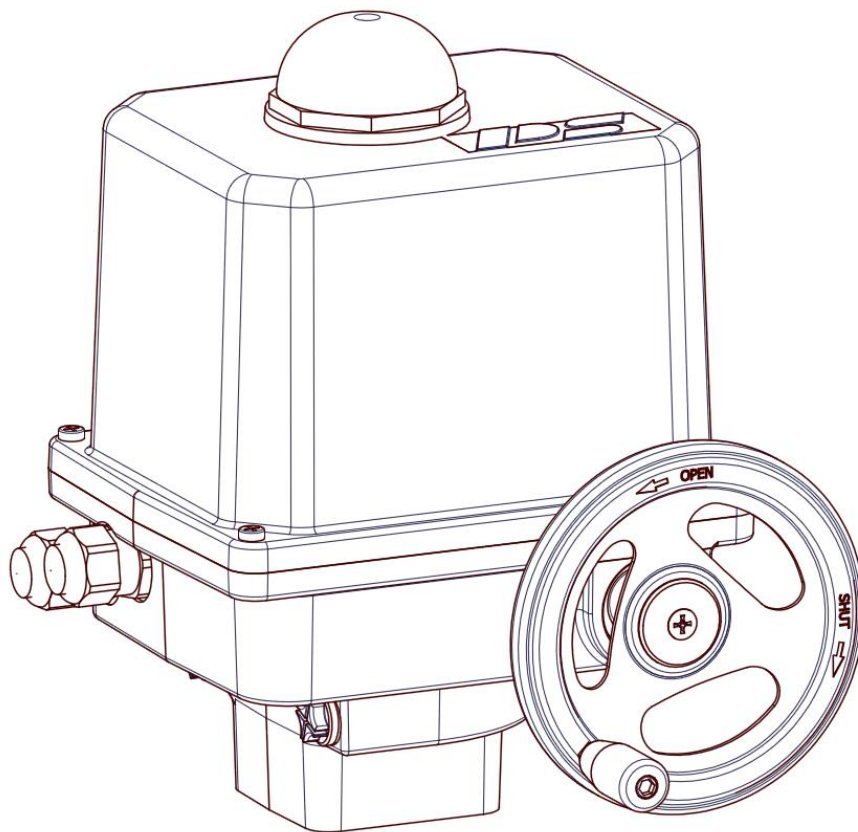


# Operating Instructions



# Contents

1. Symbols and safety.....	4
2. Usage as per specification .....	5
3. Storage .....	5
4. Operating Conditions and Installation Position .....	5
4.1 Operating Conditions.....	5
4.2 Installation Position .....	6
5. Operating Principle.....	7
6. Manual Operation .....	7
7. Mechanical Mounting .....	8
7.1 Safety Note .....	8
7.2 Valve Mounting PSQ103-1503AMS .....	8
7.3 Valve Mounting PSQ2003/2803AMS.....	9
8. Electrical Connection.....	10
8.1 Safety Note .....	10
8.2 Wiring Arrangements .....	11
8.3 Electric Wiring.....	11
8.3.1 Mains Supply .....	11
8.3.2 Input Terminals .....	15
8.3.2.1 Set-Value .....	15
8.3.2.2 Sensor Feedback for Process Controller (optional).....	15
8.3.2.3 Binary Input .....	15
8.3.2.4 Fail-safe port for Binary Input (optional) .....	15
8.3.3 Output Terminals .....	15
8.3.3.1 Active Position Feedback .....	15
8.3.3.2 Additional Position Switches (optional) .....	15
8.3.3.3 Voltage Feed to Process Sensor (optional) .....	15
8.3.3.4 Fault Indication Relay .....	16
8.3.4 Fieldbus interface (optional) .....	16
8.4 Accessories .....	16
8.4.1 Space Heater (optional) .....	16
8.4.2 Adjusting Additional Position Switches (optional).....	17
9. Status Display / Operating Element / Communication .....	17
9.1 Status LEDs.....	17
9.2 Commissioning button.....	17
9.3 Communication Port.....	18
10. Operation .....	18
10.1 Cut-off by Force / Torque .....	18
10.2 Cut-Off by Position automatically.....	18
10.3 Cut-Off by Position.....	18
11. Commissioning .....	19
11.1 Automatic Commissioning.....	19
11.1.1 Adjusting the Mechanical Stops PSQ103-1503AMS .....	20
11.1.2 Setting the Mechanical Stops PSQ2003-2803AMS .....	20
11.1.3 Commissioning Procedure .....	21
11.1.4 Unscrewing the Mechanical Stop .....	22
11.1.5 Additional information.....	22
11.2 Manual Commissioning .....	23
12. Status messages .....	23
12.1 Fault indicator relay.....	23
12.2 Tracing faults .....	23
13. Maintenance and Repair .....	23

14. Safety on Transportation..... 24

15. Decommissioning and disposal ..... 24

16. Accessories ..... 24

17. Tracing faults ..... 25

18. CE Declaration of Conformity..... 27

19. CA Declaration of Conformity ..... 28

# 1. Symbols and safety

## General dangers of non-compliance with safety regulations

PS-AMS PSQ actuators are built at state-of the art technology and are safe to operate. Despite of this, the actuators may be hazardous if operated by personnel that has not been sufficiently trained or at least instructed, and if the actuators are handled improperly, or not used as per specification.

This may

- cause danger to life and limb of the user or a third party,
- damage the actuator and other property belonging to the owner,
- reduce safety and function of the actuator.

To prevent such problems, please ensure that these operating instructions and the safety regulations in particular have been read and understood by all personnel involved in the installation, commissioning, operation, maintenance and repair of the actuators.

## Basic safety notes

- The actuators may only be operated by skilled and authorized operating personnel.
- Make sure to follow all security advices mentioned in this manual, any national rules for accident prevention, as well as the owner's instructions for work, operation and safety.
- The isolating procedures specified in these Operating Instructions must be followed for all work pertaining to the installation, commissioning, operation, change of operating conditions and modes, maintenance, inspection, repair and installation of accessories
- Before opening the actuator cover, ensure that mains supply is isolated and prevented from unintended re-connection.
- Areas that can be under voltage have to be isolated before working on them.
- Ensure that the actuators are always operated in faultless condition. Any damage or faults, and changes in the operational characteristics that may affect safety, must be reported at once.

## Danger signs

The following danger signs are used in this operating manual:



**Caution!** There is a general risk of damage related to health and/or properties.



**Danger!** Electrical voltages are present that may lead to death. Avoid personal or material damages by observing applicable regulations and safety standards!



**Danger!** This sign warns of hazards posing a risk to health. Ignoring these instructions can lead to injuries.



**Attention!** Observe precautions for handling. Electrostatic sensitive devices.

## Other notes

- The motor surface temperature may rise when maintaining, inspecting and repairing the actuator immediately after the operation. There is a danger of burning the skin!
- Always consult the relevant operating instructions when mounting PS accessories or operating the actuator with PS accessories.
- Connections for signal in- and output are double isolated from circuits that can be under dangerous voltage.

## 2. Usage as per specification

- PS-AMS PSQ quarter turn actuators are exclusively designed to be used as electric valve actuators. They are meant to be mounted on valves in order to run their motors.
- Any other use is considered to be non-compliant and the manufacturer cannot be held liable for any damage resulting from it.
- The actuators can only be used within the limits laid out in the data sheets, catalogues and other documents. Otherwise, the manufacturer cannot be held liable for any resulting damage.
- Usage as per specification includes the observance of the operating, service and maintenance conditions laid down by the manufacturer.
- Not to be regarded as usage as per specification are mounting and adjusting the actuator as well as servicing. Special precautions have to be taken while doing this!
- The actuators may only be used, serviced and repaired by personnel that is familiar with them and informed about potential hazards. The specific regulations for the prevention of accidents have to be observed.
- Damages caused by unauthorized modifications carried out on the actuators are excluded from the manufacturer's liability.
- Supply voltage may only be switched on after the proper closure of the main cover or terminal box.

