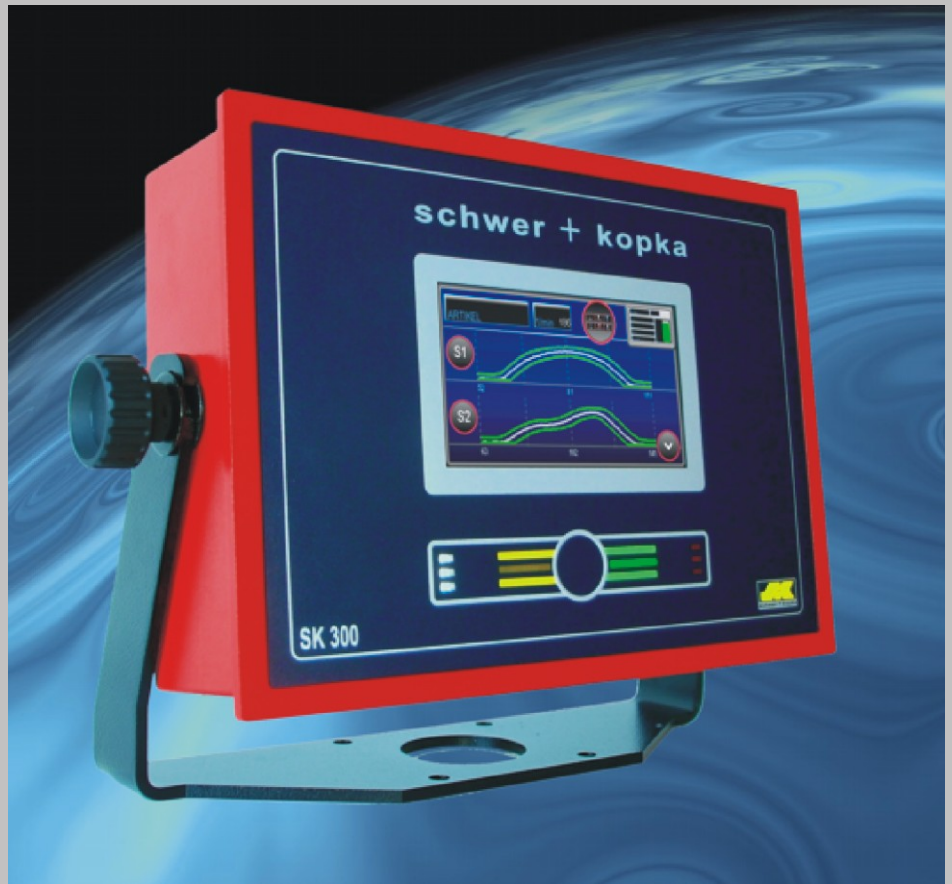




schwer + kopka

# SK 200 / SK 300 Operating Manual



## Process monitoring system for all types of

- Cold Headers
- Cold Formers
- Multi-stage presses- up to 8/16 channels
- Transfer presses
- Stamping Applications
- Thread rolling machines

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Version: 06.10.2010

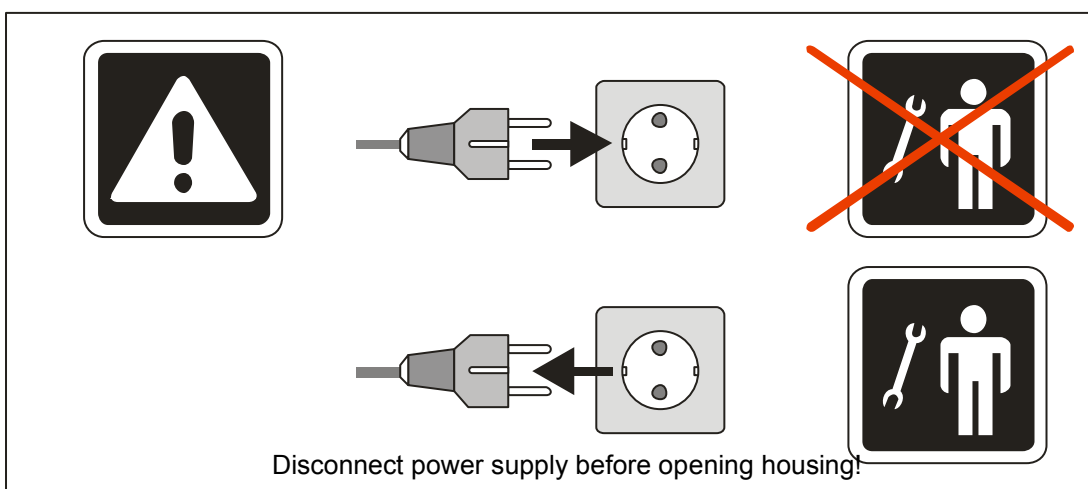
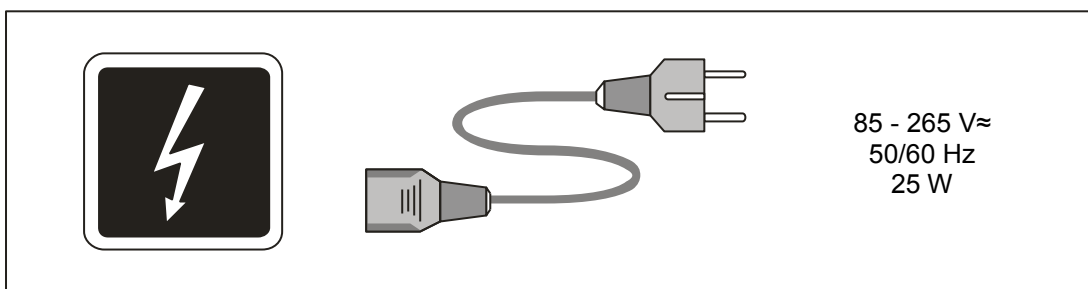
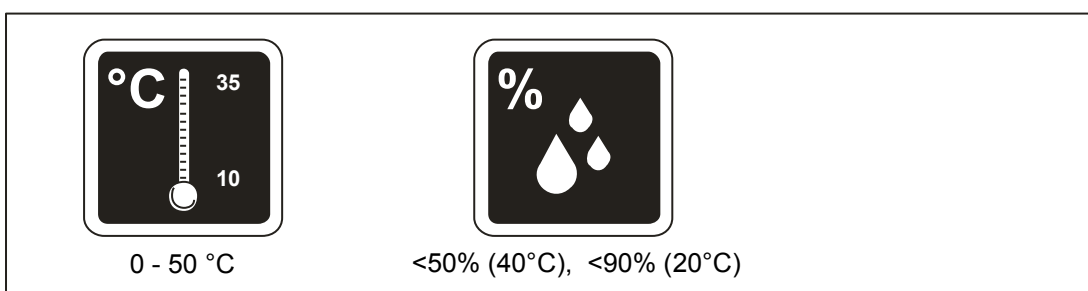
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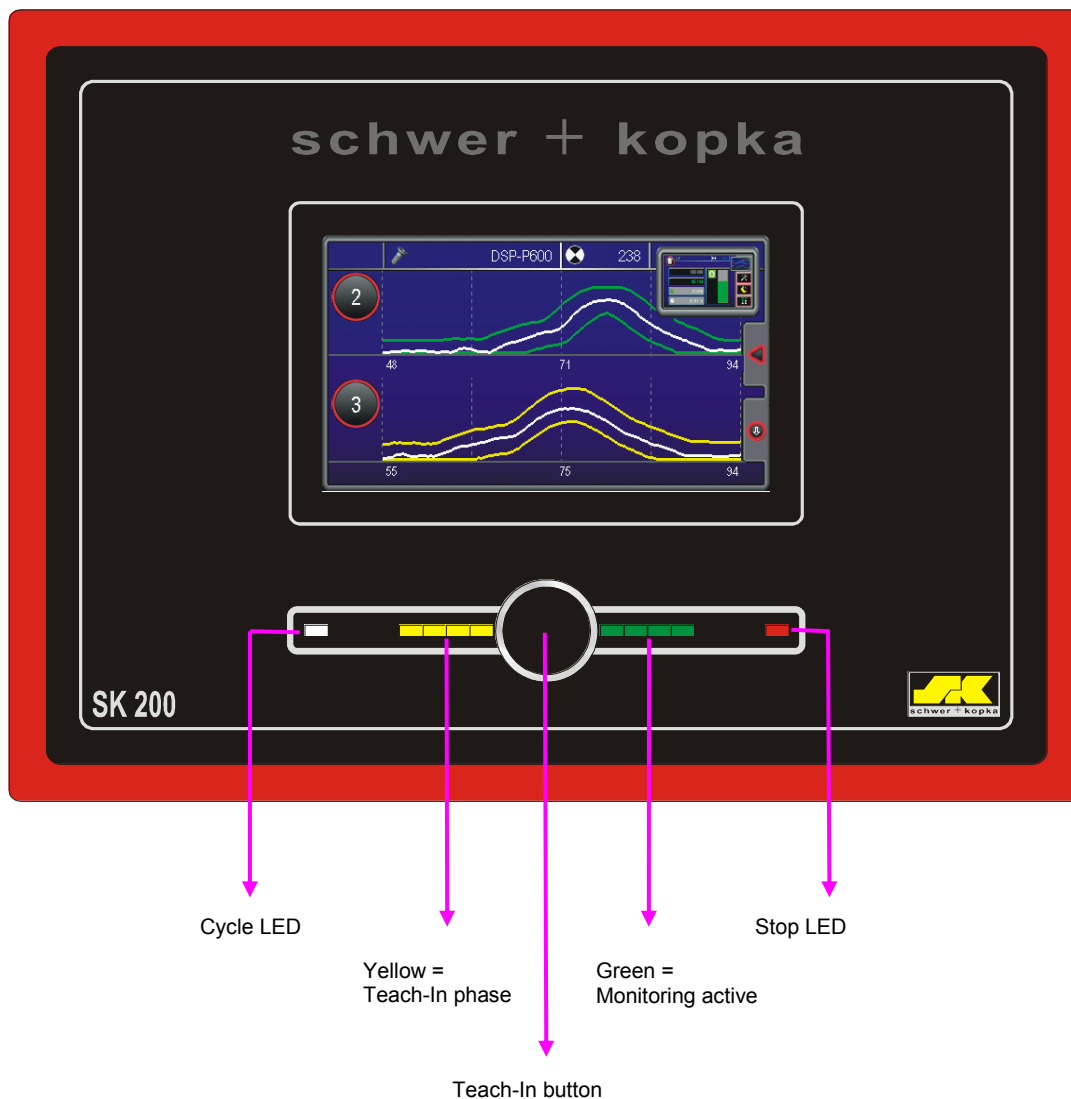
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# 1 Safety instructions



The product must not be disposed of as household waste. Dispose of the product through the WEEE scheme or return it at your own cost to SK.

## 2 Front panel with Teach-In button

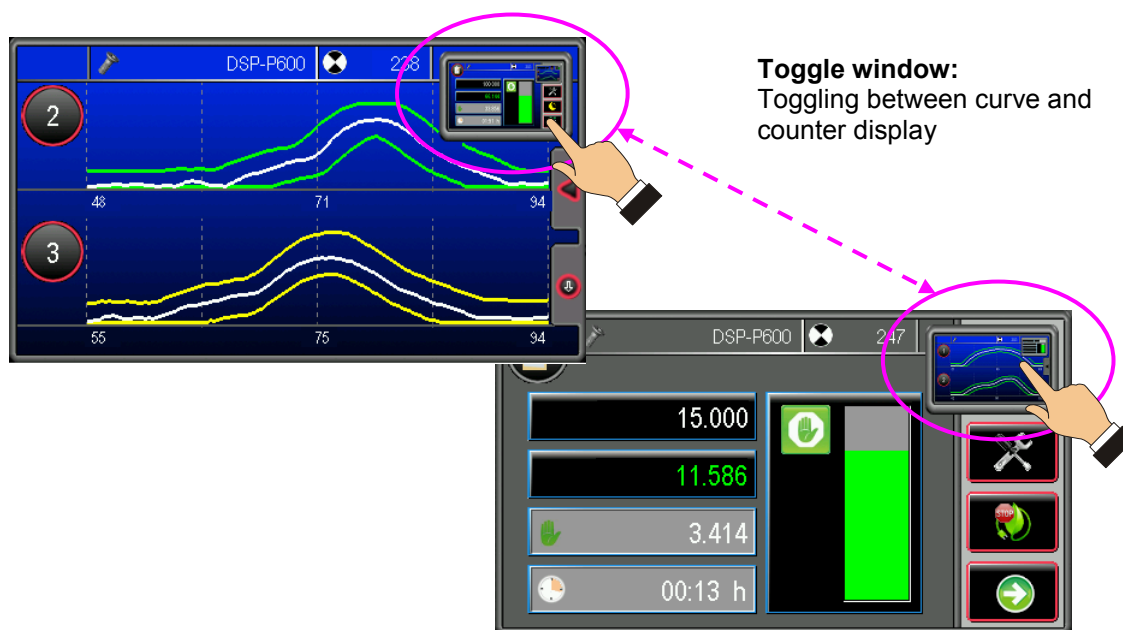


For a description of the function of the Teach-In button, see **Teach-In phase and Stop-Auto mode** (in Configuration menu).

### 3 Toggle principle

The SK 200 and SK 300 monitoring systems feature integrated toggle technology.

