



# Instruction manual

## *Actuating drive "Valve control"*



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All actuating drives are tested for torque and functionality at the factory.

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# 1 Safety instructions

## 1.1 Safety instructions for installation and maintenance

Specific safety requirements must be taken into account depending on when and under which ambient conditions you mount the actuating drive.



- **The installation, commissioning and maintenance of the drive may only be carried out by qualified specialists with sufficient mechanical and electrical expertise!**



- **Before installing or repairing an actuating drive, all cables connected to the drive must be disconnected from mains power!**



- **Before installing or repairing an actuating drive, all other affected devices/machines/systems must be switched off and, if necessary, disconnected from mains power!**



- **Before switching off devices/machines/systems, it is important to check that it is safe to do so. This is particularly important for process engineering systems!**



- **Make sure that no vibrations occur during installation!**
- Shutdowns may only be carried out after prior consultation with the plant manager, shift supervisor or safety engineer!
- Malfunctions must be reported immediately to the plant manager, shift supervisor or safety engineer in order to avoid danger!
- Secure your workplace and ensure that the devices/machines/systems you are working on cannot be put into operation unintentionally!
- When installing or repairing an actuating drive, the applicable safety and accident prevention regulations of the employers' liability insurance association must be observed!
- Before installing/repairing the actuating drive, make sure that the safety devices are functioning correctly!
- Before installing the actuating drive, check that the actuator can move freely!

## 1.2 Safety instructions for commissioning



- **Make sure that no danger to people, the environment or devices/machines/systems can result from the commissioning process or due to test settings!**



- **Make sure that the actuating drives can move freely and that there is no danger of personnel being crushed by the actuators/fittings which will be driven. If necessary, erect barriers!**



- **When working on open and ready-to-operate actuating drives, there is a risk of touching live parts (24/115/230/400 V AC~)! Installation personnel must therefore be appropriately qualified and aware of this potential danger!**



- **When working on open and ready-to-operate actuating drives, only the 3 operating buttons and the 2 rotary switches may be used. During all further work on an opened actuating drive, all cables connected to the drive must be disconnected from mains power!**



- **When mechanically adjusting the switches on the optional add-on board, all cables connected to the drive must be disconnected from mains power!**



- **Once the adjustments have been completed or paused, all cables connected to the actuator must be disconnected from mains power immediately!**



- **Once the adjustments have been completed or paused, the housing cover must be replaced immediately!**

- **Secure the working area of the devices/machine/systems to prevent unintentional start-up or shut-down!**
- **After completing the adjustments, check whether the electrical signals of the actuating drives (especially the position feedback) correspond to the mechanical position of the drive! This applies in particular to the end positions!**
- **After completing the installation or configuration work, check that the actuating drive is functioning correctly. Check compliance with the end positions if necessary! Also check that any optional components are functioning properly!**

- Finally, check that any safety devices are functioning properly to ensure that they are free of errors!

### 1.3 Device safety

- The actuating drives are high-quality products manufactured according to recognised technical rules, and they left the factory in a safe condition.
- In order to keep the actuating drives in a safe condition, it is imperative that installers/users strictly adhere to the manufacturer's instructions in this documentation and have the appropriate professional qualifications.
- The actuating drives may only be used for their intended purpose!
- The actuating drives may only be used when securely fixed on the relevant fitting!
- The actuating drives may only be operated in accordance with the values specified in the technical specifications!
- The actuating drives must not be installed, commissioned or adjusted on damaged supply lines or flanged system parts! The same requirements apply to damaged actuating drives!
- The device must not be disposed of with household waste. Please use the return and collection systems available to you to return the old device.



## 2 Function and intended use

The actuating drives are used in conjunction with an air or gas flow control valve or a comparable fitting to adjust volumes or throttle the flow rate.

The actuating drives are suitable for all applications requiring a rotary movement with high accuracy.

The actuating drives are factory-set for a rotary movement covering a range from 0° to 90°. The end positions can be freely adjusted.

The actuating drives are available for the following mains voltages:

AC: 90-260 V

DC: 24 V

The configuration of the actuators, such as setting the end position, is conveniently done via an integrated touch display.

The actuators have three-point stepping control and analogue control (4-20 mA, 0-10 V). Manual adjustment of the actuator is also available for servicing.

The current position of the actuator is shown on the display and is also transmitted to the outside via a position feedback signal (4-20 mA, 0-10 V).

The actuators also have a variety of setting options such as direction of rotation, torque, speed or ramp. These can all be accessed via the touch panel.

## 3 Commissioning

**Important:** *The "Safety instructions for installation and maintenance" and the "Safety instructions for commissioning" provided in this document must be observed during the commissioning phase.*



### 3.1 Installation

The drive must be firmly screwed to the fitting to be moved using the available threaded holes on the flange plate. The drive shaft is fitted with an internal square, for example, depending on requirements.

Adapters for other shaft designs are also available.

### 3.2 Opening the housing cover

To open the housing cover, loosen the four 3 mm hexagon socket screws in the corners.

