Operating Manual for actuators with SMARTCON controls (CSC1182e)

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Note:  **Notes contain important information.**

Warning:  **Warnings indicate special methods or handling procedures which, if not followed properly, may result in serious injury.**

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1 Introduction

This manual applies to SCHIEBEL actuators of the AB series with integrated SMARTCON controls. By the use of RISC processors this actuator control unit offers even more flexibility and user comfort than those so far known controls.

Range of application is the operation of industrial valves, e.g. plug valves, slide gate valves, butterfly valves or cock valves. For other applications, please consult us. SCHIEBEL is not liable for any possible damages resulting from use in other than the designated applications. Such risk lies entirely with the user.

Observance of these operation instructions is considered as part of the actuator's designated use.

During electrical operation certain parts inevitably carry lethal voltages. Work on the electrical system or equipment must only be carried out by a skilled electrician himself or by specially instructed personnel under the control and supervision of such an electrician and in accordance with the applicable electrical engineering rules.

The maintenance instructions must be observed, otherwise a safe operation of the actuator is no longer guaranteed.

Non-observance of the warnings and notes may lead to serious injuries or damages. Qualified personnel must be thoroughly familiar with all warnings and notes in these operation instructions.

Correct transport, proper storage, mounting and installation, as well as careful commissioning are essential to ensure a trouble-free and safe operation.

When working in potentially explosive areas, observe the European Standards EN 60079-14 "Electrical Installations in Hazardous Areas" and EN 60079-17 "Inspection and Maintenance of Electrical Installations in Hazardous Areas".

For work carried out in hazardous areas, special regulations (European Standard EN 60079-17) must be observed.

Work at the open actuator under voltage must only be performed if it is assured that for the duration of the work there is no danger of explosion. Pay attention to additional national regulations.

2 General

2.1 overview

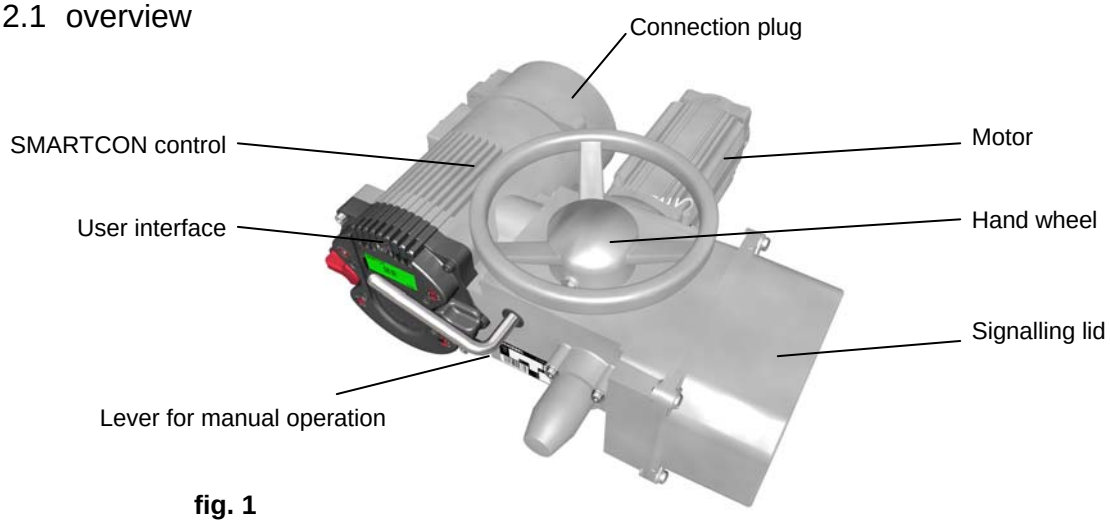

fig. 1

2.2 serial number

Each actuator possesses its own serial number, also called fabrication number. The serial number is an 8-digit number, which begins with the year of production. The serial number is found on the type plate (see fig. 2) of the actuator (the type plate of the actuator is located under the hand lever - see fig. 3). In-plant recordings of the company Schiebel enable on the basis this serial number an unique identification of the actuator (type, size, execution, options, technical data and inspection report).

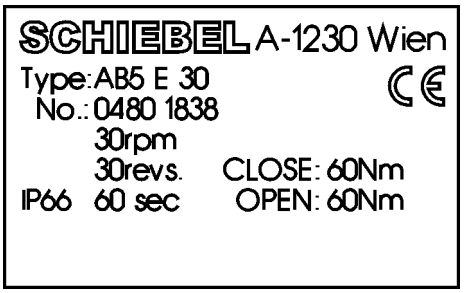

fig. 2

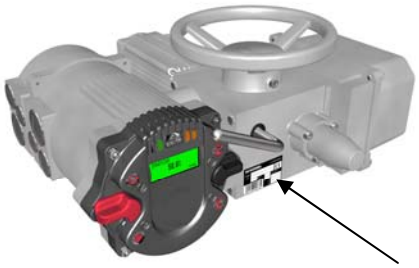

fig. 3

Actuators in explosion proof design (according standard EN 50014) are using a different type plate (EEx, TÜV – see fig. 4) including various ex-proof indications

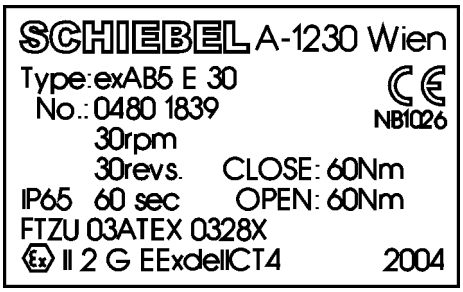

fig. 4

2.3 mode of operation

There are two distinct modes of operation: open-loop control operation (operational mode S2 for ON-OFF) and closed-loop control operation (operational mode S4) according to VDE 0530. But since there is a great number of varying and special models made to order, it is recommended to consult the motor model plate for the mode of operation and the running time.

2.4 degree of protection

Control drives with three-phase motors have according to standard enclosure IP 67 (according to DIN 40050). **Explosion-proof** actuators have the enclosure IP 65. Exceptions might be actuators with direct current and/or brake motors and other ordered enclosures relating to orders**.** .

ATTENTION: at the type plate printed enclosure is given only if the cable glands correspond to the necessary enclosure, which signalling lid as well as the plug cover is carefully fixed and the installation position is in accordance with description in chapter 2.5 (page 5).

We recommend metallic cable glands with metric thread form according to DIN 13. Further not used cable entries have to remain locked with blind screw connections. **After the opening of covers** for mounting purposes or set up, it is to be made certain with the remounting of the covers that the seals are correctly installed. Improper assembly may lead to water entrances and to failures of the actuator.

ATTENTION: The lid of the user interface may not be opened !

The connection wires should have a dip before the cable glands, so that water on the leads can drip off and the cable glands is not reached. Thus also forces which affecting the cable gland are reduced (see chapter 2.5, page 5)

2.5 installation position

The installation position is basically unimportant; due to practical experience it is advisable however to consider if mounted outside or within splash-water-endangered areas the following recommendations:

- actuator with cable glands downwards
- Motor not hanging down
- Sufficient dip of leads before coming to the cable glands

2.6 turning direction

If not expressly differently ordered, is the standard direction of rotation:

right turning (clockwise) = CLOSE **left turning (counter clockwise) = OPEN**

Clockwise rotation of the actuator is given when the output shaft turns counter clockwise when looking on the output shaft respectively when turning in clockwise direction when looking on the hand wheel.

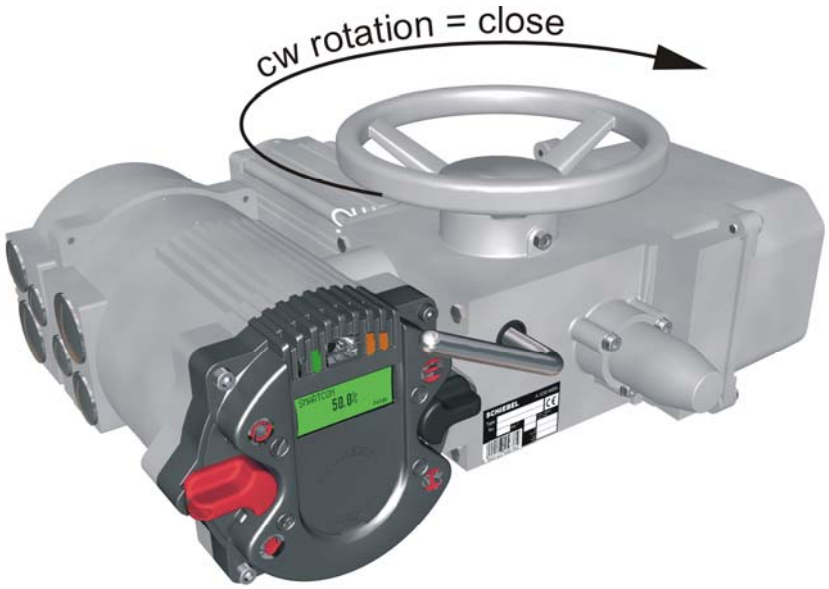

fig. 5

ATTENTION: All specifications in this manual refer to the standard direction of rotation

2.7 Protective Gear

2.7.1 Mechanical Protective Gear

The torque monitoring of the actuators with integrated SMARTCON control is done mechanically by diaphragm spring packages which transmit the current torque via a plastic potentiometer and pass the signal on to the control unit. A modification of the switch off - torque can be done in the menu of the control unit SMARTCON for each direction separately. The switch off - torque is adjusted to the ordered torque. If with the order no torque was specified the actuators factory-setting is the smallest adjustable torque of the model size.

Set torque must suit the valve!

The setting of the torque value should only be changed with the consent of the valve manufacturer!

Further information might be found in Chapter 7.2 (page 26)

2.7.2 Electrical Protection

All motors are equipped according to standard with thermal relays (temperature sensors optionally available), which are wired into the control, and protect the motor against illegal coil heating up.

In the housing of the connection plug (for actuators in explosion-proof design in the electronic room) super fast safety fuses are located the protect the integrated thyristors (electronic reversing contactors).

Additionally in principle the control drive should be secured lie close-laterally with a protective relay for motor for the protection of the control from to high rivers, whose trigger current is adjusted to the engine rated current

(during explosion-proof design of the control drives according to the execution recommendations the national explosion protection supervisory authority to proceed).

2.8 Ambient temperature

If not relating to orders differently fixed, generally does apply to the following application temperatures:

On/off duty (open loop control)	-25 to +70°C
Modulating duty (closed loop control)	-25 to +60°C
Ex-proof actuators	-20 to +40°C (according EN50014)

ATTENTION: Die maximum application temperature can be dependent on further order-specific installation components also. Consider please the technical data sheets which product specific to be provided and has been supplied with the actuator.

2.9 As-delivered condition of the actuators

For each actuator with the final inspection an inspection report is provided. Are accomplished 100% - a visual inspection, a calibration of the torque unit in connection with an extensive run examination and a functional test of the micro controllers control SMARTCON. The execution of these examinations according to the quality system are noted and can be made available if necessary.

The basic adjustment of the end position must take place after the assembly on the valve. NOTE: The guidance for start-up (see chapter 5, page 11) is to be kept absolutely! If mounted on provided valves in the work shop at SCHIEBEL this reference is done by the factory and documented with the attachment of a sticker at the signalling lid (see fig. 6).

fig. 6
sticker at the signalling lid

2.10 Reference (marker)

On each actuator after the final inspection an edited version of this manual in 2 languages is fastened by means of a red marker (see **Fehler! Verweisquelle konnte nicht gefunden werden.**) on the hand wheel. Likewise the internal commission number is noted on this.

V3.00 – 27/05

SCHIEBEL

Antriebstechnik Ges.m.b.H Tel. +43 (1) 66108 / 0

ACHTUNG! Wichtige Unterlagen befinden sich im Meldedeckel

- Die Betriebsanleitung ist für jegliche Arbeiten am Stellantrieb und bei der Inbetriebnahme zu beachten!
- Lagerung/Langzeitlagerung, Einbau u. Wartung sind lt. Betriebsanleitung vorzunehmen.
- **HEBEZEUGE:** Nur weiche Gurte verwenden. Nicht am Handrad befestigen.
- Vor **INBETRIEBNAHME** *Silicagel* aus dem Meldedeckel entfernen.
- Sämtliche **WARTUNGSARBEITEN** sind nur am spannungslos geschalteten Stellantrieb vorzunehmen. Das Einschalten während der Wartung muss, gemäß EN50110, ausgeschlossen sein.
- Beim elektrischen Anschluss **Schaltbild** beachten!
- Beim **Umschalten** auf Handbetrieb wird die **Selbsthemmung** des Stellantriebes **aufgehoben**. Die Umschaltung auf Motorbetrieb erfolgt **automatisch** und **darf nicht** mit dem Handhebel vorgenommen werden.
- **Vorsicht! Handhebel Schwenkwinkel ca. 15°**

KOMM.NR.:

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ATTENTION! Important documents are inside the indicator lid

- The operating instructions must be observed for any and all operations on the actuator!
- Storage/long-term storage, installation and maintenance to be undertaken according to operational instructions.
- **HOISTING EQUIPMENT**: Use soft belts only. Not to be attached to the hand wheel.
- Prior to **START-UP** remove *silica gel* from the indicator lid.
- All **MAINTENANCE WORK** must only be carried out when actuator is **switched off from power**. Switching on during maintenance must be prevented acc. EN50110.
- Observe the **wiring diagram** when establishing electrical connection!
- When **switching** to manual operation, actuator's **automatic interlock** is **cancelled**. Do not use the hand lever for **re-switching** to motor operation. Reengagement is done **automatically** during motor start-up.
- **Caution! Hand lever has a slewing angle of approx. 15°**

CONSIGNMENT No.:

See back page

3 Packing, transport and storage

Depending upon order the actuators are packed or delivered not packed. Special packing requirements must be specified with the order. When the out and/or repacking largest care is to be used.