The toggle principle allows for quick switching between the main display screens of the system. In the top right corner of the individual screens, you find a thumbnail image of another screen that can be called up by touching it:



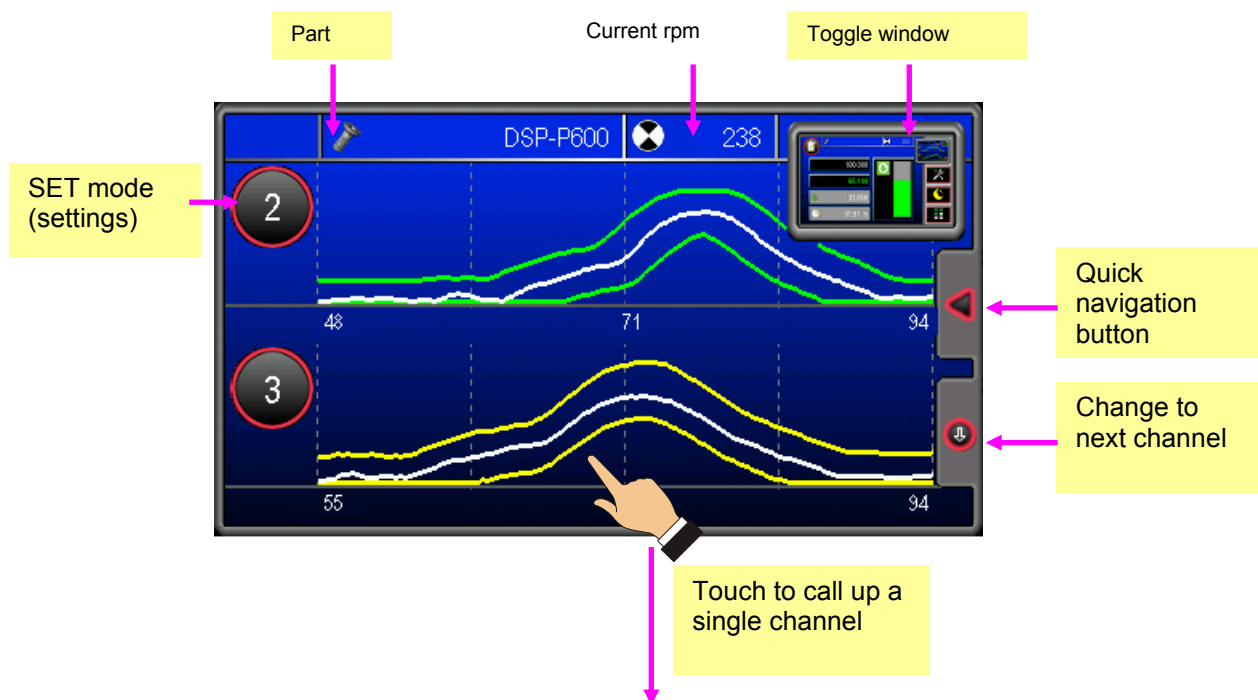
The toggle window is available in the various monitoring modes, the menu and the SET mode screens. This principle enables operators to quickly return to the basic screens of the process monitoring system and the counters (home function).

When touching the toggle window, the last displayed counter or the last displayed monitoring channel or channel overview respectively is displayed (live window principle).

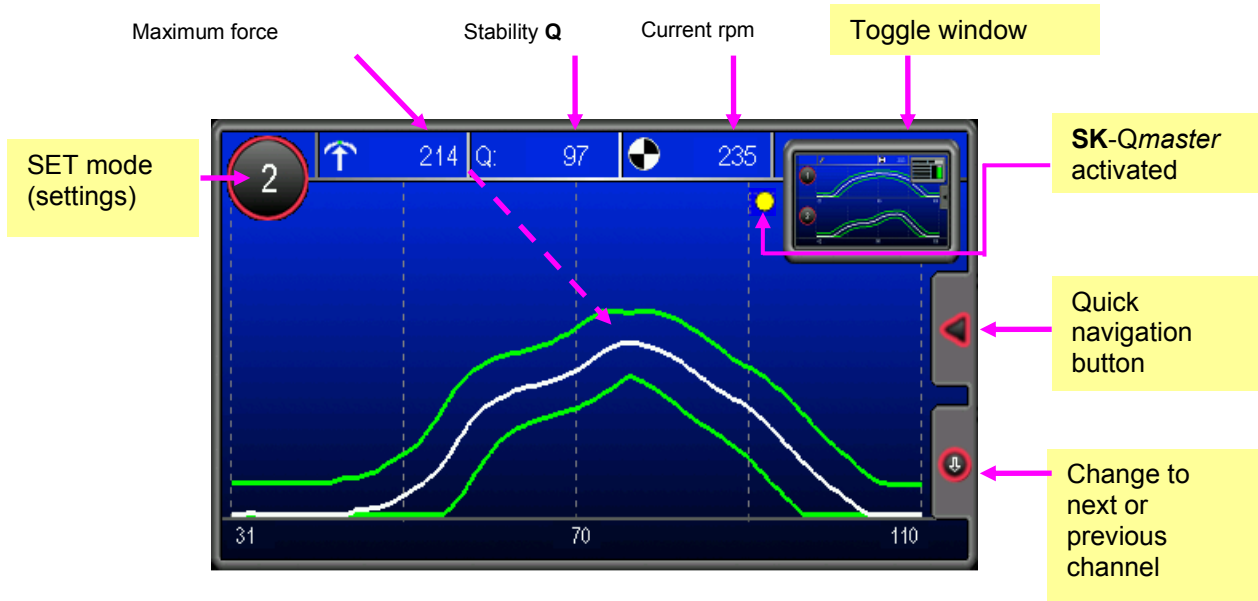
By default, the system always toggles between the counter and the curve screens.

## 4 Start screen (channel overview)

After switching on the device, the screen shows an overview of the channels. By touching the areas highlighted in yellow, the operator can call up other functions. The text fields not highlighted in yellow are display fields only.

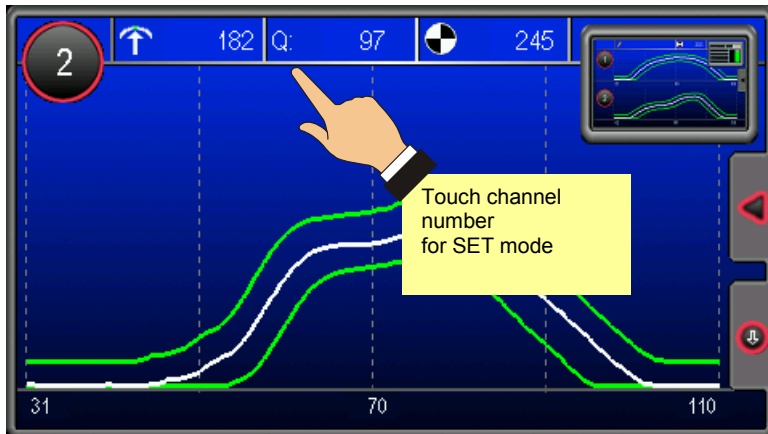


## 5 Single curve screen



## 6 Monitoring parameters in SET mode

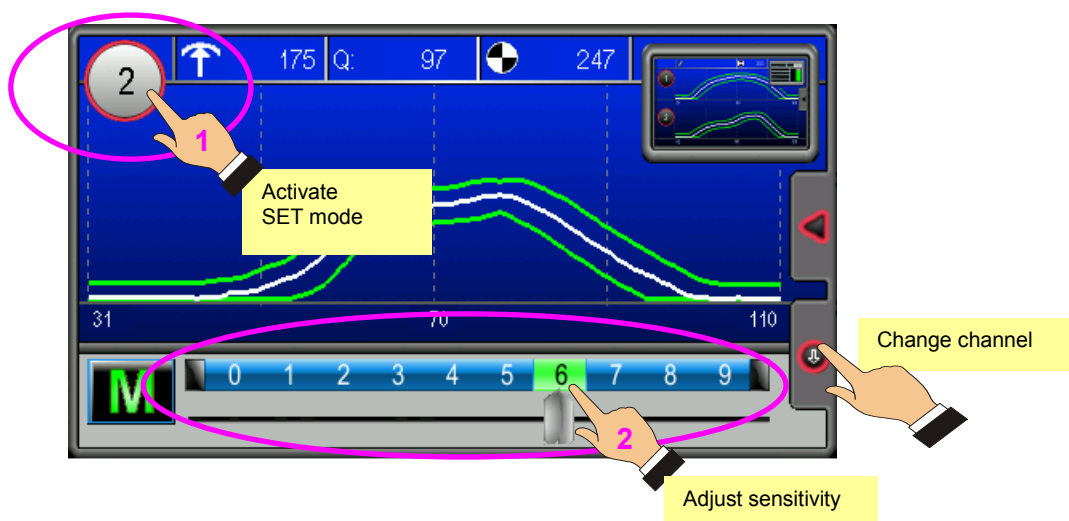
The monitoring limits (sensitivity, puzzle monitoring, trend, etc.) are set in **SET mode** in the single curve screen. To set the system to SET mode, simply enter the desired channel number.



While **SET mode** is active, the channel number is shown in silver grey. After 30 seconds of idle time, SET mode is terminated. The SET mode can also be terminated by touching the channel number again.

### 6.1 Sensitivity (envelope width)

Touch the channel number to call up SET mode.



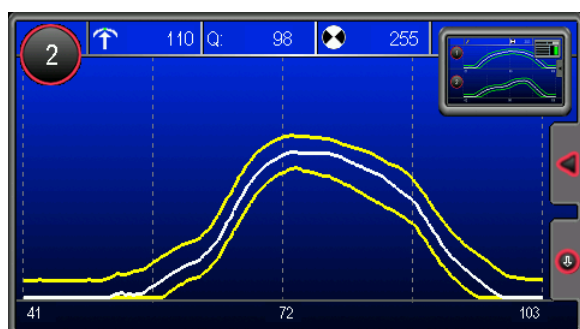
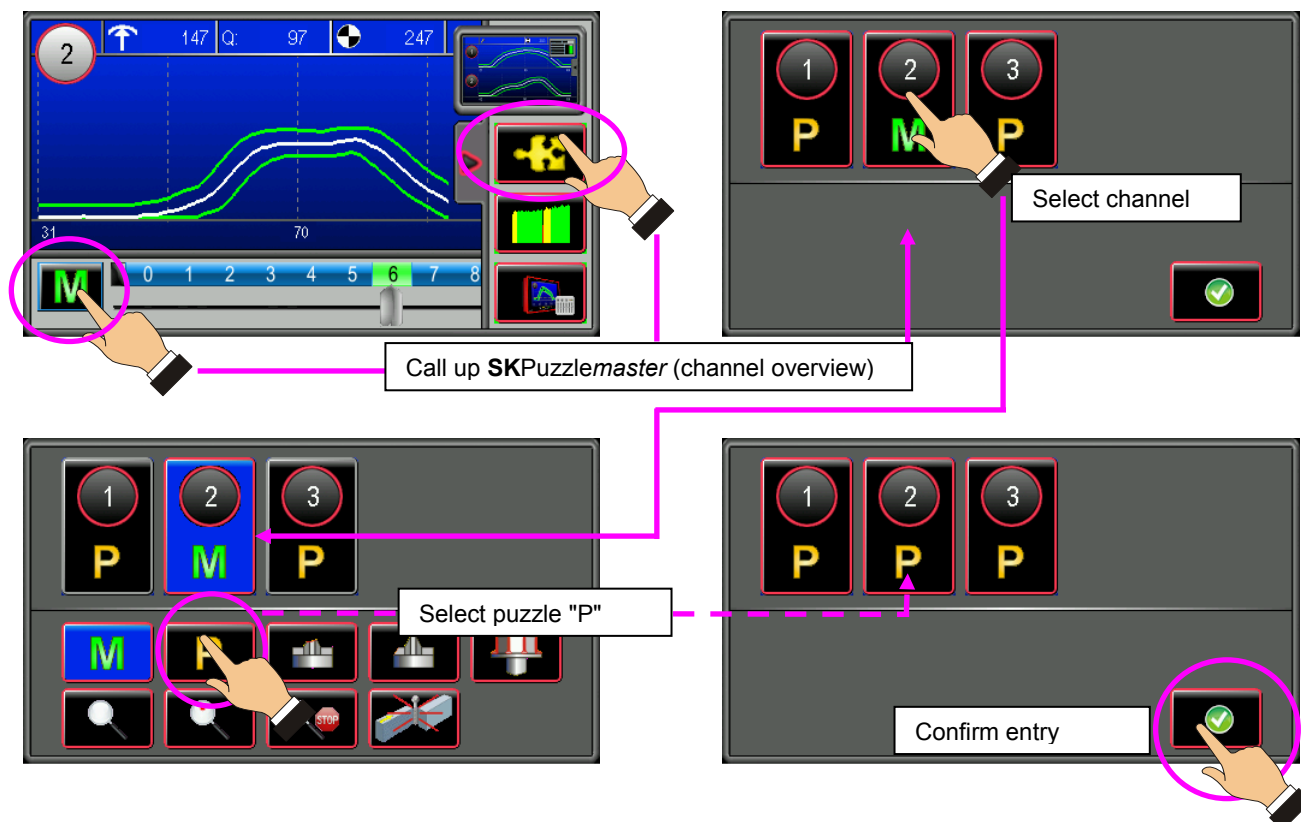
The sensitivity (envelope width) can be adjusted from **1** (low) to **9** (very high) by touching or moving the side slide control at the bottom of the screen.

At **sensitivity "0"**, the envelope monitoring of the respective channel is switched off. The envelope disappears from the screen and the channel number is displayed in red.



## 6.2 Auto-monitoring with "Prozzy" puzzle<sup>1</sup>

To change from manual envelope adjustment "M" to automatic envelope adjustment "P", first activate the **SET mode** in the single curve screen. To choose a monitoring puzzle, touch the active puzzle button to the left of the sensitivity scale or call up the Puzzlemaster with the quick navigation button.



### Monitoring puzzle "P" (Prozzy)

= automatic envelope calculation for each measuring point with reference to the respective process fluctuation.

The envelope is now displayed in **yellow**. The permissible minimum and maximum values are shown above the slide control. "Prozzy" now calculates the best fitting envelope width in this section. The check intervals can be adjusted in Configuration / Service / Auto-monitoring.

<sup>1</sup> SK Puzzlemaster (with Prozzy puzzle) is a device option that can be added at any time.

## 6.2.1 Configuration of monitoring intervals ("Prozzy" puzzle)

The intervals of the "Prozzy" monitoring puzzle can be configured in the Configuration menu (Configuration / Service / Auto-monitoring).



In Prozzy mode, the functions *Automaster* and *Qmaster* are **always active**. The menu screen however shows how the two functions *Automaster* and *Qmaster* are set when the system changes to monitoring puzzle "M" (manual).

### Curve character:

This monitoring strategy allows for a new type of monitoring, which should however only be activated after consultation with an SK service technician.

For the adjustment of the Prozzy intervals, observe the following:

- **Prozzy start phase:** After this interval (run time in AUTO mode in seconds) has lapsed, the Prozzy function performs the first calculation of the fitting envelope width.
- **Prozzy interval:** Time interval (in seconds) during which the Prozzy function checks whether the envelope width can be adjusted further while the machine is running.

### Recommendation:

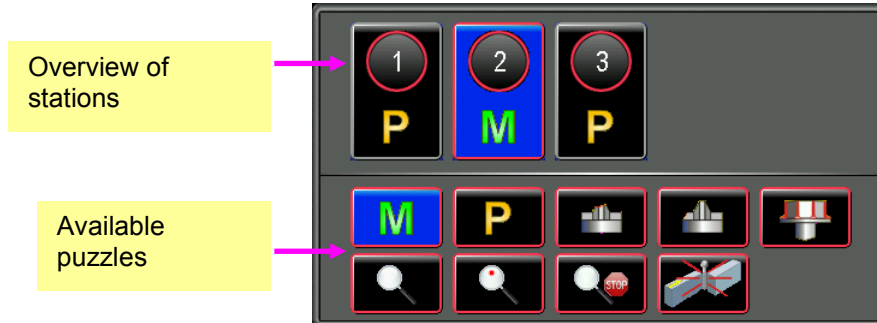
**Choose the longest possible interval, as this increases the amount of data that is used by the Prozzy function for the calculation. If possible, the monitoring puzzle "P" should be combined with the Stop-Auto function.**

## 6.3 Selecting additional monitoring puzzles with SK Puzzlemaster<sup>2</sup>

To select the monitoring puzzles (expert programs), proceed as described in "Auto-monitoring with "Prozzy" puzzle" (previous chapter). Certain puzzles cannot be switched on or off during an active monitoring phase. A message to this fact is displayed on the device.

