal has been completely filled (short shot)

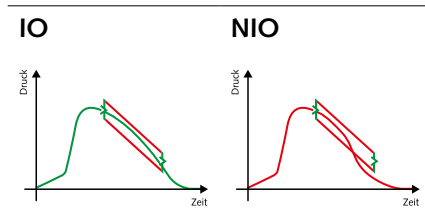


#### EntryExit

The EntryExit box ensures that only the green and not the red lines are crossed. These can be freely defined. The passage, for example, is horizontal or, as in the example, via entry at the bottom and exit on the right. This box is always rectangular.

Kistler recommends this box for almost all applications, as it not only checks the level but also the time component.

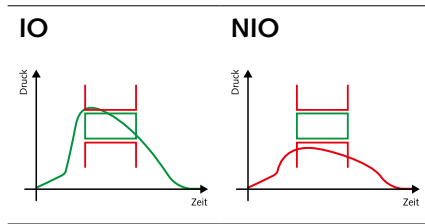




### Trapezoid

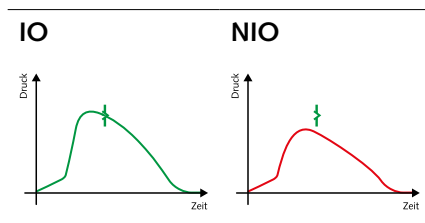
The curve can only enter on the left and must exit on the right. The upper and lower limits must not be at the same height.

This box is recommended to ensure that a certain holding pressure profile is maintained.



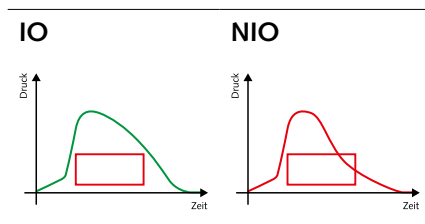
### Integral

The area below the curve must maintain a certain value within a defined period of time. The integral function is used to monitor sink marks



### VerticalThreshold

A vertical threshold must be crossed from left to right. For complex curves, it is advisable to use this EO as a supplement to other EOs



### NoEntry

No curve may touch this box. This function is used to monitor whether a pressure drop occurs..

### 9.3.2 Manual configuration of EOs

#### Procedure

1. Press the [Add EO] button
2. In the first dialog, select the EO type from the table of available EOs.
3. In the second dialog, select the monitoring type frontside or backside sensors.

#### Monitoring type "Cavities"

4. Select in the same dialog sensor type and sensor position.
5. In the next dialog assign the cavities to the EO

The Name of the EO can be customized in the "Name" field.

If the EO is to be used for good/bad part separation, the "Sorting" must be activated.

Only those cavities are displayed that contain measurements for the previously selected sensor position and the specified sensor type.

If the color of the signal symbol is filled, the signal is selected.

6. Save the EO with the "Create" button.

The EO is shown in the display area.

7. Set the process values as required in the parameter area

The EO is setup.

### Monitoring type "Backside Sensors"

1. Select in the same dialog the backside signal.
2. If this EO is not to be used for sorting, remove the check mark at "Sorting".
3. Save the EO with the "Create" button.

The EO is shown in the display area..

4. Set the process values as required in the parameter area.

The EO is setup.



- EOs are automatically named with their type and a consecutive number (per type).
  - If several EOs are defined, the EO can be selected via the dropdown list above the parameter area.
-