NOTE: Use with lifting witnesses soft belts, do not fasten belts to the hand wheel. If the actuator is mounted on a valve, fasten lifting apparatus to the valve and not to the rotary drive.

3.1 General

In the signalling cover of all actuator min. 5g SILICA-gel are contained ex factory.

NOTE: Before start-up of the actuator (see chapter4, page 9) the silica-gel must be removed!

3.2 Storage

NOTE: Damage is avoided by attention of the following measures with the storage of actuator:

- store actuator in well ventilated, dry areas.
- Protection against ground moisture by storage on wooden pallets, in lattice boxes or shelves
- Cover the actuators against dust and dirt with plastic foil
- actuators do have do be protected from mechanical damages

it is not necessary to open the control unit of the actuator for maintenance of batteries or the like.

3.3 long term storage

Note! For **storage of actuator over more than 6 months**, the following instructions must be absolutely considered additionally:

- The silica-gel brought in the signalling cover is to be exchanged at the latest after six month's storage (starting from delivery date - work company SCHIEBEL, Vienna)
- After opening of the signalling cover and exchange silica-gel is the rubber seal of the signalling cover to be coated with glycerin. Afterwards signalling cover close carefully again.
- coat screw heads and bright places with resin-free fat or long-term corrosion protection.
- Defective painted areas, which resulted from transport, inappropriate storage or mechanical influences, please repaint with separately sold colour spray.
- the prescribed measures and precautions met for the long term storage repeat every 6 months for effectiveness examine as well as corrosion protection and silica-gel renew.

In case of neglect the instructions stated above condensation arises, which entails a damage of the actuator.

4 mounting instruction

Mounting and/or assembling works are only aloud to be done by skilled and entitled personal!

4.1 mechanical mounting

Examine, whether armature flange and actuator flange fit to each other, whether the stem of the valve and the actuator drive bush respectively whether the thread of the output form Am with the thread of the spindle fits with each other.

- Grease stem
- Clean mounting flange of valve
- Grease the connection parts of actuator and valve
- Mount the actuator on the valve
- lock screws crosswise

Output form A (spindle nut unthreaded) is necessary to be lubricated after machining of the nut is done!

For this the optionally available grease of the SCHIEBEL or every commercial available grease according to our lubricant recommendation (chapter 14.1.3, page 44) can be used.

4.2 electrical connection

The electrical connection must be accomplished only by technical personnel.

Relevant safety regulations have to be considered (OEVE EN 1).

Do the electrical connection only in the condition without tension accomplish.

Further it is to be taken care that the ground connection screw is connected to a ground contact. This is to protect the product against electrostatic dischargement.

Please check if the supplied power (voltage, frequency) is corresponding with the actual data on the type plate of the electric actuator.

The connection of the electric wires has to be done according the supplied wiring diagram / connection plan of the actuator. This wiring diagram is to be found in the signalling lid or the plug cover of the actuator.

In case it has been lost it is possible to source from SCHIEBEL Vienna or to download from the Internet with reference to the fabrication number of the actuator.

In combination with additional options such as Profibus interface the particular manuals and norms have to be considered.

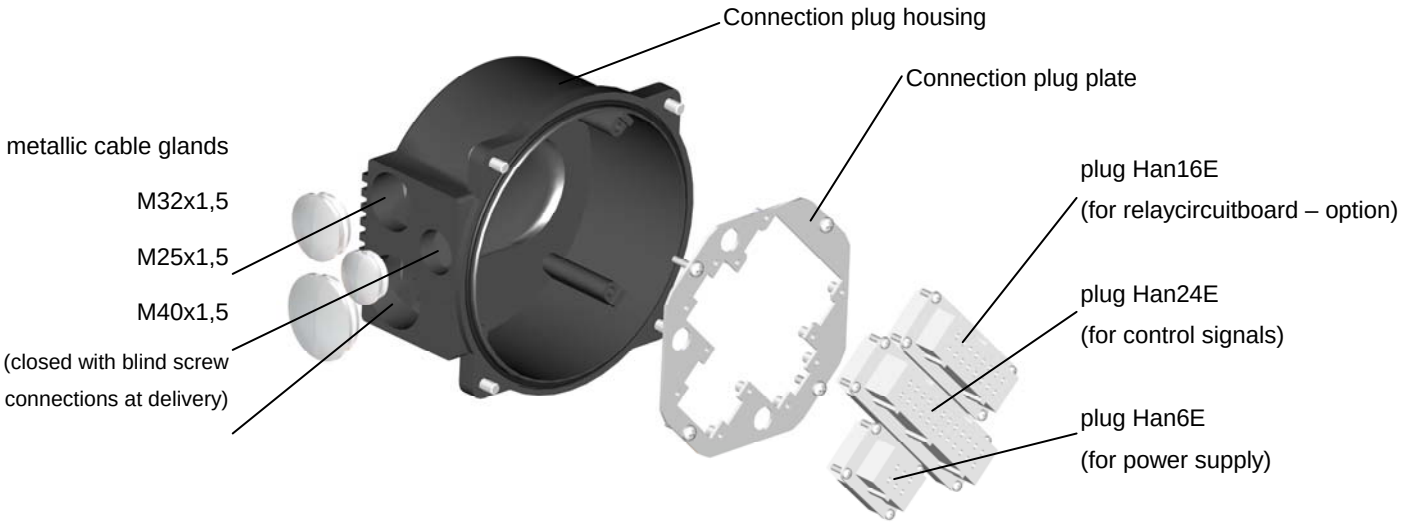


fig. 7 (Connection plug)

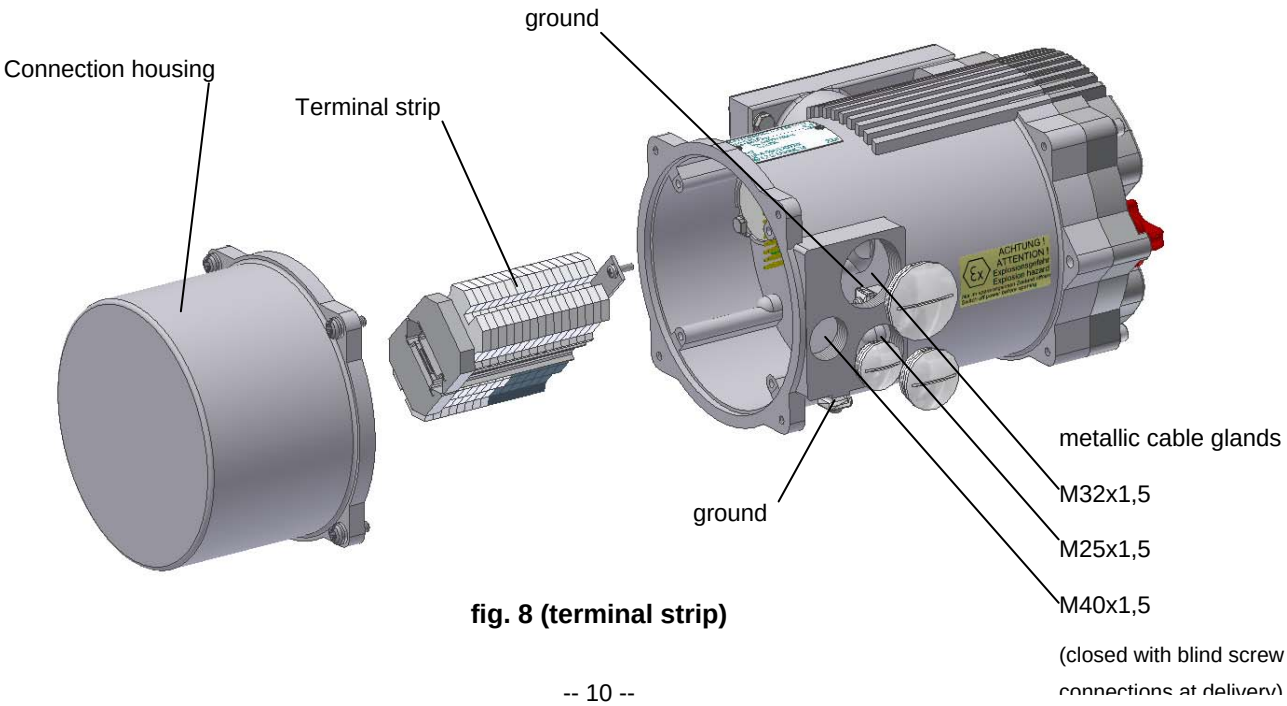


fig. 8 (terminal strip)

Based on the ordered actuator version the following connection

The standard model can be ordered with the following connection options:

- Connection of the control unit and the motor is made with a screw plug (I_n=16A). max wire size is 2,5mm² (AWG 14)
- For **Ex prove actuators** or an special request the connection can be made by terminal strip. max wire size is 2,5mm² (AWG 14).On special request (or because of a large current) larger motor strips can be used

motor connection:

AB series actuators with integrated SMARTCON control unit only the supply voltage has to be connected. The motor control is done by SMARTCON.

The connection is done via a separated 6 – pole plug in the connection compartment.

3 phase power is applied in positive turning direction of the electric field on the connectors L1, L2, L3 according the wiring diagram.

Before starting the actuator the turning direction of the electronic field should be checked.

NOTE: **If phase sequence of the three phase power supply system is wrong the integrated phase sequence monitoring generates an error and the actuator is blocked (refer to chapter 11, Page 43).**

If you need a reverse rotation of the actuator (ccw) you must change this in the control unit (see Section 7.1 – Page 24)

If electrical connection is not immediately followed by start-up and if the unit is located outdoors, the heating resistor should be promptly activated (Be sure the voltage is in accordance with the proposed wiring diagram!) or the silica gel should be left in the indicator unit

Caution: See Section 3.2 (Page 9) of the operating instructions

5 START-UP

It is assumed that the actuator has been correctly assembled and electrically connected (see Section 3).

Caution: Remove silica gel from the indicator lid.

5.1 General

WARNING: After mounting and setup as well as after each removing from the valve the mechanic and the electric end positions have to be readjusted!

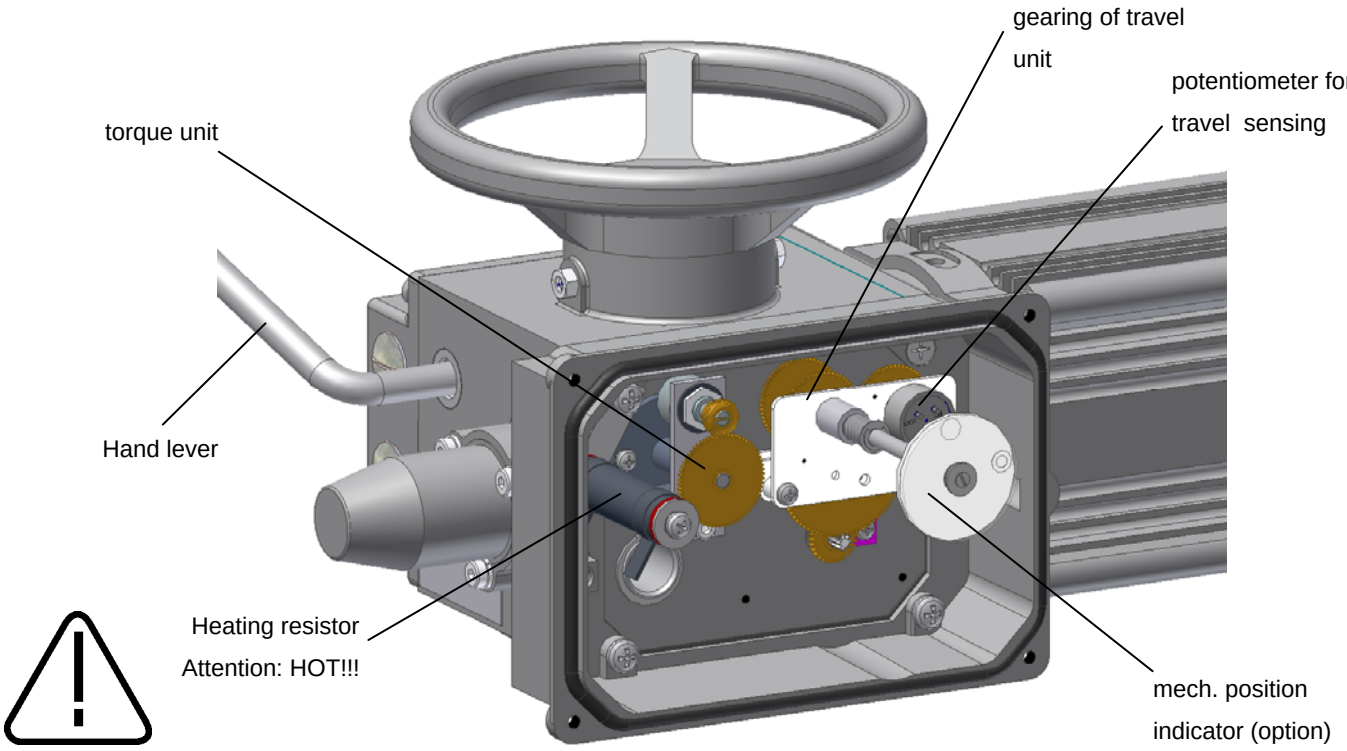


fig. 9

ATTENTION: The torque unit is adjusted at work and must not be changed

5.2 Switching Actuator to Manual Operation

The actuator is switched to manual operation by moving the hand lever (see fig. 10 and fig. 11) by approximately 15°, and by simultaneously turning the hand wheel. The lever remains in this position.

Caution: When switching to manual operation, the actuator's automatic interlock is deactivated. Switching back to motor operation **must not be undertaken with the hand lever.** Switching takes place automatically as the motor runs up.

WARNING!: Hand lever has a slewing angle of approximately 15°, therefore release the hand lever immediately upon activation!