<sup>2</sup> SK Puzzlemaster is a device option that can be added at any time.

### 6.3.1 Available monitoring puzzles<sup>3</sup> (status 07/2010)



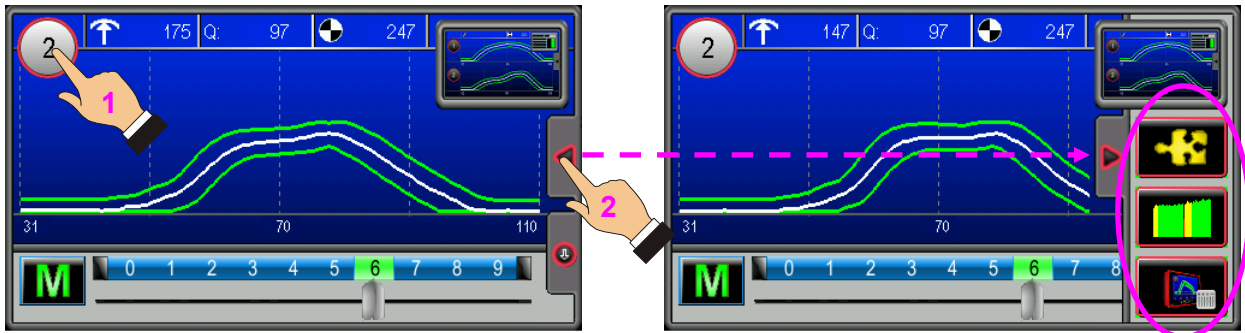
The following monitoring puzzles (expert programs) are available or can be installed:

1. Tip breakage
2. Side breakage
3. Crack head
4. Rotated head
5. Zoom
6. Slug
7. Immediate stop
8. Returns check

To install additional monitoring puzzles and to enable installed puzzles for a **30-day trial period**, access the code system in the options section under "**Upgrade-Options**".

<sup>3</sup> Missing monitoring puzzles can be added.

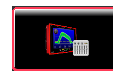
## 7 Quick navigation button in SET mode



Puzzlemaster



Trend

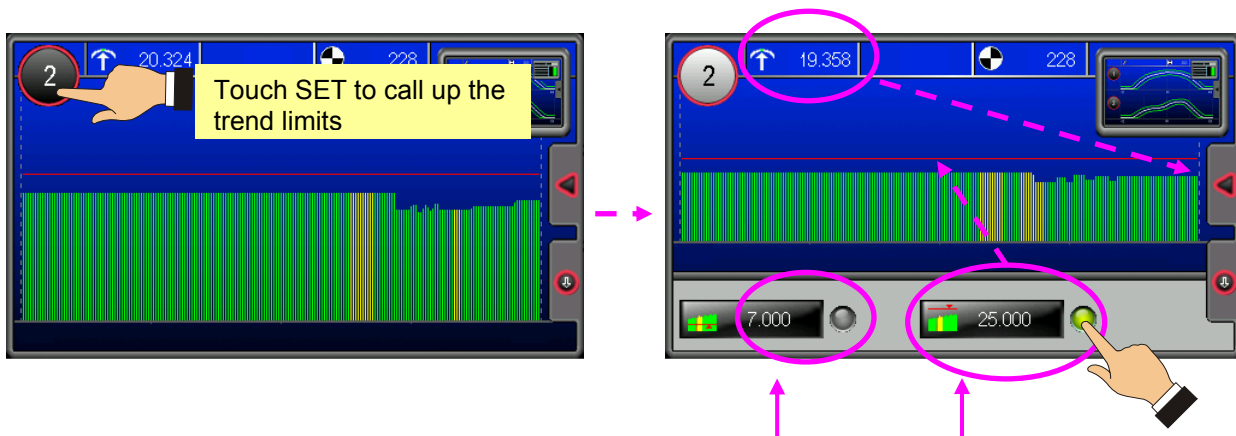


Additional parameters

The quick navigation options are hidden after 30 seconds of idle time.

### 7.1 Trend monitoring

The trend monitoring screen shows the maximum force values of the last 250 strokes, whereby the last stroke is added from the right. Strokes performed in Teach-In mode (not monitored) are shown in yellow. Strokes performed during monitored operation are shown in green. Signals that have resulted in a shut-down (e.g. trend errors or values outside the envelope) are shown in red. An upper and lower trend limit can be set for the trend values.



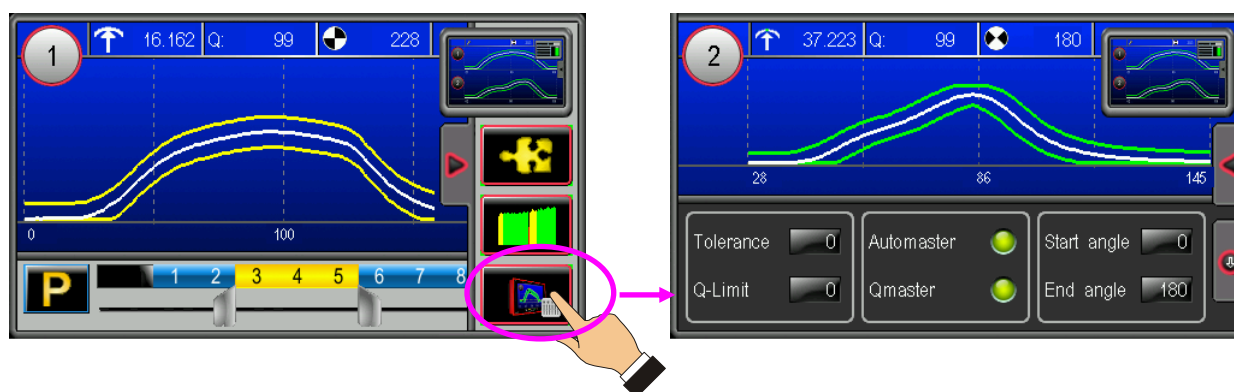
Trend limit not active: the indicator of the lower trend limit is off.

The limit is activated by touching the indicator (changes to green).

The active trend limit is displayed as a thick red bar.

An absolute trend limit is based on the actual value of the sensor signal as measured by the monitoring device. Absolute trend limits must normally be adjusted to the new part at each product change.

## 7.2 Additional parameters



Touch the button for additional parameters to activate the following monitoring functions<sup>4</sup>: Tolerance, Q-Limit, Automaster, Qmaster, Start and End angle measurement windows.

### 7.2.1 Tolerance

The **Tolerance** value corresponds the number of consecutive parts with deviations (e.g. outside the envelope) that are tolerated before the machine is automatically shut down. The tolerance setting thus enables operators to prevent unjustified or unwanted stops by instructing the machine to ignore random signal changes. The tolerance value can be set to a value between 0 and 9:

- 0 = **no part** with deviations is tolerated. The machine is stopped when the first faulty part is detected.
- 1 = **one non-conforming part** is tolerated. If this part is followed directly by a second non-conforming part, the machine is stopped.
- 9= Up to **nine consecutive non-conforming parts** are tolerated. The system is stopped when a tenth faulty part is detected.

Normally, the tolerance value should be set to **zero (0)** to ensure that every detected fault results in a machine stop. For multi-station processes, it is particularly important that **Tolerance = 0** is set, so that faulty parts are **not** transferred to the next station where they could cause further damage.

<sup>4</sup> Some of the monitoring functions are optional and can be installed separately when required.

### 7.2.2 Q-Limit

Monitoring of process stability and quality (Q)

The **Q** factor is a percentage value describing the stability and repeat accuracy of the forming process from stroke to stroke. A low Q factor (e.g. well below 90) indicates that there are significant fluctuations in the process, as the signals vary from part to part. Accordingly, the quality of the parts also fluctuates within a certain range. As a result, the envelope limits of the process in question are also rather distant from each other.

A smooth and stable process where the signals deviate only a little from each other results in a high Q factor of 95 or higher. As a result, the envelope limits are closer to each other, which again results in a better quality and higher sensitivity of the monitoring process.

The Q factor is calculated separately for each monitoring channel and is indicated in the single curve screens of the respective sensor as "Q". If required, you can set a **QL** (Q-Limit, minimum permissible Q value) for each channel. If the Q factor of the respective channel is below this minimum value, e.g. due to high signal scatter, the machine is stopped with an error message, as the set minimum quality is not reached.

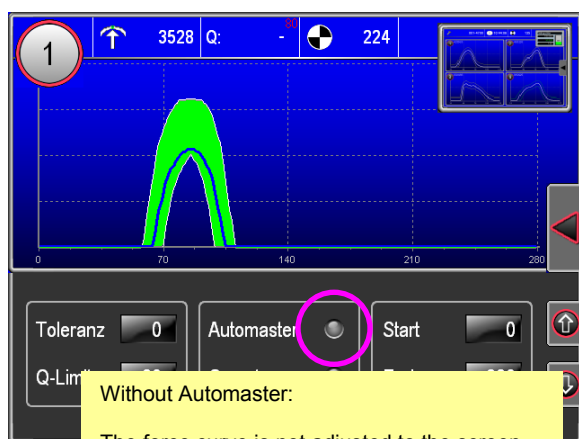


If Q-Limit is active, the Q limit (red) is displayed beside the Q value (white) in the top right corner.

### 7.2.3 SKAutomaster

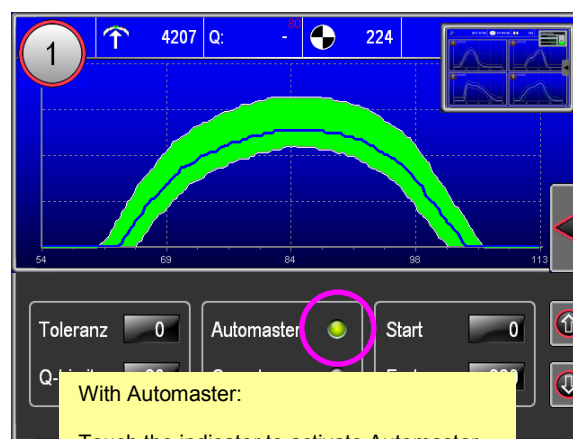
With the **SKAutomaster**, the system automatically adjusts the measuring window to the actual curve.

The measurement and evaluation of the force progress is thereby optimised for each process as the window automatically zooms in on the actual force curve. This ensures that the monitoring system always focuses on the actual working range and does not collect data during the "dead" times. When changing from Teach-In to monitored automatic mode, the **SKAutomaster** automatically adjusts the measuring window, so that the curve is displayed in such a way that it is spread across the entire screen width.



Without Automaster:

The force curve is not adjusted to the screen width.  
The available monitoring capacity is wasted as "dead" intervals without signals are also monitored.



With Automaster:

Touch the indicator to activate Automaster mode:  
The measuring window is adjusted so that the force curve fills the entire width of the screen.

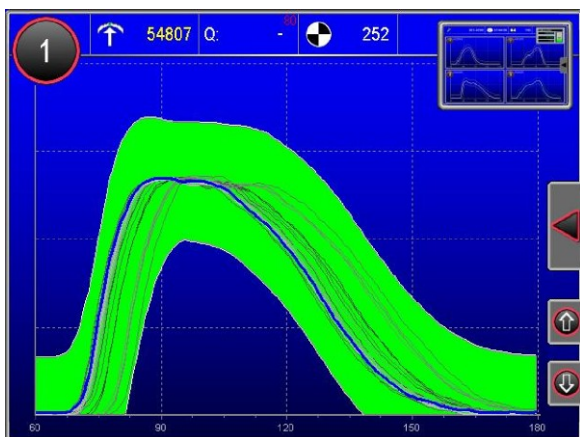
### 7.2.4 SKQmaster

**SKQmaster** = automatic compensation of signal fluctuations caused by machine

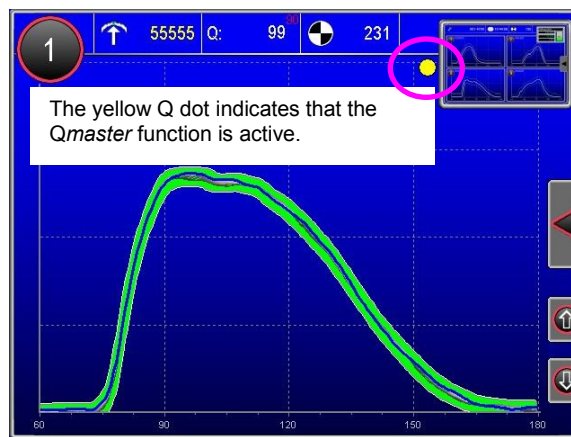
In certain machines, the rpm fluctuates somewhat due to the chosen drive system. In others, the trigger signals (cycles) for monitoring are produced by chain-driven control shafts that show a certain imbalance.

In both cases, the speed fluctuation results in a horizontal scatter of the sensor signals on the screen. It is possible to adjust the envelope settings to ensure that the horizontal offset of the force curve does not result in unnecessary machine stops. This has however the disadvantage that the monitoring accuracy becomes very poor.

The **SKQmaster** function stabilises the sensor signal by automatically compensating the horizontal curve offset. This means that you can work with the normal narrow envelopes without causing unnecessary machine stops.

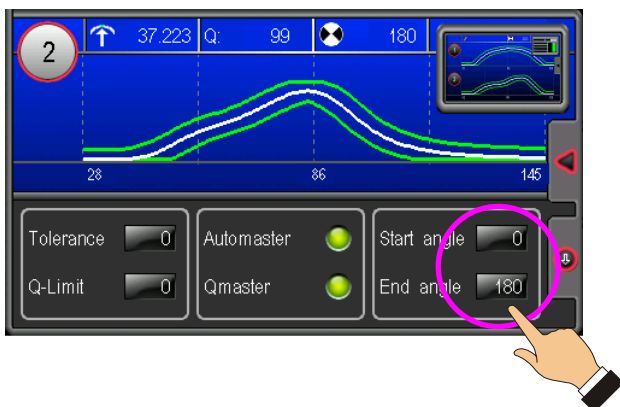


Envelope monitoring with fluctuating signals and without **SKQmaster**: the envelope limit range is very wide and the sensitivity is thus very low.