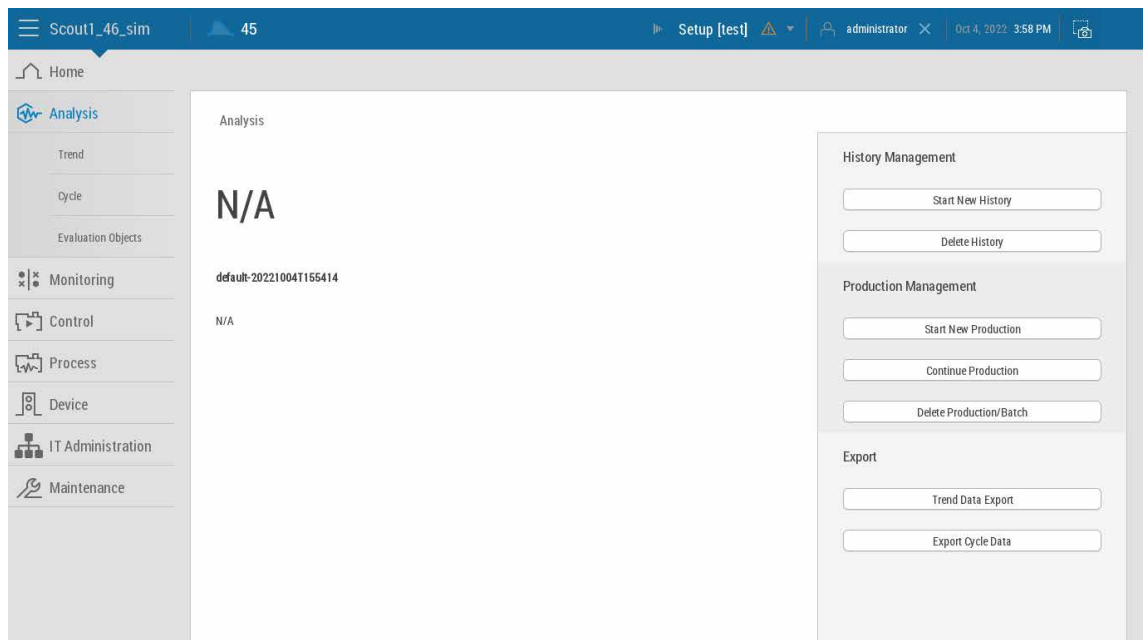
## 10. Configuration of Analysis Functions – [Analysis] menu

Once the basic settings have been made on the ComoScout, the device is ready to record and evaluate measurements. From this point on, the analysis functions become the central element of the ComoScout.

In the standard configuration, ComoScout records all measured cycles and stores them permanently in memory. A distinction is made between production orders and default histories. Default histories are recorded in the "Standby" and "Setup" modes.

If the device should behave differently from the standard and should not always save all data automatically, this can be configured, see section 5.2.

### 10.1 Overview page



On this page you can manage histories and production orders.

#### 10.1.1 Parameter area "History Management"

Start New History	When a new history is started, the active history is closed and stored in the memory. Cycle counters and all trend and cycle views are reset. The history in start-up mode is automatically named and begins with "default", followed by the date and time separated by the letter "T", e.g. "default-20190426T153242".
Delete History	Select History and use the [Delete History] button to delete it from ComoScout.



- Once a history has been closed, this is final. It is not possible to reopen this history. It is also not possible to reload the data to view it on the ComoScout.
- If the history is to be used for analysis purposes, it must be exported by the ComoScout and imported into the ComoDataCenter.

### 10.1.2 Parameter area "Production Management" – production plant

#### Start new production

The [Start New Production] button is only active if the following requirements for switching to production mode have been met:

- At least one sensor is assigned to each signal
- Each assigned sensor is monitored with at least one EO
- No active error message
- A user is logged in and has the appropriate rights to start a production

1. Press the [New production] button.
2. Enter a production name and a production description in the first dialog window. Note the following:
  - The production name must be unique and may only exist once.
  - The production name cannot be changed later.
3. Switch to the next dialog window with the [Next] button.

Start Production - Name and Description

Production Name ----- P\_20221004T135333

Production Description

Description

Cancel Next

Start Production - Batch Settings

Batch Name ----- 1\_Batch

The batch needs to be stopped manually.

Auto Resume

Discard after interruption ----- ☐

Cancel Start Production

4. Enter batch name and batch size.

- The batch name must be unique and may only exist once.
- The batch size refers to the number of good parts produced.

5. Select batch control.

- "VisualNotification": Display on the overview page with scrap rate and red/green ring for good and bad parts.
- "MachineStop" The machine is stopped when the batch size is reached.
- "UnlimitedBatch": No batch control, the batch must be stopped manually.