**Important:** *When working on the open device, always observe the safety requirements.*



**Important:** *Before opening the housing cover, disconnect all cables connected to the drive from mains power!*



**Important:** *As soon as the configuration of the device is complete or paused, the housing cover must be replaced immediately.*



### 3.3 Electrical connection

The connection cables must be fed through the cable glands (2x M20x1.5, Ø: 9-13 mm) into the housing.

The cable glands must then be tightened firmly. The permissible outside diameter of the inserted cables must be observed.

The connections must be made in accordance with **appendix C**.

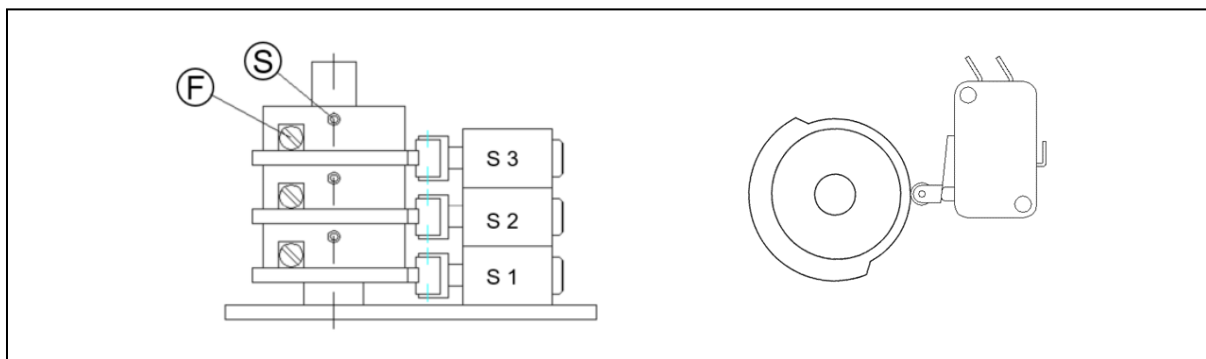
### 3.4 Setting the cam switches

The optional cam switches can be used for a number of purposes, such as controlling an external device or querying an intermediate position.

**Important:** Switch off the power supply whenever you adjust the device with tools.



Move to the desired position. Secure the cams on the shaft with stud bolt **S**. Fine adjustments can be made with a screwdriver on adjusting screw **F**. To do this, turn the adjusting screw **F** until a slight click of the switch can be heard.



### 3.5 Close the housing

Close the housing cover and tighten the four 3 mm hexagon socket screws in the corners. Ensure that the seal is correctly seated.

**Important:** Before closing the housing cover, disconnect all cables connected to the drive from mains power!



### 3.6 Setting the end positions

The end positions for "Closed" and "Open" are set at the factory to a setting range of approx. 90°.

Instructions for setting the end positions are provided in the section **Set Limits menu item**.

### 3.7 Setting the other operating parameters

If needed, the other operating parameters (torque, speed, ...) can be set by following the instructions in the section **Settings menu**.

### 3.8 Readiness for operation

The desired operating mode is to be selected according to the information in the chapter **Mode menu item**.



The installation must be put through a function test.


## 4 Operation



**Before operating, remove the protective glass, if present.**

The following four keys are used to navigate within the menu system:

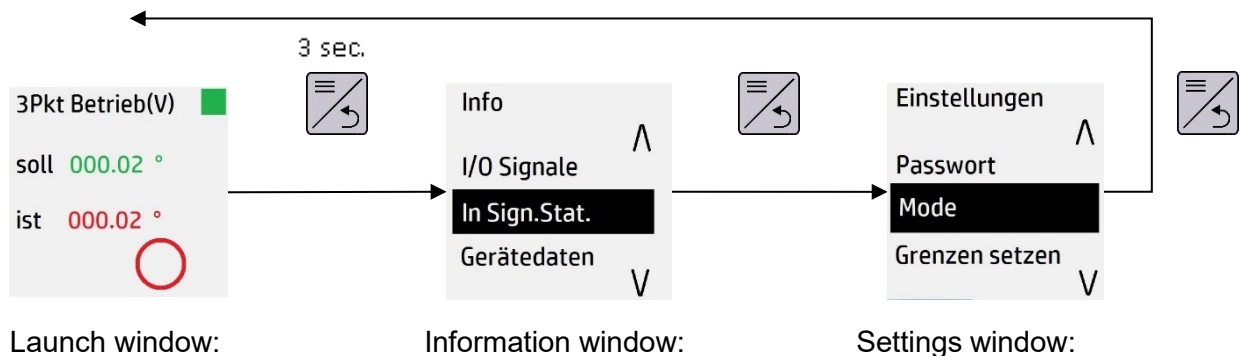
You can scroll in the lists and increase/decrease values using the   keys.

You can go to the next window (without accepting the value) using the  key.

You can select menu items or accept the value using the  key.

Touching the display changes the display mode in several menu windows, e.g. from volt to % or °.