**SKQmaster** stabilises the horizontal offset. It is now possible to operate the system with a much more narrow envelope limit range. The number of (unnecessary) machine stops is reduced.

### 7.2.5 Adjusting timing window



The size of the timing window = size of measuring window is entered through the start and end values in degrees of the crank angle. To change the values, touch the "Start" or "End" field.

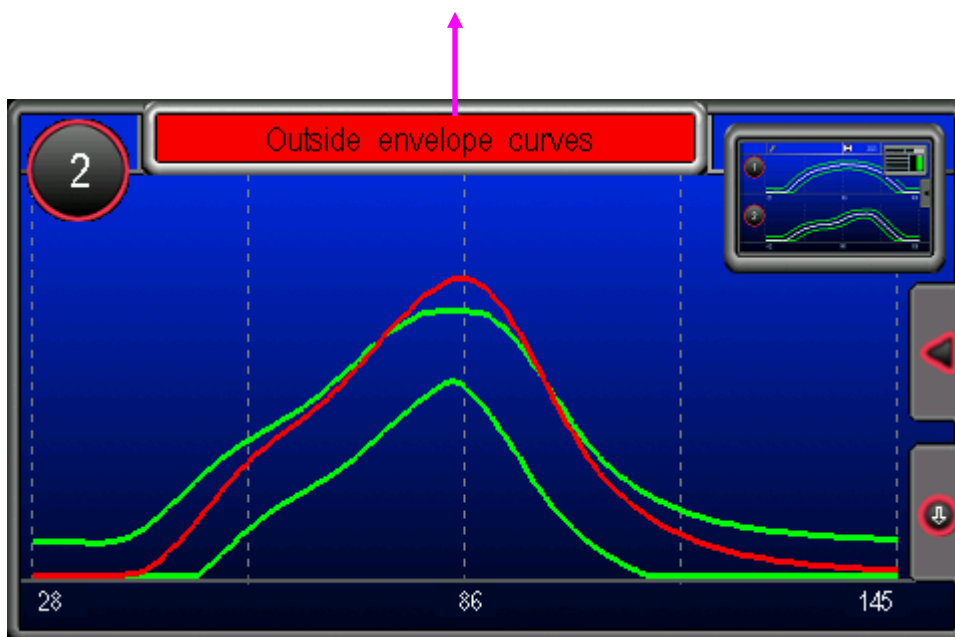
If the **SKAutomaster** is active, the actually monitored measuring window is automatically adjusted to be displayed across the entire screen width.



## 8 Stop signal and communication line

If the monitoring device stops the machine, the system automatically displays the screen containing the information that has caused the stop (e.g. counter, envelope, trend, etc.). This enables the operator to quickly identify and eliminate the cause of the problem.

The communication line at the top of the window indicates the reason for the stop in plain text.



In the event of measurements that are outside the envelope, the stop signal is displayed as a red curve. If the peak value increases suddenly by more than 50%, message "**Crash**" is displayed as the system is stopped. This crash limit (50%) can be adjusted in Configuration / Service / Monitoring.

## 9 Optional equipment (device options)

### 9.1 SKPuzzlemaster

The **SKPuzzlemaster** consists of two basic puzzles


- Manual "M" = manual envelope adjustment and
- Prozy "P" = automatic monitoring

For instructions on the operation of puzzle "P", see page 9, chapter 6.2 Auto-monitoring with "Prozy" puzzle.


### 9.2 SKPartmaster

With the **SKPartmaster**, you can store and call up monitoring parameter values for each individual part. It is part of the Analysis/Statistics menu and can be called up by touching the parts symbol in the curve overview window. Navigate through the part list using the electronic thumbwheel. The white line indicates the position in the list. Alternatively, you can search for a part. To do this, enter the correct initial letter or digit: Example: enter "8" or. to call up all parts starting with the digit 8.


#### 9.2.1 Saving, loading and searching parts



Load part data

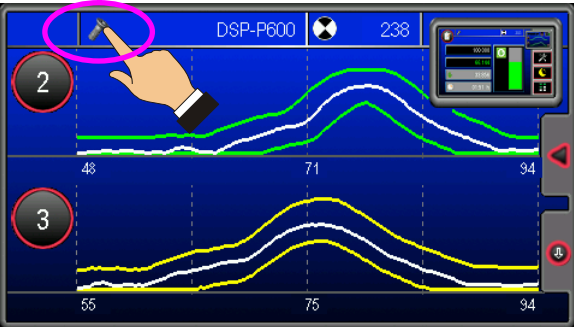


Store part data



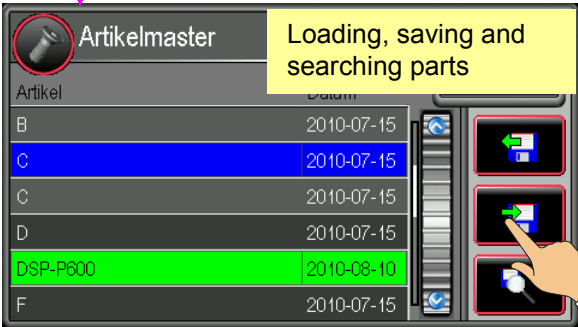
Search part data



Green = active part  
Blue = currently marked part

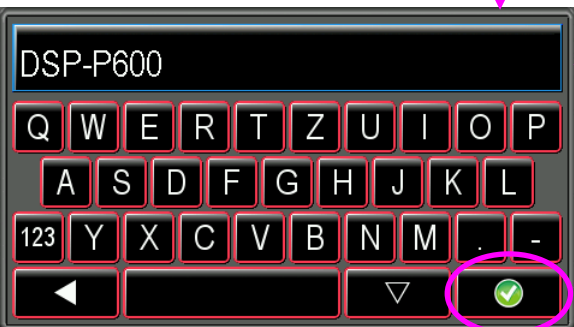
  



Loading, saving and searching parts

Artikel	Datum
B	2010-07-15
C	2010-07-15
C	2010-07-15
D	2010-07-15
DSP-P600	2010-08-10
F	2010-07-15



Store part data

When storing the part, a alphanumeric keyboard is displayed for the entry of the part numbers as plain numbers or in text format.

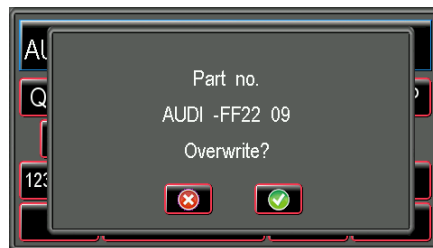
Touch ENTER (green check) to confirm the entry

## STORE PARAMETERS YES / NO

To store the data of a part for the first time:

Please note that saving data is only possible while the machine is running in AUTO mode (to ensure that the active envelopes are also stored).

## OVERWRITE PARAMETERS YES / NO



If you wish to save new data for an existing part (e.g. because you have found better settings for the part and wish to use these in the future), the already stored data can be overwritten.

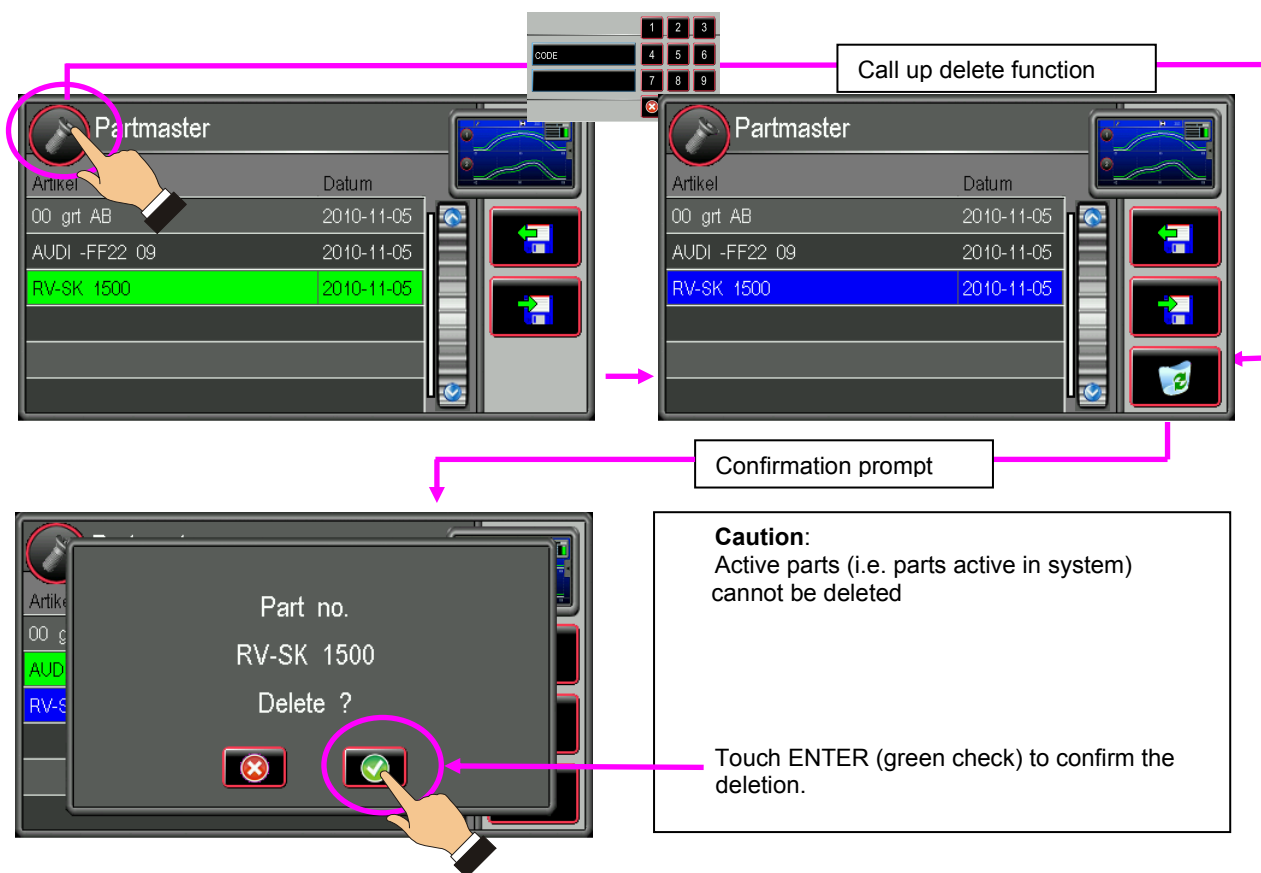
By calling up stored part data:

- All relevant monitoring parameter values are set to the previously stored values
- The current signals can be compared with the stored envelopes (in grey) (set-up aid)

It is not possible to load part data while the system is in **monitoring mode**.

## 9.2.2 Deleting part

The delete button is activated by touching the SET button in the **SKPartmaster** window. To do this, you must enter the system code: As long as the code is active and the screen has not been closed, you can toggle with the SET button between the buttons **Search** and **Delete**.



### 9.3 SKSinglemaster

This option has been designed for idle stroke detection during the Teach-In phase for thread rolling. This allows for an accurate calculation of the envelope, even if there are idle strokes recorded during the Teach-In phase.

For instructions regarding the operation of the SK Singlemaster, see page 35, chapter 13.1.2 Idle stroke detection.

### 9.4 SKAutomaster

SK-Automaster (automatic adjustment of measuring window)

For details regarding this function, see page 15, chapter 7.2.3 SKAutomaster.

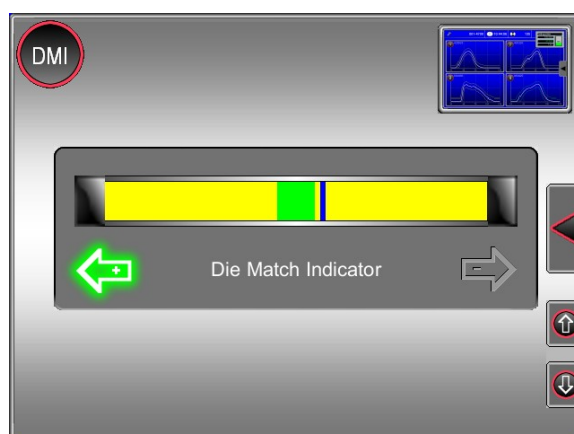
### 9.5 SKQmaster

SKQmaster (compensation of signal fluctuations caused by machine)

For details regarding this function, see page 16, chapter 7.2.4 SKQmaster.

### 9.6 DMI Die Match Indicator

The DMI indicates the track position of the tools in thread rolling machines. It has been devised to ensure that the rolling dies can be adjusted so that the indicator (blue line) is as close as possible to the green centre. If the indicator is right of the centre, the operator is notified with a message to adjust eccentricity to the left and vice versa.



Condition for correct DMI operation:

Rolling dies must be parallel to each other (vertically and horizontally)

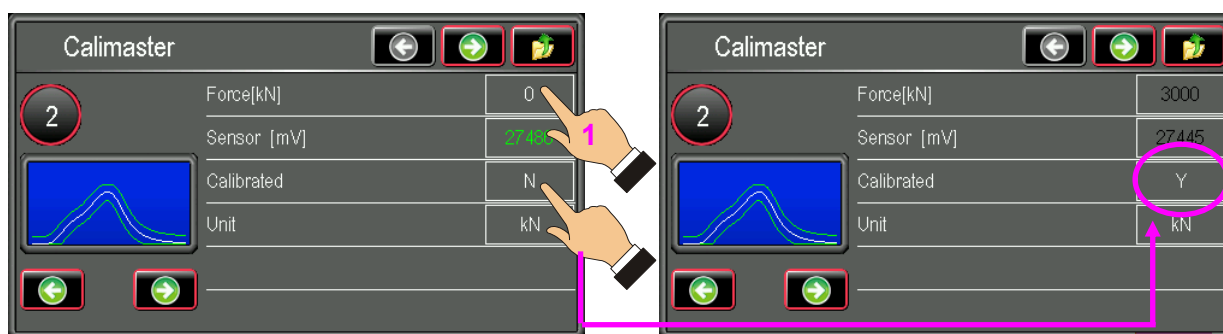
The DMI function can be released in Configuration / Service / Die Matching and is then available in the Process menu.

## 9.7 SKKalimaster

SKKalimaster can be found in the configuration area and contains the calibration menu for the display of absolute force values. The calibration menu is code-protected.

### 9.7.1 Calibration of sensor signal

To calibrate a sensor signal, a measured reference value must be entered in the calibration menu.



Enter the (absolute) reference value in the force field. The sensor (mV) field shows the associated voltage value. Set calibration field to "Y" (yes) to apply the calibration value. The calibrated value pair is greyed out and can thus not be changed.