6. Configure Continue after production interruption ("Auto Resume" area).

- In production mode, monitoring of the cycle time is active. This is based on the target cycle time from the process settings; see section 7.4. If the cycle time exceeds the target cycle time (plus a tolerance), a production interruption is detected and a warning message is issued.
- If a production interruption is terminated by a new cycle, it can be continued in such a way that a defined number of cycles are rejected, independent of the actual evaluation result of the EOs. Activate the option "Discard after interruption".
- If "Discard after interruption" is activated, an additional line "Discard cycles" appears to enter the number of cycles to be discarded.

7. Press the [Start production] button.

ComoScout switches to production mode.

**Create new batch**

A new batch can be created for the productions created.

1. Press the [Continue Production] button
2. In the first dialog window, select the production for which the new batch is to be created.
3. Switch to the next dialog window with the [Next] button.
4. Make further settings for the batch like steps 4 to 7 when creating a new production.

### Pause production

→ Press the [Pause Production] button.

The batch is stopped. A new history is created and left open until the production is either continued or stopped.



No settings can be changed during a production pause except to deactivate/activate cavities. This can be useful, for example, if a signal is temporarily not ready for production.

---

---

### End production

→ Press the [Stop Production] button.

This closes the lot permanently, it can no longer be opened.

### 10.1.3 Parameter area "Export"

This parameter area provides options for exporting production data.



#### Large volume of data

Depending on the number of cycles, the export of the cycle data can be larger than 100 MB and take several minutes.

→ Make sure that there is enough free memory on the data carrier.

Trend Data Export	<ul style="list-style-type: none"> <li>▪ Select the desired trend data or activate "Select all"</li> <li>▪ Select desired "Decimal Separator"</li> <li>▪ Export with the [Export] button as a .csv file</li> </ul>
Export Cycle Data	<ul style="list-style-type: none"> <li>▪ Enter cycles "From" / "To"</li> <li>▪ Select "Time Standard" and "Time Point Distribution" See the table below for details</li> <li>▪ Select desired "Decimal Separator"</li> <li>▪ Change to the selection of sensors with button [Next]</li> <li>▪ Select desired sensors or activate "Select all"</li> <li>▪ Export as a .csv file using the [Export] button</li> </ul>

Time Standard	Utc	Time stamp UTC (time zone independent)
	Local	Time stamp of local time
Time Point Distribution	Raw	Export of the raw data (approx. 1 000 measuring points distributed over the measuring time)
	Equidistant	Data export with a time interval to be defined between the data points



## 10.2 [Analysis] –> [Trend]

### 10.2.1 [Trend View] tab

Trends are very well suited to represent process sequences and to analyze them over a longer period of time. All ComoScout trend curves contain all data of the current history.

Analysis > Trend > View



#### Trend selection

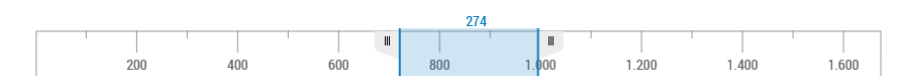
ComoScout offers two types of trends: default trends and EO trends.

**Default trends** are predefined process parameters that are always calculated and always take into account all active cavities. Apart from the cycle time, all default trends are calculated separately for each sensor type and for each sensor position. ComoScout offers the following default trends for selection:

- Cycle time
- Measuring time

**EO trends** contain the characteristic values of an EO type and only exist if the corresponding EO type exists. They only contain the cavities assigned to the EO type.

#### Trend View



In the case of very long histories, the trend view may no longer be able to be displayed in detail on the available screen area. In such cases, the zoom

function under the trend view can be used to select which cycles are to be displayed.

The blue zoom window below the trend view indicates which cycles are currently visible. The zoom window can be enlarged and reduced on the left and on the right by zooming in and out. The zoom window can be freely positioned over all cycles.

When the zoom window is pulled up to the right edge, an anchor symbol is displayed. This means that the selection is always dragged with the newest cycle and does not remain static with the selected cycles.