## 5 Menu tree: overview of the structure



Overview of the current state:

- Control mode
- Setpoint/actual value
- Move/stop
- Reports
- Green flashing - mode is running

Function:

- Screen Touch: change units
- +/- valve movement (only in displacement control mode)
- Next key

Window selection with detailed information:

- I/O signals
- In Sign. statistics
- Device data
- Err
- Green flashing - mode is running

Function:

- Scroll +/- list
- OK menu item selection
- Next key

Window selection for parameter setting:

Display without PW

- PW
- Mode
- Set limits
- Language
- Set default value

Display with user PW:

- Mode
- Set limits
- Language
- Set default value
- Target tolerance
- Start value tolerance
- Max speed
- Ramp settings
- Current settings
- Prog default value
- Linear Actuator
- Enable-Signal
- Disp. equalisation

Function:

- Scroll +/- list
- OK menu item selection
- Next key

## 6 Start window

The start window turns on by default when the device starts (except in the error state), and displays the current state, e.g.




Breakdown of content:

- Control mode: 3-point operation, analogue output in V: from 0 to 10V
- Target valve flap position in °. By touching the display, you can switch between different units (here volts and %)
- Current valve flap position in °. By touching the display, you can switch between different units (here volts and %)
- Current direction of movement: Stopped, currently no movement

### Functionality:



The display in the start screen can be changed by pressing the display itself. Depending on the set mode, the display will change between:


- Setpoint and actual value of the angle
- Setpoint and actual value of the voltage/current
- Setpoint and actual value of modulation in %

Press and hold the  key to access the other menu items.




These keys are only used in Display Control mode.



In Display Control mode, you can use the arrow keys  or  to move the actuator: 1) If the actual actuator position is within the set limits, it can also be moved within the set limits. 2) If the actuator position was previously outside of the limits for some reason, the actuator can be moved back to a valid position with the arrow keys.


The  key has no function on the start screen.


## 7 Menu Info



The "Info" menu can be accessed from the start screen by pressing and holding the  key.

You move up or down in the scroll list using the   keys. The black mark indicates the current selection.

You can open the Selection window by pressing the  key.

You can open the other menu list (Settings) by pressing the  key.

The following menu items are available:

- I/O signals
- In Sign. statistics
- Device data
- Err.


## 7.1 Menu item In Sign. Stat




In Sign.Stat.	
Max	05.017 V
MW	05.017 V
Min	05.015 V
2*Sig	0.0013 V

Provides an overview of the current statistical values of the analogue input: Max, mean, min and 2 \* sigma.

By pressing on the display itself:

- The old values are deleted and the statistical values are reset
- The display in the start screen changes. Depending on the set mode, the display will change between: V/A,% and °.

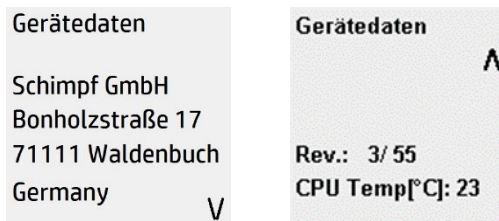
You can open the Info window by pressing the  key.

The   and  keys have no function in the "In Sign. Stat." window.



**Note:** The displayed statistical values are valid from the time of the start or last use (pressing the display, touch-panel).





## 7.2 Device data menu item



Provides an overview of the manufacturer's address, software version number and unit temperature.

You move up or down in the scroll list using the   keys.



You can open the other menu list (Settings) by pressing the  key.



The  key has no function on the Device Data screen.

### 7.3 Err. menu item

Err. 000  
no ERR

Provides an overview of pending error messages. If there are any current errors, the window is displayed in red and the error is displayed regularly. The Err signal is switched on the relay output, and only switched back to "error-free" 10s after the error is removed.

You move forward or back in the scroll list using the   keys.


You can open the start window and operate the module by pressing  or  key. This temporarily suspends the display of errors (for 30s), before it activates again.




## 7.4 I/O Signals menu item

```
I/O Signale
In 050.16 %
Out 050.13 %
Regl.fregb: ja
3Pkt Auf:  nein
3Pkt Zu:   nein
```

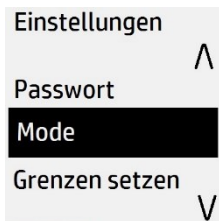
Provides an overview of the current values of the analogue input and output as well as the signals of the 3-point control.




The display in the start screen can be changed by pressing the display itself, or the arrow keys + or - depending on the mode. Depending on the set mode, the display will change between V/I, % and °.

You can open the menu list (Info) by pressing the  key.

The   and  keys have no function in the I/O Signals window.

## 8 Settings menu




The "Settings" menu can be accessed from the start screen by pressing the  key twice (first time long, then short). You move up or down in the scroll list using the   keys. Some items are password-protected. The list will be expanded after the password is entered (see table below). After 30 seconds, the password-protected items will be removed.

The black marker shows the current selection in the scroll list:

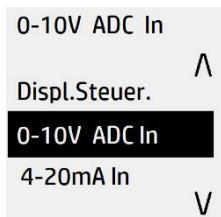
Item	PW	Comment*
Mode	No	Switching control modes: Manual, 3 point, analogue ...
Set limits	No	Setting the CLOSE/OPEN position, end position message, safe angular position
Language	No	Language selection
Set default value	No	Restore factory settings
Password	No	Password entry
Trgtvlue-trnc	Yes	Target angle tolerance: 0.04° to about 2°
Startvlue-trnc	Yes	Start signal tolerance: 0.04° to about 2°
Max. speed	Yes	Set traversing speed
Ramp setting	Yes	Acceleration, speed, deceleration
Current settings	Yes	Traction and holding current, heating
Linear Actuator	Yes	Activate linear drive function
Enable-Signal	Yes	Activate controller enable signal
Disp. equalisation	Yes	Smooth display values

\* detailed description below



You can open the Selection window by pressing the  key.