### 9.7.2 Cancellation of calibration and recalibration

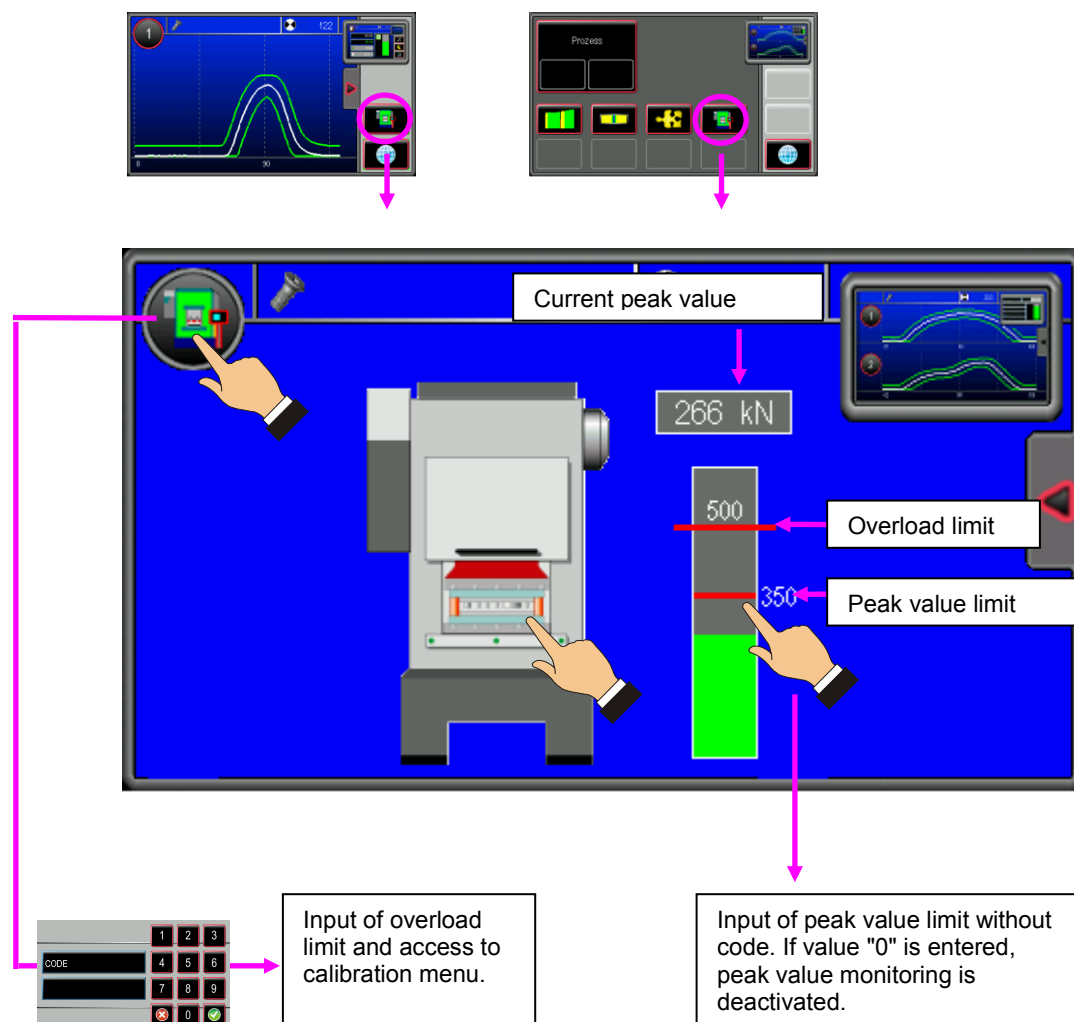
If the calibration field is reset to "N" (no), the calibration is cancelled and the system can be recalibrated. First, enter value "0" in the sensor [mV] field to activate the sensor display.

## 9.8 SKPressmaster

SKPressmaster protects the machine or individual machine parts against overload. Pressmaster monitoring consists of peak force monitoring and is activated both in automatic and Teach-Inn mode. It monitors the entire 360-degree range.

Up to 5 channels and a cumulative force can be monitored. With Pressmaster 1+1, 3+3 and 5+5, not only the peak values but also the signals are monitored, in parallel to the envelope technology.

SKPressmaster can be called up from the Process menu or with the quick navigation button.



The assignment and positioning of the force columns is done in Configuration / Service / Channel configuration.

## 9.9 Purchasing and testing device options

You can upgrade your system with additional device options **or** test options free of charge for a **single** 30-day period, provided of course that the selected function is available for your device model.

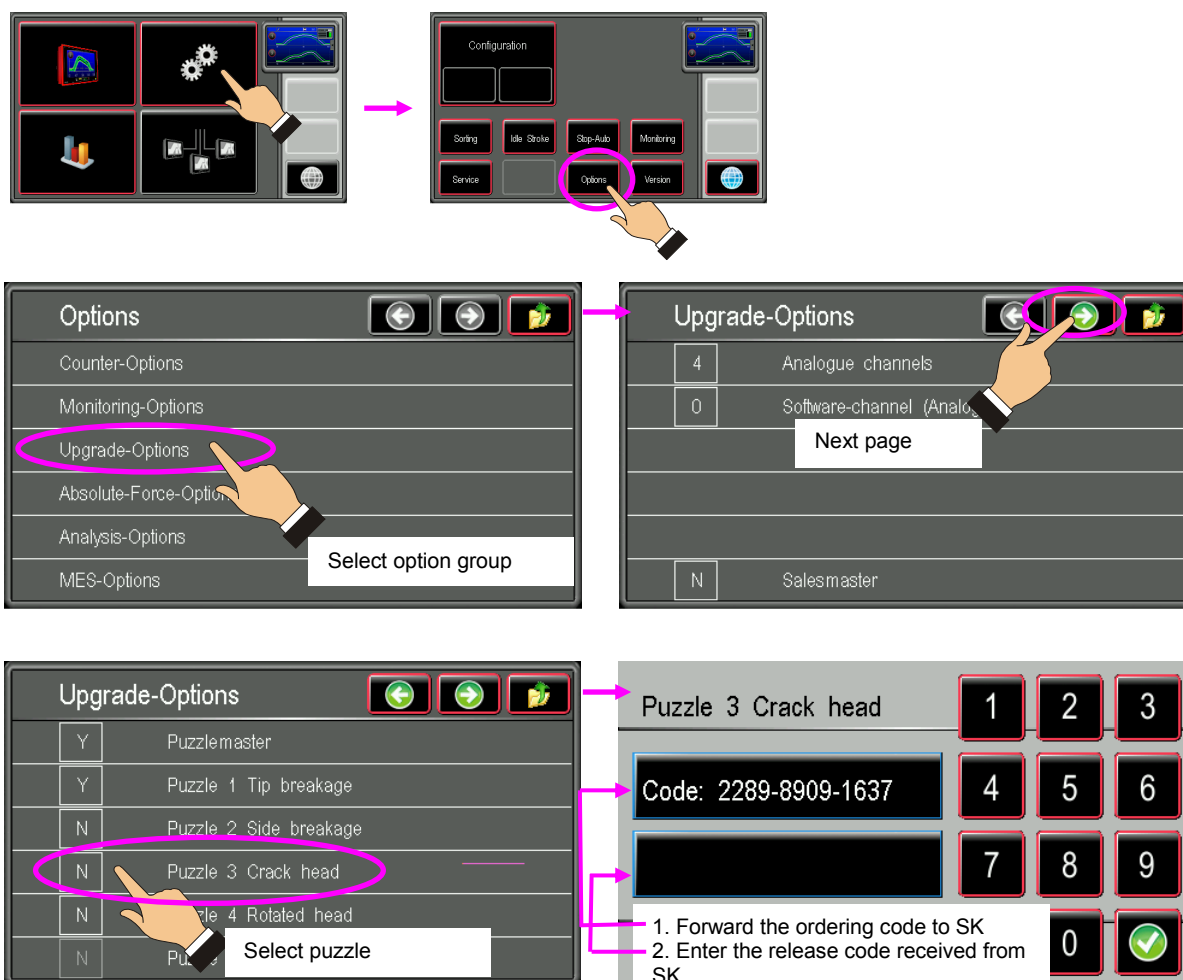
To test or purchase an option, you must access the code system:

The available options are listed in Configuration / Options. They are displayed in 6 groups. Already installed options are marked with "Y" (yes).

Touch the option you wish to purchase or test. A window for the entry of the ordering code is displayed:

This ordering code must be communicated by phone, e-mail or fax to SK so that a release code can be issued. When communicating the ordering code, please inform us whether you require a release code for purchase or for a 30-day trial period.

The example below shows the release of the "Crack head" monitoring puzzle for the already installed **SK-Puzzlemaster** expert system.



The sequence of screenshots illustrates the following steps:

- Configuration / Options:** The 'Options' button is selected in the Configuration menu.
- Options List:** The 'Upgrade-Options' group is selected from a list of options.
- Upgrade-Options:** The 'Next page' button is selected to view more options.
- Puzzle Selection:** 'Puzzle 3 Crack head' is selected from a list of puzzles. The status is 'N' (Not installed).
- Code Entry:** The ordering code '2289-8909-1637' is entered on a numeric keypad.

Instructions for the final step:

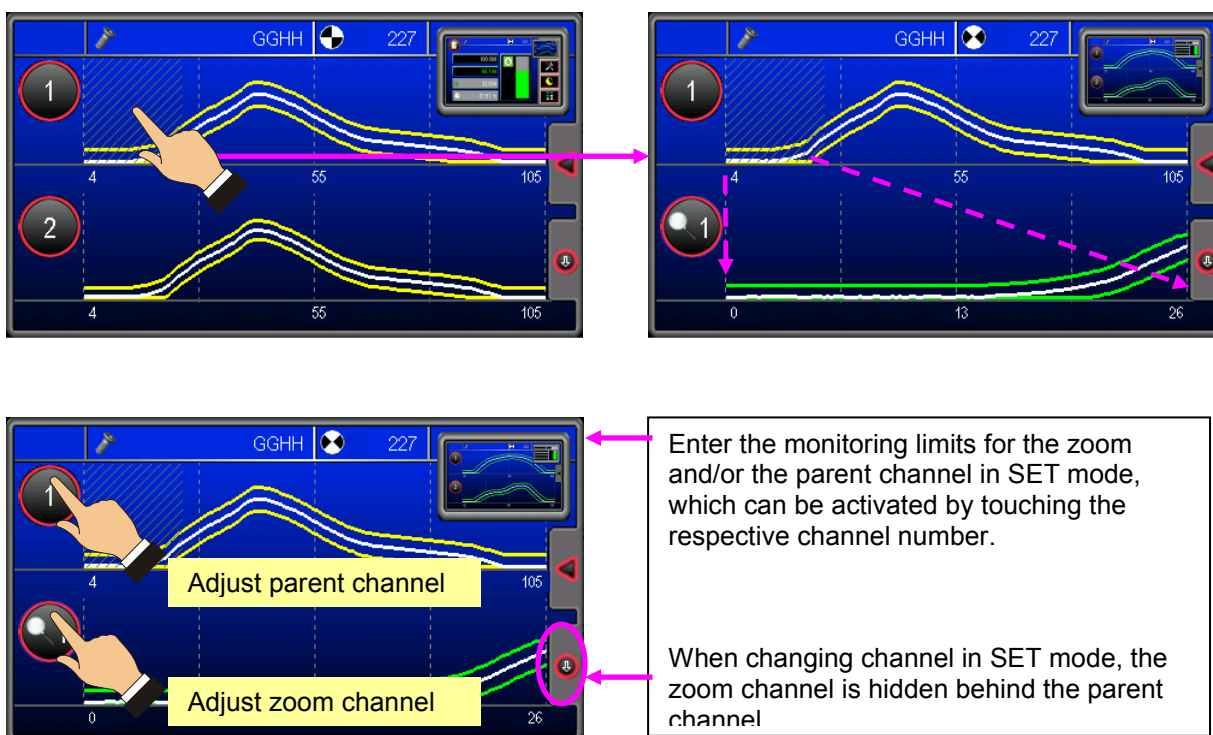
1. Forward the ordering code to SK
2. Enter the release code received from SK



## 9.10 Zoompuzzle – zoom channel display

A zoom channel can be installed through the **"Zoom" monitoring puzzle** in the Puzzlemaster<sup>5</sup>. This allows for a more sensitive and improved fault detection, especially where it is possible to zoom in on a fault-relevant and stable signal range. The active zoom channel is always linked to a parent channel whose channel number is displayed beside the magnifying glass. In the parent channel window, the zoom area is shown as a hatched area.

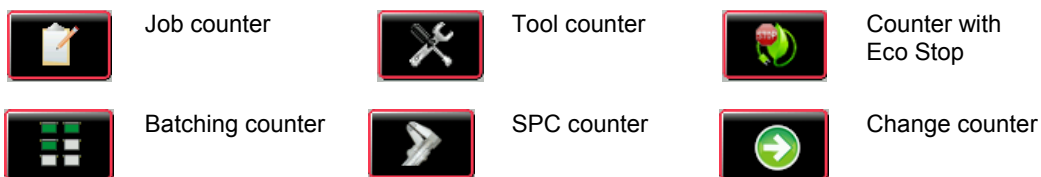
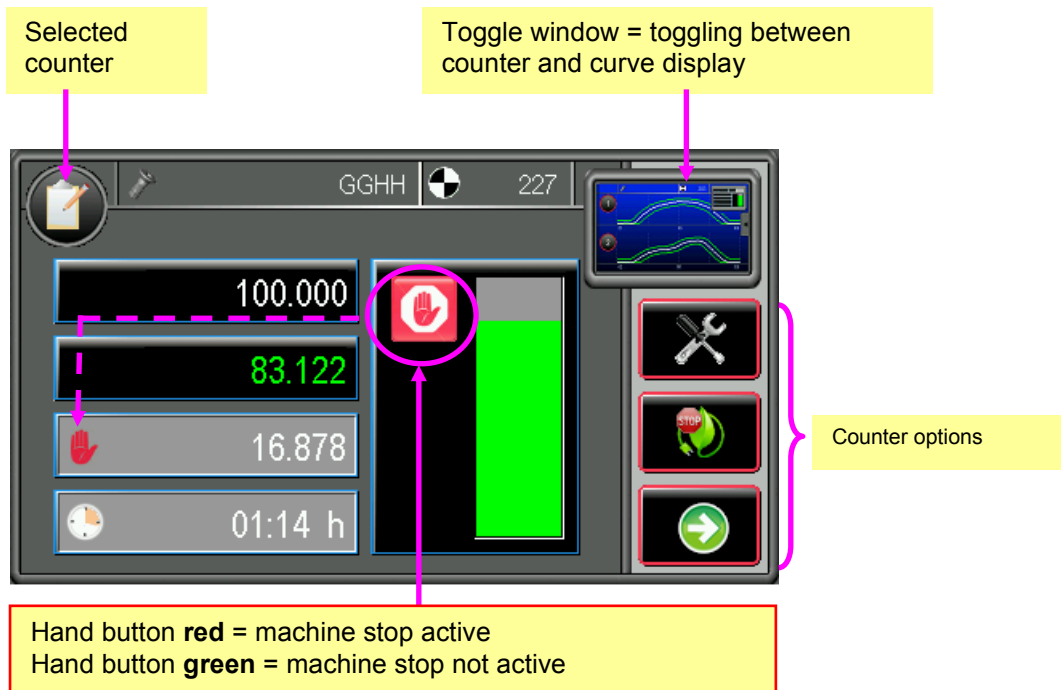
By selecting single channel display, the screen is split into two windows showing the **parent channel** and the associated **zoom channel** respectively.