## 10.2.2 Parameter area

For each trend representation, various parameters are available for modifying or evaluating the trends, which are distributed over several tabs.

Frontside Sensors
Edit

01

02

03

04

05

06

07

08

Backside Sensors

Switch Over Point 1
☐

Visualisation Options

Evaluation Objects
show current

Reference
None

Create Reference

Colouring
color per sensor

### Tab [Graph] - Signal Display

The signal display is not available with trend selection "Cycle Time".

Signal Display	Showing/hiding or highlighting of cavities.	
Reference	Select a reference cycle to additionally display its values.	
Coloring	Selection of the color scheme	
	<ul style="list-style-type: none"> <li>Color per signal</li> <li>Only highlighted signal</li> <li>Color per position</li> <li>Color per Unit</li> <li>Color machine signals</li> </ul>	<ul style="list-style-type: none"> <li>Each signal has its own color</li> <li>Only the highlighted signal is displayed in color</li> <li>Each position has its own color</li> <li>Every unit has its own color</li> <li>Every machine signal has its own color</li> </ul>

**Trend Guard Settings**

Enable guard ☒   
 Trend guards monitor all sensors

Max value    
 Min value

Violation counter    
 Number of violations within the violation window

Violation window    
 Number of cycles considered for violation counter

Digital Outputs ☐   
 If checked, this trend guard will trigger a digital output

### Tab [Graph] – Trend Guard Settings

In order to ensure the monitoring of the process stability, optional "Trend Guards" are available.

Enable guard	If activated, a process message is triggered and a process message output is activated if the "Trend Guards" are violated.
Max value Min value	Enter the upper and lower limits or define them directly in the trend display by placing the yellow guards
Violation counter	Number of violations within the violation window from which a process message is triggered. The violation counter must be smaller than the violation window.
Violation window	Number of cycles taken into account for the violation counter. If the violation window = 1, a process message is output for each violation.
Digital Outputs	If the Trend Guard is violated, a signal can be output via a digital output.

### Tab [Cursor]

To mark selected cycles, a cursor can be placed in the trend display.

Cursor 1 position	Enter the cycle at which the cursor is to be placed.
Show in Cycle View	Switches to the [Cycle] submenu for the cycle displayed.
Enable cursor 2	If activated, a second cursor is available
Cursor 2 position Show in Cycle View	Like "Cursor 1 position"
Cursor 2 value	Selection between "Absolute" and "Delta" (difference to cursor 1)

The table following the settings is first sorted by signal, then by sensor type and finally by sensor position.

Sensor	Standard deviation	Cp	Cpk
01	0.018 mm	879.052	824.176
06	0.007 mm	2,166.309	2,127.958
07	0.031 mm	509.414	429.417
08	0.037 mm	432.384	330.911

### Tab [Comments]

The [Comments] tab displays all existing free text comments on the current history created in the [Cycle] submenu. A comment is always assigned to a cycle.

### Tab [Statistics]

The [Statistics] tab is only relevant for EO trends.

The table shows the standard deviation as well as Cp and Cpk values for each signal, calculated according to the generally valid formulas.

To calculate the Cp and Cpk values, the upper and lower limits of the relevant EOs are used.

## 10.2.3 Tab [Trend Management]

ComoScout offers an overview of all available trends in the Trend Management area.

- Visibility of the trend when selected in the Tab [Trend view]
- Status of the Trend Guard: enabled/disabled
- Linking the Trend Guard with a digital output

Analysis > Trend > Management

Visible	Name	Type	Unit	Trend Guard	Digital Output
<input checked="" type="checkbox"/>	Cycle Time	Default	s	disabled	disabled
<input checked="" type="checkbox"/>	Measuring Time	Default	s	disabled	disabled