You can open the start window by pressing the  key.


## 8.1 Mode menu item





This menu item can be accessed via the Settings menu. The current mode is displayed in green at the top of the display.

You move up or down in the scroll list using the   keys. The black marker shows the current selection in the scroll list (see table below).

Select the appropriate mode using the  key. If the switching process was successful, a message will appear at the bottom of the screen: "Save OK", "Save nOK" will be displayed if it was unsuccessful.

You can open the start window by pressing the  key.

Contents of the scroll list with explanations:

Item	Function	Explanation
<b>Analogue control Voltage</b>	Actuator is controlled with voltage level 0-10V	Actuator moves within CLOSE and OPEN position according to the applied analogue signal. If the controller enable is activated in the menu, the drive only runs in analogue mode if the controller enable signal (DC: terminal 4, reference signal terminal 3 ; AC: terminal 25 reference signal terminal 23) is present. Otherwise, 3-point operation is active.
<b>Analogue control Current</b>	Actuator is controlled with current level 4-20mA	
<b>Manual control</b>	Actuator is controlled via push-button on circuit board	<p>Controls in 360° angular range. Has the highest priority. If manual control is active, the module does not react to any input signal except the buttons on the board.</p> <p>Can be activated via the display or by pressing the button for the first time.</p> <p>To deactivate the mode, proceed as follows:</p> <ul style="list-style-type: none"> <li>- If you have activated the mode via the push-button, press both buttons simultaneously.</li> <li>- If you have activated the mode via the display, switch on the other (desired) mode via the display.</li> </ul>
<b>3-point operation</b>	Actuator is controlled via the inputs (CLOSE/OPEN).	Actuator is controlled within the CLOSED and OPEN position. According to the signals applied to the inputs (CLOSE/OPEN) (DC: terminals 5 and 6, reference signal terminal 3; AC: terminals 26 and 27, reference signal terminal 23).
<b>Display control</b>	Actuator is controlled by the display	Actuator is controlled via buttons   on the display within the CLOSED and OPEN position.


The position feedback via terminals 9 and 10 (mA or V) in **three-point step operation** and **display control** is carried out with the last set analogue operating mode. If the signal for the position feedback is to be changed in these operating modes, the appropriate analogue operating mode must be selected once and then switched back to **three-point step operation** or **display control**.

## 8.2 Set Limits menu item

This menu item can be accessed via the Settings menu.

In the menu item "Set limits", the direction of rotation, the end positions as well as the switching points for the relay feedbacks are set via the end positions.



The  key is used to switch to the next submenu item. In this way, individual values in the submenu items can also be changed without adjusting the others.



**Note:** The start/stop angle and the direction of rotation can influence the operation of the device and must therefore be set carefully.

### 8.2.1 Direction of rotation menu item




In this menu item, the direction of rotation is set to "closing to the right" or "closing to the left".




The selection is changed with the   keys.



Press the  key to accept the current selection. If a change is made, the end positions already programmed are retained. However, they are swapped with each other.





Press the  button to change to the next menu item (CLOSE position).


### 8.2.2 CLOSED position menu item




In this menu item, the end position "CLOSED position" is set. The measured values in the display show the currently set CLOSED position and the new CLOSED position to be set.

**Note:** The angle in ° refers to the factory setting.

With the buttons   , the drive moves to the desired position.

The button  sets the current position of the drive as the new end position "CLOSED position".

In diesem Menüpunkt wird die Endlage „ZU-Position“ gesetzt. Die Messwerte im Display zeigen die aktuell gesetzte ZU-Position und die neu zu setzende ZU-Position an.



Press the  button to change to the next menu item (OPEN position).


### 8.2.3 OPEN position menu item




In this menu item, the end position " OPEN position" is set. The measured values in the display show the currently set OPEN position and the new OPEN position to be set.

**Note:** The angle in ° refers in relation to the end position "CLOSED position".

With the buttons   , the drive moves to the desired position.

The button  sets the current position of the drive as the new end position "OPEN position".

Press the  button to change to the next menu item (CLOSE switch point).

### 8.2.4 CLOSE switch point menu item









In this menu item, the switching point for the relay "Position feedback 1 (CLOSE)" is set.

If the position of the drive is below the limit set here, the relay switches. Above the limit, the relay is not switched.

**Note:** The angle in ° refers to the end position "CLOSED position".

Use the buttons   to set the desired value.

Press the key  to accept the new setting.

Press the key  to change to the next menu item (OPEN switching point).

### 8.2.5 OPEN switch point menu item





In this menu item, the switching point for the relay "Position feedback 2 (OPEN)" is set.

If the position of the drive is below the limit set here, the relay switches. Above the limit, the relay is not switched.

**Note:** The angle in ° refers to the end position "CLOSED position".

Use the buttons   to set the desired value.

Press the key  to accept the new setting.




Press the key  to change to the next menu item (save position).