## 3. Storage

For appropriate storage, the following instructions have to be met:

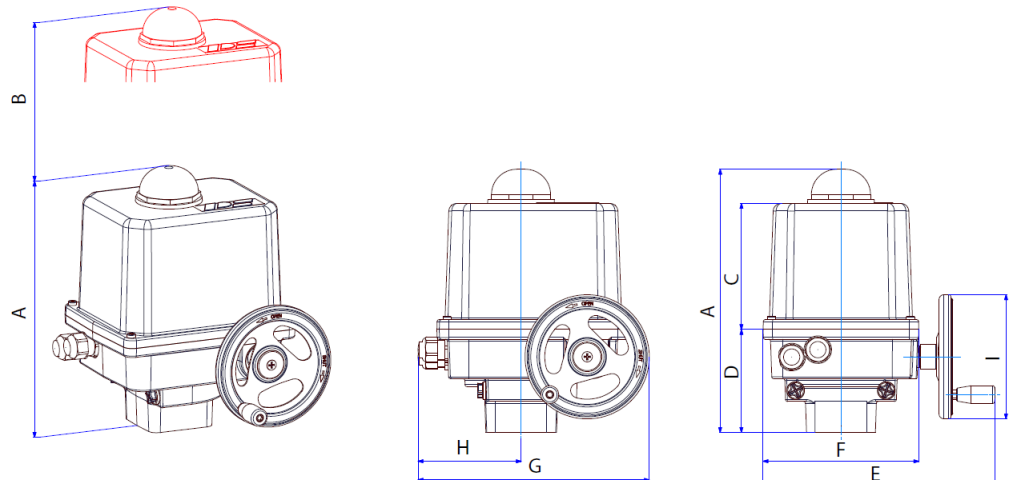
- Only store the actuators in ventilated, dry rooms.
- Store the actuators on shelves, wooden boards, etc., to protect them from floor moisture.
- Cover the actuators with plastic foil to protect them from dust and dirt.
- Protect the actuators against mechanical damage.

## 4. Operating Conditions and Installation Position

### 4.1 Operating Conditions

- The actuators PS-AMS PSQ can be operated at ambient temperatures from -20°C to +60°C.
- The operating modes correspond to DIN EN 60034-1: S2 for short cycle and S4 for modulating operation (for actuator specific data see the actuator specific data sheets).
- The lifetime of the actuator meets the requirements of class C according to DIN EN ISO 22153.
- For protection against moisture and dust, the enclosure rating is IP67 or IP68 according to EN 60529.
- When installing the actuators, leave enough space to permit cover removal (Figure 1).
- The actuator may be mounted in any desired position except "cover facing downwards".

PSQ103-1503AMS



PSQ2003/2803AMS

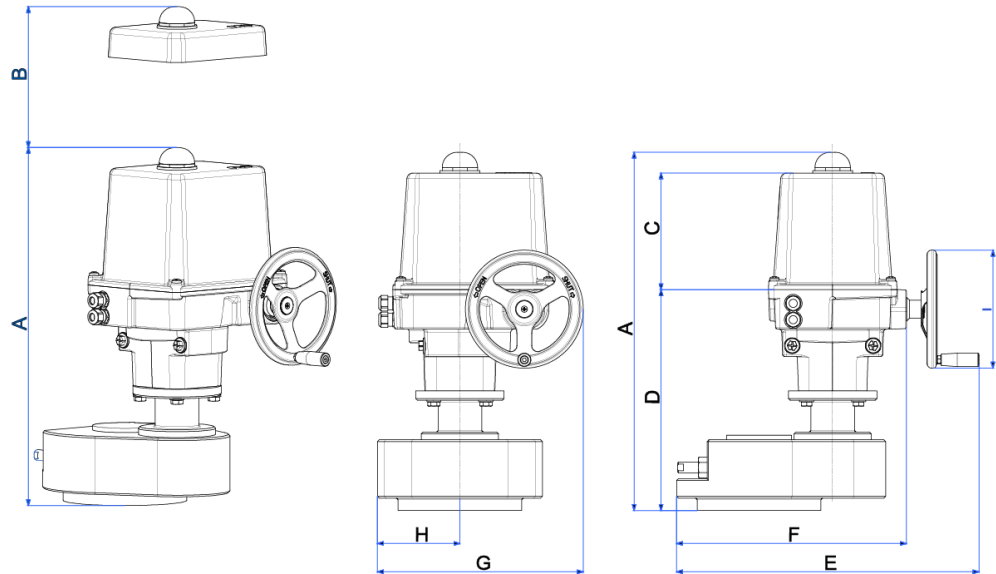


Figure 1: Outside dimensions

Actuator Type	A	B	C	D	E	F	G	H	I
PSQ103AMS	268	161	128	104,5	236	158	244	114	125
PSQ203AMS	355	228	194	122,5	307	185	292	112	200
PSQ503/703AMS	406	240	198	171,5	358	234	350	141	200
PSQ1003AMS	406/409	240	198	171,5	287	234	375	141	250
PSQ1503AMS	406/409	240	198	173	275	234	375	141	250
PQ2003/2803AMS	608	240	198	374,5	514	390	350	140	200

## 4.2 Installation Position

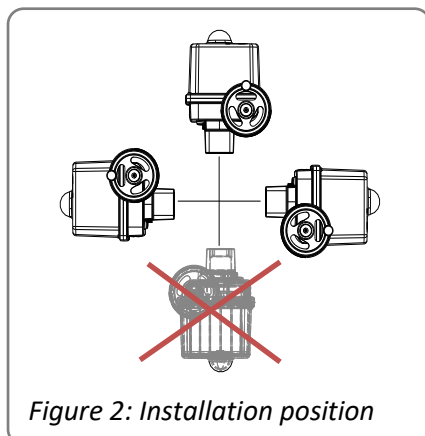


Figure 2: Installation position

### Outdoor usage:



When using the actuators in environments with high temperature fluctuations or high humidity, we recommend using a heating resistor as well as a higher enclosure rating (optional accessories).

## 5. Operating Principle

The quarter-turn actuators PS-AMS PSQ are designed for the use as electric valve actuators. Mounting to the valve is done by a mounting flange as per ISO5211, plus an exchangeable drive bushing with an inside contour as per the valve shaft.

Mechanical power is created by a 24 volts DC-motor which is controlled from the electronics via pulse width modulation (PWM). Absolute encoded feedback comes from a precision potentiometer. The motor torque is transmitted through a reducing spur gear to a planetary gear set. Output is a centre gear with a multi-toothed inner profile to accept the drive bushing.

During power failure and adjustment work the actuators can be emergency-operated via the handwheel (see chapter 6. Manual Operation) except when using the fail-safe unit PSCP.

## 6. Manual Operation

A handwheel is provided to operate the actuator in case of power failure or for valve adjustment. PS-AMS PSQ actuators are supplied with handwheel loosely added. Before operation it has to be fitted as shown below.

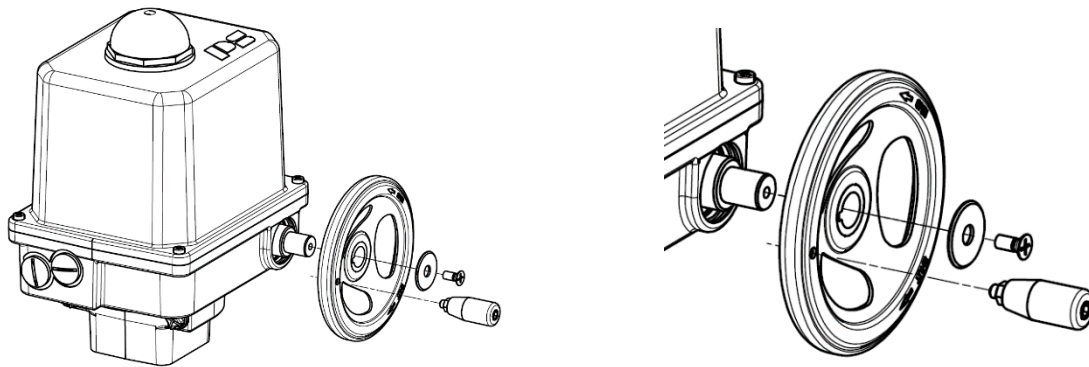


Figure 3: Mounting the handwheel

The handwheel on a worm shaft drives the entire planetary gear set. In motor operation, it is standing still, but is available in any position without need for cluching. Turning the handwheel clockwise turns the output clockwise as well, viewed from the top.