Trend Data Export

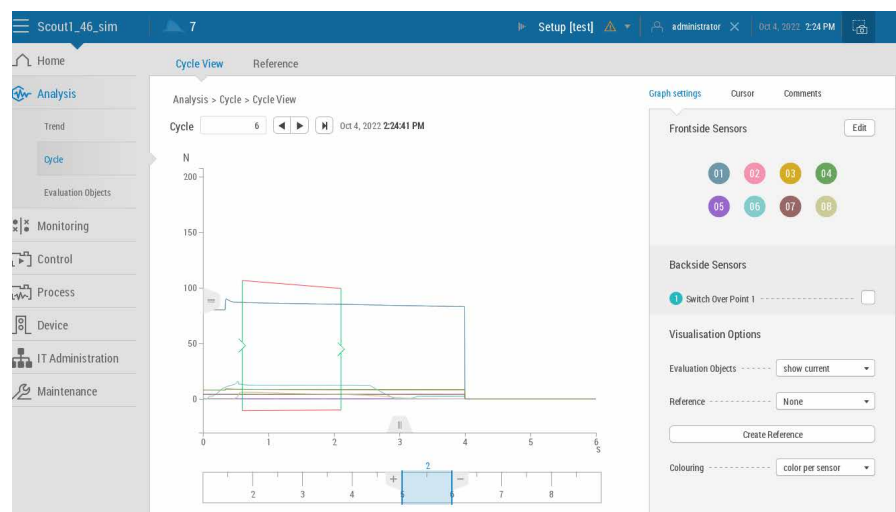
## 10.3 [Analysis] → [Cycle]

The [Cycle] submenu is divided into the following tabs:



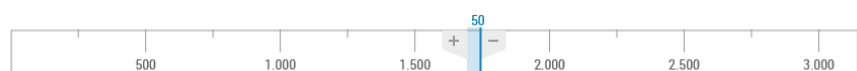
### 10.3.1 [Cycle] / [Cycle View] tab – Display area

In this submenu, the measured cycles and the associated measurement curves can be viewed and analyzed in detail.



The active cycle is displayed in the input field above the curve display. A specific cycle can be accessed here.

### Overlaying of measurement curves



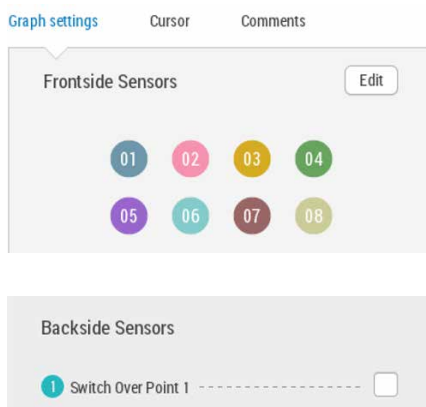
The bar below the curve display shows the active cycle with a blue line.

- The buttons [+] / [-] are available to the right and left of the blue line to overlay several cycles. [+] overlays cycles in steps of 10/20/50/100. [-] reduces the number of overlays accordingly.

- The overlaid area can be freely placed over the entire history by touching and moving it. In the example shown 50 cycles are superimposed, the active cycle is 1744, i.e. cycles 1719-1769 are shown.
- If the overlaid area is drawn up to the right edge, an anchor symbol is displayed. As a result, the selection is always updated with the latest cycle and does not remain static with the selected cycles.

### 10.3.2 [Cycle]/[Cycle View] tab – Parameter area

Various functions are available for the analysis of the cycles, which are distributed over 3 tabs in the parameter area.

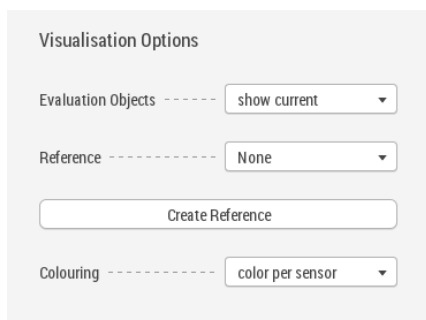


#### [Graph settings] tab – "Signal Display" area

In this area cavities can be shown and hidden from view or the corresponding curves can be highlighted.