### 8.2.6 save position menu item




The "Safe position" function is defined in this menu item. The "Safe position" function is only active in 4 to 20 mA control mode. The actuator moves to the safe position set here if the signal falls below 4mA (with tolerance). For example, in the event of a cable break. In this case, the error relay is also set.

If "---" is selected as the setting for the safe position, the drive stops at its current position in the event of this failure.

Use the   buttons to set the desired value. The setting "---" can be selected by pressing  when 000.00 ° is displayed.


Press the  key to accept the new setting.

Press the  button to return to the Settings menu.


### 8.3 Language menu item



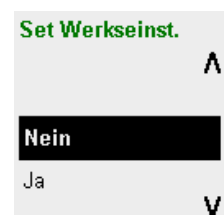
This menu item can be accessed via the Settings menu.

You move up or down in the scroll list using the   keys. The following languages are available: German, English, French and Spanish.

You can choose the desired language using the  key.


Return to the Settings menu using the  key.


### 8.4 factory settings menu item



In this menu, the drive can be reset to the factory settings.

Use the buttons   to switch between "Yes" and "No" in the selection menu.

Press the key  to make the selection. Selecting "Yes" resets the drive to the factory settings. To accept the change, the drive restarts. Selecting "No" takes you back to the Settings menu without making any changes.

Return to the Settings menu using the  key.

## 8.5 Password menu item



This menu item can be accessed via the Settings menu.



Expert mode is activated by entering the correct password in the Password menu item. This adds the following menu items in the "Settings" menu:

- Target tolerance
- Start value tolerance
- Max. speed
- Ramp settings
- Current settings
- Linear Actuator
- Enable-Signal
- Disp. equalisation


**Note:** The items are added for a limited time (30s).



Use the arrow keys to select the digits (1 to 3) on the display (marked with an underscore).

The numerical value is increased or decreased using the   keys.

You can confirm the password using the  key. The Settings menu will open again.

Return to the Settings menu using the  key.

The default PW for expert mode is "000".



## 8.6 Target value Tolerance menu item


Zieleinste.-Trnz	
akt	0.04 °
neu	0.08 °


This menu item can be accessed via the Settings menu.

The target value tolerance defines the maximum permissible deviation of the motor position from the target value position. If the deviation is smaller than the target value tolerance, the motor stops.

The desired tolerance of the target value can be set to between 0.02° and 2.05°.

The new tolerance value can be increased or decreased using the   keys.

Press the  key to accept the new tolerance value.

Return to the Settings menu using the  key.

## 8.7 Start Value Tolerance menu item



Startschwelle-Trnz	
akt	0.04 °
neu	0.08 °


This menu item can be accessed via the Settings menu.


The start threshold tolerance defines the maximum permissible deviation before a drive that is already at a standstill readjusts. If the deviation of the current motor position is greater than the start threshold tolerance, the motor starts up again.

The desired tolerance of the start threshold can be set to between 0.02° and 2.05°.

**Note:** Reasonable setting for tolerance values: "Start value tolerance" ≥ "Target value tolerance"

The new tolerance value is increased or decreased using the   keys.

Press the  key to accept the new tolerance value.



Return to the Settings menu using the  key.

## 8.8 Max. Speed menu item




The drive speed is set as a relative value (0-100%) in the Max. Speed menu item.

**Note:** In three-point-step operation, the drive stops immediately when the movement signal is removed.

The new Max. Speed value is increased or decreased using the   keys.

The new value is applied using the  key.

You can cancel the input and/or return to the Settings menu using the  key.

## 8.9 Ramp Settings menu item



The Ramp Settings menu item is used to set the acceleration and deceleration ramps as a relative value (0-100%).

The % figures refer to the permissible maximum values (100%) which have been defined for each motor and drive.


### 8.9.1 Acceleration menu item



The maximum acceleration ramp is set as a relative value (0-100%) in the Acceleration menu item.

The new Acceleration value is increased or decreased using the   keys.



The new value is applied using the  key.

Press the  button to change to the next menu item (Delay).


### 8.9.2 Delay menu item



The maximum delay ramp is set as a relative value (0-100%) in the Delay menu item.

The Delay value is increased or decreased using the   keys.

The new value is applied using the  key.

Press the  button to return to the Settings menu.

### 8.10 Current Settings menu item

The holding and traction current are set as a relative value (0-100%) in the Current Settings menu item.

The % figures refer to the permissible maximum values (100%) which have been defined for each motor and drive.





### 8.10.1 Holding Current menu item




The holding current is set as a relative value (0-100%) in the Holding Current menu item.

**Note:** The required holding current is determined based on the forces that can occur at the output shaft. Setting the current values too high will shorten the service life of the motor. If the current is too high, the motor temperature will rise.

The new holding current value is increased or decreased using the   keys.

The new value is applied using the  key.



Press the  button to change to the next menu item (run current).

### 8.10.2 Run Current (torque) menu item




The run current (torque) is set as a relative value (10-100%) in the run Current menu item.

**Note:** The required traction current is determined based on the resistances that can occur at the output shaft. Setting the current values too high will shorten the service life of the motor.

The new traction current value is increased or decreased using the   keys.

The new value is applied using the  key.



Press the  button to change to the next menu item (heating).