<sup>5</sup> SK Puzzlemaster and "Zoom" monitoring puzzle are device options that can be added at any stage.

## 10 Counters

Touch the toggle window to call up the counter screens<sup>6</sup>.

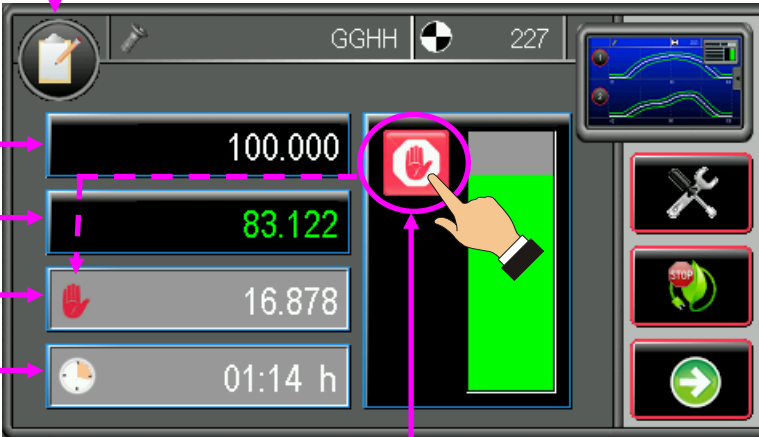


If you need additional counters, you can upgrade your system accordingly. To do this, you need a release code.

<sup>6</sup> If you need additional counters, you can upgrade your system accordingly. To do this, you need a release code.

## 10.1 Job counter

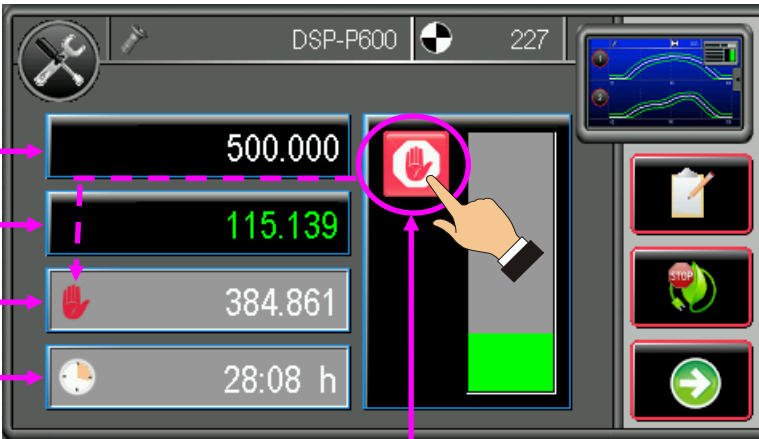
**SET panel of the job counter:**  
 - Parts per stroke  
 - Include parts in Teach-In?



Hand button **red** = machine stop active  
 Hand button **green** = machine stop not active

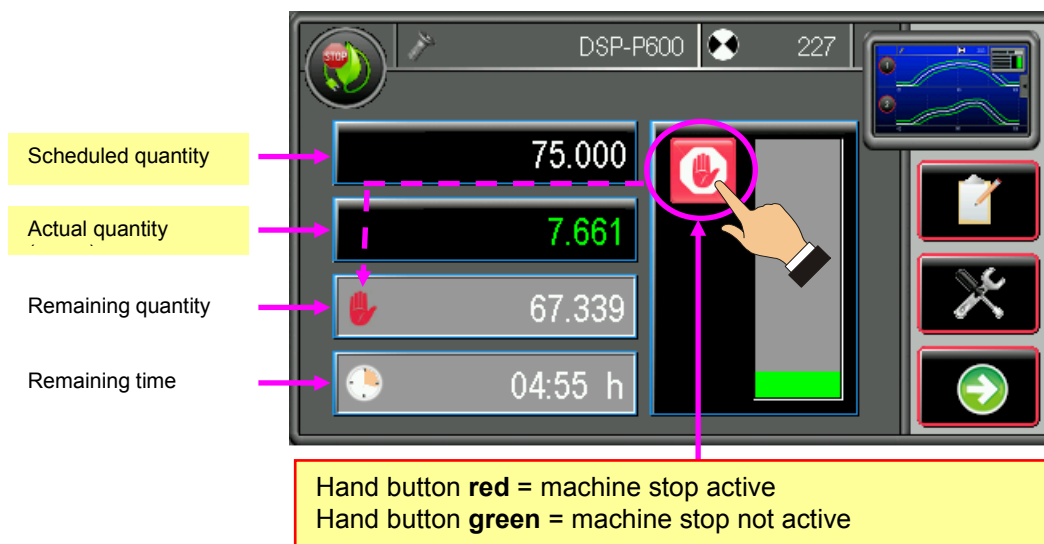
Touch the scheduled or actual quantity field to change the counter values. An input field with a numerical keypad is displayed. **All entries must be confirmed by touching the "E" button. Otherwise, they are not applied.** In BDE-controlled monitoring systems, the input of scheduled and actual quantities might be locked.

## 10.2 Tool counter



Hand button **red** = machine stop active  
 Hand button **green** = machine stop not active

## 10.3 Counter with Eco Stop



The counter with Eco Stop is normally used for the monitoring of afterrun shifts, dummy shifts and other production phases where the machine is not restarted after a stop.

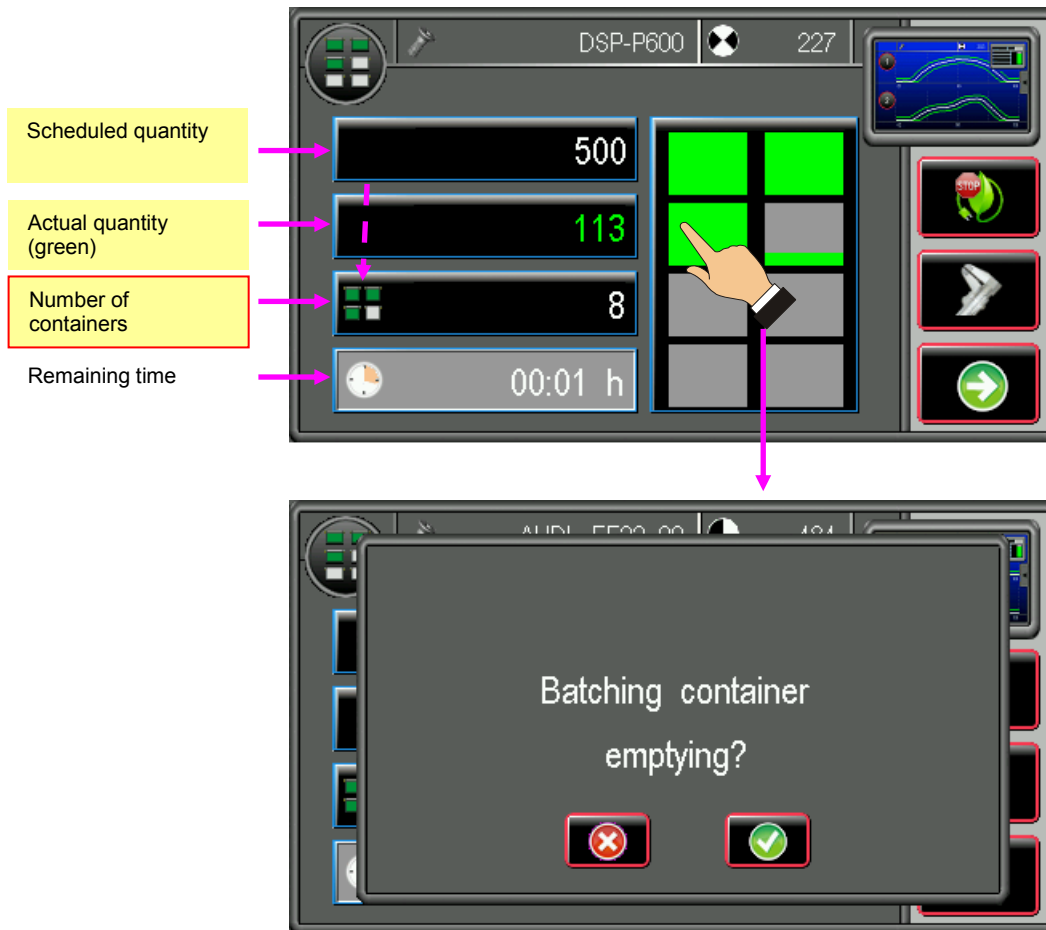
To save energy, the machine is stopped as soon as the schedule quantity is reached. After a subsequent **additional buffer time of 60 seconds**, **the main switch of the machine is actuated**, so that all consumers are disconnected from the machine power supply system. To initiate and Eco Stop, a stop pulse must be set in the switch cabinet of the machine!

### Starting counter with Eco Stop:

The counter with Eco Stop is activated by touching the green stop hand button, which then changes to red. If the counter with Eco Stop is active (red hand), the green monitoring LED on the device front panel **flashes**.

## 10.4 Batching counter

To activate the batching counter, you must first enter the schedule quantity and the number of containers. The maximum number of single containers that can be set is 8. After the last container is filled, the stop signal is generated.



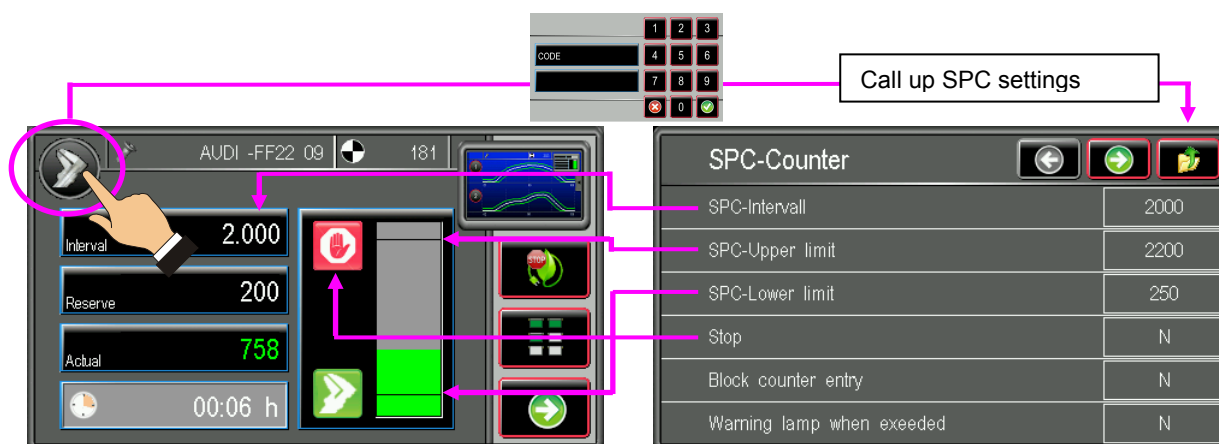
By touching a single filled container, this container can be reset to 0 (e.g. if a container is emptied).

If the container counter is set to "0" (zero), the batching counter is not active.

## 10.5 SPC counter

The SPC counter is used to keep track of the preset check intervals. Normally, regular dimension checks of the manufactured parts are required during series production, whereby the measured values are compared with those in the documentation. The SPC counter integrated into the process monitoring device is able to determine the next check time based on the actual manufactured quantity.

The settings of the SPC counter can be adjusted by touching the SET button on the counter screen. To adjust the settings, you need to enter the device code. If the interval is set to "0" (zero), the SPC counter is not active.



After the check interval has lapsed, the machine operator is notified with a message window (see below) and must then confirm that the check is to be performed. If no check is performed within the set buffer time, the machine is stopped (depending on whether stop function is active or not).



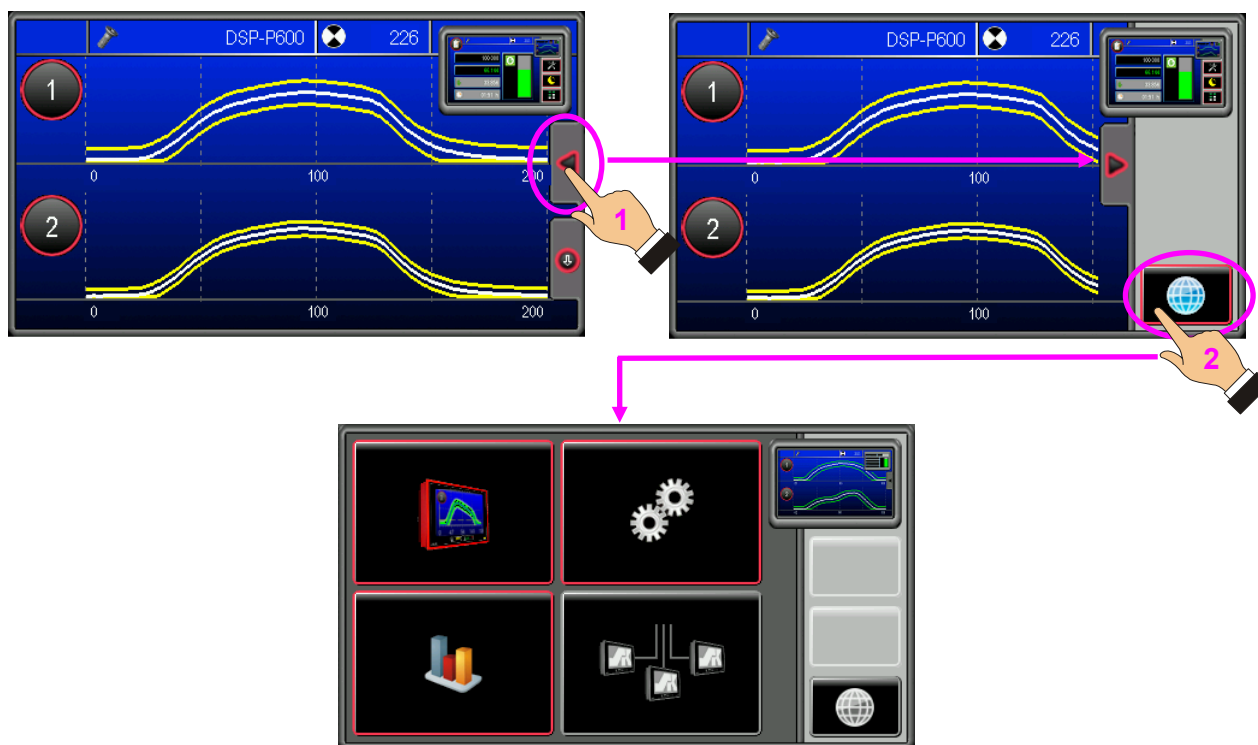
Apart from the integrated SPC counter described here, the machine can also be equipped with an SPC counter that is linked to a CAQ system. If the SPC counter is linked and no positive SPC check signal is sent within the preset check interval, production is stopped and an SPC message is displayed on the machine.