#### [Graph settings] tab – "Machine Signal" area

If additional cycle events (e.g. switchover time) or machine signals (e.g. machine pressure) are configured, these are listed under the sensor matrix. By selecting and deselecting the respective signals, they are shown or hidden in the curve visualization.



#### [Graph settings] tab – "Visualization Options" area

Evaluation Objects	Show or hide EOs
Reference	Selection of a reference curve
Create Reference	With this button, the selected curve can be created as a reference curve. Reference cycles are automatically named as follows: "Process_default:yyyymmddThhmmss_cycleNumber". Reference curves include pressure and temperature curves as well as signals from the injection moulding machine.
Coloring	Selection of the color scheme <ul style="list-style-type: none"> <li>▪ Color per signal      each signal has its own color</li> <li>▪ Good/Bad              good cavities are displayed green, bad cavities are red</li> <li>▪ Only highlighted signal      only the highlighted signal is displayed in color</li> <li>▪ Color per position      each position has its own color</li> </ul>




Graph settings   **Cursor**   Comments

Cursor 1 position ----- 1.69 s

Enable cursor 2 ----- ☒

Cursor 2 position ----- 2.49 s

Cursor 2 value ----- Absolute ▾

Type	Cursor 1	Cursor 2
01  Sensor 1	85.83 N	85.01 N
02  Sensor 2	8.58 N	8.5 N
03  Sensor 3	8.58 N	8.5 N

### [Cursor] tab

To mark selected cycles, a cursor can be placed in the curve display.

Cursor 1 position	Enter the time position at which the cursor is to be set
Enable cursor 2	If activated, a second cursor is available
Cursor 2 position	Like "Cursor 1 position"
Cursor 2 value	Selection between "Absolute" and "Delta" (difference to cursor 1)

The table following the settings is first sorted by signal, then by sensor type and finally by sensor position.

Graph settings   Cursor   **Comments**

Comments

Cycle 178: administrator:

Cycle 93: admin Pressure adjusted to 500bars

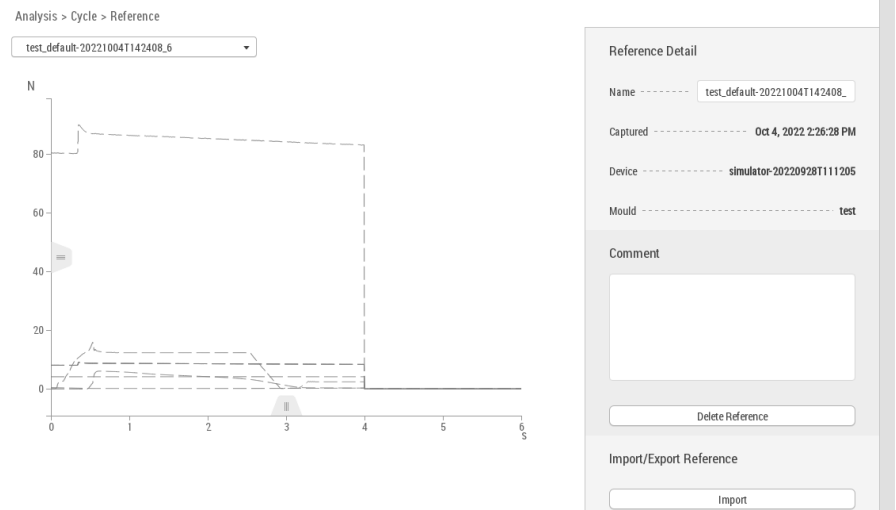
### [Comments] tab

The tab [Comments] shows all existing free text comments of the current history. A comment is always assigned to the cycle selected in the curve view.

→ Button [Add Comment] to open the window for entering a new comment

Comments are useful, for example, to note when parameters are changed on the injection processing machine. Later, the resulting changes to the measurement curves can be traced in this way.