### 8.10.3 Heating menu item




The heating is set as a relative value (0-100%) in the run Current menu item.

**Note:** The heating automatically switches on when the unit temperature falls below a preset threshold. With the setting 0%, the heating is deactivated.

The new heating value is increased or decreased using the   keys.

The new value is applied using the  key.


Press the  button to return to the Settings menu.


## 8.11 Linear actuator menu item



In this menu, the special function linear actuator can be activated. If this is active, the drive no longer counts the movement in ° but in mm. This changes the appearance of the drive in the main window and in the "Set limits" menu. The value to be set here must correspond to the distance that an attached linear drive would cover during a full rotation of the drive shaft.

Use the buttons   to set the desired value.

Press the key  to accept the new setting (With the setting 000.00 mm, the linear drive function is deactivated).

Press the  button to return to the Settings menu.


## 8.12 Enable signal menu item




In this menu, the controller enable signal can be activated/deactivated. The "enable signal" function is only relevant in the two analogue operating modes. If the "enable signal" function is **activated**, the drive will only run in analogue mode in this case if the controller enable signal (DC: terminal 4, reference signal terminal 3; AC: terminal 25, reference signal terminal 23) is present. If no voltage is present, the **three-point-step operation** is active.

If the "enable signal" function is **not activated**, the drive always runs in the set analogue mode in this case. The controller enable signal (DC: terminal 4, AC: terminal 25) is ignored.

Use the buttons   to switch between "Yes" and "No" in the selection menu.

Press the key  to accept the new setting. To accept the change, the drive performs a restart.


Press the  button to return to the Settings menu.


### 8.13 Display smoothing menu item




In this menu, the display smoothing can be activated/deactivated. If the "display smoothing" function is **activated**, the actual value shown in the display is adjusted to the setpoint value, provided the deviations are within the set reaction tolerance. The display is also adjusted when the drive has reached the end position. If the "display smoothing" function is **not activated**, the real values are always shown in the display.

Use the buttons   to switch between "Yes" and "No" in the selection menu.

Press the key  to accept the new setting.

Press the  button to return to the Settings menu.

## A. Error messages

Certain error messages can be confirmed via the  key.

Tab. A1.0: Complete list of errors

Fehlermeldung	Kommentar
001_ERR_NOSIGNAL	Signal below critical limit
002_ERR_EEPROM_STRUDEVICE	EEPROM read/write error
003_ERR_EEPROM_STRUCONTROL	EEPROM read/write error
004_ERR_EEPROM_STRUDACSETS	EEPROM read/write error
005_ERR_EEPROM_TASKEEPROMWRITE	xx
006_ERR_DAC_DATAREAD	EEPROM read/write error
007_ERR_DAC_OVERTEMP	DAC temperature message
008_ERR_DAC_EEPROMREAD	EEPROM read/write error
009_ERR_EEPROM_JOURNAL	EEPROM read/write error
010_ERR_EEPROM_ERRLIST	EEPROM read/write error
011_ERR_EEPROM_WINKELDATEN	EEPROM read/write error
012_ERR_EEPROM_SAMPLINGTOLERANCES	EEPROM read/write error
013_ERR_EEPROM_TIMECONSTANTS	EEPROM read/write error
014_ERR_EEPROM_ADCNORM	EEPROM read/write error
015_ERR_ADC_INVALUE	xx
016_ERR_ADC_FROZENSIGNAL_SOMEVAL	Signal value equal to 4(any value)
017_ERR_ADC_INITFAIL	ADC Init fail
018_ERR_ADC_SHUTDOWN_HARDRESET	ADC Init fail
019_ERR_ADC_SHUTUP_HARDRESET	ADC Init fail
020_ERR_ADC_ERRSHUTDOWN	ADC Init fail
021_ERR_ADC_ERRSHUTUP	ADC Init fail
022_ERR_ADC_ERRREAD	Error reading from chip
023_ERR_ADCNORM_RECHNFEHLER	Calculation error
024_ERR_MOTOR_OVERTEMPERATUR	Trinamic message
025_ERR_CPU_OVERTEMPERATUR	CPU message
026_ERR_EEPROM_AUSSIGNAL	EEPROM read/write error
027_ERR_MECHANICAL_STOP	Engine does not start despite requests

028_ERR_ DIFFER_VELOCITIES	Significant differences between Trinamic and Cambrige
029_ERR_ MOTOR_DOESNTSTOP	No stop despite multiple requests
030_ERR_ 3POINT_BOTH_ACTIVE	Both lines (open/close) high
031_ERR_ EEPROM_SWREV	EEPROM read/write error
032_ERR_ EEPROM_HWREV	EEPROM read/write error
033_ERR_SPI	No SPI access despite several attempts
034_ERR_ EEPROM_MOTORINIT	EEPROM read/write error
035_ERR_ MOT_INITFAIL	Motor Init fail
036_ERR_ SPI_READWRITE	FINISH routine error
037_ERR_ MOTOR_BLOCKED_CONT	Motor does not start despite requests/continuous error
038_ERR_ MOTOR_TODDLED	
039_ERR_ MOTOR_BLOCKED_NUM	Motor does not start despite requests/numerical error - counted once
040_ERR_ ADC_FROZEN_SIGNAL_MAXVAL	Signal value equal to 4x(>=0x00800000)
041_ERR_ POOVE_MOTOR_CABLE	Suspected break in cable to the engine
042_ERR_ LOW AMP SENSOR SIGNAL	Signal ampl. /sensor attached very low?
043_ERR_ NO SENSOR SIGNAL	Sensor signal cannot be read correctly/sensor attached very low?
044_ERR_ NO SENSOR INIT	Error in Routine _ReadWriteRegister_CAM
045_ERR_S ENSOR_EEPROMREAD	EEPROM read/write error
046_ERR_ EEPROMREAD	EEPROM read/write error general