Interfaces to the CAQ-linked checking system exist for systems from Quipsy, Babtec and Böhme & Weihs.

## 11 Main menu

The main menu can be called up through the quick navigation button in the multiple channel or the single channel screen (by touching the **globe** icon).

**Caution:** if the system is in SET mode, the quick navigation bar includes other buttons (for the setting of the monitoring parameters).



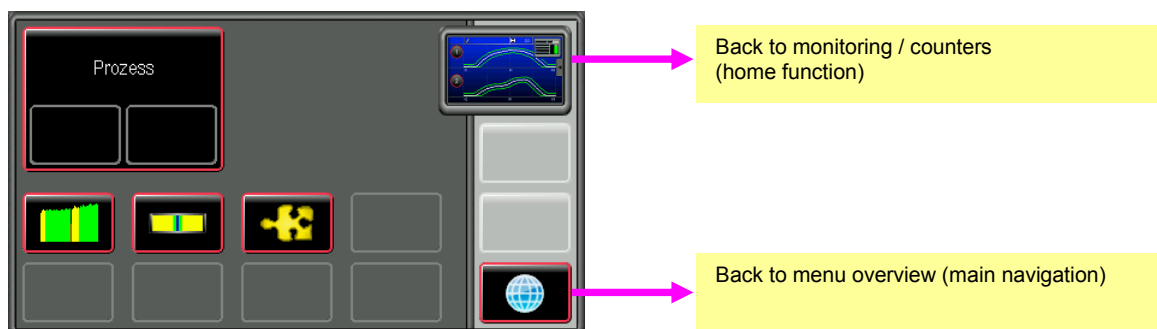
The main menu consists of the following 4 menu sections:

1. **Process**
2. **Configuration**
3. **Analysis / Statistics**
4. **SK-go!® BDE-MES system (shop floor management)**

Upon delivery, the quick navigation button does not include any favourites.

## 12 Process menu

The process menu panel enables operators to call up the various monitoring methods such as envelope, trend, puzzles, DMI, etc.



Trend



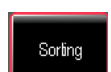
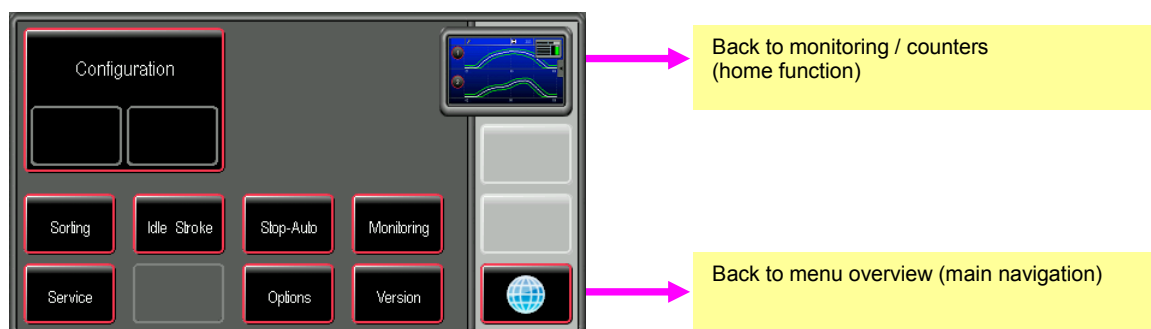
DMI Die  
Matching  
Indicator



Puzzlemaster

## 13 Configuration menu

On the configuration menu panel, the various parameters and functions of the monitoring system can be viewed and edited. Please note that the service area is protected by an access code.



Sort parameters



Idling  
parameters



Teach-In  
parameters



Auto-monitoring



Service  
area



Testing and  
purchasing  
options



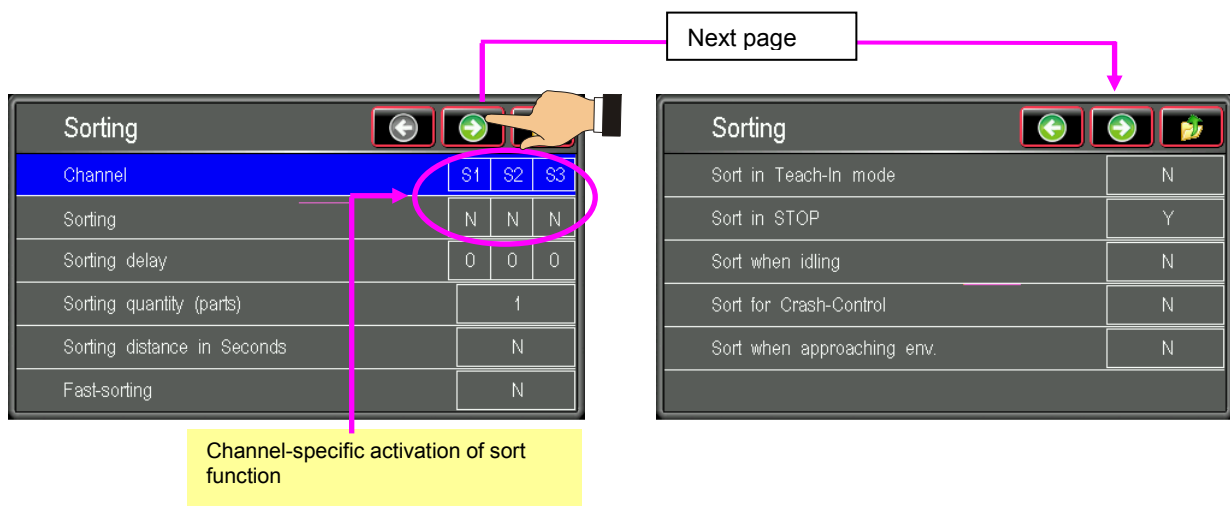


Software  
version

### 13.1.1 Sort function

All SK monitoring systems can be used for the control of suitable sorting equipment such as switches and locks, so that detected non-conforming parts can be separated from the OK parts. We recommend that the machine is stopped when such a part is detected, so that the non-conforming part can be examined and suitable corrective measures can be taken.

Alternatively, the machine can be programmed to continue production, while the non-conforming parts are automatically ejected. In this case, the machine is only stopped, if the number of consecutive non-conforming parts exceeds a certain limit. This number can be entered through parameter "Tolerance"(see page 13, chapter 7.2.1 Tolerance).



### Sort function settings

#### Sort (Y/N):

"Y" indicates that sorting is activated for the respective channel. "N" indicates that it is deactivated for the respective channel.

#### Sorting delay (parts):

Indicates whether the sort pulse for the respective channel is to be generated with a delay. This is useful for machines where the parts require some time to reach the sorting point. The delay ensures that the number of OK parts that have been produced prior to the non-conforming part and that are sorted out is as small as possible. Enter the delay in numbers of machine strokes.

#### Sorting quantity (parts):

Indicates the number of parts that are to be sorted out in the event of a fault (based on machine strokes). This parameter ensures that all non-conforming parts are reliably sorted out. If this value is set to a number greater than 1, it is unavoidable that a certain number of OK parts are also sorted out. This is however normally accepted for safety reasons.

#### Sorting distance in seconds:

This parameter is used, if the conveyor belt is coupled to the machine drive, and if a sorting delay that is independent of the machine stroke rate is required.

**Fast-sorting (Y/N):**

The sort pulse is generated immediately after a value outside the envelope is detected, so that the sort gate can be operated without any delay. (Certain monitoring functions such as Q-master and Prozyzy cannot be combined with fast-sorting).

**Page 2 of sort menu**

**Sort in Teach-In mode (Y/N):**

This function allows the operator to set the sorting equipment permanently to sorting while the machine is in Teach-In mode. This ensures that all parts that are not monitored and the set-up parts are separated from the OK parts.

**Sort in Stop (Y/N):**

This function allows the operator to set the sorting device permanently to sorting while the machine is in stop mode.

**Sort when idling (Y/N):**

If set to "Y", the sorting device is switched on during each detected idle stroke. In certain machines (e.g. thread rollers), idle strokes occur frequently due to the machine design and are detected as idle strokes and not as faults or errors by the monitoring device. It is however possible that non-conforming parts (e.g. bolts that are too short or too thin) are produced, whereby the force signals are similar to those of idle strokes, so that they are ignored. To ensure that such non-conforming parts are properly separated, the machine can be configured to sort at each idle stroke signal.

**Sort for Crash-Control (Y/N):**

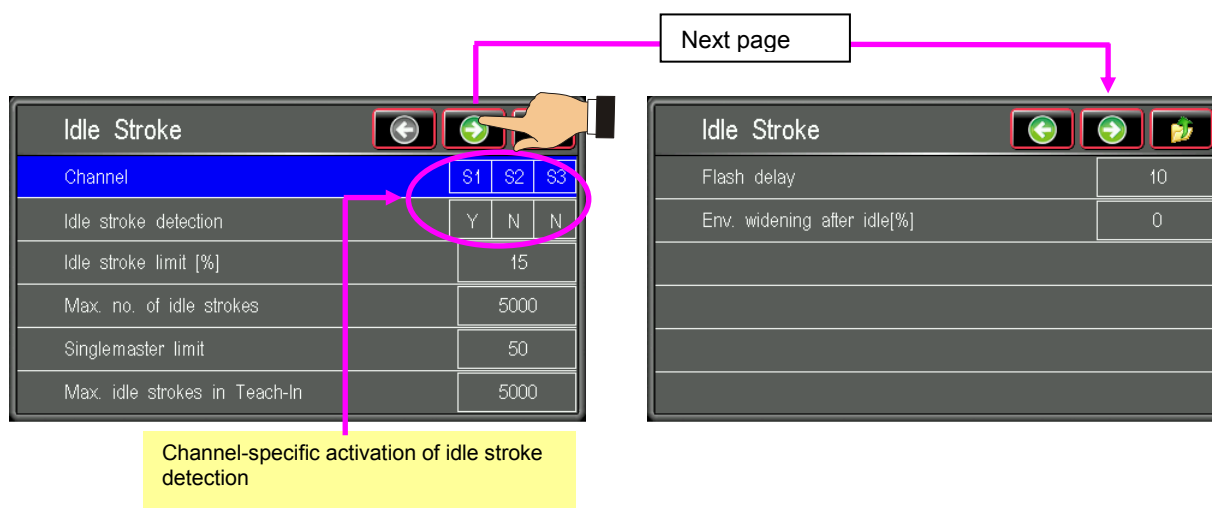
If set to "Y", the sort gate is switched on for crash control strokes. Crash control strokes are machine strokes during which the forces are only monitored for excessive loads (= crashes). This option can be useful in situations where standard fine envelope monitoring is to be suspended as parts are deliberately dropped from the transfer conveyor.

**Sort when approaching env. (Y/N):**

If this function is activated, all parts are sorted while the envelope approaches the monitoring signal (e.g. after idle strokes or with STOP-AUTO transition).

### 13.1.2 Idle stroke detection

Certain machine types such as thread rolling machines tend to perform frequent idle strokes due to bottlenecks in the part feed. Normally, an idle stroke is considered an error, and the monitoring system of the machine would switch off the equipment. To prevent such unnecessary stops, the monitoring system can be programmed to distinguish between idle strokes and real errors and to permit a certain number of consecutive idle strokes before the machine is stopped. The system thus only stops the machine if there are no other strokes than idle strokes (e.g. due to permanent blockage of the part feed or lack of material). The following parameters can be configured:



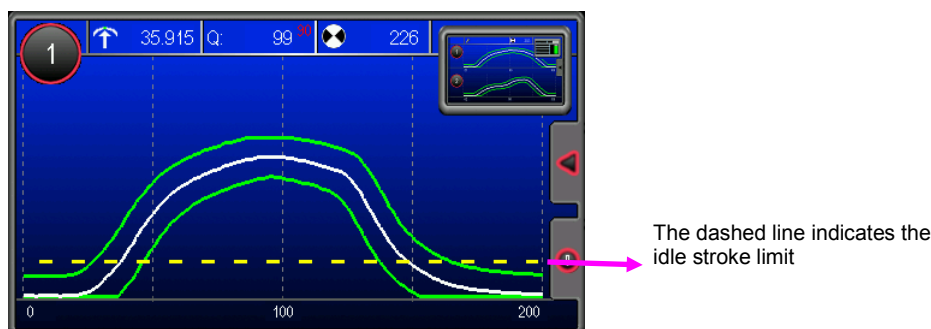
## Adjustment of idle stroke detection

### Idle stroke detection (Y/N):

Allows the operator to select the monitoring channels for which idle stroke detection is to be activated.

### Idle stroke limit (%):

Idle stroke limit value in percentages of the maximum force. If the current force is below this limit value, the stroke is registered as an idle stroke. In this example, each force that is smaller than 10% of the normal force is considered an idle stroke. This idle stroke limit is visible during monitored operation.



### Max. no. of idle strokes (parts):

This parameter defines the number of consecutive idle strokes that are permitted before the machine is stopped (in this example: 500 parts). During this interval, the warning lamp flashes.

### Singlemaster limit:

Absolute idle stroke limit. This value determines that very small force signals (whose maximum value is smaller than the entered value) are registered as idle strokes. This ensures that sporadically occurring idle strokes, that are common in applications such as thread rolling, are not teached in. The Singlemaster limit is visible in Teach-In mode as a dashed line.

### Max. idle strokes in Teach-In (0 + 9999):

Maximum permissible number of idle strokes in Teach-In mode (in conjunction with item 4, SK Singlemaster, this function is used to prevent that idle stroke signals are teached in).

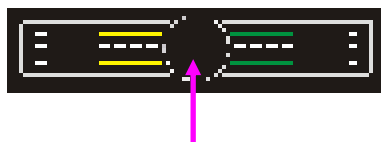
### Flash delay:

This parameter is used to define the number of consecutive idle strokes that are permitted before the optional warning lamp begins to flash. It prevents constant flashing of the lamp in the event of irregular part feed.