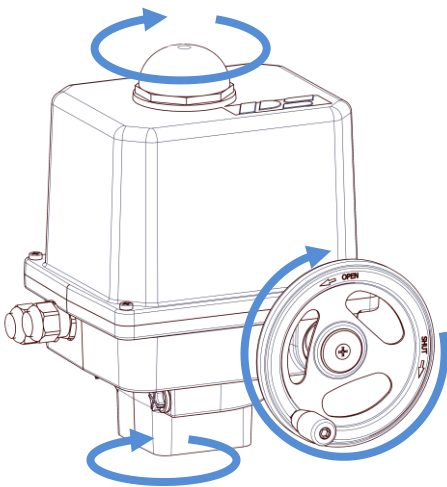


Figure 4: Manual operation PSQ103-1503AMS

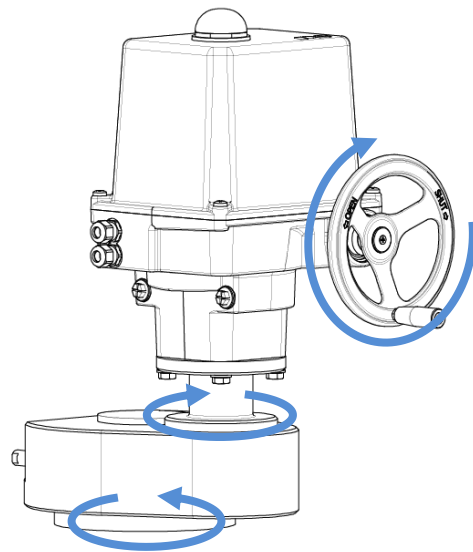


Figure 5: Manual operation PSQ2003/2803AMS



### Caution!

The handwheel should not be used in ongoing motor operation, as the actuator tries to compensate the deviation in position, depending on the operating mode selected.



If a fail-safe unit type PSCP (option) is installed, the handwheel can't be used, as the actuator drives back to the failsafe position.

## 7. Mechanical Mounting

### 7.1 Safety Note



**Beware of mechanical hazards due to electrically powered actuator components!**

With the actuator powered electrically, operating the unit holds the danger of crushing your fingers, damaging the actuator and/or the valve.

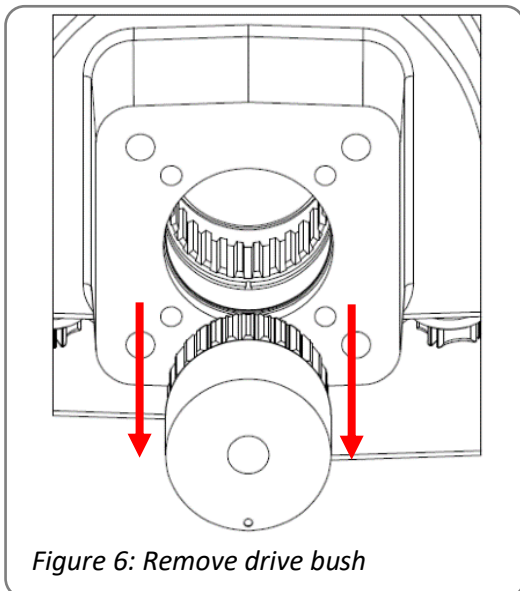


**During adjustment work, the actuator may be operated by means of the handwheel only.**

**Do not operate electrically!**

### 7.2 Valve Mounting PSQ103-1503AMS

The PS-AMS PSQ actuators are provided with flanges according to ISO 5211 for valve mounting. Connection to the valve shaft is made with an exchangeable drive bush.



#### Mounting the actuator with drive bush

- If the drive bush is already installed in the actuator, it must first be removed (see fig. left)
- Ensure the correct position of the actuator by position indicator and adapt it to the position of the valve by handwheel. Ideally, the end position of the valve should be open or closed. Drive the actuator in the same end position by handwheel.
- Recommended mounting position: End position closed
  - for flaps: End position closed
  - For ball valves: Open end position



**The actuator and valve must always be in the same end position.**



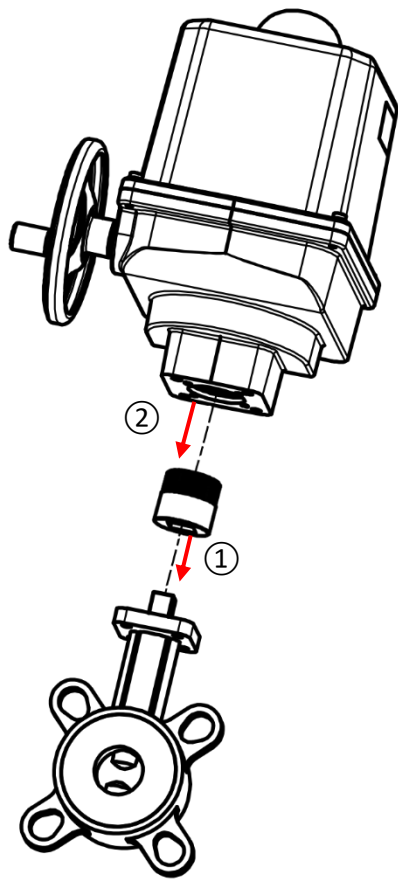


Figure 7: Mechanical interface

- ① If the position of valve and actuator are adapted, put the drive bush on the valve.
- ② Then put the actuator on the drive bush.
  - Check the correct tothing with the drive bush and turn actuator slightly if necessary.
  - Adapt the accurate mounting position by handwheel to insert the screws in the mounting flange. If the fit is inaccurate, move the actuator one tooth further along the drive bush.
  - Tighten the screws in a diagonal sequence.

Starting position: drive bush is delivered separately and not yet pre-installed in the actuator

- Put the drive bush on the valve shaft first.
- Follow the instructions of the pre-installed drive bush above. However, please note: The drive bush is not installed in the actuator for mounting on the valve shaft. Instead, the drive bush is already mounted on the valve shaft as a unit. Put the actuator on this unit.

### 7.3 Valve Mounting PSQ2003/2803AMS

The PS-AMS PSQ actuators are provided with flange F16 according to ISO 5211 for valve mounting. Connection to the valve shaft is made with a 55 mm double square. Delivery of the actuator includes two components: the gearbox and the actuator itself (already pre-mounted).

- Use the position indicator at the gearbox to ensure the correct position of the actuator. Adapt it to the valve position by handwheel. In the best case, the position of the valve should be open or closed during mounting. Drive the actuator in the same end position manually.
- If the gearbox and actuator are in the same position, mount the actuator on the valve (if necessary, mount the adaptation of the valve shaft on the 55 mm double square first).
- Adapt the accurate mounting position by handwheel to insert the screws in the mounting flange. Tighten the screws in a diagonal sequence.

## 8. Electrical Connection

### 8.1 Safety Note



When performing electric work on this unit, the local accident prevention regulations must be followed.

Observe EN 60204-1 (VDE 0113 part 1) to ensure human safety, integrity of the assets as well as the proper functioning of the unit.



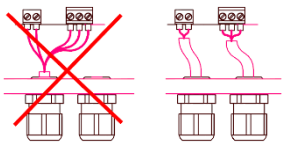
Electric supply lines must be dimensioned for the peak current of the unit and comply with IEC 227 and IEC 245.

Yellow-and-green coded cords may only be used for connection to protective earth.

When leading wires through the cable glands on the actuator, their minimum bending radius has to be considered.

The electric actuators PS-AMS PSQ are not fitted with an internal electric isolator, hence a switching device or circuit breaker must be integrated in the facility. It should be installed close to the actuator and should be easy to access for the user. It is important to mark the circuit breaker as this actuator's isolator.