## B. Default settings

No.	Value	Default	
1	Acceleration	10	%
2	Delay	20	%
3	Holding current	10	%
4	Traction current	40	%
5	Heating current	0	%
6	Motor speed high	60	%
7	Start angle	0	°
8	Stop angle	90	°
9	End position 1	2	°
10	End position 2	88	°
11	Safe position	0	°
12	Rotn direc.	right	
13	Target tolerance	0,04	°
14	Start value tolerance	0,08	°
15	Language	Deutsch	

## C. Connections

The actuator is available in a 24V DC or a 110-240V AC version. For 24V DC units, the power supply, controller enable and three-point-step-operation (open/close signal) are connected to 24V DC on the base board.

For 110-240V AC units, the AC/DC additional module is installed. In this case, the power supply, controller enable and three-point-step-operation (open/close signal) are connected to the AC/DC additional module.

The relay connections for the error message and for the valve flap end position 1 and end position 2 are located on the display board.

Connection number	Connection
1	+24V DC Mains voltage
2	GND DC Mains voltage
3	GND DC Reference potential for three-point-step and controller enable (terminals 4, 5 and 6)
4	+24V DC Controller enable
5	+24V DC Three-Point-Step CLOSE
6	+24V DC Three-Point-Step OPEN
7	Analogue signal (current/voltage) In +
8	Analogue signal (current/voltage) In GND
9	Analogue signal (current/voltage) Out GND
10	Analogue signal (current/voltage) Out +
13	Error message NO
14	Error message C
15	Error message NC
16	Position feedback 1 NO (CLOSE)
17	Position feedback 1 C (CLOSE)
18	Position feedback 1 NC (CLOSE)
19	Position feedback 2 NO (OPEN)
20	Position feedback 2 C (OPEN)
21	Position feedback 2 NC (OPEN)
22	110-240V outer conductor
23	110-240V neutral conductor
24	110-240V protective conductor
25	110-240V controller enable
26	110-240V Three-Point-Step OPEN
27	110-240V Three-Point-Step CLOSE



## C.1 Baseboard connections

Incoming connections: 24V DC, Controller enable, three-point-step-operation, Analogue Input