Labels on actuator:

AB3, 5

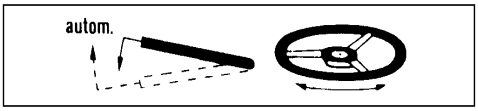


fig. 10

AB8, 18, 40

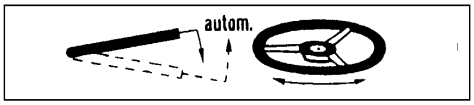


fig. 11

5.3 Mechanical preadjustment

Instructions:

- Switch with the hand lever to manual operation and turn the actuator with the handwheel to fully CLOSED position (at left closing valves to fully OPEN position).
- Remove cover of the signalling unit.
- Switch with the control switch (black switch) to the status menu S4 (absolute values), the selector switch (red switch) should remain in the neutral (middle) position.
- For units without mechanical position indicator turn the slotted shaft (see fig. 12) with a screwdriver until the value displayed at the position is between 5 and 10%. (see fig. 15)
- For units with mechanical position indicator turn the wheel (see fig. 13 und fig. 14) until the value displayed at the position is between 5 and 10%. (see fig. 15)
- Close cover of the signalling unit.

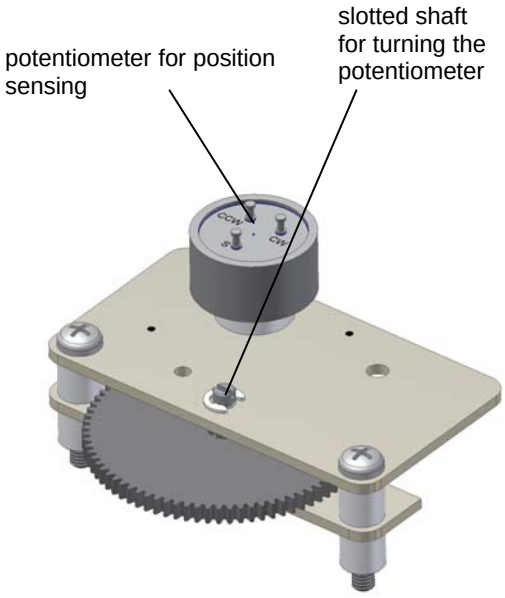


fig. 12

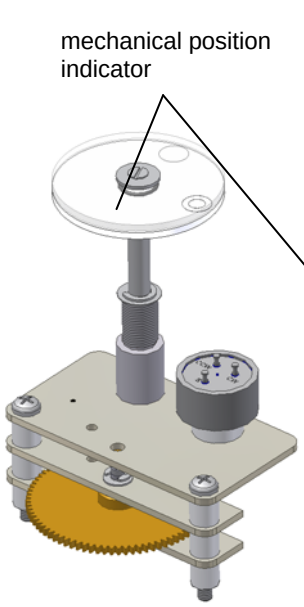


fig. 13

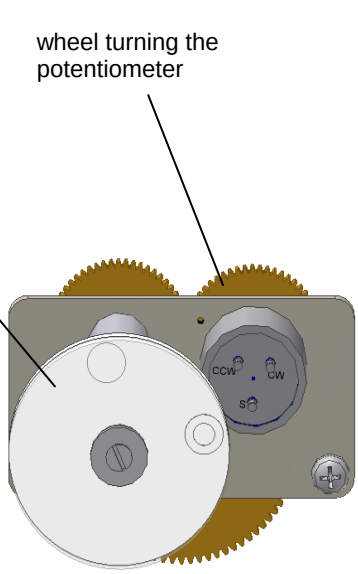


fig. 14

fig. 15

5.4 Adjustment of the mechanical position indication (Option)

The adjustment of the mechanical position indication should be done together with the mechanical pre-setup.

proceeding:

- remove signalling lid
- turn Indicator slide to position „CLOSE“ in reference to the mark on the signalling lid.
- Move actuator to end position „OPEN“ and turn the corresponding indicator slide in reference to the mark of the signalling lid. It is necessary that you hold the second slide in its earlier set position.
- Put the cover back on and fix the screws.

5.5 additional components (Optional)

Possibly installed additional components have to be set-up according their separately supplied technical descriptions.
After finishing this basic set-up all sealing of covers as well as the proper installation of cable glants have to be checked again. (refer to chapter 2.4, Page 5)
Also check the optical appearance for painting damages because of transport and handling which have to be repaired.

5.6 Parameterize of the SMARTCON control

After finishing the pre-setup of the all further settings can be done via the SMARTCON interface.

WARNING: It is absolutely necessarily to control the torque settings of the actuator and to teach in the end positions of the travel.

5.7 Adjusting the end positions:

5.7.1 End position OPEN:

Switch both switches in the middle position.

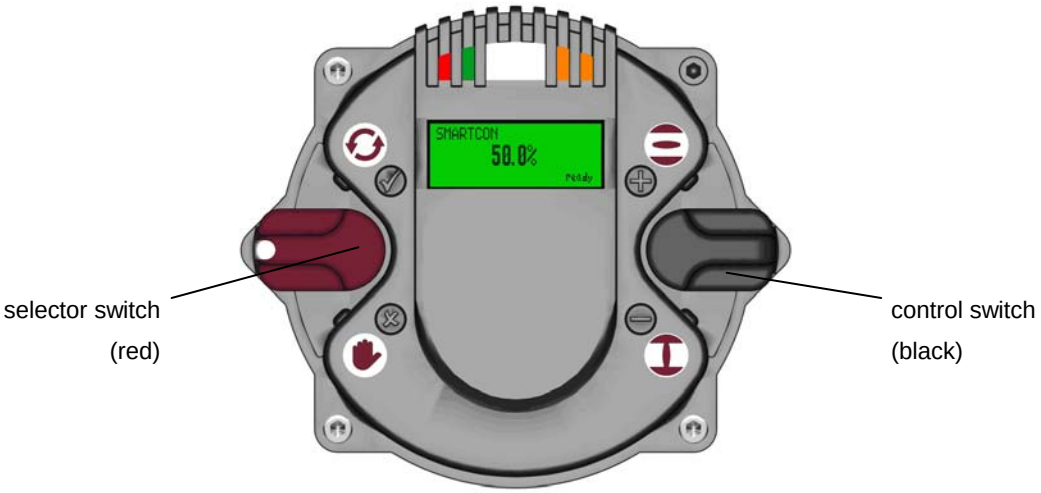


fig. 16

Select the parameter “P 1.1 End limit – Limit OPEN“ with the control switch (direction ⊖).

fig. 17

fig. 18

To change this parameter swich the selector switch half way in direction ✓ and back to the neutral position. This should take about 0.5 … 1 seconds.

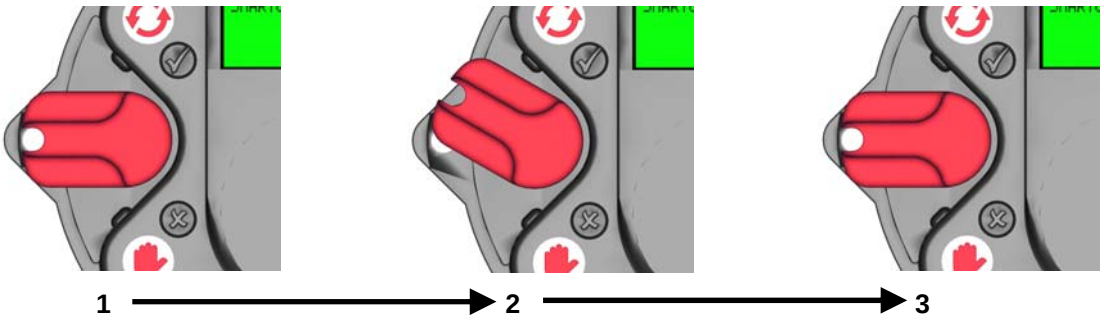


fig. 19

The last line in the display changes from “EDIT ?“ to “SAVE ?”.

fig. 20

fig. 21

Then switch the selector switch quickly in fully position ⊗. At the display appears “TEACHIN”.

fig. 22

fig. 23

Move the actuator by handwheel or with the control switch to the fully open position.

Attention: **If you operate the actuator by motor, only the torque monitoring is activated so please check the correct torque adjustment at parameters P2.1 and P2.2.**

The value on the display changes during the movement.

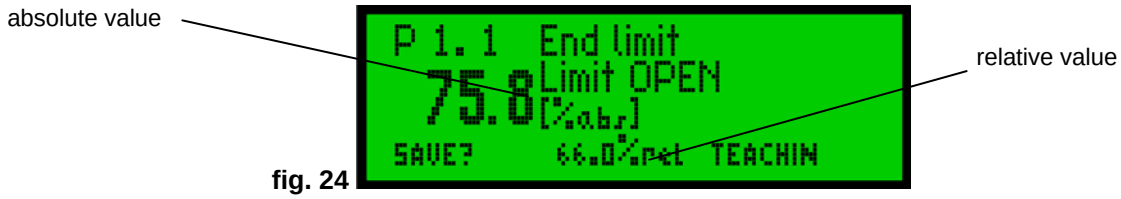


fig. 24

If the actuator is in the fully open position remember the displayed value and save this parameter:

Switch the selector switch quickly back in the neutral position (“TEACH IN” disappears).

fig. 25

fig. 26

Save the parameter acc. to fig. 27. (“SAVE ?” changes to “EDIT ?”, this takes about one second).

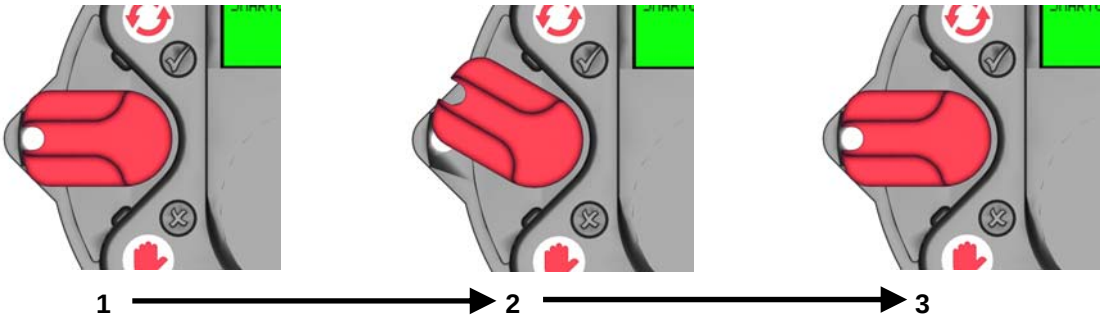


fig. 27

fig. 28

fig. 29

Check if the displayed value and the remembered value are equal, if not restart at fig. 29.

5.7.2 End position CLOSE:

Select the parameter “P 1.2 End limit – Limit CLOSE“ with the control switch (direction ⊖).
All other steps are identical to the position OPEN.

5.8 final work

After completion of the start-up recheck if all lids are closed proper and check the cable glands.
Also check the painting of the actuator, if the paint was damaged during transport or start-up.

6 The SMARTCON control

The SMARTCON control has the purpose to control and operate the actuator. It is the interface between operator, control system and actuator.

6.1 the interface

The operation of the control unit is done via 2 switches, the operator switch and the selector switch. The last is pad lock able to protect the actuator against unauthorized operation.
For additional visual information the product is equipped with 4 indication lights and a graphic display.
The corresponding symbols of these switches are illuminated and depend into the cover surface.

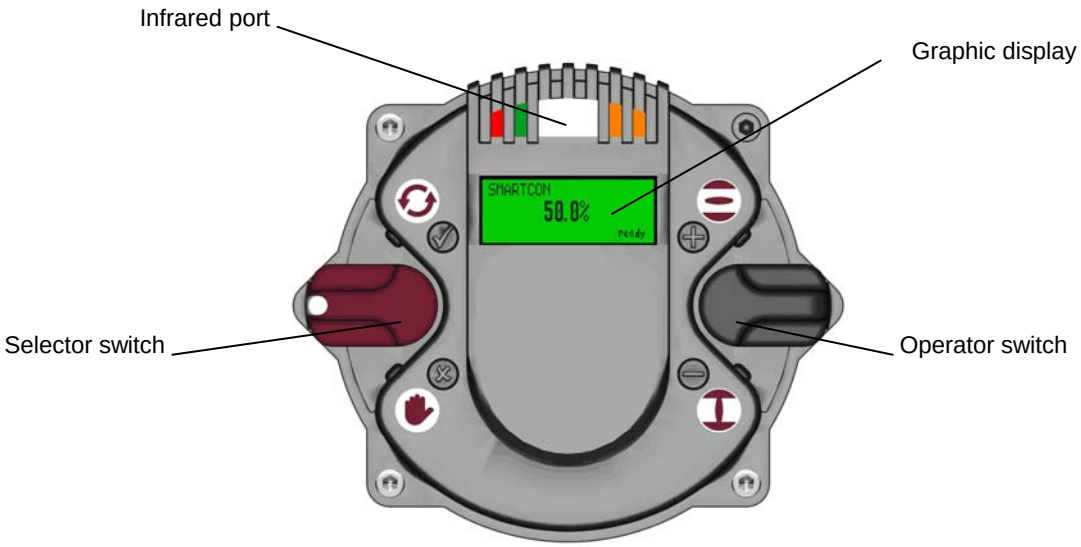


fig. 30

The switches are used to operate the actuator on one level but are needed for the parameterisation and scrolling through the menu of the control unit on a second level.

The cover of the control unit is only to be cleaned with a wet, soft cleaning rag.

6.2 Indication elements

6.2.1 Graphic display

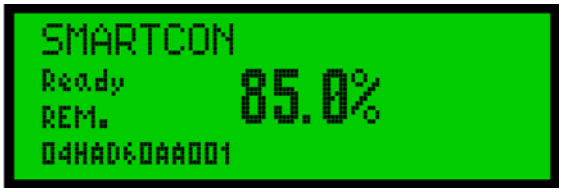
The used graphic display of the SMARTCON control unit enables the operator to communicate with the control unit in plain text. It is possible to choose between different languages. Additionally special symbols and signs can be displayed.

fig. 31

During operation of the actuator the actual position of the valve in percent is visualized on the display of the control unit.