Electric installations and over-current protection devices must be conformed to the standard IEC 364-4-41, protective class I resp. DIN IEC 60364-4-44 according to the overvoltage category of the actuator.



Please protect all of the power supply and control cables in front of the terminals mechanically by using suitable measures against unintentional loosening. Never install the power supply and the control cables together in one line but instead please always use two different lines.



PE earth connection has to be connected to gear casing at  !

Ensure that all connecting cables are stripped to the correct length so that they are protected against electric shock.

## 8.2 Wiring Arrangements

Depending on order specification, the PS-AMS PSQ are supplied with two different wiring arrangements.

**Wiring to the Main Board:** Electric wiring is made to terminals on the main board inside the actuator. Accordingly, the cover has to be opened for wiring.

**Wiring to Terminal Box:** Electric wiring is made inside a separate box mounted to the actuator. Take off the cover from the box and fit the wires to the screwed terminals at the back of the plug modules.

## 8.3 Electric Wiring

### 8.3.1 Mains Supply

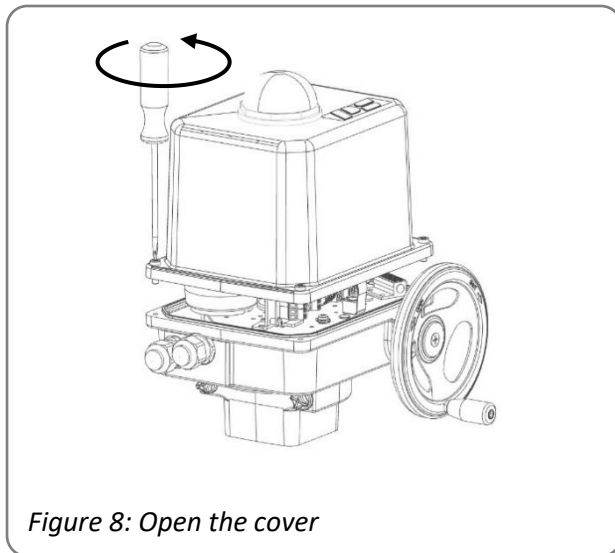


Isolate the power supply.  
Safeguard the line against unauthorized and unintended restarting.

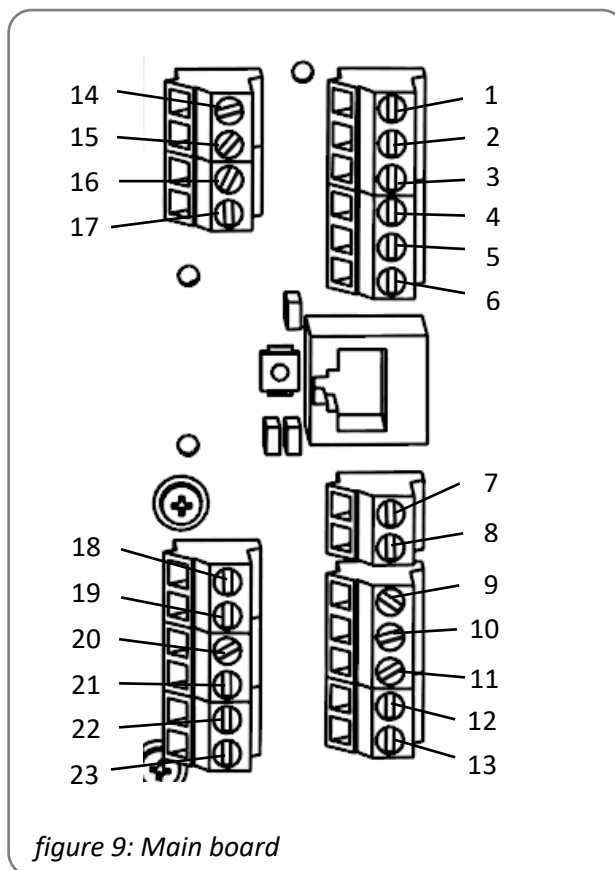


**Attention!** Observe precautions for handling.  
Ground the actuator.  
Before opening the cover, touch grounded housing parts.

### Wiring to the main board:



Open the cover. Insert the cable into the actuator via the cable glands.

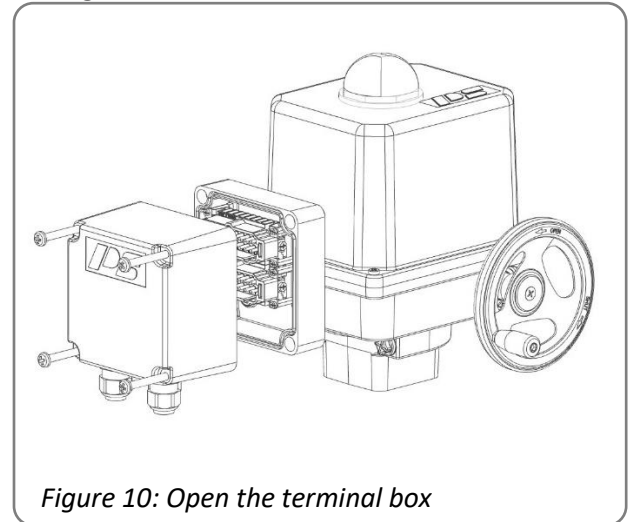


The main board provides terminals to accommodate rigid and flexible cables of wire widths of 0.14 mm<sup>2</sup> to 2.5 mm<sup>2</sup> as well as a PE screw on the housing.

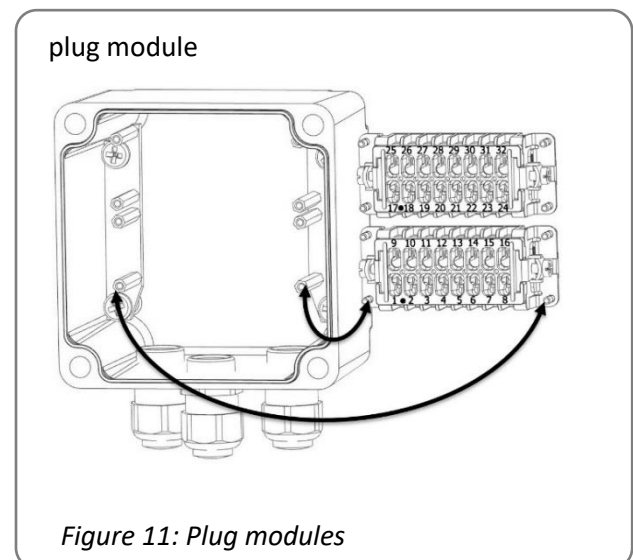
Caution: Please observe the supply voltage and the maximum power consumption of the actuator as indicated on the actuator's name plate!

Connect wires as per the enclosed wiring diagram.

### Wiring to the terminal box:



Open the cover of the terminal box. Insert the cable through the cable glands to the inside of the cover.

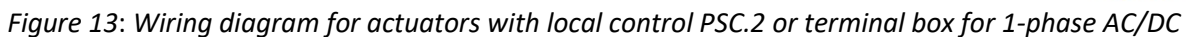
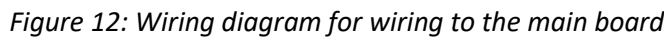


Unscrew the 4 holding screws of either plug module from the holding frame inside the cover. Wiring is made to the back side of the modules.

Each plug module provides 16 numbered terminals to accommodate rigid and flexible cables of wire widths of 0.14 mm<sup>2</sup> to 2.5 mm<sup>2</sup>

Caution: Please observe the supply voltage and the maximum power consumption of the actuator as indicated on the actuator's name plate!

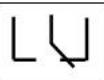


Connect wires as per the enclosed wiring diagram.