## 10.3.3 [Reference] tab

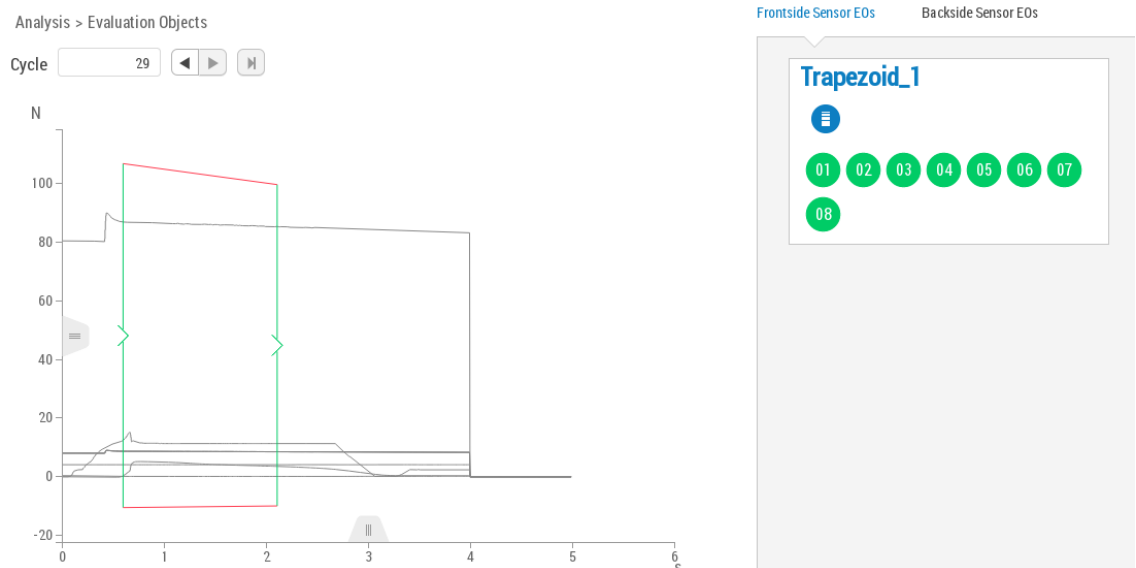


All reference cycles related to the current process are stored in the [Reference] tab.

The following information on the selected reference is displayed in the parameter area and can be partially edited:

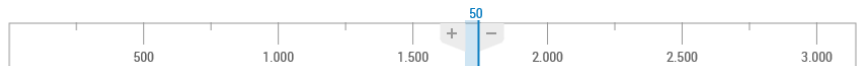
		edit
Name	Name of reference	✓
Captured	Time at which the reference curve was measured	–
Device	Name and time of the device setup	–
Process	Process name	–
Comment	Enter comment for the reference	✓
Delete Reference	Deletes the selected reference curve. A confirmation prompt appears.	✓
Import/Export	Import reference curves via USB stick / export to USB stick	✓

## 10.4 [Analysis] → [Evaluation Objects]



The display area shows the current measurement curves.

### Overlaying of measurement curves



The bar below the curve display shows the active cycle with a blue line.

- The buttons [+] / [-] are available to the right and left of the blue line to overlay several cycles. [+] overlays cycles in steps of 10/20/50/100. [-] reduces the number of overlays accordingly.
- The overlaid area can be freely placed over the entire history by touching and moving it. In the example shown 50 cycles are superimposed, the active cycle is 1744, i.e. cycles 1719-1769 are shown.
- If the overlaid area is drawn up to the right edge, an anchor symbol is displayed. As a result, the selection is always updated with the latest cycle and does not remain static with the selected cycles.

### **Parameter area**

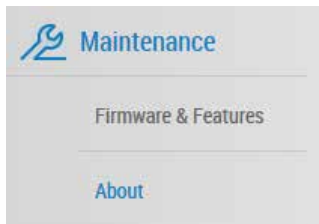
- The parameter area is divided into the [Process EOs] and [Machine EOs] tabs.
- As soon as a monitoring with EOs has been set up, the EOs are listed here.
- By selecting an EO in the parameter area, the EO is displayed together with the associated measurement curves in the display area.
- A frame, which represents an EO, contains a symbol for the sensor type and the sensor position in addition to the name of the EO. All cavities assigned to the EO are displayed graphically.
- The "Step" selection is only available for multi-component processs.