When using the electric type plate (option) the defined valve name (KKS number) is displayed in the lowest line of the display area. Also the lowest line of the display can be used for additional information.

fig. 32



Being in the parameterize modus of the control unit the following information's are display:

- Menu item with numeric position
- Selected options
- Additional options (e.g. edit, save,…)
- Status information (e.g. TEACHIN Mode,…)

6.2.2 LED display

To improve the information of the operator some basic operating status are indicated via 4 different colour LED's lights on the top of the control unit.

After connection of the supply power a 3 seconds self test is done by the SMARTCON control unit during which all 4 indication lights (LED's) are lighting at the same time.

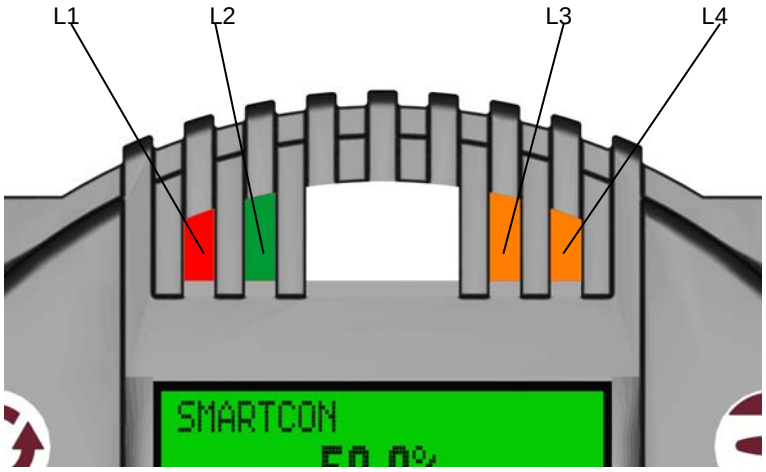


fig. 33

nomincaltion	color	lighting	flashing fast	flashing slow	Not lighting
L1 [1)]	red	Open	Running into open direction	On torque depending open: open position reached but the switch off torque was not reached	Actuator not in an end position
L2 [1)]	green	closed	Running into closing direction	On torque depending closing: close position reached but the switch off torque was not reached	Actuator not in an end position
L3	orange	No torque failure	Torque failure	---	---
L4	orange	ready	travel fault (NOT ready!)	---	Motortemp. trip. (NOT ready!)

Further information regarding warning and failure indications please find in chapter 11, Page 43

[1)] LED L1 and L2 can be changed by parameter P1.7 – see chapter 7.1, page 24

6.3 operation

the operation of the actuator is mainly done with switches of the control unit. (selector and operating switch).
All settings of the control unit and the actuator is also done with these switches.
To extend the ease of operation all settings can also be done by using the infrared connection in combination with the optional available software or by using the connection via Profibus (refer to chapter 7.14 page 37).
To ensure the most efficient operation the operator is working on various levels of the control unit menu with the two switches. We differ between the operating level and the parameterize level.
The second is reached when the selector switch is in neutral position (position “OFF“).
With the deflection of the switch an Amplification of the internal signals is performed.
That means as more the switch is pushed as faster the speed of scrolling through the menu becomes.

neutral position

little move of the switch (slow scrolling in the menu)

more move of the switch (fast scrolling in the menu)

complete move of the switch – the switch keeps at this position (you will move to the end of the menu)

fig. 34

6.3.1 operating status

With the selector switch (red) the various operating status are selected. In each position the switch can be locked by using a pad lock and the actuator can be protected against unauthorized operation.

The following positions are possible:

OFF the actuator is switch off. Neither the control system can operate the actuator nor the local operator switch is working.

LOCAL Local operation. It is possible to operate the actuator with the operator switch. The control system can – if parameterized – overrule the local commands and also operate the actuator.

REMOTE Remote Operation. The actuator is ready to process signals from the control system. The operator switch is not for motorized operation of the actuator activated.

Beside the selection of the operating status the selector switch is used to confirm or cancel inputs in the parameterize level of the control unit.

Depending on the position of the selector switch the operating switch takes over different functions:

selector switch in position „OFF“:

The operating switch is used – according the inner symbols on the cover – to scroll the menu up and down.

From the neutral position in ⊕ direction the operator attains to the status menu which is used to overview the actual settings and the data log (option).

Into the direction of the symbol ⊖ the parameter menu is reach and all detail settings can be viewed and modified.

Being in the menu area the selector switch becomes the functionality of confirmation ✓ respectively cancellation ✗ of the actual input. The switch has not to be brought into thgh to confirm or cancel.

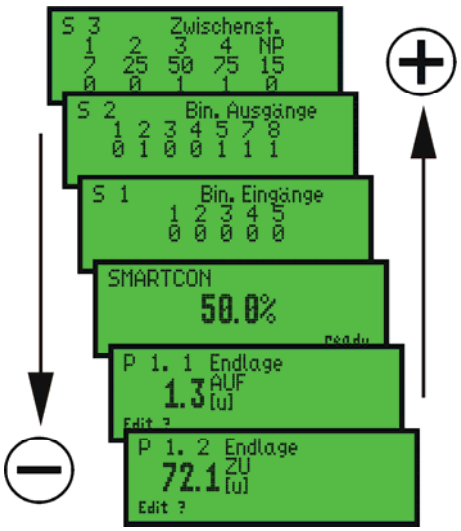


fig. 35

selector switch in position „REMOTE“:

The operating switch permit to view the status respectively the data log area. The access to the parameterize level is not possible.

selector switch in position “LOCAL“:

According the „outer“ illuminated symbols on the control cover the operator switch is used to move the actuator either with mechanical lock in the end position of the switch position or only in step motion by only push the switch a small way. The switches are equipped with spring which push the switches back into the neutral position except the switch is pushed into the mechanical hold position.

6.3.2 Parameterization

Generally all parameters are displayed in numeric order and alphabetic nominclation. Scrolling through the menu of the control unit is done with the operating switch.

In the left bottom corner of the selectable options such as „edit“ are displayed.

fig. 36

By using the selector switch (short tip of the switch – see fig. 27, page 17 – middle illustration) in the direction of the symbol ✓, the selected parameter can be edited. To show that the system is ready for input instead of „edit“ the option “save“ will be displayed in the left bottom corner.

fig. 37

After setting the desired value which is done by pushing the black operating switch into the corresponding direction (towards the ⊕ or ⊖ symbol – see fig. 34, page 20) the parameters can be saved by confirming with the selector switch move towards the symbol ✓.

In case the input should be cancelled move the selector switch into the opposite direction (to the symbol)

6.3.2.1 example for a Parameterization

We will activate the infrared communication by changing the parameter 20.6 from 0 (infrared off) to 1 (infrared on)

Switch both switches in the middle position.

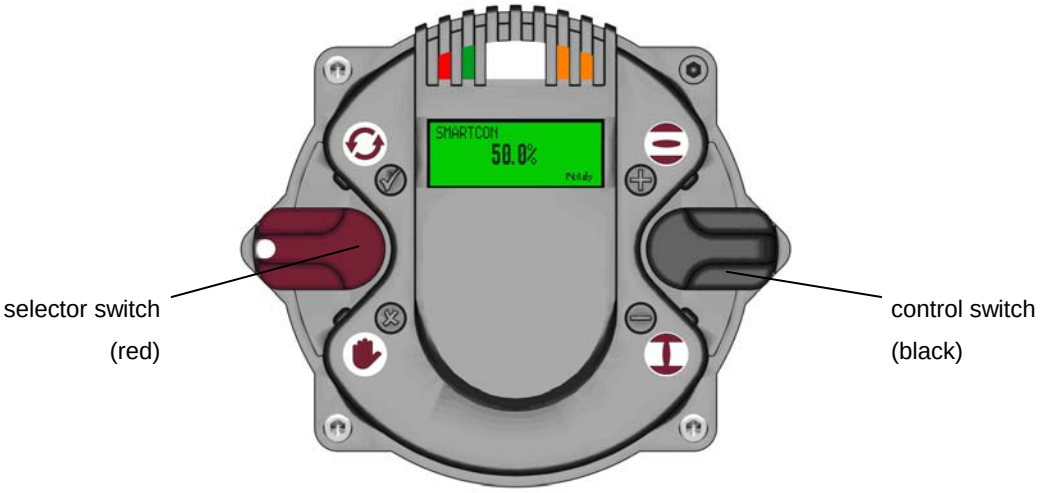


fig. 38

Select the parameter “P 20.6 Miscellaneus – Infrared“ with the control switch (direction ⊖).

fig. 39

fig. 40

To change this parameter switch the selector switch half way in direction ✓ and back to the neutral position. This should take about 0.5 … 1 seconds.

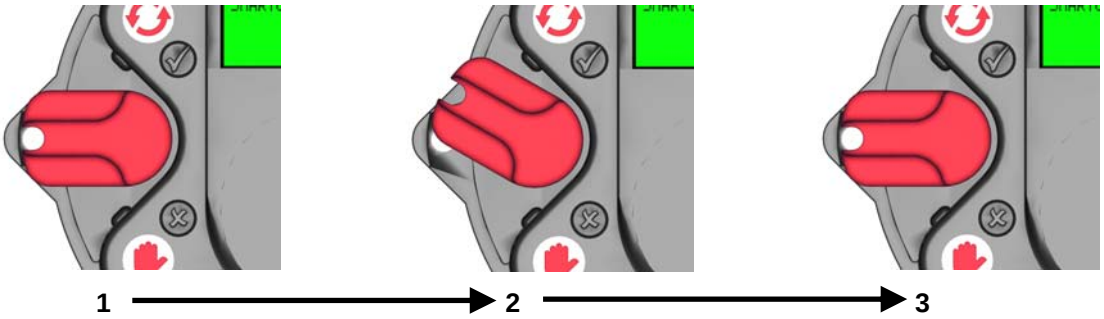


fig. 41

The last line in the display changes from “EDIT ?“ to “SAVE ?”.

fig. 42

fig. 43

Move the control switch (direction ⊕) to change the value from 0 (off) to 1 (on)

fig. 44

fig. 45

After changing the value to 1 save the parameter by switching the selector switch half way in direction ✓ and back to the neutral position. This should take about 0.5 … 1 seconds. – see fig. 41

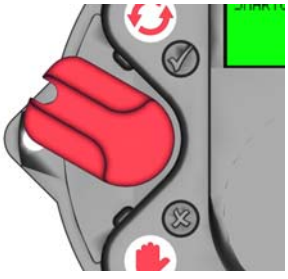


fig. 46

fig. 47

6.3.3 „Teach-in“ Mode

Additionally to the described input of parameters it is possible to use a teach-in mode to set various parameters such as end position. This teach in mode can essential ease the input of parameters.

After selection of the menu item which has to be adjusted (e.g. End position „Open“) please switch the red selector switch fully into the position manual operation . On the display the status information “teachin” is displayed. Now the actuator can be driven by hand or motor to the demanded position which shall be defined as the end position.

fig. 48

WARNING: Please check if the switch off torque is correct defined! For safety reasons you should drive the last travel towards the end position by hand.

After reaching the demanded position you use put the selector switch back into the neutral position and use the operating switch to confirm the achieved settings.

The setting will be saved and the setup is done.

7 The Parameter menu

In the following paragraphs an overview about the possible menu settings of the SMARTCON control unit shall be given. The menu is used to customize the actuator and control unit according the specific requirements of the valve on the one hand and of the control system on the other hand.

For each parameter group you will find a description and an overview chart of the sub-menu items and the possible options of each item.

The below described menu items also include optional available functionalities. It might be that menu items are described which are not available at your product.

7.1 parameter group: end limit

These parameter group is used for setup of end positions and the switch off behaviour of the actuator when reaching the end position.

The end positions can either be adjusted by input of parameters or by „tech-in“ mode as described earlier. It is important that the mechanical pre-setup described in chapter 0 (Page 12) has been done earlier.

WARNING: Before using the actuator these parameters MUST be adjusted. Also the settings of the menu „torque settings“ have to be checked in accordance with the valve data. (refer to chapter7.2, Page 26)

WARNING: Generally it has to be considered that OPEN is always indicated with 100% and the closed position with 0%. These indications can not be changed!

	Menu item	Sub item	Possible settings.	Explanation / remarks
P1.1	End limit	Limit OPEN	Teach-in mode; 0 – 100%	Change or teach the limit setting for OPEN direction.
P1.2	End limit	Limit CLOSE	Teach-in mode; 0 – 100%	Change or teach the limit setting for CLOSE direction.
P1.3	End limit	Torquedep. OPEN	by travel (0)	The actuator uses the travel end position for switch off and signalling.
			by torque (1)	The actuator stops the motor and signals the end position after reaching a certain torque but only if the travel position has been reached earlier. In case of not reaching the travel position a failure notice is generated.
P1.4	End limit	Torquedep. CLOSE	by travel (0)	The actuator uses the travel end position for switch off and signalling.
			by torque (1)	The actuator stops the motor and signals the end position after reaching a certain torque but only if the travel position has been reached earlier. In case of not reaching the travel position a failure notice is generated.
P1.5	End limit	ccw closing	cw (0)	Actuator is right turning (clockwise) = closing
			ccw (1)	Reverse turning direction! Counter clockwise turning = closing. All signals get swapped by the control unit.
P1.6	End limit	Rot. sense. pos.	0	Rotation sense of the Potentiometer
			1	
P1.7	End limit	LED function	CLOSE=green (0)	Defines the colour of the OPEN / CLOSE position
			CLOSE=red (1)	

WARNING: In combination of the actuator with an additional gearbox the effective data of the gearbox / linear unit has to be considered for parameterization of the actuator!

WARNING: Prior using the option „torque depending open/close“ the travel end positions have to be proper adjusted! This means that the end positions have to be set as close as possible to the actual end of the actual travel. The switch off of the motor and the signalling of the end position will be done by the control unit after reaching a defined torque and the corresponding travel end position. If the torque is reached prior travel limit a failure notice is generated. (refer to chapter 6.2.2, Page 19)

7.2 Parameter group: torque

The input of the torque is done as described earlier in chapter 6.3.2 (Page 21).