13



			Pin-Number					
Set Value Input	+ 0(2) - 10 V	➔	1	9	➔	21 - 40 VDC / 100 mA	Supply	Process Sensor
	+ 0(4) - 20 mA	➔	2	10	⬅	+ 0(2) - 10 V	Actual Value	
	GND	➔	3	11	⬅	+ 0(4) - 20 mA		
Active Feedback	+ 0(2) - 10 V	⬅	4	12	⬅	GND		
	+ 0(4) - 20 mA	⬅	5	13	(reserved)			
	GND	⬅	6	14	(reserved)			
(reserved)			7	15	(reserved)			
(reserved)			8	16	(reserved)			

				Pin-Number						
Binary Input Signals	24V AC/DC - 230 VAC	L/+ OPEN	➔	17	25	⬅	L/+ (24V AC/DC)		Fail Safe Signal	
		N/-	➔	18	26	⬅	N/- (24V AC/DC)			
		L/+ CLOSE	➔	19	27	↔	(Option)	COM		
Fault Indication on Relay potential-free	max. load 100 mA at 24 VDC		↔	20	28	↔	(Option)	NC/NO*		Position Switch potential-free contact
			↔	21	29	↔	(Option)	COM		
Power Supply Voltage	L2 400 VAC	➔		22	30	↔	(Option)	NC/NO*		
	L3 400 VAC	➔		23	31	⬅	N			
				24	32	⬅	L1 400 VAC		Power Supply Voltage	
PE						S-310_E				

\*) Position-Switch NC / NO: swap at terminal X6 to change

S-310\_B

Figure 14: Wiring diagram for actuators with local control PSC.2 or terminal box for 3-phase AC

**Caution:** Please observe the supply voltage and the maximum power consumption of the actuator as indicated on the actuator's name plate!

**Close the cover of the actuator:**

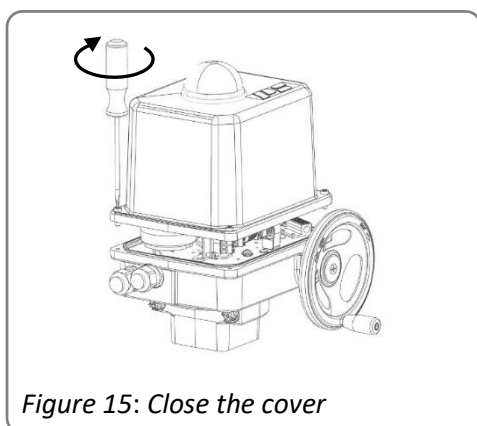


Figure 15: Close the cover

After wiring is completed, put on the cover properly, tighten the 4 screws crosswise, and tighten the cable glands.

**Caution:** Close cover and cable glands properly to ensure enclosure as per the specified rating (IP67 or IP68).

**Close the cover of the terminal box:**

**Wiring of Protective Earth (PE) has to be made to terminal 24!**

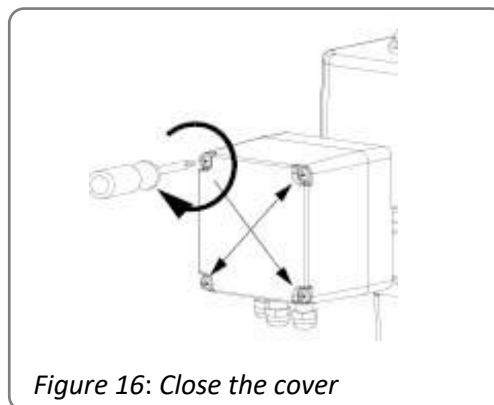


Figure 16: Close the cover

After connecting all the required wires, tighten the modules again and put on the cover properly. Tighten the 4 screws crosswise, and tighten the cable glands.

## 8.3.2 Input Terminals

### 8.3.2.1 Set-Value

Terminals 1 through 3 are used to receive a parameterisable modulating set-value for control operation within the range of 0-20 mA or 0-10V.

### 8.3.2.2 Sensor Feedback for Process Controller (optional)

Terminals 15 through 17 (main board) resp. 10 through 12 (terminal box) are used to receive a process sensor's feedback to the - optional - process controller, in the parameterisable range of 0-20 mA or 0-10 V.



#### Caution!

The following binary input terminals (8.3.2.3 & 8.3.2.4) have priority over the modulating set-value. If the actuator is parameterised for modulating service, these set-value settings are disregarded in case a binary signal is applied. Only after disconnection of the binary signal the actuator will reposition according to the set-value applied.

### 8.3.2.3 Binary Input

Terminals 9 through 11 (main board) resp. 17 through 19 (terminal box) are for binary open/close signals. Standard voltage level is 24 V to 230 V; see wiring diagram. The actuator is then driven in 3-point service.

### 8.3.2.4 Fail-safe port for Binary Input (optional)

The fail-safe port of the terminals 12 and 13 (main board) resp. 25 and 26 (terminal box) allows to drive the actuator to a parameterised safety position by applying a voltage of 24 V to 230 V.

## 8.3.3 Output Terminals

### 8.3.3.1 Active Position Feedback

Active position feedback is adjustable within the range of 0-20 mA or 0-10 V.

Main board: terminals 4 - 6

Terminal box: terminals 4 - 6

### 8.3.3.2 Additional Position Switches (optional)

The activation points of the optional position switches can be mechanically adjusted via two cams. The switches can be accessed as potential-free changeover contacts. The standard switches with silver contacts are rated to 230 VAC/5 A. Special switches with gold plated contacts for low power (up to 100 mA and 30V) are available on request.

Limit switch board: terminals X6 / 1-3 or X6 / 4-6 respectively

Terminal box: terminals 22/27/28 or 23/29/30 respectively

### 8.3.3.3 Voltage Feed to Process Sensor (optional)

Terminals 14 and 17 provide an unregulated output voltage of 21 to 40 VDC at maximum 100 mA to feed an external process sensor.

Main board: terminals 14 + 17

Terminal box: terminals 9 + 12

#### 8.3.3.4 Fault Indication Relay

This potential-free relay contact allows to display adjustable fault indication to the control room with a maximum load of 24 VDC/100 mA. See instruction manual for software PSCS.

Main board: terminals 7 + 8

Terminal box: terminals 20 + 21

#### 8.3.4 Fieldbus interface (optional)

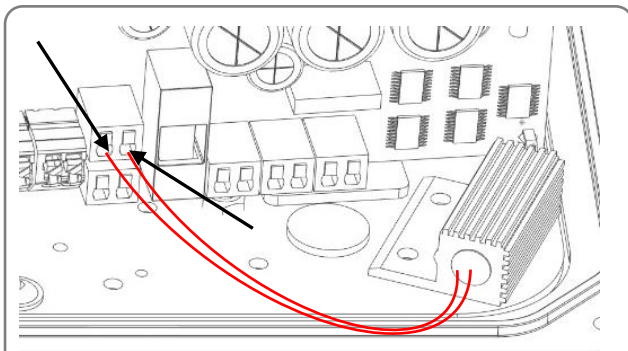
Optionally a fieldbus interface can be fitted to the AMS-actuator, with wiring to a terminal block or an external socket.

-> See special operating instruction for AMS-Fieldbus.

### 8.4 Accessories

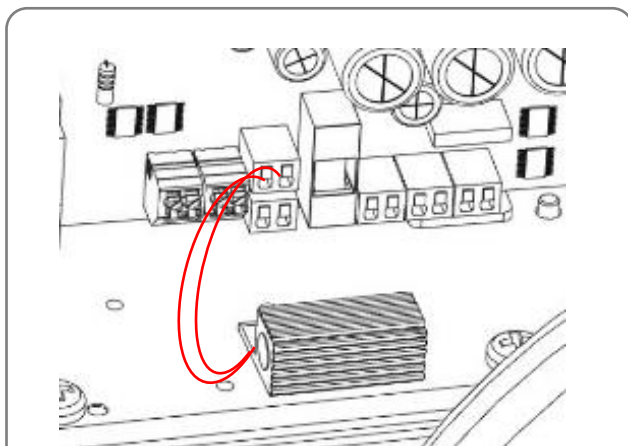
#### 8.4.1 Space Heater (optional)

Actuators PS-AMS PSQ can be fitted with a space heater. When using actuators in environments with high temperature fluctuations or high humidity, we suggest a heating resistor be fitted to prevent the build-up of condensation within the enclosure.