Outgoing connections: Analogue Output

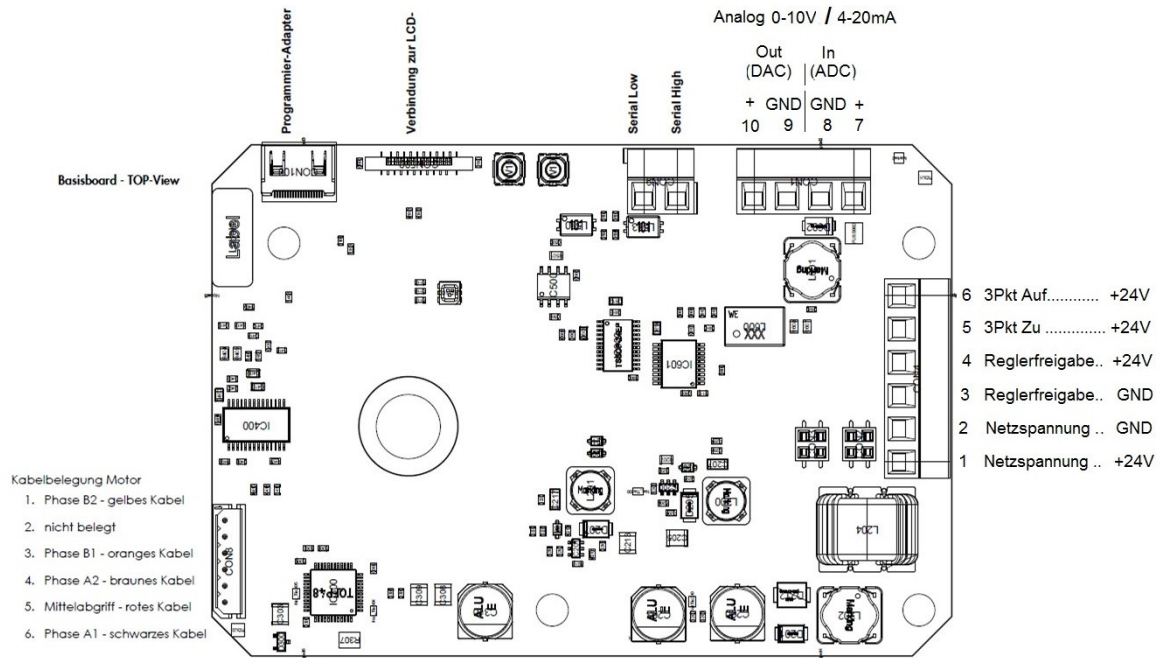


Fig. 1 Baseboard

## C.2 Displayboard connections

Outgoing connections: Fault/position report relay

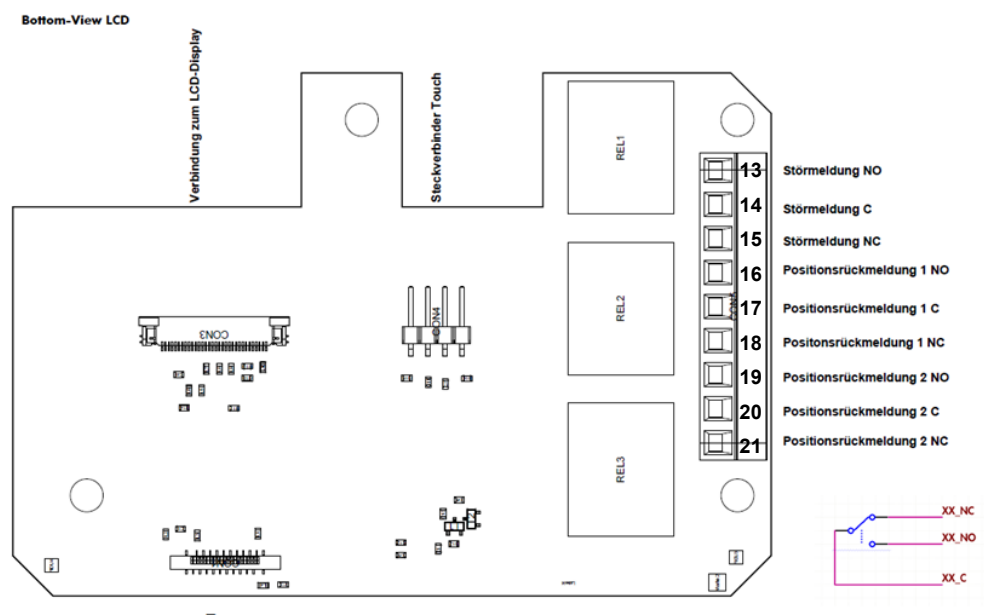


Fig. 2 Displayboard

### C.3 AC/DC Board connections

Incoming connections: 230V AC, controller enable, three-point-step-operation

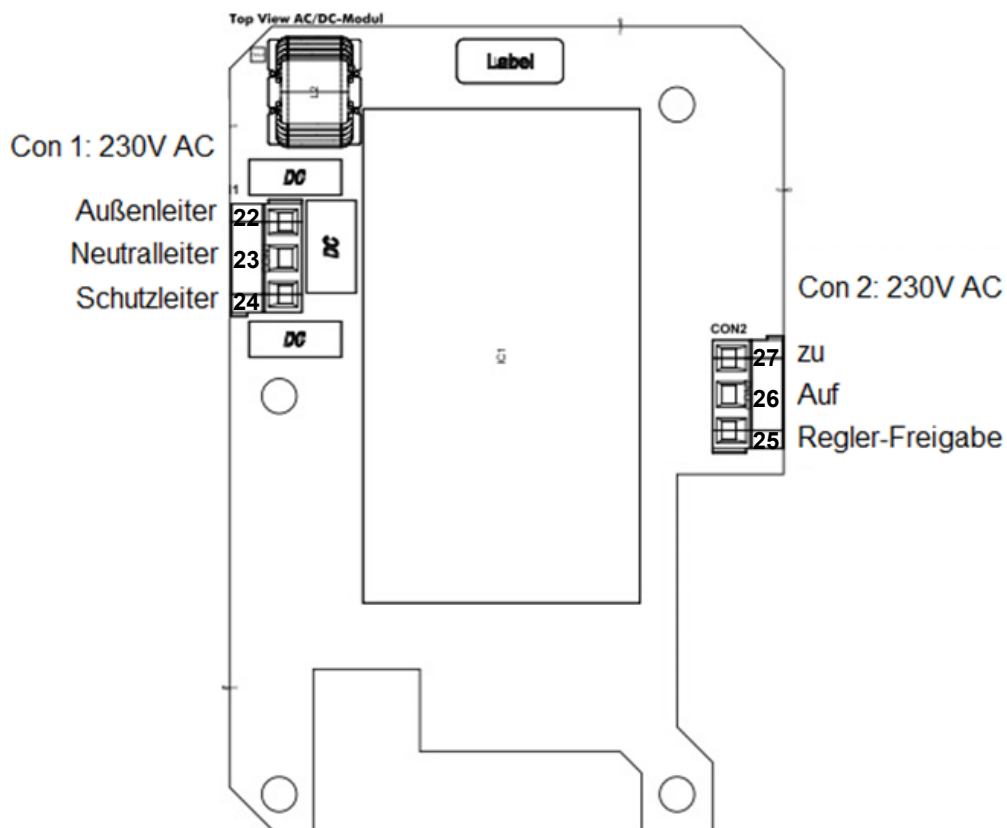


Fig. 3 AC/DC board top view

## D. Dimensions