If no customer specification is given the actuator is supplied with the lowest possible torque setting of the particular model size. Torque values are given in percentage of the maximum torque of the model size.

.

	Menu item	Sub item	Possible settings.	Explanation / remarks
P2.1	torque	OPEN	40 – 100%	The required switch off torque in percent of the maximum torque in OPEN direction. NOTE: The range can be limited by the menu item P2.3
P2.2	torque	CLOSE	40 – 100%	same as menu item P2.1 but in CLOSE direction.
P2.3	torque	torque limit	40 – 100%	Limit torque to protect the valve, the gear or the trust unit. This value is to prevent an erroneous increasing over the permitted value with the menu options P2.1 and P2.2.
P2.4	torque	latching	off (0)	For self locking actuators
			on (1)	If the adjusted torque is reached the actuator cannot drive into the same direction. You must first drive the actuator in the other direction. That means that a reduction of the torque after a torque switch off, the actuator will not drive into the same direction. That is necessary for non self locking actuators

WARNING: In combination of the actuator with an additional gearbox the effective data of the gearbox / linear unit has to be considered for parameterization of the actuator! For the effective output torque (in combination with an additional gear)/ output thrust (in combination with an additional thrust unit) the factor of the gear/thrust unit is to be considered.

7.3 Parameter group: Speed (Option)

The parameter group – Ramp is only visible if it is a control unit with frequency inverter.

	Menu item	Sub item	Possible settings.	Explanation / remarks
P4.1	Speed	LOCAL OPEN	5 – 100%	Output speed for local operation in direction OPEN
P4.2	Speed	LOCAL CLOSE	5 – 100%	Output speed for local operation in direction CLOSE
P4.3	Speed	REMOTE OPEN	5 – 100%	Output speed for remote operation in direction OPEN
P4.4	Speed	REMOTE CLOSE	5 – 100%	Output speed for remote operation in direction CLOSE
P4.5	Speed	EMERG. OPEN	5 – 100%	Output speed for emergency operation in direction OPEN
P4.6	Speed	EMERG. CLOSE	5 – 100%	Output speed for emergency operation in direction CLOSE
P4.7	Speed	Torquedep. operr.	5 – 100%	Output speed for torque depending operation (see P1.3 and P1.4)
P4.8	Speed	Minimal	5 – 100%	Minimal output speed

WARNING: 50% means nominal output speed (50Hz) and 100% meens that the output speed is 2 times faster (100Hz)

7.4 Parameter group: Speed (Option)

The parameter group – Ramp is only visible if it is a control unit with frequency inverter.

	Menu item	Sub item	Possible settings.	Explanation / remarks
P5.1	Ramp	LOCAL	5 – 100%	Ramp for local operation
P5.2	Ramp	REMOTE	5 – 100%	Ramp for remote operation
P5.3	Ramp	EMERGENCY	5 – 100%	Ramp for emergency operation

7.5 Parameter group: Control

	Menu item	Sub item	Possible settings.	Explanation / remarks
P6.1	Control	Phase sequence	off (0)	Phase sequence detection is deactivated. A wrong phase sequence will not be shown on the display and also not corrected. In case of wrong phase sequence the actuator will drive in the wrong direction.
			on (1)	Phase sequence detection is activated. A wrong phase sequence will be shown on the display but not corrected. In case of wrong phase sequence the actuator cannot be driven electrical.
			auto (2)	The phase sequence will be corrected automatically. The actuator will always drive in the right direction.
P6.2	Control	readydelay	0 – 10 sec.	time-delayed dropout fort he ready signal (bin. output)

7.6 Parameter group: Password

The control unit SMARTCON can be password protected on several levels to protect the actuator of unauthorized operation. The factory setting of the passwords are always „000“ and deactivated.

To set a password both numbers and alphabetic characters are available.

After setting a password the selected protection gets activated.

To erase a password a zero „000“ password has to be set again.

Selecting a password protected parameter the input of the password is requested. Only after input of the correct password the change of the parameter is possible.

	Menu item	Sub item	Possible settings.	Explanation / remarks
P7.1	Password	Reading PWD	3-digit	Status and data log (optional) are access able. No Access to Parameterize Menu.
P7.2	Password	Writing PWD	3-digit	Status, data log (optional) and parameter menu are access able but can not be changed.

WARNING: password is not to be misunderstood with option releases.

7.7 Parametergroup: Position

Beside end positions also intermediate positions can be defined and set for signaling.

Both possibilities are given. Adjustment by “tech-in” as well as set by percent values.

WARNING: A change of the end position setting (refer to chapter 7.1, Page 24) does not change the intermediate positions in terms of percentage but in a change of the absolute position of the intermediate position. as well.

	Menu item	Sub item	Possible settings.	Explanation / remarks
P8.1	Position	Intermed. pos. 1	0 - 100 %	To set the intermediate position. Input by percent or „teach-in“
P8.2	Position	Intermed. pos. 2	0 - 100 %	as above
P8.3	Position	Intermed. pos. 3	0 - 100 %	as above
P8.4	Position	Intermed. pos. 4	0 - 100 %	as above
P8.5	Position	Emerg. position	0 - 100 %	To set the emergency position. Input by percent or „teach-in“. (also possible to set in menu P8.5)
P8.6	Position	Hysterese	0,1 - 10 %	Hysteresebereich der Zwischenstellungen. Innerhalb dieser Hysterese erfolgt beim Anfahren von Zwischenstellungen keine Nachpositionierung (Option Zwischenstellunganfahren). Weiters sind innerhalb dieses Bereichs die Ausgangsfunktionen für Position = Zwischenstellung aktiv (siehe auch P10.1 …).

7.8 Parameter group: Binary inputs

The SMARTCON control is equipped with 5 programmable binary inputs. Further details of the technical data please find in chapter 18 (Page 49).

Also by using the optional available Profibus interface the parameterization of the input settings have to be done.

The factory settings of the binary inputs are the following:

input 1:	OPEN	input 4:	EMERGENCY OPEN
input 2:	CLOSE	input 5:	EMERGENCY CLOSE
input 3:	STOP		

	Menu item	Sub item	Possible settings.	Explanation / remarks
P9.1	Binary input	Input 1	0: no function	Without function
			1: Open	To run the actuator into OPEN direction as long as the signal is active
			2: Close	To run the actuator into CLOSE direction as long as the signal is active
			3: Stop	To stop the actuator
			4: Open Lock	To run the actuator into OPEN direction – push to run
			5: Close Lock	To run the actuator into CLOSE direction – push to run
			6: Emerg. Open	To OPEN the actuator in LOCAL or REMOTE mode highest priority
			7: Emerg. Close	To CLOSE the actuator in LOCAL or REMOTE mode highest priority
			8: Release	Actuator is only enabled to run (in LOCAL and REMOTE) when signal is on.
			9: Open/Close	Actuator run OPEN when signal is activated and into CLOSE direction when signal is not activated
			10: Close/Open	Actuator run CLOSE when signal is activated and into OPEN direction when signal is not activated

			11: Positioner on	
			12: Open inv.	like Open but active low input
			13: Close inv.	like Close but active low input
			14: Stop inv.	like Stop but active low input
			15: Open Lock inv.	like Open Lock but active low input
			16: Close Lock inv.	like Close Lock but active low input
			17: Em. Open inv.	like Emerg. Open but active low input
			18: Em Close inv.	like Emerg. Close but active low input
			19: Block	Active signal blocks the actuator in local operation
			20: Positioner off	Block of the positioned
			21: Freigabe Ort	Antrieb kann im Ortsbetrieb nur bei geschaltetem Signal betätigt werden.
			22: Block. Ort	Wie Freigabe Ort jedoch active low input
			23: Verrieg.-Auf	Verriegelung AUF auslösen (in Betriebsart ORT und FERN). Antrieb fährt mit höchster Priorität AUF, Befehl steht auch nach Erreichen der OFFEN Endlage intern weiter an. Abwurf nur mit VERRIEGELUNG-AUS, Versorgung aus oder Betriebsart AUS.
			24: Verrieg.-Zu	Verriegelung ZU auslösen (in Betriebsart ORT und FERN). Antrieb fährt mit höchster Priorität ZU, Befehl steht auch nach Erreichen der ZU Endlage intern weiter an. Abwurf nur mit VERRIEGELUNG-AUS, Versorgung aus oder Betriebsart AUS.
			25: Verrieg.-Aus	Abwurf der Verriegelung
			26: Failsafe	Auslösen der Failsafe Funktion (nur funktionsfähig bei Failsafe Antrieben).
			27: Failsafe inv.	Wie Failsafe jedoch active low input
			28: Verrieg.-Auf inv.	Wie Verriegelung AUF jedoch active low input
			29: Verrieg.-Zu inv	Wie Verriegelung ZU jedoch active low input
			30: Verrieg.-Aus inv.	Wie Verriegelung AUS jedoch active low input
			31: Zwischenstellung 1	Zwischenstellung 1 (P8.1) anfahren in Betriebsart FERN (Option Zwischenstellunganfahren). Innerhalb der Hysterese (siehe P8.6) um die Zwischenstellung wird nicht nachpositioniert. Höhere Priorität als Zwischenstellung 2, 3 und 4.
			32: Zwischenstellung 2	Wie Zwischenstellung 1 jedoch höhere Priorität als Zwischenstellung 3 und 4.
			33: Zwischenstellung 3	Wie Zwischenstellung 1 jedoch höhere Priorität als Zwischenstellung 4.
			34: Zwischenstellung 4	Wie Zwischenstellung 1 jedoch niedrigste Priorität.
			35: Notposition	Notposition (P 8.5) anfahren. Wie Zwischenstellung 1 jedoch höhere Priorität als Zwischenstellung 1, 2, 3 und 4.
			36: Zwischenstellung 1 inv.	Wie Zwischenstellung 1 jedoch active low input
			37: Zwischenstellung 2 inv.	Wie Zwischenstellung 2 jedoch active low input
			38: Zwischenstellung 3 inv.	Wie Zwischenstellung 3 jedoch active low input
			39: Zwischenstellung 4 inv.	Wie Zwischenstellung 4 jedoch active low input
			40: Notposition inv.	Wie Notposition jedoch active low input
P9.2	Binary input	input 2	Equal to input 1	
P9.3	Binary input	input 3	Equal to input 1	
P9.4	Binary input	input 4	Equal to input 1	
P9.5	Binary input	input 5	Equal to input 1	

7.9 Parameter group: Binary Outputs

The binary output contacts are designed for a control voltage of 24V and can be internally or externally supplied.

In case of external supply of the control voltage the binary outputs are optically separated from the other control signals.

The signals parameterize able in the standard menu are generally active high – the signal is given by closing the contact – signals.

Factory preset only the first four output signals are defined with the following signals:

output 1: READY output 2: limit OPEN

output 3: limit CLOSE output 4: LOCAL

	Menu item	Sub item	Possible settings.	Explanation / remarks
P10.1	Binary output	Output 1	0: User defined	option
			1: Ready	Actuator is ready for operation
			2: Fault	Collected failure; actuator is not ready
			3: Open	Actuator reached limit OPEN
			4: Closed	Actuator reached limit CLOSE
			5: Opening	Actuator is running towards OPEN direction
			6: Closing	Actuator is running towards CLOSE direction
			7: Running	Actuator is running towards OPEN or CLOSE direction
			8: Torque Open	Actuator reached preset torque in OPEN direction and stopped
			9: Torque Close	Actuator reached preset torque in CLOSE direction and stopped
			10: Torque	Actuator reached preset torque in any direction and stopped
			11: Travel Open	Actuator reached preset travel position in CLOSE direction
			12: Travel Close	Actuator reached preset travel position in OPEN direction
			13: Pos. > Int.1	Position > intermediate position 1
			14: Pos. < Int.1	Position < intermediate position 1
			15: Pos. > Int.2	as intermediate position 1
			16: Pos. < Int.2	
			17: Pos. > Int.3	as intermediate position 1
			18: Pos. < Int.3	
			19: Pos. > Int.4	as intermediate position 1
			20: Pos. < Int.4	
			21: LOCAL	Signal of the status of the selector switch
			22: REMOTE	Signal of the status of the selector switch
			23: OFF	Signal of the status of the selector switch
			24: no function	
			25: fault motor	Motor temperature switch or phase failure
			26: Always	Signal always active
			27: Never	Signal never active
			28: Bin. Eingang 1	Weiterleitung des binären Eingangs an den Ausgang
			29: Bin. Eingang 2	Weiterleitung des binären Eingangs an den Ausgang
			30: Bin. Eingang 3	Weiterleitung des binären Eingangs an den Ausgang
			31: Bin. Eingang 4	Weiterleitung des binären Eingangs an den Ausgang
			32: Bin. Eingang 5	Weiterleitung des binären Eingangs an den Ausgang

			33: Drehmo Auf ma.	Wie Drehmo Auf jedoch wird in der Endlage bei drehmomentabhängiger Abschaltung dieses Signal unterdrückt (maskiert).
			34: Drehmo Zu ma.	Wie Drehmo Zu jedoch wird in der Endlage bei drehmomentabhängiger Abschaltung dieses Signal unterdrückt (maskiert).