*Figure 17: Mounting and connecting of the space heater*

In actuators PS-AMS the space heater is powered via the power supply of the actuator does not have to be fed separately. For retro-fitting the heating resistor, wiring of the two cables has to be made to the terminals on the main board as per the pictures.



*Figure 18: Mounting and connecting of the space heater*

Mounting of the space heater has to be made to the indicated place on the base plate by using the screws provided.

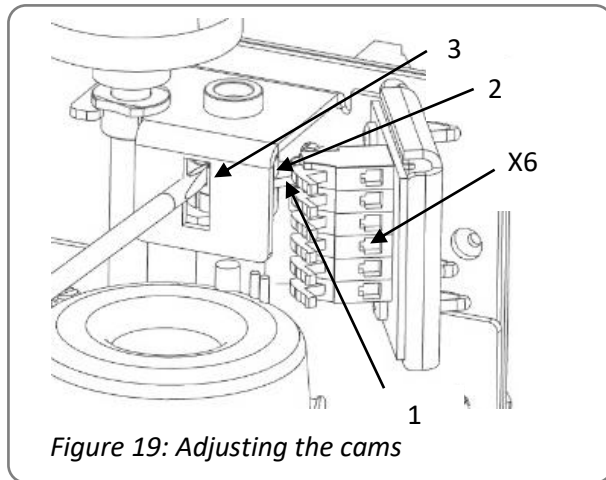


**Route the cables in a way to prevent them from being squashed by the main cover, and from being touched by moving parts inside the actuator.**



### 8.4.2 Adjusting Additional Position Switches (optional)

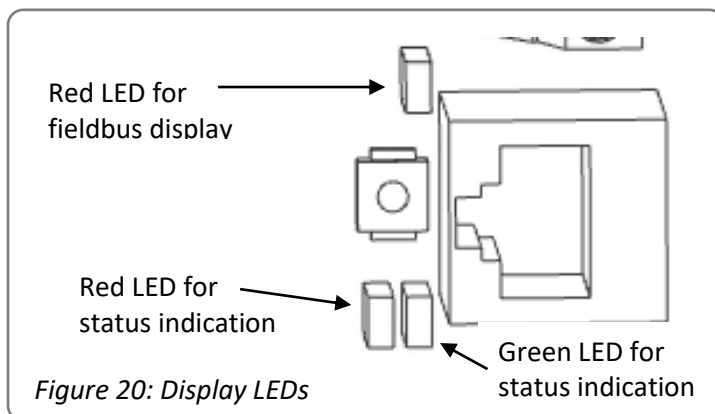
For PS-AMS PSQ two switches for position feedback are available as factory-mounted option. They are available with silver contacts (for currents between 10 mA and 5 A at maximum 230 V). Special switches with gold plated contacts for low power (up to 100 mA and 30V) are available on request. Connection goes to terminal X6 or terminals 22/27/28 and 23/29/30 in case of wiring to the terminal box.



The cams for activating the switches are mounted on a shaft by means of a friction coupling. They are adjustable by a screwdriver with a small end, using the bride (3) as support. At actuators closing clockwise, the lower cam (1) activates the switch for closing direction, the upper cam (2) for opening direction.

## 9. Status Display / Operating Element / Communication

### 9.1 Status LEDs

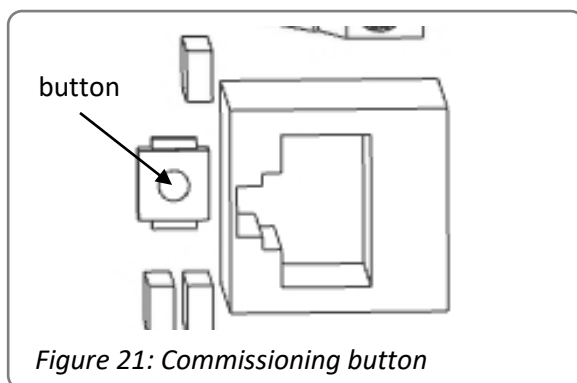


Unscrewing the cap reveals a red and a green LED to indicate the status of the actuator.

#### Option Feldbus:

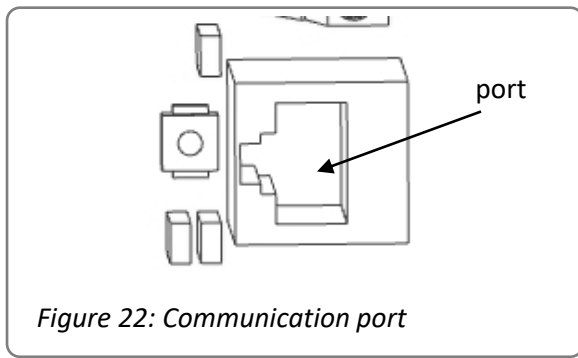
Another single red LED (optional) signals the status of the optional fieldbus interface. -> See special operating manual for AMS-Fieldbus

### 9.2 Commissioning button



The commissioning button for starting the automatic commissioning run (to adjust the actuator to the valve) is located beside the LEDs. -> See chapter 10.1 "Cut-off in end positions" and 11.1.2. "Commissioning Procedure"

## 9.3 Communication Port



Communication and parameterising via computer is done using a special communication cable to a RJ45 socket. All actuator parameters are adjustable using the communication software PSCS.  
-> See operating instruction PSCS.

## 10. Operation

All internal parameters, like required motor torque, actual position, functional status, etc., are being permanently monitored during operation of the actuator PS-AMS. This ensures that the actuator positions with optimum accuracy, and closes the valve always tight. Deviations can be read out via communication software PSCS or via local control PSC.2 (see respective instruction manuals), or can be displayed to the control room using the fault indication relay. This provides maximum safety of the process.

Cut-offs of the PS-AMS actuators can be adjusted to meet the valve function in an optimum way by using the communication software PSCS (using a special interface cable, or optionally Bluetooth connection). This will result in different behaviour of the actuator. In case a position is surpassed or not reached, this can be read out via the Fault Indication Relay or via the communication software PSCS.

### 10.1 Cut-off by Force / Torque

The actuator delivers the programmed maximum force / torque each time when driving to this end position. If the closing point inside the valve dislocates, e.g. when a seat gasket wears, then the actuator will drive further in its possible actuation range to try to reach the programmed force / torque.

### 10.2 Cut-Off by Position automatically

In normal operation, the actuator will stop at the position which was found at a mechanical stop in the valve or the actuator during Automatic Commissioning. If the closing point inside the valve dislocates, the actuator will NOT follow this dislocation but it will always stop at the point initially found.

### 10.3 Cut-Off by Position

In normal operation, the actuator will stop at the point which was defined by Manual Commissioning. This position is not depending on any mechanical stop inside valve or actuator.

## 11. Commissioning

The actuator is shipped in the „not commissioned“ condition with the green LED flashing slowly. There will be no response to any input (set value or open/close signal). To make the actuator operational, it has to be commissioned to a valve.

Depending on the type of cut-offs programmed (see 10.1), there are two ways to do commissioning:

- Automatic commissioning is done if at least one of the cut-offs is set to be “by force/torque” or “by position automatically”.
- Manual commissioning has to be made in case both cut-offs are “by position”, either via software PSCS or via control box PSC.2.



### **Caution!**

Electrical operation of the actuator is allowed only after mounting to a valve!

To avoid injuries due to live or rotating components, commissioning is allowed only while the main cover of the actuator is closed.



**Attention!** Observe precautions for handling. Electrostatic sensitive devices.



**The electrical connection and commissioning with mains voltage applied may only be carried out by trained specialist personnel!  
Do not touch any connection lines during commissioning!**

### 11.1 Automatic Commissioning

This is performed if at least one of the cut-offs is set to be “by force/torque” or “by position automatically”.

During automatic commissioning the actuator goes through the full programmed valve stroke / angle automatically. Parameters specific to the valve are being measured and calculated values are permanently stored in the actuator. At the same, set value and position feedback range are scaled.