### **Signal display**

- Depending on the valuation result, the cavities are displayed in green or red.
- If cycles from the past are selected, the coloring shows the result at the time of production of the corresponding cycle.
- If cycles are superimposed, the result for each signal is also superimposed. The result can be as follows.
  - Green, if this signal was good in all superimposed cycles.
  - Red, if this signal was bad in all superimposed cycles.
  - Yellow, if this signal was partly good, partly bad in the superimposed cycles.



## 11. [Maintenance] Menu



This menu is used to manage firmware and additional functions as well as to download log files.

### 11.1 Overview page

The following information is displayed on the overview page of the [Service & Maintenance] menu:

- Version of the ComoScout, e.g. ComoScout 3.0
- Serial number
- Build number
- All activated features

#### 11.1.1 Parameter area "Device logs"

The log files of the ComoScout can be downloaded to a USB stick.

1. Insert the USB stick into the ComoScout.

The [Download logs] button becomes active.

2. Press the [Download logs] button.

The log files are saved in ".tar" format on the USB stick.

### 11.2 [Maintenance] → [Firmware & Features]

This submenu displays the firmware version and the activated features. The features are additionally provided with a short description.

#### 11.2.1 Parameter area "Firmware Update"

If a new firmware for the ComoScout is available, it can usually be downloaded from the Kistler website.

To be notified of new firmware updates, the ComoScout can be registered with its serial number and an appropriate contact person at

[www.kistler.com/comoneonews](http://www.kistler.com/comoneonews)

##### Prerequisite

- User logged in as administrator
- Update has a higher version than the currently installed firmware

### Procedure

1. Download the new firmware from the Kistler web site  
<https://www.kistler.com/de/produkt/type-5889a/>
2. Unzip the zip file and copy it to a USB stick.
3. Plug the USB stick into the ComoScout.  
The [Check for Firmware Updates] button becomes active.
4. Press the [Check for Firmware Updates] button.  
The firmware update is displayed.
5. Press the [Download Update] button.  
The firmware update is loaded from the USB stick to the ComoScout. This can take up to 1 minute until the message "Firmware update successfully downloaded" appears. The USB stick must not be removed during this time!
6. Confirm the message and remove the USB stick.  
The button [Update & Restart] becomes active.
7. Press the [Update & Restart] button.  
The update process starts and ends with an automatic restart of the system. This process can take up to 15 minutes.
  - The progress of the update process is shown on the Kistler Touch Display.
  - The page cannot be accessed via a web browser during the update. Once the update has been completed and restarted, the ComoScout can be accessed again via a web browser.The new firmware version is displayed in the [Firmware & Features] sub-menu.

### 11.2.2 Parameter area "Features"

There are functions in ComoScout that need to be additionally licensed so that they can be used.



All licenses are linked to serial numbers and can only be used for a single device. Therefore it is important to make sure that the correct serial number is indicated when ordering.

---

### Prerequisite

- User logged in as administrator

#### Procedure

1. Order the desired feature from Kistler. Make sure that the correct serial number of the ComoScout on which the feature is to be used is indicated.

You will receive an e-mail with the activation code.

2. Copy the activation code to a USB stick.
3. Insert the USB stick into the ComoScout.
4. Press the [Activate License] button.
5. Select the desired activation code on the USB stick.
6. Press the [Import] button.

The activation code is loaded from the USB stick onto the ComoScout and the message "Import completed" appears.

7. Confirm the message and remove the USB stick.

The new feature is displayed in the list of features and is thus enabled.

### 11.3 [Maintenance] → [About]

This submenu provides more information about licensing, customer service and support from Kistler.

## 12. Annex

### 12.1 Glossary

<b>EO</b>	Evaluation object
<b>OPCUA</b>	Open platform communications unified architecture
<b>RFID</b>	Radio-frequency identification
<b>VNC</b>	Virtual network computing
<b>Wild shot</b>	outliers

### 12.2 FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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