			35: Bereit Fern	Bereit und Betriebsart FERN
			36: Bereit Ort	Bereit und Betriebsart ORT
			37: Bereit Ort/Fern	Bereit und Betriebsart FERN oder ORT
			38: Verrieg.-Auf	Verriegelung AUF ist aktiv. Befehl AUF steht intern mit höchster Priorität an und wird auch in der Endlage nicht abgeworfen
			39: Verrieg.-Zu	Verriegelung ZU ist aktiv. Befehl ZU steht intern mit höchster Priorität an und wird auch in der Endlage nicht abgeworfen
			40: Failsafe OK1	Failsafe OK (nur bei Failsafe Antrieben)
			41: Failsafe OK2	Failsafe OK und Bereit (nur bei Failsafe Antrieben)
			42: Failsafe OK3	Failsafe OK,Bereit und FERN (nur bei Failsafe Antrieben)
			43: Verriegelung	Verriegelung AUF oder ZU ist aktiv.
			44: Ber./DrehmoOK	Antrieb ist betriebsbereit und keine Drehmomentabschaltung
			45: Ber./Fern/ DrehmoOK	Antrieb ist betriebsbereit, in Betriebsart FERN und keine Drehmomentabschaltung
			46: Pos.=Zwi1	Position = Zwischenstellung 1. Die Breite des Intervalls ist mit dem Parameter P8.6 einstellbar.
			47: Pos.=Zwi2	Position = Zwischenstellung 2. Die Breite des Intervalls ist mit dem Parameter P8.6 einstellbar.
			48: Pos.=Zwi3	Position = Zwischenstellung 3. Die Breite des Intervalls ist mit dem Parameter P8.6 einstellbar.
			49: Pos.=Zwi4	Position = Zwischenstellung 4. Die Breite des Intervalls ist mit dem Parameter P8.6 einstellbar.
			50:Pos.=Notpos	Position = Notposition. Die Breite des Intervalls ist mit dem Parameter P8.6 einstellbar.
P10.2	Binary output	Output 1 conf.	active high	if the condition of Point 10.1 is true the Output 1 will be set to HIGH (avtive HIGH)
			actice low	if the condition of Point 10.1 is true the Output 1 will be set to LOW (avtive LOW)
			flashing	if the condition of Point 10.1 is true the Output 1 will begin to flash (avtive HIGH)
			inv. falshing	if the condition of Point 10.1 is true the Output 1 will begin to flash (avtive LOW)
P10.3	Binary output	Output 2	same as Output 1	
P10.4	Binary output	Output 2 conf.	same as Output 1 conf.	
P10.5	Binary output	Output 3	same as Output 1	
P10.6	Binary output	Output 3 conf.	same as Output 1 conf.	
P10.7	Binary output	Output 4	same as Output 1	
P10.8	Binary output	Output 4 conf.	same as Output 1 conf.	
P10.9	Binary output	Output 5	same as Output 1	
P10.10	Binary output	Output 5 conf.	same as Output 1 conf.	
P10.11	Binary output	Output 6	same as Output 1	

P10.12	Binary output	Output 6 conf.	same as Output 1 conf.	
P10.13	Binary output	Output 7	same as Output 1	
P10.14	Binary output	Output 7 conf.	same as Output 1 conf.	
P10.15	Binary output	Output 8	same as Output 1	
P10.16	Binary output	Output 8 conf.	same as Output 1 conf.	

WARNING: On use of the option Torque depending OPEN or Torque depending CLOSE (refer to chapter7.1, Page 24, Point P1.3 and P1.4) the actuator is only opened or closed if the adjusted torque and the end position is reached. If the end position will not be reached a toque failure will occur (refer to chapter 6.2.2, Page 19)

7.10 Parameter group: position signal (Option)

The position signal is used to indicate the actual position of the actuator via 0/4 – 20 mA. This option is a SMARTTOOL which means that it can be upgraded after delivery of the actuator at any time.

If the option is not released only the message “inactive” will displayed in the menu. Further menu items will only displayed after activation of the option by using a SMARTCODE provided by SCHIEBEL.

After setting of the travel limits (refer to chapter 7.1, Page 24) no further adjustments are needed. Also in case of using torque depending motor switch off no further adjustments are needed.

The SMARTCON control unit always refers to the switch off positions of the actuator independent from the procedure of switch off.

Factory preset:

4mA at 0% position 20mA at 100% position

	Menu item	Sub item	Possible settings.	Explanation / remarks
P11.1	Position signal	function	not activated	position signal is not activated
			activated	position signal is activated
P11.2	Position signal	Begin (at 0%)	0 - 20,5 mA	mA value in CLOSE position (0%)
P11.3	Position signal	End (at 100%)	0 - 20,5 mA	mA value in OPEN position (100%)
P11.4	Position signal	Calib. 20mA	-10% - +10%	For calibration of the position signal During modification of this parameter a 20mA (100%) output is generated. Use this parameter to calibrate the output exactly to 20mA! (e.g. if you measure only 19,8mA (0,02mA…1%) pls. add 1% to the calibration value)

7.11 Parameter group: step motion

By using step motion it is possible to „change“ speed in sections of or over the full travel. Defining Stop intervals it is possible to reduce the speed of the actuator.

Step motion is available in LOCAL, REMOTE or EMERGENCY operation and can be separated activated for OPEN or CLOSE direction. (refer to fig. 3)

	Menu item	Sub item	Possible settings.	Explanation / remarks
P12.1	Step mode	function	not activated	step motion is not activated
			activated	step motion is activated for LOCAL, REMOTE and EMERGENCY operation
			only LOCAL	step motion is only in LOCAL operation activated
			only REMOTE	step motion is only in REMOTE operation activated
			only LOC+REM	step motion is in LOCAL and REMOTE operation activated
P12.2	Step mode	Start OPEN	0 - 100 %	Start position for OPEN direction in %
P12.3	Step mode	End OPEN	0 - 100 %	Position to end step motion in OPEN direction in %
P12.4	Step mode	ON Time OPEN	0,1 - 20 s	Run time into OPEN direction in seconds
P12.5	Step mode	OFF Time OPEN	0,2 - 20 s	Break interval into OPEN direction in seconds
P12.6	Step mode	Start CLOSE	0 - 100 %	Start position for CLOSE direction in %
P12.7	Step mode	End CLOSE	0 - 100 %	Position to end step motion in CLOSE direction in %
P12.8	Step mode	ON Time CLOSE	0,1 - 20 s	Run time into CLOSE direction in seconds
P12.9	Step mode	OFF Time CLOSE	0,2 - 20 s	Break interval into CLOSE direction in seconds

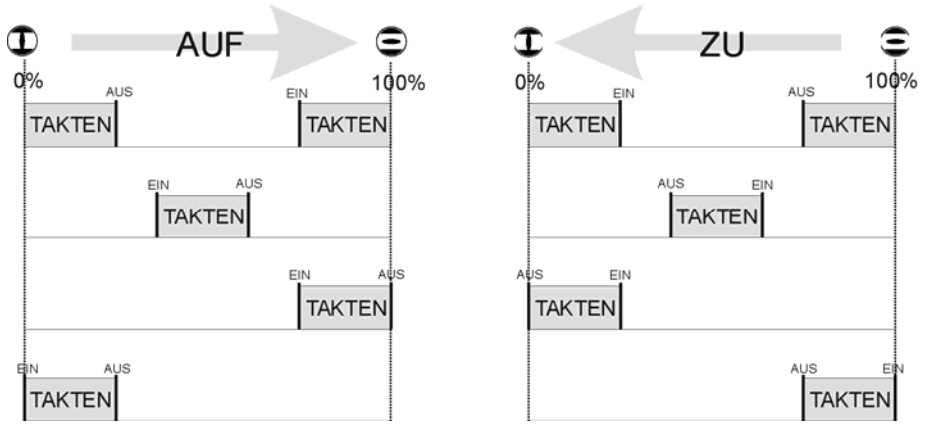


fig. 49

WARNING: It is to be made certain that the mode of operation of the actuator is not exceeded!
The run indication of the actuator (refer to chapter 6.2.2, Page 19) flashes only during the actuator moves that means during the break the signal does not flash,

7.12 Parameter group: positioner (Option)

The optional available positioner is required to operate the actuator with a 0/4 – 20mA input signal from the controls. The positioner is used to adjust the actual position of the actuator according the received SET point value.

For optimal positioning behaviour various advanced settings of the positioner can be parameterized.

	Menu item	Sub item	Possible settings.	Explanation / remarks
P13.1	Positioner	function	not activated	positioner is not activated
			activated	positioner is activated
P13.2	Positioner	Begin (at 0%)	0 - 20,5 mA	Definition of the mA values at CLOSED position (0%)
P13.3	Positioner	End (at 100%)	0 - 20,5 mA	Definition of the mA values at OPEN position (100%)
P13.4	Positioner	Death band	0,1 - 10,0%	Death band definition in reference to set point changes. (Not to be set too small to prevent malbehavior of the actuator)
P13.5	Positioner	Gain	1 – 100%	
P13.6	Positioner	Live zero detection	ignore	Live zero detection is deactivated
			stop	actuator stops in case of lost signal
			open	actuator opens in case of lost signal
			close	actuator closes in case of lost signal
			emerg. pos.	actuator moves into the emergency position in case of lost signal (see Point P13.7)
P13.7	Positioner	Emergency pos.	0 – 100 %	Used to set the emergency position. (also available at P8.5)
P13.8	Positioner	Calib. set point	-10% - +10%	For calibration of the positioner Use this parameter to calibrate the 20mA input exactly (e.g. if you give a 20mA signal to the positioner input then you have to change the value until on the display 20mA will be shown)
P13.9	Positioner	Min. Impulszeit	0,1 – 2,0 s	Kleinste Ansteuerzeit der Wendeschütze. Bei sehr kleinen Ansteuerzeiten (< 0,3…0,5 s) wird der Motor noch während des Anlaufvorganges wieder ausgeschaltet, das erhöht den Kontaktverschleiss bei mechanischen Wendeschützen erheblich. Bei häufig auftretenden sehr kleinen Ansteuerzeiten (unruhiger Regelkreis, kleine Totzone, Takten nahe dem Sollwert) empfehlen wir daher elektronische Wendeschütze.
P13.10	Positioner	Period	0,2 – 20,0 s	Dieser Parameter ist nur relevant, bei aktiviertem Takten bei Annäherung an die Sollposition (Parameter Steigung kleiner als 100%) und bestimmt die Periodendauer eines Lauf/Pause-Zyklus.
P13.11	Positioner	Anfangsposition (a0)	0,0 – 25,0 % {2,0 %}	Kleinste ansteuerbare Position außer der Endlage GESCHLOSSEN. Der Bereich 0% … a0 wird nur durchfahren. Mit dem Parameter a0 kann man den Anfang des erlaubten Regelbereichs der Armatur festlegen (z.B. Totwinkel bei Kugelsegmentventilen, etc…).
P13.12	Positioner	Endposition (e0)	0,0 – 25,0 % {2,0 %}	Größte ansteuerbare Position außer der Endlage OFFEN. Der Bereich e0 … 100% wird nur durchfahren. Mit dem Parameter e0 kann man das Ende des erlaubten Regelbereichs der Armatur festlegen.
P13.13	Positioner	Anfangssollwert (a1)	75,0 – 100,0 % {98,0 %}	Unterhalb dieses Wertes wird die Endlage GESCHLOSSEN angesteuert. Im Bereich 0% … a1 kann nicht geregelt werden (Endlagentoleranz). Der Anfangssollwert a1 ist mit einer kleinen Hysterese (1/4 der Totzone) behaftet.

P13.14	Positioner	Endsollwert (e1)	75,0 – 100,0 % {98,0 %}	Oberhalb dieses Wertes wird die Endlage OFFEN angesteuert. Im Bereich e1 … 100% kann nicht geregelt werden (Endlagentoleranz). Der Endsollwert e1 ist mit einer kleinen Hysterese (1/4 der Totzone) behaftet.

7.13 Parameter group: PID controller (Option)

The optional available PID controller is used to operate the actuator according the 0/4 – 20mA set point under consideration of an additional external actual value.

	Menu item	Sub item	Possible settings.	Explanation / remarks
P14.1	PID-controller	function	not activated	PID-positioner is not activated
			position	PID-positioner is activated
			speed	(at SMARTCON without function)
P14.2	PID-controller	Ext. setpoint	external (0)	The PID positioner processes an external SET point parametered in the menu of the positioner (menu 13)
			Fixed value (1)	A fix, preset SET point is used for operating
P14.3	PID-controller	setpoint value	0 - 100 %	Input of the fixed SET point
P14.4	PID-controller	Begin (at 0%)	0 - 20,5 mA	Definition of the mA values at CLOSED position (0%) of the external actual value
P14.5	PID-controller	End (at 100%)	0 - 20,5 mA	Definition of the mA values at OPEN position (100%) of the external actual value
P14.6	PID-controller	Proportional	+50,0 - 50,0	
P14.7	PID-controller	Integral	0 - 100,0 s	To deactivate the reset time (I) set this parameter 0
P14.8	PID-controller	Differential	0 - 100,0 s	
P14.9	PID-controller	Startup	0 – 100 %	
P14.10	PID-controller	Period	2.0 - 20.0 s	
P14.11	PID-controller	Min. Impuls	0,1 – 20,0 s	
P14.12	PID-controller	Live zero detection	ignore	Live zero detection is deactivated
			stopp	actuator stops in case of lost signal
			open	actuator opens in case of lost signal
			close	actuator closes in case of lost signal
			emerg. pos.	actuator moves into the emergency position in case of lost signal (see Point P13.7)
P14.13	PID-controller	Kal. ext.Istwert	-10.0 – 10.0 %	For calibration of the PID-controller Use this parameter to calibrate the 20mA input exactly (e.g. if you give a 20mA signal to the PID-controller input then you have to change the value until on the display 20mA will be shown)

7.14 Parameter group: Profibus (Option)

7.14.1 General

Profibus DP specifies the technical and functional characteristics of a serial field bus system, with which distributed digital automation devices can be networked. Profibus DP differs between master and Slave devices. Profibus DP is conceived for data exchange in the field level. The central controllers communicate, e.g. SPS or PC, over a fast, serial connection with decentralized field devices such as input/output devices, valves and actuators. Data exchange with these decentralized devices takes place cyclically. The communication functions needed for it are fixed by Profibus DP the basic functions in accordance with EN 50,170.

Master devices determine the data traffic on the bus. A master may send messages without external request. Masters are called in profibus protocols also active participants**.**
Slave-devices e.g. SMARTCON Profibus DP control drives are peripheral devices. Typical Slave devices are input/output devices, valves, actuators and transducers. They do not receive a bus access authorization, i.e. they may only received messages acknowledge or on request of a masters message at these convey.
Slaves are participant-designated also as passive.

The master reads cyclically the input of the Slaves and writes output information cyclically the Slaves. Beside this cyclic data communication of the process image also efficient functions are available for diagnosis and start-up with professional bus DP. The data traffic is supervised by monitoring functions on master and Slave Page.

The **transmission** technique been based on a Rs-485 twisted two-wire line or fiber-optic cable connection and supports Baud rates up to 1.5 MBits/s

7.14.2 Installation and connection

The option PROFIBUS DP generally is a hardware option and should be already ordered with the actuator. An afterwards installation is possible but should however only be done by a SCHIEBEL specialized technician or a particularly trained person.

For the wiring of PROFIBUS DP only cable corresponding to the standard DIN 19245 and/or EN 50170-2, type A might be used. Maximum of 32 PROFIBUS devices can be attached at one segment.
Are more devices to be attached at a PROFIBUS line, several segments must be connected by Repeaters.
The bus cable must be laid in a distance from at least 20 cm to other lines. It should be shifted in a separate, conductive and grounded wire tray.
It is to be made certain that there are no potential differences between the individual devices at the PROFIBUS loop.

Regarding the connection of the PROFIBUS wire to the actuator we please also refer to further description in the operation manual „PROFIBUS DP for SMARTCON control“

7.14.3 Start-up

With start-up a PROFIBUS DP network the devices at the PROFIBUS DP have to be parameterized and configured with the projecting software of the controls (PROFIBUS Configuration)
The projecting software reads first the GSD file (equipment master data) of the individual actuators in.
Die GSD file contains information about the characteristics of the equipment, which are needed by the master. The GSD file SMARTCON.GSD is provided with actuators equipped with PROFIBUS DP.

Afterwards the user can configure and parameterized each actuator connected to the PROFIBUS DP loop..

These information is put down in the control (DP master) and sent with each start of communication to the actuators (DP Slaves). The control is made by the process image input and output byte.

A further detailed proceeding to start-up the PROFIBUS communication you find in the manual Profibus DP for SMARTCON control".

7.14.4 Parameter group: Overview

	Menu item	Sub item	Possible settings.	Explanation / remarks
P15.1	Profibus	active	not activated	Demand for SMARTCODE input
			para. enable	
			para. ignore	
			para. reject	
P15.2	Profibus	Address channel A	0 to 125	Setting of the bus address for the first, primary channel
P15.3	Profibus	Address channel B	0 to 125	Setting of the bus address for the second, secondary (only available with option "Profibus redundant")

7.15 Parameter group: Characteristics (option)

Here the customer can activate position depending torque- characteristics-

With these characteristics the torque, which is set in the parameter P2, can be further **reduced**.

The characteristics can be set with the infrared port and the SMARTTOOL software. (see fig. 50)

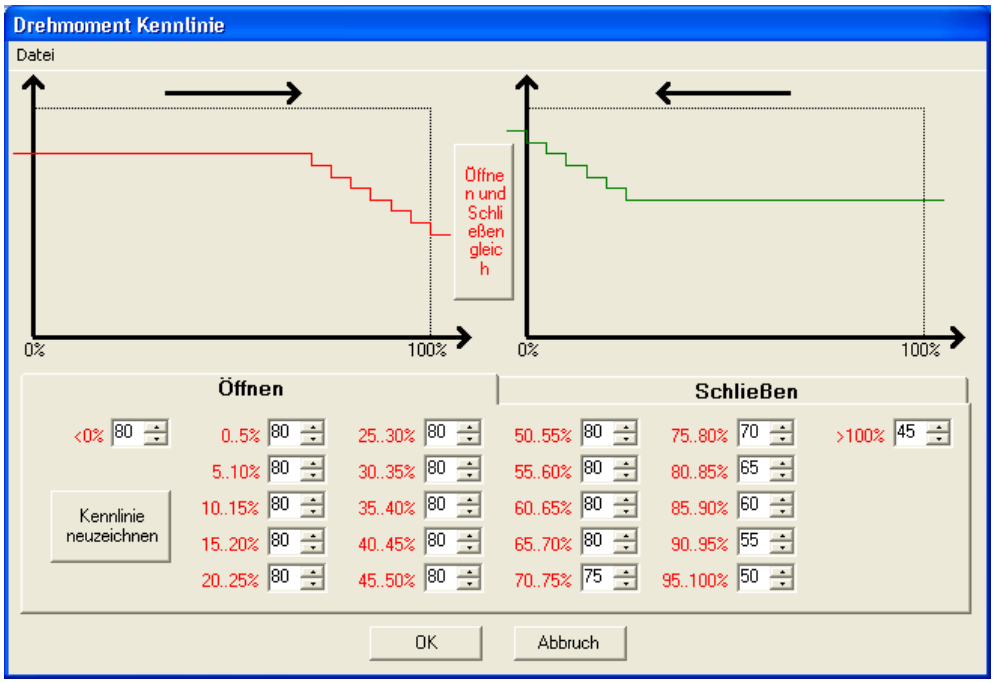


fig. 50

If one of the characteristics is activated this will be shown by a symbol in the display (see fig. 51)

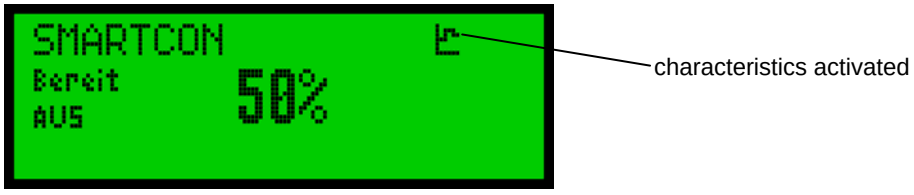


fig. 51

	Menu item	Sub item	Possible settings.	Explanation / remarks
P17.1	Characteristics	Torque OPEN	off	The torque - characteristics for the OPEN direction is not activated
			on	The torque - characteristics for the OPEN direction is activated
			only LOCAL+REM	The torque - characteristics for the OPEN direction is only activated for LOCAL and REMOTE (for NOT the characteristics is not activated)
P17.2	Characteristics	Torque CLOSE	off	The torque - characteristics for the CLOSE direction is not activated
			on	The torque - characteristics for the CLOSE direction is activated
			only LOCAL+REM	The torque - characteristics for the CLSE direction is only activated for LOCAL and REMOTE (for NOT the characteristics is not activated)

7.16 Parametergroup: Identification (Option)

For additional customer information

	Menüpunkt	Unterpunkt	mögl. Einst.	Erläuterungen / Anmerkungen
P18.1	Identification	KKS-number	15 digit	For an additional KKS-no. This no. will be displayed in the Display in the lowest line. Note the no. will only be displayed if the Parameter P20.5 is set to 0.

7.17 Parametergroup: System params (locked)

Is used for the calibration of the actuator. Not visible for customers.

7.18 Parametergroup: various

It is possible to configure the SMARTCON control unit to the regional conditions as well as different circumstances due to the installation position.

	Menu item	Sub item	Possible settings.	Explanation / remarks
P20.1	various	language	German	To select Menu language
			English	To select Menu language
P20.2	various	Rotate display	no (0)	standard
			yes (1)	Rotate display by 180°
P20.3	various	Restore param.	Cust. param. **-**	The actuator parameter will be overwritten with the saved customer parameters. Except parameter P1.1 to P1.6
			Cust. param. **+**	The actuator parameter will be overwritten with the saved customer parameters. Including parameter P1.1 to P1.6
			Backup param.. **-**	The actuator parameter will be overwritten with the saved parameters at the state of delivery. Except parameter P1.1 to P1.6
			Backup param. **+**	The actuator parameter will be overwritten with the saved parameters at the state of delivery. Including parameter P1.1 to P1.6
P20.4	various	Backup. param.	Cust. param.	saves all parameter in the customer parameter list
P20.5	various	Info display		
P20.6	various	Infrared	off (0)	The Infrared port is deactivated
			on (1)	The Infrared port is activated for about 4 min

8 Status menu

The status menu of the SMARTCON control unit is used for comprehensive visualization of the actual setting of various parameters. Being in the status menu the parameters can not be changed.

Both if the selector switch is in the neutral position or in the remote position, it is possible to scroll the status menu. The operator switch has to be switched into the direction of the symbol.

The status menu is divided into 3 sections:

- Status
- History

8.1 Status

The status provides an overview about the input and output signal settings.

8.1.1 Status – Bin. Output

Used for visualization of the actual setting of the output contacts.

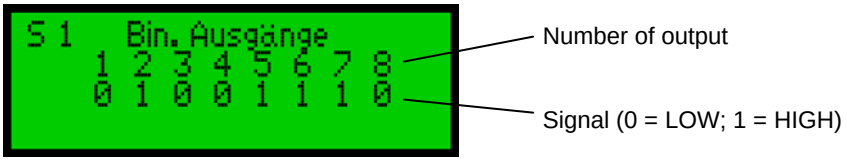


fig. 52

8.1.2 Status – Bin. Inputs

The actual value of the 5 input settings is viewed. No information about the signal allocation is given.

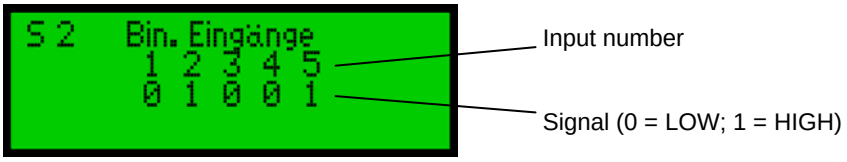


fig. 53

8.1.3 Status – analogue values

The actual value of the analogue in and output signals is viewed

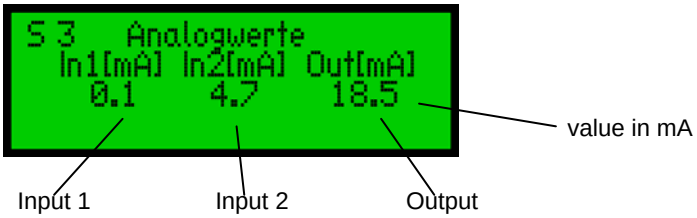


fig. 54

8.1.4 Status – absolute values

This is used for the mechanical pre-adjustment of the position unit. (see chapter 0, page 12)

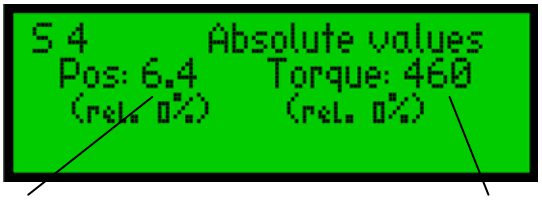


fig. 55

absolute value of the position unit

value for the torque unit (is factory adjusted)

8.1.5 Status – Firmware

Here you can find the firmware version of the control unit

Bild 1

firmware

date of the firmware

8.1.6 Status – Serial number

The serial number of the electronic, actuator and the control unit is viewed

Bild 2

Serial number of the electronic

serial number of actuator

serial number of the control unit

8.2 History

Here the last 10 history entries can be viewed. Additionally to the error also the time can be read off since the last history entry.

Please note that the actuator can only compute the time if the power supply is attached. For an error analysis please also consider chapter 11 (Page 43).

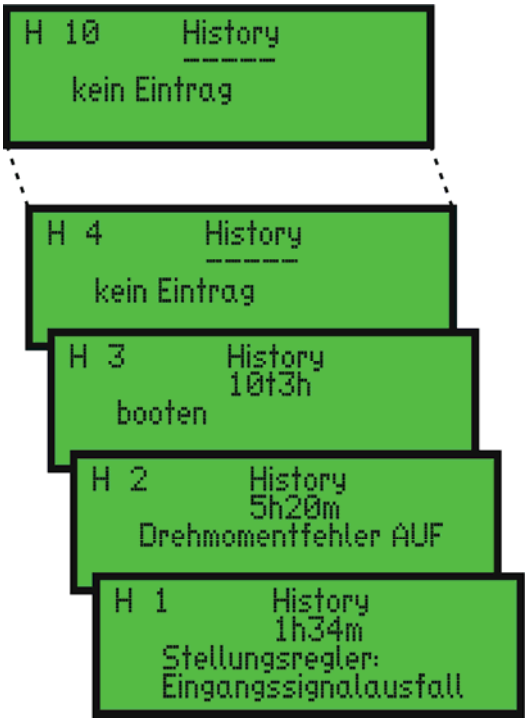


fig. 56

9 Infrared connection

For simpler communication and better visualization of the menu also an infrared connection to a computer is possible.

The hardware needed for this (cable connection to the Rs-232 PC) and the appropriate software are available optionally. Software updates are available for free download on our homepage at http://www.schiebel.com.

The software SMARTCON-ECT made possible apart from communication with the actuator also the administration of several actuators with same parameter sets and can ease the start-up of more actuators a lot.

For the use of SMARTCON-ECT Software a separate manual is available.

It is to be made certain during operation that the surface of the IR interface is protected against strong damages otherwise communication can be impaired.

Before putting the infrared adapter on the surface of the infrared interface it is to be cleaned with a damp cloth.

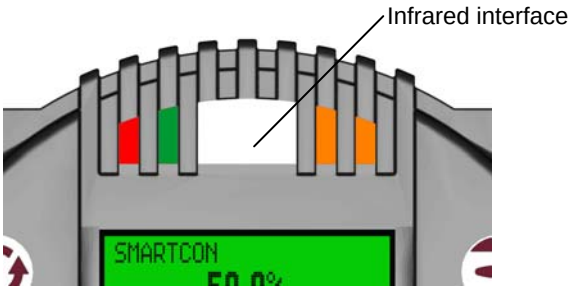


fig. 57

10 Maintenance

No maintenance work must be undertaken unless the actuator has been switched to **IDLE**.

(Switching on during maintenance must be rendered impossible.) Following start-up, the actuators are ready for use. The actuator is standard filled with grease (oil filling upon customer's request).

Regular Maintenance Inspection:

- Beware of increased running noises. After every three months of non-operation, activate the actuator.
- With actuators having output types A, B and C according to DIN 3210-Standard (types A, B1, B2 and C according DIN ISO 5210-Standrad), re-grease them at the lubricator nipple at least every six months (refer to chapter 14.1.3, Page 44)

Depending on the frequency of operation (approx. after 5 years of operation - refer to chapter14, Page 44):

- change the grease (oil),
- renew the seals and
- check all roller bearings and the worm-wheel unit and replace them, if necessary.

See the Table of Lubricants for the types of oil and grease to be used. (refer to chapter14, Page 44)

11 Failure Diagnosis

In case of a failure the motor operation is stopped by the control unit. The failure reason is shown on the display. Also the failure get stored in the history data (refer to chapter 8.2, Page 41). Further the corresponding counter increases.

Additionally the failure is displayed by the light indicators on the interface (refer to chapter 6.2.2, Page 19).

11.1 Failure table

failure	light indicators	description
Motortemp. trip	L4 is off	There are 4 possibilities for this failure: 1. phase sequence of the power supply is wrong, exchange phase L1 with phase L2 2. loss of one phase, check the power supply 3. a fuse is blown – refer to chapter 0, Page 43 4. motor is to hot
travel fault	L1 and L2 is on L4 is flashing	the travel device is out of its range and must be adjusted – refer to chapter 6.2.2, Page 19

12 Fuses

All SMARTCON actuators equipped with solid state relays (option) have fuses in the connection housing next to the plugs.

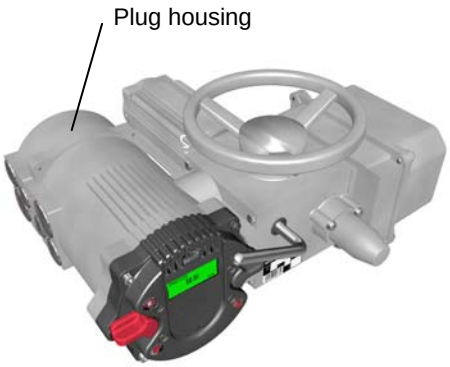
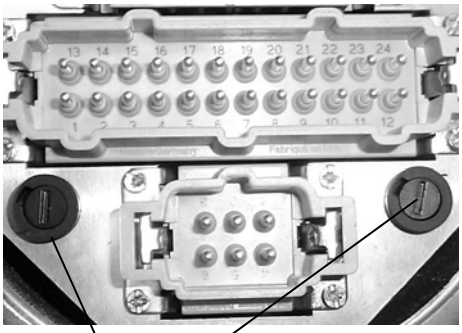


fig. 58

fig. 59



13 spare parts

When ordering replacement parts, the fabrication number of the actuator must be given (refer to chapter 2.2, Page 3). For actuator spare parts use our Replacement Parts List 11.1. For SMARTCON spare parts please refer to our spare part sheet 11.1.1.

14 RECOMMENDATIONS OF LUBRICANTS (for all grease brands)

14.1 Main Casing:

14.1.1 Application temperature from -35°C to +100°C

Lubricating grease DIN 51826 - GP 00 P-30

i.e. High pressure (EP), complex grease on Li soap basis,
work penetration 0.1 mm 355 to 430
Dripping temperature: about 200°C
NLGI grade 00
Acid-free, not or only marginally reacting with water.

14.1.2 Spur Gears from -40 to +85°C

Lubricating grease DIN 51826 - KPF -1/2 G-20

i.e. High-graphite, bitumen-free permanent lubricant with outstanding EP properties.
Work penetration 0.1mm: between 265 and 340.

14.1.3 Output Drive Type A and Spindle Drive (Linear Actuators) from -40 to +85 °C

Lubricating grease DIN 51862- G 1 -G

i.e. Water-resistant complex grease on Al soap basis, highly resistant to acids and alkalines
work penetration 0.1 mm around 265
Dripping temperature: about 260°C
NLGI grade: 1
Acid-free, not or only marginally reacting with water.

14.1.4 Precision Components from -40 to +85 °C

Lubricating grease (or spray) DIN 58396- S1

i.e. High-creeping, water-displacing, low-viscosity grease chemically neutral to copper and plastics.
Work penetration 0.1mm: 175 to 385
Dripping temperature: over 150°C
Evaporation loss: max. 1%
Water resistance: Evaluation grade DIN 51807-1-40

14.2 Basic Lubricant Service Interval

The service interval for Schiebel actuators is 10 years (from the date of delivery by Fa. SCHIEBEL Antriebstechnik Gesellschaft m.b.H, A-1230 Vienna)

The functionality and operating life of the lubricants is, however, dependent upon operational conditions. It may be necessary to take reduction factors into account.

Operational condition(s)	Definition	Reduction Factor (Multiplier)
On-period (OP)	(Total of motor running time)	
Extremely high OP	over 1,250 hours/year	0.5
High OP	over 500 hours/year	0.7
Extremely low OP	less than 0.5 hours/year	0.8
Ambient temperature	(Permanent or long-term)	
Extremely changing	between -10 and +50°C	0.5
Extremely high	over +50°C	0.7
Extremely low	below -25°C	0.9
Output speed	(at main shaft of actuator)	
High revolution	over 80 rev./min	0.8
Utilization factor	(with respect to nominal performance)	
Very high	over 90%	0.8
High	between 80 and 90%	0.9

Example:

Extremely low OP + extremely low ambient temperature + high revolution + utilization factor 87%

⇒ 0.8 x 0.9 x 0.8 x 0.9 = 0.51 reduction factor.

Lubricant maintenance interval ⇒ 10 years x 0.51 = 5.1 years (62 months).

WARNING:

A thusly calculated maintenance interval **does not apply** to the maintenance of the output type A (threaded bushing), nor to the maintenance of the linear and spindle actuator units. These must be regularly re-greased (at least once every six months) at the lubricating nipples (chapter 14.1.3, Page 44) !

During actuator maintenance, the old lubricants must be thoroughly removed and replaced by fresh ones. **No mixing of different makes of lubricant is permitted!.**

Die The quantities needed for lubricant service can be seen from the table below.

14.3 Lubricant Requirements

Type of actuator	Main gear	Spur gears	Linear actuator Pin jack (form B, B1, B2) Threaded bushing (form A) Claw coupling (form C)
AB5	1 kg (1 liter oil)	---	11 ccm 3 ccm 5 ccm 3 ccm
AB8	1 kg (1 liter oil)	1 ccm	15 ccm 3 ccm 5 ccm 3 ccm
AB18	1 kg (1 liter oil)	1 ccm 1 ccm	--- 5 ccm 8 ccm 5 ccm
AB40	1.5 kg (1.5 liters oil)	1.5 ccm	--- 6 ccm 9 ccm 6 ccm

When lubricating precision components, such quantities of lubricant are to be used as to ensure fine moistening of the sliding surfaces.

15 Training

Warning: Should problems arise on site in connection with assembly or adjustment, please contact the SCHIEBEL Antriebstechnik Gesellschaft m.b.H, Josef-Benc Gasse 4, A-1230 Wien, Telephone +43 (1) 66 108 or at http://www.schiebel.com/actuators, in order to avoid any incorrect operations or damage to the actuators. The Schiebel Company recommends to recruit only qualified personnel for assembly of Schiebel actuators. Upon special request by the ordering party, personnel can be trained on the premises of the Schiebel Company according to the operations listed in the instructions for use.

16 Declaration with ref. to machine parts (machine components)

The manufacturer,

SCHIEBEL Antriebstechnik Gesellschaft m.b.H.

Josef-Benc-Gasse 4

A-1230 Vienna

hereby declares that the new machine part/component hereinafter described, to wit

for actuators of the model series AB, rAB, exAB, exrAB in rotary, semi-rotary, 90° and linear designs,as well as the model series rM3 and rM10.

1. does not constitute a safety component for machines,
2. is only put on the market for the purpose of installation in a machine or for the purpose of assembly with another machine or machine component, and
3. that it must not be operated until a compatibility declaration for the entire machine has been submitted according to the Machine and Safety Ordinance, Fed.Leg.Gaz.No. 306/1994, thus meeting the Machine Standard 89/392/EEC, as amended.

Vienna, **10.06.2002**
(place) (date)

.....
(General Manager)

17 Statement of Conformity

The manufacturer,

SCHIEBEL Antriebstechnik Gesellschaft m.b.H.
Josef-Benc-Gasse 4
A-1230 Wien

herewith declares that the following products:

electric actuators model series
AB, rAB, exAB, exrAB and rM
with
three-phase AC-motor,
single phase motor or
pole switchable three-phase AC-motor

with the additional components:

Smartcon CSC
Smartcon exCSC

meet the requirements of the directive 89/336/EEC „directive on the approximation of the laws of the member states relating to electromechanical compatibility“ changed by the directive 92/31/EEC and 93/68/EEC, and take into consideration the respective operating instructions.

The fulfillment of the directive has been proved by the following standards:

EN 61000-6-2:2005
EN 61000-6-3:2001 + A11:2004

As well as the requirements of the directive 73/23/EWG „Low Voltage Directive” and take into consideration the respective operating instructions.

The fulfillment of the directive has been proved by the following standards:

EN 60034-1
EN 60204-1

Vienna, (place) **27.08.2007** (date)

..... (General Manager)

18 Certificate of Conformity

The producer

SCHIEBEL Antriebstechnik GesmbH
Josef Benc Gasse 4
A-1230 WIEN
Österreich

herewith confirms, that the equipment:

Description	Type	Marking	Certificate-Nr.
Electric Actuator	ex (r) AB	II2G Ex de(q)(ib) II (B)C T4(T6) Gb	FTZU03ATEX0328X
Control Unit	V1 / V2	II2G Ex de II C T4 Gb	FTZU03ATEX0329
Control Unit	CSCex	II2G Ex de II C T4(T6) Gb	TÜV-A04ATEX0009X
Flameproof Induction Motor	D(.).()FUY63/..-.	II2G Ex d II C T4 Gb	FTZU03ATEX0330X
Flameproof Induction Motor	D(.).()FUY80/..-.	II2G Ex d II C T4 Gb	FTZU03ATEX0333X
Flameproof Induction Motor	ex DKF .. .X. ..	II2G Ex d II C T4 Gb	TÜV-A03ATEX0016X
Microswitch	d 515U	II2G Ex d II C Gb	FTZU03ATEX0332U
Flameproof Potentiometer	dP1 / dP2	II2G Ex d II C Gb	FTZU03ATEX0387U
Flameproof capacitor	dK .	II2G Ex d II B Gb	FTZU07ATEX0009U
Control Unit	CSCex FU	II2G Ex de II B T4(T6) Gb	TÜV-A08ATEX0006X

meets the requirement of the EC-directive:

94/9/EG

EC-Directive for Operation of Equipment in Potentially Explosive Atmospheres

and complies with the following harmonised standards in the version valid at sigature date:

EN60079-0:2009
Electrical apparatus for explosive gas atmospheres – General requirements
EN60079-1:2007
Electrical apparatus for explosive gas atmospheres – Flameproof enclosures "d"
EN60079-7:2007
Electrical apparatus for explosive gas atmospheres – Increased safety "e"
EN60079-11:2007
Electrical apparatus for explosive gas atmospheres – Intrinsic safety "i"

Following notified bodies certificate the conform design of the equipment:

FTZU	CZ-716 07 Ostrava Radvanice	NB 1026: Quality system, Type examination certificates
TÜV-Austria	A-1015 Vienna	NB 0408: Type examination certificates

.....**Vienna**....., ...**28.09.2012**....
(location) (date)

.....

Klaus Schiebel, general manager

19 Technical Data

19.1 binary inputs

inputs: 5
Nominal voltage: 24VDC
Input active: ..... >10V
Input off: ..... <5V
Max. voltage: 30VDC
Power consumption at 24VDC: 5mA

Common earth of inputs is separated by opto couplers from control voltage.

19.2 Binary Outputs

outputs: 8
power supply: ..... 24VDC +/- 6V (wahlweise von intern oder extern)
Max. Spannungsabfall bei gesetztem Ausgang: 2V
Ausgangsspannung bei nicht gesetztem Ausgang: ..... < 1V
Max. zulässiger Strom pro Ausgang: ..... 50mA (kurzschlußfest)
Max. zulässiger Gesamtstrom für alle Ausgänge: ..... 150mA bei interner Versorgung
Max. zulässiger Gesamtstrom für alle Ausgänge: ..... 250mA bei externer Versorgung

Die binären Ausgänge sind bei externer Versorgung von der restlichen Steuerung optisch getrennt.

19.3 Analogue Inputs

Inputs: 2
current: 0-20,5mA
resolution: 10Bit
accuracy: 0,5%
resitance: ..... 120 Ohm

Absolute ground is the common ground of the control and the auxiliary supply

19.4 Analogue Outputs

outputs: 1
current: 0-20,5mA
resolution: 10Bit
accuracy: 0,5%
Max. Bürde: ..... 500 Ohm

Absolute ground is the common ground of the control and the auxiliary supply

19.5 auxiliary supply

voltage: 20-30VDC
Max. current consumption: 320mA

Absolute ground is the common ground of the control and inputs / outputs

19.6 power supply

voltage: ..... 3 x 400VAC +/-10%, 50Hz, neutral not required

No-load power consumption: ..... max. 24W

19.7 connections

power / motor: ..... 6pole standard plug nominal 400VAC, 16A

controls: ..... 24pole standard plug nominal 400VAC, 16A

screw contacts, optional crimp contacts are available

19.8 Miscellaneous

Ambient temperature::

On/Off Actuators: ..... -25 bis +70°C

Modulating actuators: ..... -25 bis +60°C

Ex prove actuators: ..... -20 bis +40°C (acc. EN50014)

protection class:

standard actuators:..... IP67

Ex prove actuators: IP65

colour: RAL7024