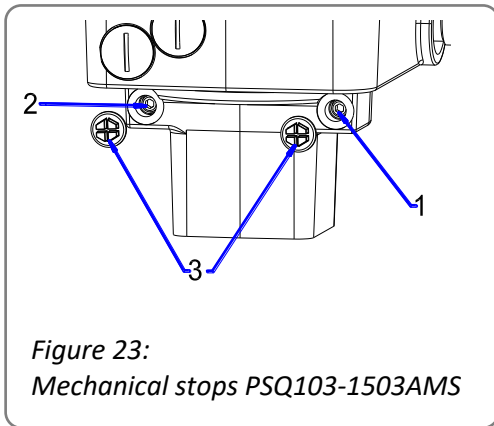
To enable Automatic Commissioning, a mechanical stop is required in at least one end position (usually the closed position) of the valve. This mechanical stop can be either given by design of the valve, or it may be adjusted by the stop screws of the actuator (only when cut-off “by position automatically” is programmed).

### 11.1.1 Adjusting the Mechanical Stops PSQ103-1503AMS

Shown is the adjustment of a mechanical stop in closing direction for a valve closing clockwise.



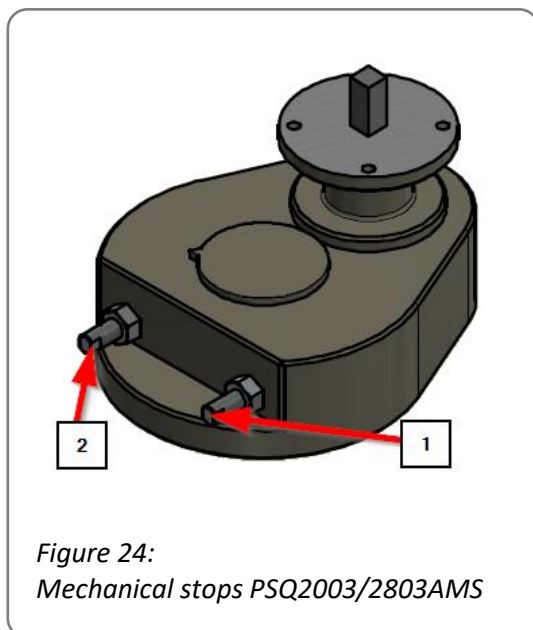
**When adjusting a mechanical stop, drive the actuator only by handwheel, not electrically!**



- Remove the protection cap (Figure 23, item 3) from either stop screw.
- Unscrew both hexagon sockets anti-clockwise by approximately 5 turns.
- Move the actuator to the closed position by turning the handwheel clockwise.
- Turn stop screw for closed position (Figure 23, item 1) to the stop.
- Move the actuator to the open position by turning the handwheel anti-clockwise.
- Turn stop screw for open position (Figure 23, item 2) to the stop.
- Screw on protection cap.

Item 1: Allen screw for CLOSED position  
Item 2: Allen screw for OPEN position  
Item 3: protective caps

### 11.1.2 Setting the Mechanical Stops PSQ2003-2803AMS



- Unscrew both hexagon sockets anti-clockwise by approximately 5 turns.
- Move the actuator to the closed position by turning the handwheel anti-clockwise.
- Turn stop screw for closed position (Figure 24, item 1) to the stop.
- Move the actuator to the open position by turning the handwheel clockwise.
- Turn stop screw for open position (Figure 24, item 2) to the stop.
- Tighten hexagon nuts.

Item 1: Stop screw CLOSED position  
Item 2: Stop screw OPEN position

### 11.1.3 Commissioning Procedure

Commissioning button

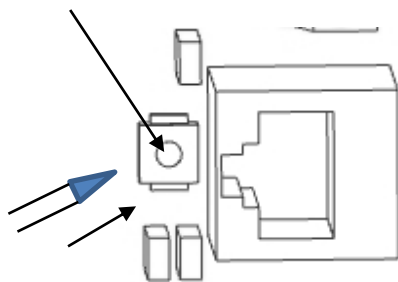
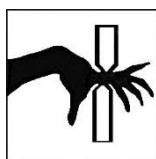


Figure 25: Commissioning button

Ensure that all mechanical and electrical connections have been made properly. Switch on power supply. Unscrew the side cap for the actuator's main cover and press the commissioning button with an insulating pin for about 3 seconds.



#### Caution!

The actuator will now travel through the full valve angle!

#### Commissioning in progress !

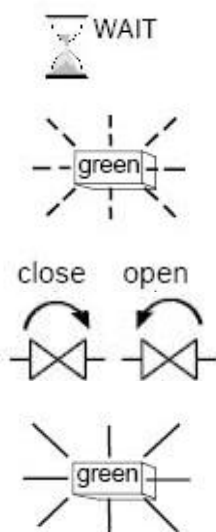


Figure 26: Automatic commissioning procedure

The automatic commissioning run start now. The actuator will drive through the full adjusted range.

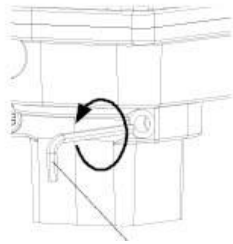
The green LED flashes quickly during this commissioning run.

After finishing it the actuator is ready for operation. The green LED glows permanently as long as there is no malfunction. See status indication summary in chapter 17. Tracing *faults*.

Watch the valve's moving element during this run to ensure that both end positions are reached properly. If not, adjust the stop screws (unscrew if end position is not reached, screw in if position is overridden) and start commissioning run again.

### 11.1.4 Unscrewing the Mechanical Stop

Only at valves without mechanical stop in closed position:



Allen key

Figure 27: Unscrewing the mechanical stop

In normal operation, the actuators PS-AMS PSQ should not stop repeatedly by hitting a mechanical stop inside the actuator. In case a mechanical stop inside the actuator has been adjusted for “Cut-off by Position automatically”, after finishing the commissioning this stop screw has to be unscrewed by one full turn mandatorily.

### 11.1.5 Additional information

#### Note

If the actuator is stalled during the automatic commissioning run BEFORE reaching a desired position-dependent cut-off, it will then store the so-obtained stroke.

#### Note

If, as a result of automatic commissioning, no force/torque limit is found, or if a stroke below the minimum allowed stroke (10° in standard version) is found, the commissioning run will be aborted. The actuator returns to the “not commissioned” condition (i.e. green LED flashing slowly), even if the actuator had been initialized correctly before that.

#### Note

Automatic commissioning can be started via software PSCS -> See relevant operation manuals



#### Caution!

If the LEDs display other types of signals than “flashing green” or “glowing green permanently”, please refer to the chapter 17 on “Tracing Faults”.



#### Caution!

The mains supply must not be interrupted during the commissioning run!

## 11.2 Manual Commissioning

If both cut-offs are selected to be „by position“, the actuator must be commissioned manually using the software PSCS or the control box PSC.

Mount the actuator to a valve, wire it and switch the power on, according to these instructions. Permanently apply the set-value for the closed position, or the input signal „close“.



**Caution!** The actuator operates the valve!



**Caution!**

The valve stroke has to be parameterised using software PSCS or control box PSC! -> See relevant manuals.

Drive the actuator to the closed position of the valve using software PSCS or control box PSC. The open position of the valve will be calculated in accordance with the programmed valve stroke.

After manual commissioning, the actuator is ready for use. The green LED is glowing permanently.

### Note

If the parameterised valve stroke, starting from the adjusted closed position, exceeds the possible actuator stroke, then the operating stroke will be reduced to the resulting maximum possible value.

## 12. Status messages

### 12.1 Fault indicator relay

Fault messages can be transmitted to the control room with a maximum load of 24 VDC/100 mA via a closing contact at terminals 7 and 8. The messages can be parameterized via software PSCS.

The contact on terminals 7 and 8 is closed when there is no fault and the drive is supplied with power.

-> See relevant manuals PS-AMS PSCS

### 12.2 Tracing faults

See the table on page 22 for explanation of the blinking codes of the status-LEDs.

## 13. Maintenance and Repair

**Maintenance** Under the conditions of use as per specification as lined out in the data sheet, the PS-AMS actuators are free of maintenance. All gears are lubricated for their service life and do not require to be re-lubricated.

**Cleaning** Clean the actuators with a dry soft cloth and do not use any cleaning agent. Do not use any coarse or abrasive materials.

## 14. Safety on Transportation

For transportation and storage all cable glands and connection flanges have to be closed to prevent ingress of moisture and dirt. A suitable method of packaging is required for transporting to avoid damage of coating and any external parts of the actuator.

## 15. Decommissioning and disposal

- Disconnect the mains supply and ensure that it is secured against an accidental switching-on.
- Open the cover.
- Remove external electrical connections.
- Take off the actuator from the valve.

### Disposal

For its disposal, the product should be treated as waste containing electrical and electronic equipment and should not be disposed of as household waste.



In accordance with 2012/19/EU on waste electrical and electronic equipment (WEEE), the devices described here may not be disposed of via municipal waste disposal companies. If you are unable or unwilling to arrange for the equipment to be disposed of by a specialist company, you may return the equipment to the manufacturer, who will then ensure that the equipment is disposed of properly for a flat fee.

## 16. Accessories

Accessories/ Options	Add'l Position Switches	2WE	Potential-free additional position switches with silver contacts (0.1 A - 5 A switching current)
	Add'l Position Switches Gold	2WE Gold	Potential-free additional position switches with gold contacts (0.1 mA - 100 mA switching current)
	Integrated process controller		Enables the autonomous control of a process so that an external controller is not required.
	Fail-Safe*	PSCP	Emergency power supply based on supercapacitors, safety position OPEN, CLOSED or free defined position
	Fieldbus Interface*		Digital transmission of nominal and actual value per mill or percent, report of monitoring and diagnostic data using Profibus DP (PSPDP) or CANOpen (PSCA) interfaces, additional interfaces available on request
	Local Control*	PSC.2	Illuminated display to show the actuator status and lockable selector to switch between modes: automatic, manual process ON/OFF, STOP and parameter menu. Control buttons for manual movement, menu operation and adjustment of parameters, display of diagnostic information
	Remote Local Control		mounting separately from the actuator (incl. 10 m connection cable)
	Data Cable	PSCS-USB	USB data cable enables the communication between the actuator and a PC by using the software PSCS
	Fail-Safe Port*	FSP	Signal port to drive to a "safety position", selectable fail-safe position, standard 24 V
	Corrosion Protection	K2	Increased corrosion protection incl. heating resistor
	IP68		Increased enclosure IP68**
	Heating Resistor	HR	Heating resistor to prevent condensation
	Terminal Box*		Plug and socket in an IP68 box

\*not retrofittable \*\*only valid for PSQ103AMS - PSQ1503AMS



## 17. Tracing faults

Red LED			Green LED					
Glowing	Flashing quickly	Flashing slowly	Off	Glowing	Flashing quickly	Flashing slowly	Off	

[illegible]

## 18. CE Declaration of Conformity

### Declaration of Incorporation of Part Completed Machinery and EC Declaration of Conformity in compliance with the Directives on EMC and Low Voltage

We,

**PS Automation GmbH**  
**Philipp-Krämer-Ring 13**  
**D-67098 Bad Dürkheim**

Declare under our sole responsibility that we manufacture electric actuator series

**PSR-E...; PSQx03...; PSQ-E...; PSQ-AMS...; PSL-Mod.4...;**  
**PSL-AMS...; PSF...; PSF-M...; PSF-Q...; PSF-Q-M...**

according the requirements of the

#### **EC Directive 2006/42/EC**

as part completed machinery. These actuators are designed to be installed on industrial valves.  
It is prohibited to take the actuator into service until it has been ensured that the complete machine conforms  
the applicable machinery directives.  
The technical documentation described in Annex VII, part B has been prepared.

The above actuators further comply with the requirements of the following directives.

<b>2014/30/EU</b>	Electromagnetic Compatibility (EMC)
<b>2014/35/EU</b>	Low Voltage (LVD)
<b>2011/65/EU + 2015/863/EU</b>	Restriction of Hazardous Substances (RoHS)

furthermore, the following harmonised standards have been applied:

<b>EN 61000-6-2: 2005</b>	Electromagnetic compatibility (EMC), Generic standards- Immunity for industrial environments
<b>EN 61000-6-3: 2007</b>	Electromagnetic compatibility (EMC), Generic standards- Emission standard for residential, commercial and light-industrial environments
<b>EN 61010-1: 2020</b>	Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory use

Bad Dürkheim, 2022



Christian Schmidhuber  
(General Manager)

#### **CAUTION!**

To ensure compliance of these actuators with the above directives, it is the responsibility of the specifier, purchaser,  
installer and user to observe the relevant specifications and limitations when taking the product into service. Details are  
available on request, and are mentioned in the Installation and Maintenance Instructions.

## 19. CA Declaration of Conformity

### Declaration of Incorporation of Part Completed Machinery and CA Declaration of Conformity in compliance with the Legislation on EMC and Low Voltage

We,

**PS Automation GmbH**  
**Philipp-Krämer-Ring 13**  
**D-67098 Bad Dürkheim**

Declare under our sole responsibility that we manufacture electric actuator series

**PSR-E...; PSQx03...; PSQ-E...; PSQ-AMS...; PSL-Mod.4...; PSL-AMS...; PSF...; PSF-M...**

according the requirements of the

**2008 No. 1597**

**Supply of machinery (safety) regulations**

as part completed machinery. These actuators are designed to be installed on industrial valves.  
It is prohibited to take the actuator into service until it has been ensured that the complete machine conforms  
the applicable machinery legislation.  
The technical documentation described in Annex VII, part B has been prepared.

The above actuators further comply with the requirements of the following legislations:

**UK SI 2016 No. 1091 and  
Amendments**

**The Electromagnetic Compatibility Regulations 2016**

**UK SI 2016 No. 1101 and  
Amendments**

**The Electrical Equipment (Safety) Regulations 2016**

**UK SI 2012 No. 3032 and  
Amendments**

**The Restriction of the Use of Certain Hazardous Substances in  
Electrical and Electronic Equipment Regulations 2012**

the provisions of the legislations and their compliance are given by the following named standard(s), which  
have been applied:

**EN 61000-6-2: 2005**

Electromagnetic compatibility (EMC), Generic standards-  
Immunity for industrial environments


**EN 61000-6-3: 2007**

Electromagnetic compatibility (EMC), Generic standards-  
Emission standard for residential, commercial  
and light-industrial environments

**EN 61010-1: 2020**

Safety Requirements for Electrical Equipment for  
Measurement, Control and Laboratory use

Bad Dürkheim, 2021

  
Christian Schmidhuber  
(General Manager)

#### CAUTION!

To ensure compliance of these actuators with the above directives, it is the responsibility of the specifier, purchaser,  
installer and user to observe the relevant specifications and limitations when taking the product into service. Details are  
available on request, and are mentioned in the Installation and Maintenance Instructions.

**Our representatives:**

**Italy**

PS Automazione S.r.l.  
Via Pennella, 94  
I-38057 Pergine Valsugana (TN)  
Tel.: <+39> 04 61-53 43 67  
Fax: <+39> 04 61-50 48 62  
E-mail: [info@ps-automazione.it](mailto:info@ps-automazione.it)

**India**

PS Automation India Pvt. Ltd.  
Srv. No. 25/1, Narhe Industrial Area,  
A.P. Narhegaon, Tal. Haveli, Dist.  
IND-411041 Pune  
Tel.: <+ 91> 20 25 47 39 66  
Fax : <+ 91> 20 25 47 39 66  
E-mail : [sales@ps-automation.in](mailto:sales@ps-automation.in)  
[www.ps-automation.in](http://www.ps-automation.in)

To find out more about all our sales partners and subsidiaries please scan the QR code below or visit our website:

<https://www.ps-automation.com/locations/?lang=en>



**PS Automation GmbH**

Philipp-Krämer-Ring 13  
D-67098 Bad Dürkheim

Tel.: +49 (0) 6322 94980-0  
E-mail: [info@ps-automation.com](mailto:info@ps-automation.com)  
[www.ps-automation.com](http://www.ps-automation.com)