### Envelope widening after idle strokes:

Indicates the percentage value by which the monitoring envelope is to be increased to reduce the number of fault-induced machine stops after completion of the idle stroke.

## 13.2 Teach-In phase and Stop-Auto mode



Teach-In button at device front panel

Touch the **Teach-In** button to start the teach-in process for the calculation of the envelopes and to automatically activate monitored operation after the teach-in process is completed. The number of teach-in strokes is set in parameter **Strokes in Teach-In** in the service area of the configuration menu. To keep the number of strokes during the teach-in phases as low as possible, we recommend activating Stop-Auto transition, which ensures that the already teacher envelopes are retained so that it is not necessary to complete another Teach-In phase.

The Stop-Auto menu can be found in menu block Configuration/Service and is code-protected

Stop-Auto	
No. of strokes in Teach-In	25
STOP - MAN Mode [s]	0
STOP - AUTO Mode [s]	3
Envelope Widening [%]	25
Rotation consistence [%]	2
No. of consistant strokes	5

1) After the number of strokes performed in Teach-In mode entered here has been reached, the system automatically changes to monitored operation.

2) With STOP-AUTO mode, the taught envelopes are retained after a machine stop.

## 13.3 Monitoring (auto-monitoring)

Auto-Monitoring			
Channel	S1	S2	S3
Automaster	Y	Y	Y
Qmaster	Y	Y	Y
Curve character	N	N	N
Prozzy start phase [sec]	60		
Prozzy interval [sec]	240		

In Prozzy mode (SK Puzzlemaster), the functions *Automaster* and *Qmaster* are **always active**. The menu screen however shows how the two functions *Automaster* and *Qmaster* are set when the system changes to monitoring puzzle "M" (manual). (See also detailed description in chapter **optional equipment**.)

**Curve character:** This monitoring strategy allows for a new type of monitoring, which should however only be activated after consultation with the SK service technician.

For the adjustment of the "Prozzy" intervals, observe the following:

- **Prozzy start phase:** After this interval (run time in AUTO mode in seconds) has lapsed, the Prozzy function performs the first calculation of the fitting envelope width.
- **Prozzy interval:** Time interval (in seconds) during which the Prozzy function checks whether the envelope width can be adjusted further while the machine is running.

**Recommendation:** Choose the longest possible interval, as this increases the amount of data that is used by the Prozzy function for the calculation. If possible, monitoring puzzle "P" should be combined with the Stop-Auto function. (See also. Teach-In phase and Stop-Auto mode.)

## 13.4 Device options and software version

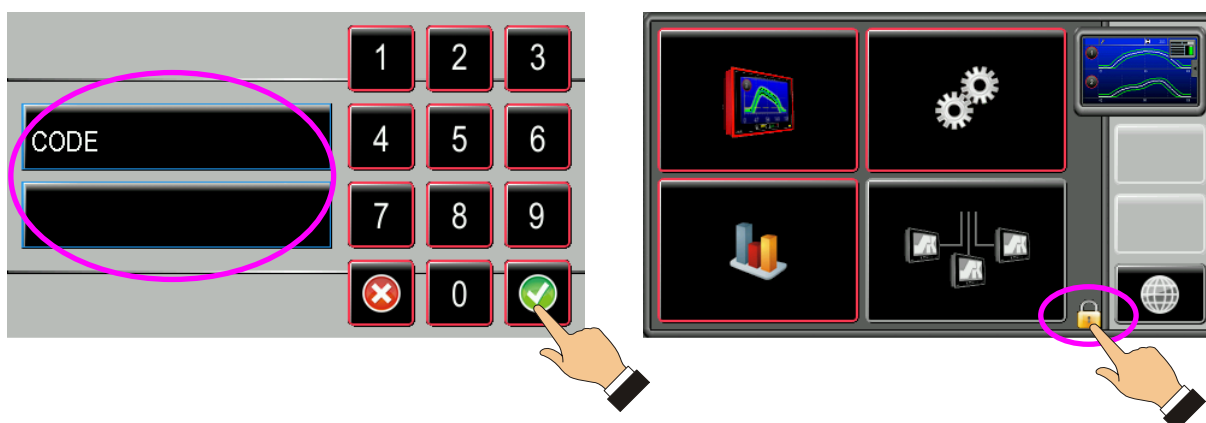


The menu options **Version** and **Options** can be opened without the need to enter a code. Select Version to view the version of the installed software. Selection Options to upgrade your system with available options or to test them for a 30-day period free of charge. (See also chapter Purchasing and testing device options.)

## 14 Service area

### 14.1 Code input and service menu

When accessing the code-protected sections of the Service menu, the user is prompted to enter the service code.



Menu locked =  
to access the menu area, the user must enter the  
service code.

Menu unlocked =  
if the service code is active, the menu can be  
accessed and padlock symbol is shown as a small  
icon in the bottom right corner without a red frame.  
The service code is automatically reset if no entry is  
made in the menu panel for more than 5 minutes. The  
code can be instantly deactivated by touching the  
padlock icon.

### 14.2 Configuration and default settings

The following items of the service area might need to be accessed by the user from time to time. To do this, he must enter the device code.

We recommend saving individual changes separately by part<sup>7</sup>. If permanent changes are made, the already existing parts must be called up, adjusted accordingly or deleted.

The main default settings are listed below:

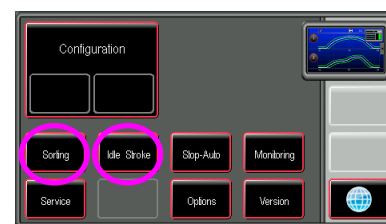
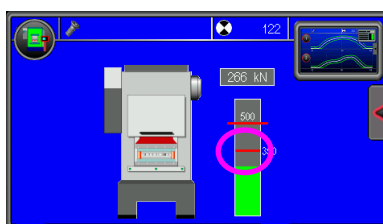
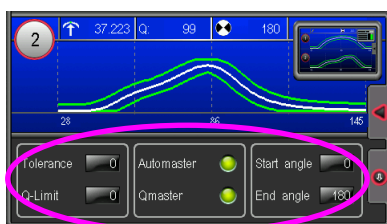
<sup>7</sup> SK Partmaster is a device option that can be added at any time.



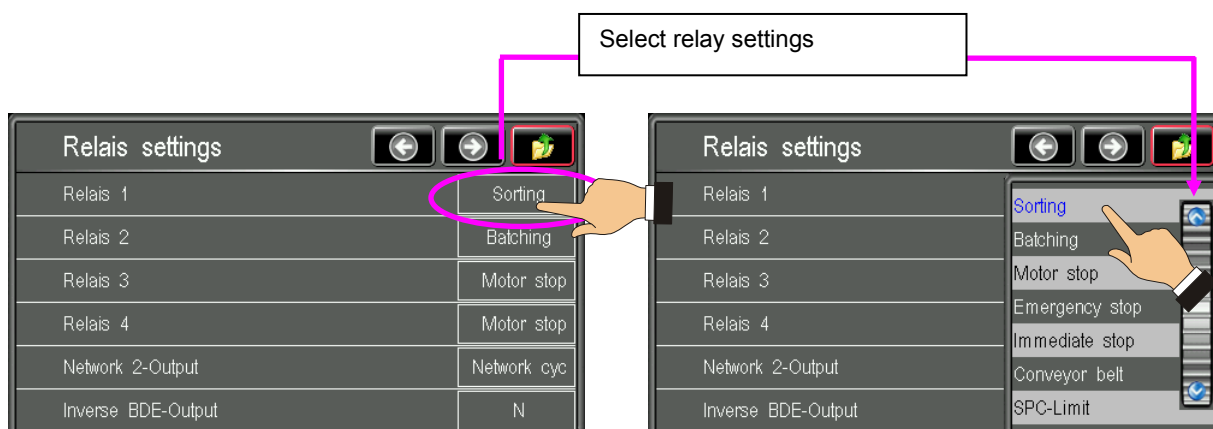
### 14.2.1 Coding / Locking

This function allows you to assign additional, previously unprotected menu areas with a code. These areas are:

- Parameters in Set area (tolerance, Q-master, Automaster, timing window)
- Peak value entry in Pressmaster
- Sorting and idling functions



### 14.2.2 Relay settings



**BDE2 output:** Output designed as opto coupler version (floating) for direct connection to the machine controls system (extremely fast). In this field, you can activate the **watchdog** function.



### Default relay assignment:

Relay 1: Sorting

**Relay 2: Batching**

Relay 3: Motor Stop

**Relay 4: Emergency Stop**

Other options:

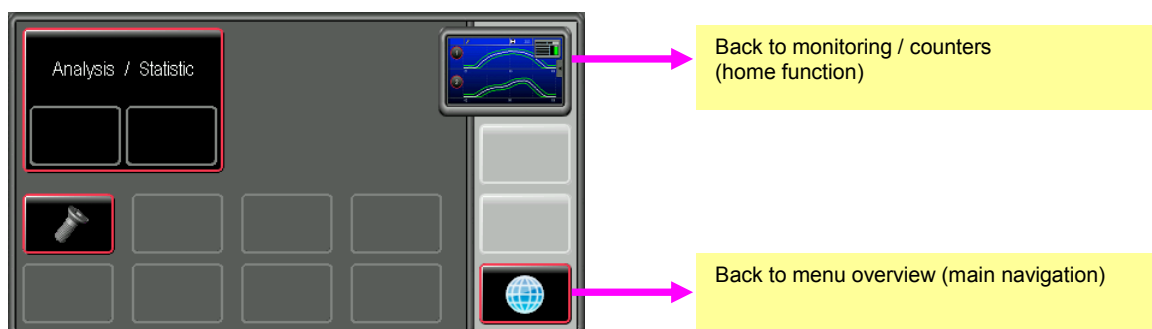
- Immediate stop
- Conveyor belt
- SPC limit exceedance
- Watchdog

The relay settings can be adjusted by means of the electronic thumbwheel. In the standard version, at least **relay 3**: motor stop (= rear and top dead centre stop) is set at the machine. Other relay outputs might require changes to the machine wiring (hardware modification).

### 14.2.3 Channel configuration and Kalimaster

**Kalimaster** is an optional function and includes the calibration menu. Its functions and features are described in chapter Optional equipment. For the use of the Pressmaster function (overload protection), menu option **Channel configuration** is of particular interest. In this option, the force columns are assigned.

## 15 Analysis / Statistics



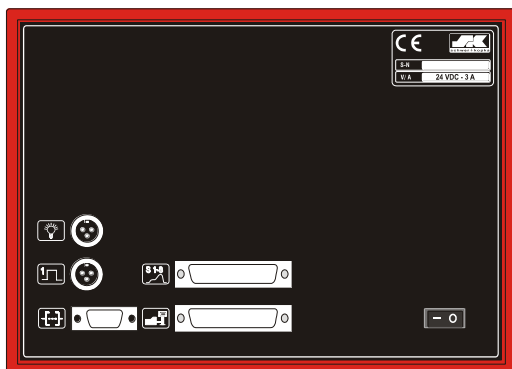
Partmaster

Technical data of SK 200 / SK300

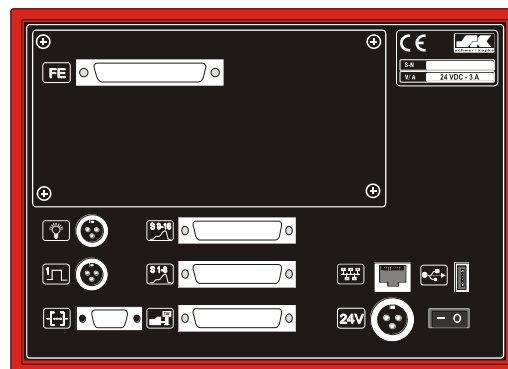
- 4.3" high-resolution colour display
- Weight approx. 3 kg
- Protection class IP54 (front)
- Power supply 24 VDC / 3 A
- **SK 200** up to 8 channels
- **SK 300** up to 16 channels

## 16 Ports (rear panel)

### SK 200



### SK 300



**Functions:**

Connection	SK 200	SK 300
Timing	X	X
Warning lamp	X	X
Serial interface RS232	X	X
Interface	X	X
V-Box 1 / channels 1-8	X	X
V-Box 2 / channels 9-16		X
1 x Ethernet (DSP)		X
1 x USB (DSP)		X
24V STAK 200 adapter port		X
Frontend or digital extension		X

## 17 Interface

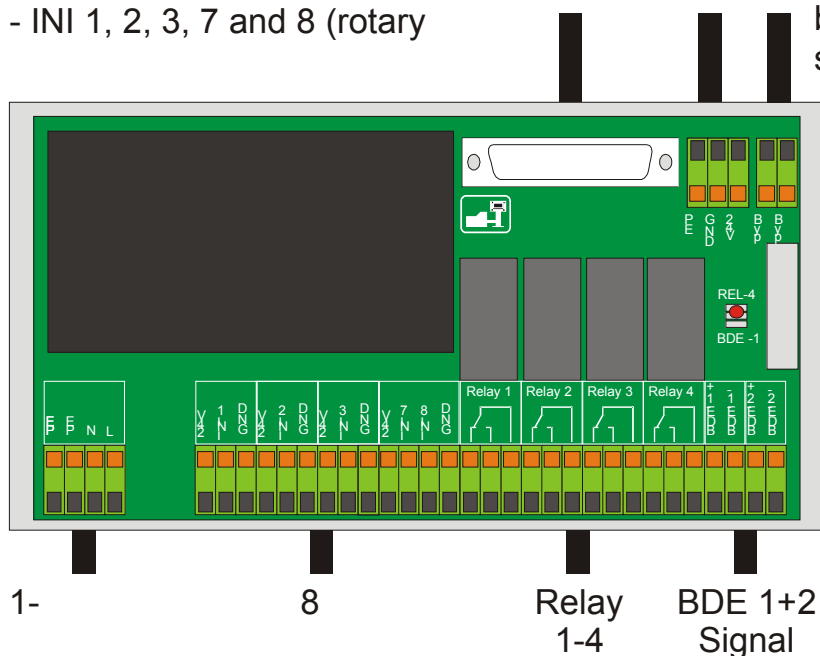
The interface is designed as a top hat rail module. For wall installation, we provide a special housing for the top hat rail module and other extensions (protection class IP67).

**Dimensions = 216 x 106 x 60 mm**

The following connections are  
 - 85 to 240V  
 - Relay 1, 2, 3 or 4  
 - BDE 1 and 2  
 - INI 1, 2, 3, 7 and 8 (rotary)

SK200 to SK800  
 SK500 to SK800  
 24V

External bypass switch



The range of functionalities can be extended with an adapter. It is for example possible to connect additional relays or inputs.

## 17.1 Interface indicators and bypass switch

The following indicators are mounted on the interface board:

