Operating and Installation Instructions

Digital electropneumatic positioner

ARI-STEVI-POS®

Contents

Rev. 0040510000 5025 english (englisch) ***- Translated original instructions -***

1.0 General information on the operating instructions

All installation, commissioning and maintenance work on the ARI-STEVI-POS® must be carried out by qualified specialist personnel or appropriately instructed persons. For the purpose of these operating and installation instructions, a qualified person is someone who by knowledge, training and experience as well as their knowledge of all relevant standards has demonstrated their ability to assess the work assigned to them correctly and recognise potential hazards.

These operating instructions provide information on safe mounting, installation, operation and maintenance of the positioner. Please contact the supplier or the manufacturer in case of problems which cannot be solved by referring to the operating instructions.

The operating instructions are binding for transport, storage, mounting, installation, commissioning, operation, maintenance and repair of the ARI-STEVI-POS®.

To ensure the highest possible quality and reliability, every product is checked thoroughly after it has been manufactured. Please read the operating instructions carefully prior to mounting and commissioning the product.

It is important to comply with the operating instructions for safety reasons. ARI-Armaturen is not responsible for any damage which is attributable to negligence on the part of the user.

The operating instructions must be made available to the end user.

Modifications or repairs to the product are only permitted if explicitly described in these operating instructions.

The operating instructions may be amended or updated without prior notice. Changes to the specifications, design and / or any of the components may not always appear in print immediately but only when the next revision of the operating instructions is published.

The operating instructions must not be copied or otherwise reproduced without the prior written consent of ARI-Armaturen.

2.0 Notes on possible dangers

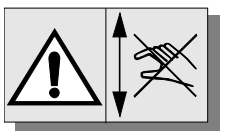
2.1 Meanings of the symbols used

Warning of general danger.

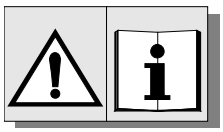
General information.

Caution! Crushing hazard!

Risk of injury!
Do not reach into rotating parts.



Risk of injury!
Do not reach into parts that move up and down.



Danger if these operating instructions are not observed! Always read and observe the instructions before mounting, operating, maintaining or dismantling the product.

2.2 Explanatory notes on safety information

Hazards, risks and safety information are highlighted in these operating and installation instructions to attract the reader's attention.

Information marked with the above symbol and "***ATTENTION !***" describes behaviour or procedures which, if ignored, could result in serious or fatal injury to users or third parties or in material damage to the system or the environment. The behaviour and procedures referred to must be complied with and suitable measures implemented to monitor such compliance.

All other information not specifically emphasised, such as transport, mounting, installation, operating and maintenance instructions as well as technical data (in these operating instructions, in the product documentation or on the product itself), must likewise be complied with in order to avoid faults or failures which could directly or indirectly cause injury to persons or damage to property.

3.0 Storage and transport

ATTENTION !
- Valve mountings such as actuators, positioners, handwheels, hoods, etc. must not be used to absorb external forces, for example they are not designed to be used as climbing aids or as attachment points for lifting gear.
Failure to comply could result in serious or fatal injury or in substantial property damage due to parts toppling over or falling off.
- Use only suitable handling and lifting equipment.

- Store the product at -25°C to +80°C at a dry location that is free from dirt.
- Do not remove the positioner or the complete control valve from the packaging until they are actually needed.
- Protect against external shocks (impact, vibration, etc.).
- Do not damage the name plate or the wiring diagram and do not allow them to become dirty.

4.0 Description

4.1 Applications and operating principle

The ARI-STEVI-POS® digital electro-pneumatic positioner is fitted to single acting pneumatic control valves to convert an electrical 4 to 20 mA setpoint signal into a valve or disc position. Wear-free, non-contact hall sensors detect the actual position of the valve plug or disc and compare it with the set value. The positioner controls the pressure in the pneumatic actuator by means of a pneumatic module, so that the actual position is within a defined deadband on either side of the setpoint.

All the most important settings such as invert, deadband and tight closing are very simple made via the user friendly switches.

You can monitor the status of the positioner on the LCD display.

When the hood is open, it is possible to move the valve plug or disc via the positioner using the buttons in manual mode.

In addition to a deadband that adapts automatically, you can also specify three fixed deadbands, namely 0.5%, 1% and 3%.

The tight closing function causes the pneumatic actuator to be completely pressurised or depressurised as soon as the setpoint exceeds the set high or low limit, to enable the maximum closing force to be built up. This function can be switched on or off for any desired direction.

4.2 Type key

Type number (example):		94P20-01G-0000-Z0
		9 4 P20 - 01 G - 0 0 00 - Z0
Actuators & accessories	-	**9**
Positioner, position indicator	-	**4**
Series	STEVI-POS® (single-acting; plastic)	**P20**
	-	**-**
Communication	2-wire 4-20 mA 2-wire 4-20 mA + feedback	**00** **01**
Electrical / pneumatic connections	M20x1.5 & G1/4 1/2” NPT & 1/4” NPT (adapter)	**G** **N**
	-	**-**
Options	Without pressure gauge	**0**
	Plastic pressure gauge, aluminium block	**1**
	Silencer, plastic	**0**
	Silencer, stainless steel	**3**
	No selection	**00**
	-	**-**
Approvals / certifications		**Z0**

4.3 Operation / operating elements

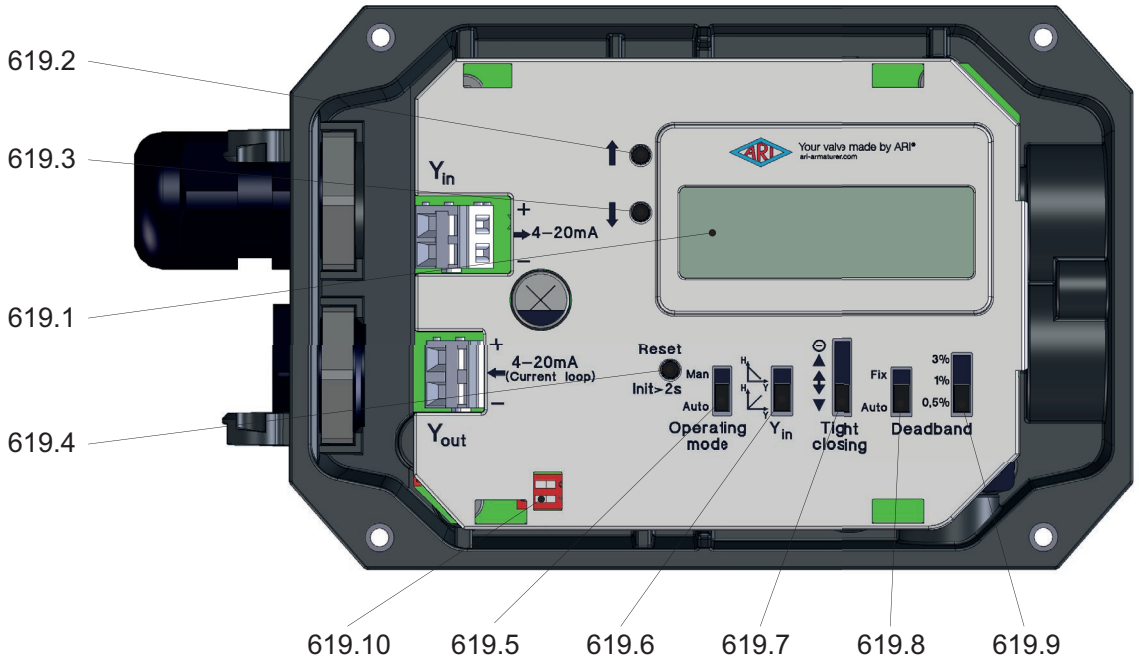


Fig. 1

Reset / Init >2 s button (pos. 619.4):

- You start the initialisation process by pressing and holding the Reset button. The positioner determines the parameters that are necessary to control the valve.
- In “Auto” mode, the Reset button is used in the navigation as a select and confirm button.

Up ⬆ (619.2) and **Down** ⬇ (pos. 619.3) buttons:

- In “Auto” (automatic) mode, these buttons are used to navigate the menu system and change settings.
- In “Man” (manual) mode, these buttons are used to pressurise or depressurise the pneumatic actuator, so that it can be moved manually.

Operating mode slide switch (pos. 619.5):

- In the “Man” position, the actuator stops and can be moved manually with the “Up” and “Down” buttons (pos. 619.2 and pos. 619.3).
- In the “Auto” position, the actuator follows the control signal; the positioner compares the setpoint with the actual value and tries to limit the control deviation to a minimum.

Y_{in} slide switch (pos. 619.6):

- **Switch up:** Inverse linear equal-percentage, i.e. a 4 mA control signal causes the actuator spindleto be fully retracted or the valve plug/disc to be in the fully closed position.
- **Switch down:** Linear equal-percentage, i.e. a 4 mA control signal causes the actuator spindle to be fully extended or the valve plug/disc to be in the fully open position.

Tight closing slide switch (pos. 619.7):

- The “Tight closing” switch specifies which direction the actuator should approach the end position in with the maximum operating force.

Θ Travel limit – no tight closing

▲Arrow up (linear actuator)	:	When the actuator spindle is retracted, the maximum force is applied to the end position.
(part-turn actuator)	:	In the direction of operation (clockwise), the disc is subjected to the maximum torque in the end position.
↕Double arrow	:	The max. actuating force or the max. torque is applied to both end positions.
▼Arrow down (linear actuator)	:	When the actuator spindle is extended, the maximum force is applied to the end position.
(part-turn actuator)	:	In the direction of operation (anti-clockwise), the disc is subjected to the maximum torque in the end position.

Deadband slide switch (pos. 619.8):

- Fixed: In the “Fixed” position, the adjacent slide switch (34) limits the deadband to a fixed value.
- Auto: The deadband adapts automatically. If the positioner oscillates about the setpoint more than 5 times a minute, the deadband is enlarged.

Deadband slide switch (pos. 619.9):

- This switch defines the deadband for “Fixed deadband” mode
  - 3% deadband
  - 1% deadband
  - 0.5% deadband

Miniature slide switches (pos. 619.10):

- These switches are necessary to update the firmware. Both slide switches must be set to “Off” during normal operation.

4.4 Diagram

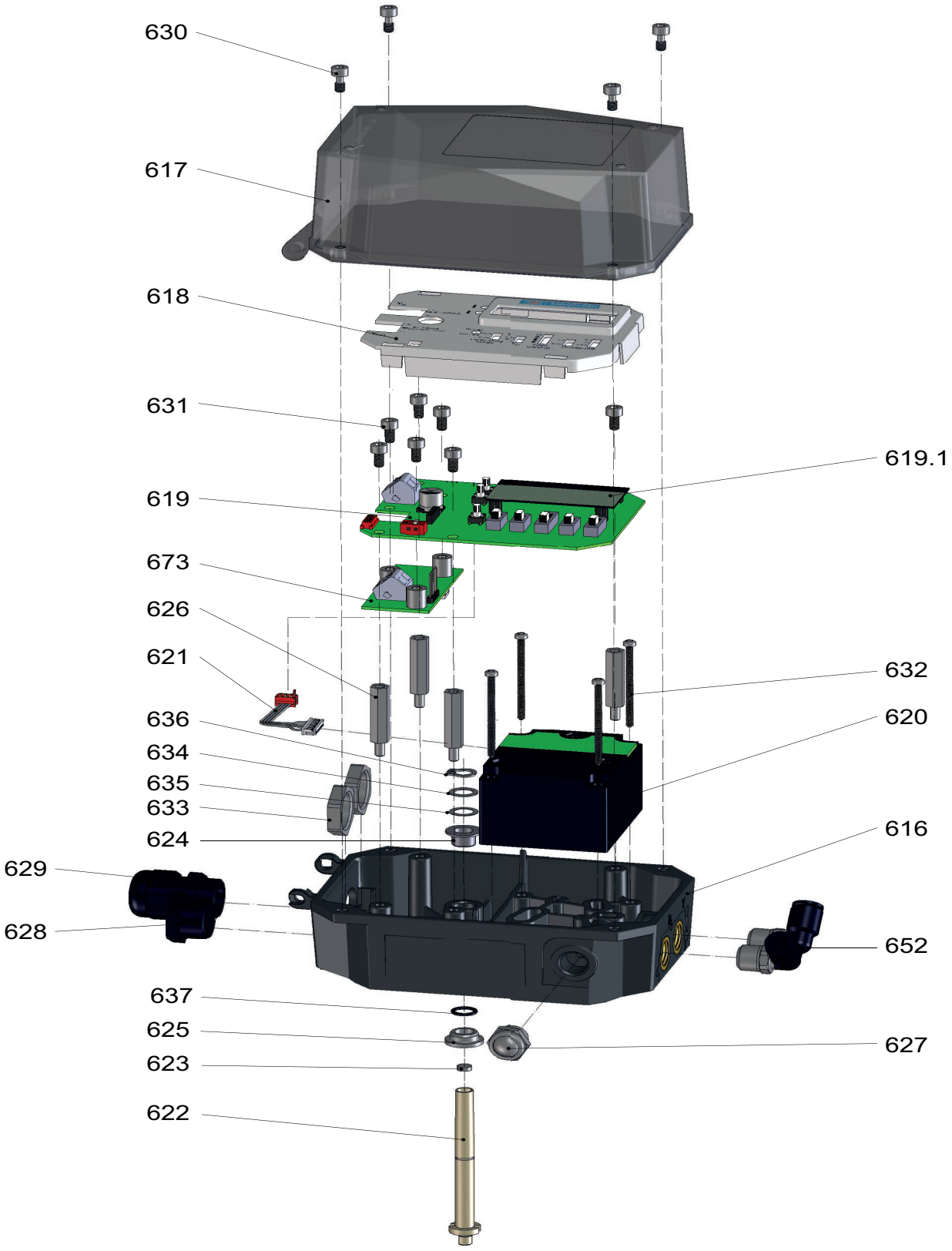


Fig. 2:

4.5 Parts list

No.	Description
616	STEVI-POS® housing
617	STEVI-POS® hood
618	STEVI-POS® protective cover
619	STEVI-POS® board
619.1	Display
620	STEVI-POS® module
621	STEVI-POS® wiring harness
622	STEVI-POS® Hall sensor shaft
623	STEVI-POS® radial magnet
624	Plain bearing GFM-0810-07
625	Plain bearing GFM-0812-06
626	Distance bolt M4x30
627	Silencer

No.	Description
628	Screw plug with sealing ring
629	Cable gland
630	Cylinder screw M4x10 DIN 7964
631	Cylinder screw M4x8 ISO 4762
632	PT screw 4x45 - T20
633	Hex nut M20x1.5
634	Shim ring 8x14x0.5
635	Spring washer W61360
636	Retaining ring 8x0.8
637	O-ring 8.9x1.83
652	Push-in L fitting
673	STEVI-POS® analogue output card

4.6 Technical data

Type	ARI-STEVI-POS®
Stroke range (thrust actuator)	10 to 120 mm
Rotation angle range	25 to 100°
Pneumatic	Single-acting
Auxiliary power	Air supply: 1.4 to 7 bar(20 to 105 psi)
Air connection	G1/4
Pressure gauge connection	G1/8
Control	4…20 mA; max. load voltage: 9.5 V (475 Ω)
Action on control signal failure	Actuator is depressurised
Action on air failure	Actuator is depressurised
Max. conductor cross-sections	Control: 2.5 mm²
Cable entry diameter	M20x1.5: Clamping range: Ø8 - 13 mm
Linearity	±1.5% F.S.[1)]
Hysteresis	1.4% F.S.[1)]
Resolution	0.5% F.S.[1)]
Max. ambient temperature	-20°C...+80°C (-4°F...+176°F)
Max. storage temperature	-25°C...+80°C (-13°F… +176°F)
Housing material	PA
Hood material	PC
Protection acc. to EN 60529	IP66
Corrosivity category	C3 acc. to EN ISO 12944-2

Pneumatic operating medium • Solid particulates • Pressure dew point • Oil content	Compressed air acc. to ISO 8573-1 • Class 4 permanent • Class 4 (at least 10 K less than ambient temperature) • Class 4
Pressurisation • Supply pressure 2 bar (29 psi) • Supply pressure 4 bar (58 psi) • Supply pressure 6 bar (87 psi)	 5.22 Nm³/h (3.25 scfm) 9.28 Nm³/h (5.78 scfm) 15 Nm³/h (9.35 scfm)
Depressurisation • Actuating pressure 2 bar (29 psi) • Actuating pressure 4 bar (58 psi) • Actuating pressure 6 bar (87 psi)	 6.89 Nm³/h (4.29 scfm) 12.18 Nm³/h (7.59 scfm) 17.63 Nm³/h (10.98 scfm)
Air consumption in controlled state	≤ 0.01 Nm³/h (0.01 scfm) (at 25°C)
Mounting position	Any, limitation: The air connections and silencer must not be facing upwards
Weight	0.7 kg

[1] F.S. = full scale (20 mA)

Accessories

NPT air connection (optional)	1/4-18 NPT (with NPT adapter)
NPT cable gland (optional)	adapter M20x1,5 x 1/2-14 NPT cable gland 1/2-14NPT
Analogue output card	4…20 mA passive for 9…32 V current loop Electrically isolated max. conductor cross-section for terminal: 2.5 mm²
Pressure gauges	2 pcs: 0 - 10 bar / 0 - 140 psi For supply and actuating pressure

4.7 Marking

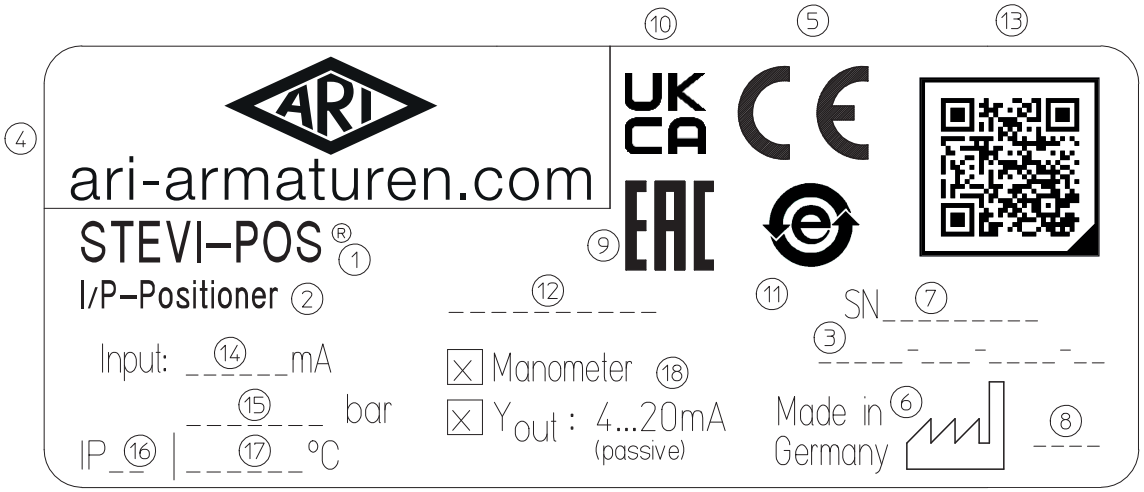


Fig. 3

No.	Description
1	Figure / Product
2	Product type
3	Type number
4	Manufactured by ARI-Armaturen
5	CE marking
6	Place of manufacture
7	Serial number
8	Year of manufacture
9	EAC marking
10	UKCA marking
11	China RoHS marking
12	Internal number
13	QR-Code [ARI-ID]
14	Input: Control signal
15	Input: Operating pressure (limited by the actuator!)
16	Protection class
17	Operating temperature
18	Installed option
Manufacturer’s address: See section “ ”	

4.8 ARI-STEVI-POS® measurements for linear actuators

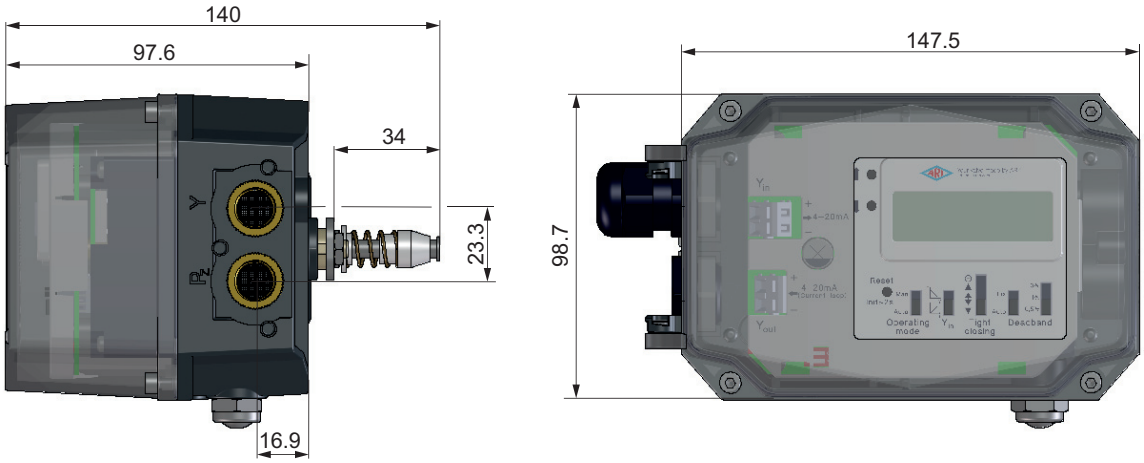


Fig. 4

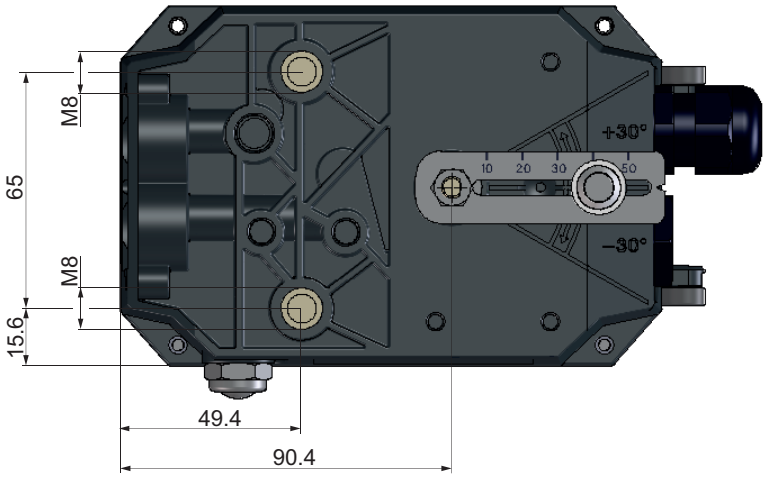


Fig. 5

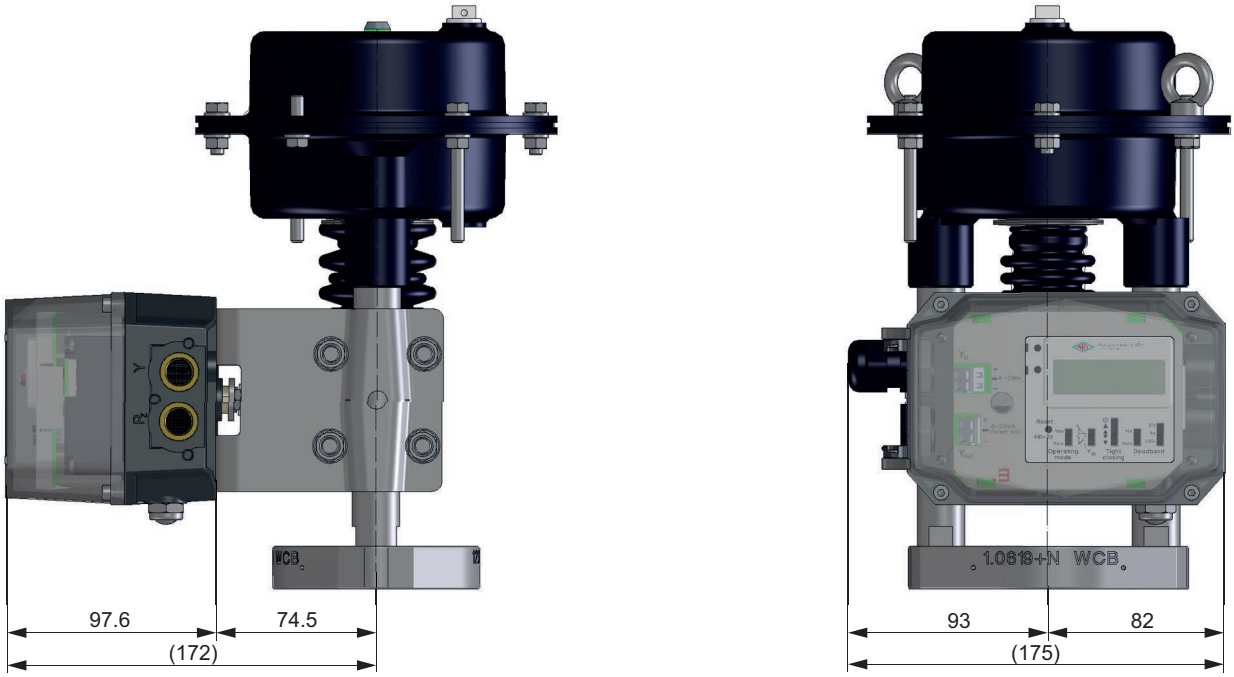


Fig. 6

4.9 ARI-STEVI-POS® measurements for part-turn actuators

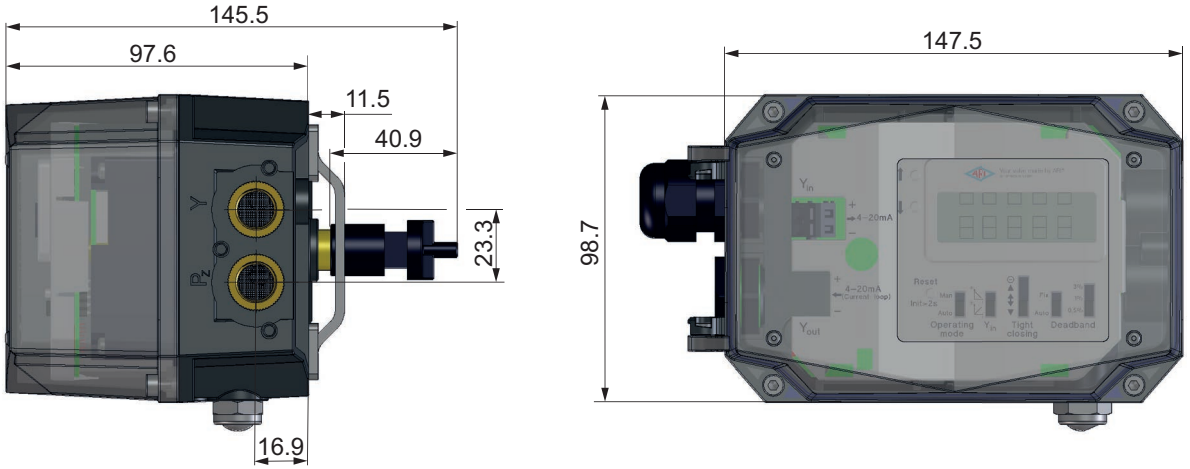


Fig. 7

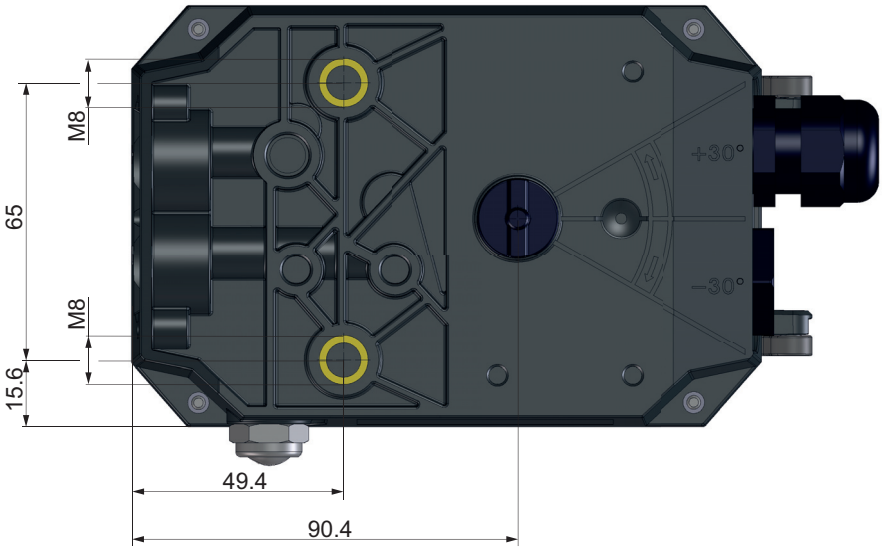


Fig. 8

5.0 Mounting

ATTENTION !

- Risk of injury when working on control valves due to the high operating force of the pneumatic actuator.

- Please observe the corresponding safety instructions for the pneumatic actuator in use.

5.1 Safety

- This product may only be installed and put into operation by suitably qualified persons who are familiar with the procedures for mounting, commissioning and operation.
- Before installing the positioner, ensure that the safety instructions have been read and that they will be observed.
- Check the packaging and the delivered items for visible damage.
- All work on the control valve must be carried with the valve completely depressurised. Any input or supply pressure at the valve, actuator or associated devices must be switched off.
  Check that there is no residual pressure inside the actuator!
- We recommend a bypass valve or another supporting device to prevent the complete system from being switched off.
- Take suitable precautions to rule out any hazards presented to the control valve by the fluid, the actuating pressure or moving parts.

When mounting the positioner, adhere to the following order:

1. Install the positioner on the pneumatic actuator.
2. Connect the pneumatic auxiliary power.
3. Connect the electrical auxiliary power.
4. Select the commissioning settings.

5.2 Pneumatic linear actuator installation

When installing the positioner on the actuator yoke or on the actuator column, an assembly kit for diaphragm actuators is required (see Fig. 9).

5.2.1 Prepare installation

Make sure the following components are available before starting the installation.

Positioner:

- ARI-STEVI-POS® positioner
- 2x push-in fitting
- 1x cable gland
- 1x screw plug
- 1x silencer

Mounting kit for diaphragm actuators acc. to IEC 534-6:

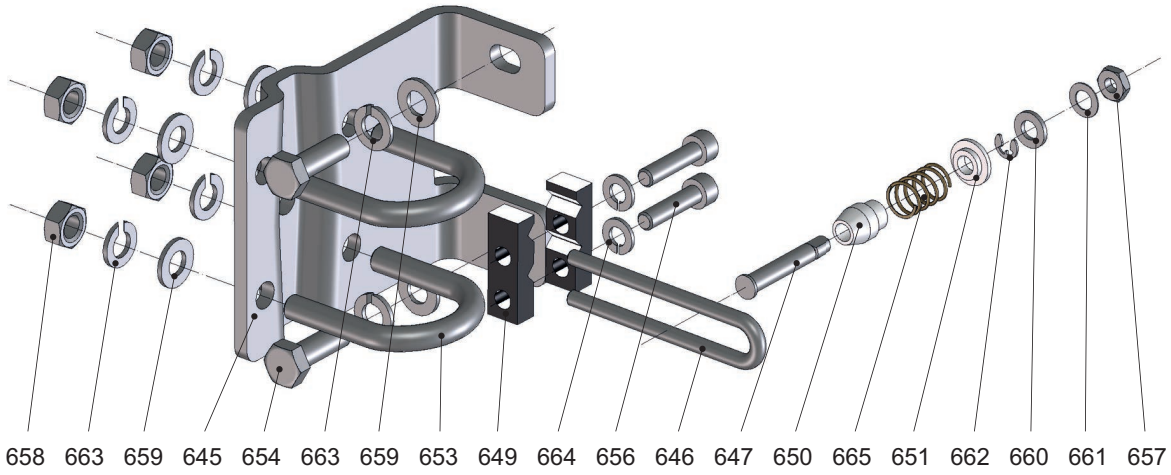


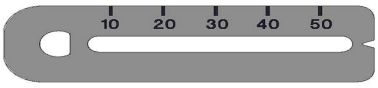
Fig. 9

No.	Description
645	STEVI-POS® mounting bracket
646	Pick-up bracket
647	STEVI-POS® carrier pin
649	Clamping piece
650	STEVI-POS® pulley
651	STEVI-POS® preload bushing
653	STEVI-POS® bracket
654	Hex screw M8x20
656	Cylinder screw M6x25

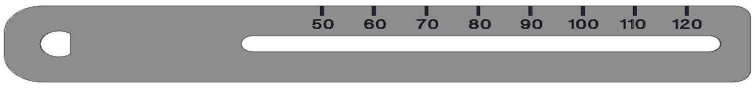
No.	Description
657	Hex nut M6
658	Hex nut M8
659	Washer 8.4
660	Washer 6.4
661	Shim ring 6x12.0x0.2
662	Lock washer 4 DIN 6799
663	Spring lock washer A8
664	Spring lock washer A6
665	Compression spring 17.36 mm

5.2.2 Positioner installation

1. Select the STEVI-POS® carrier (pos. 648a or pos. 648b) according to the valve stroke:



648a:
Carrier for strokes ≤ 50 mm



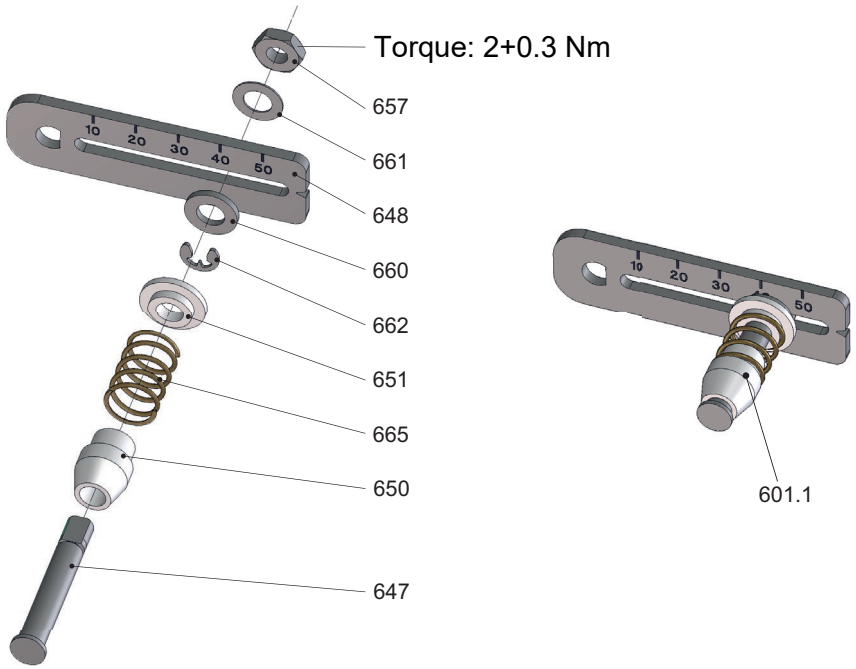
648b:
Carrier for strokes > 50 mm

Fig. 10

2. Mount the carrier pin to the selected carrier

   The carrier pin should be mounted to the selected carrier according to the valve stroke in “mm” and tightened with the hex nut (pos. 657).

NOTE !
- An incorrect setting leads to inaccurate control mode as the valve stroke is not detected correctly.



Exploded view of the carrier *Carrier, fully assembled*

Fig. 11

3. Fit the complete carrier (pos. 601.1) onto the Hall sensor shaft of the positioner (pos. 622) and tighten it with the hex nut (pos. 657).
4. Attach the mounting bracket (pos. 645) to the rear of the positioner using the M8x20 hex screws (pos. 654), the spring lock washers (pos. 663) and the washers (pos. 659).

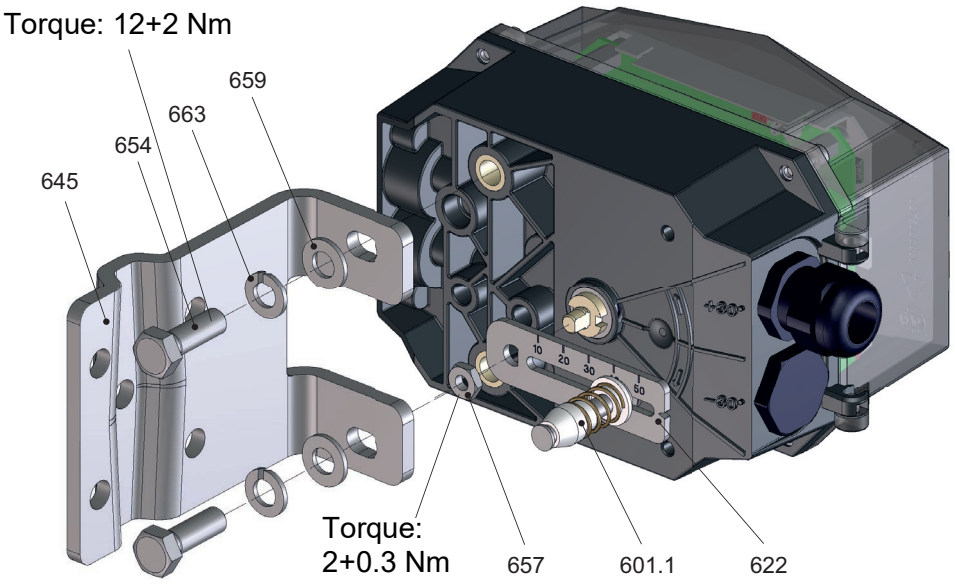


Fig. 12

5. Fit the two clamping pieces (pos. 649) around the pick-up bracket (pos. 646), then attach them to the actuator's coupling or the torsion safety feature (pos. 700) using the cylinder screws M6x25 (pos. 656) and the spring lock washers (pos. 664).
   The alignment of the clamping pieces and the pick-up bracket shown at Fig. 13 must be observed. The two open ends of the pick-up bracket must lie between the clamping pieces.

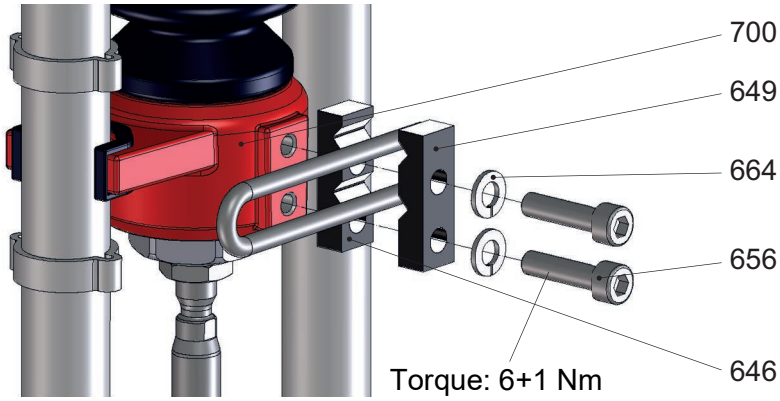


Fig. 13

6. Attach the ARI-STEVI-POS® to the actuator column (see Fig. 14):
   Place the mounting bracket on the free actuator column where the actuator anti-rotation device is not in contact.
   Place the two brackets (pos. 653) around the actuator column from the inside and insert them through the holes in the mounting bracket.
   Place a washer (pos. 659), a spring lock washer (pos. 663) and a hex nut (pos. 658) one after the other on the threads of the brackets and tighten the hex nut by hand so that the positioner can still be moved manually.
   Align the positioner so that the carrier pin (pos. 601.1) engages with the pick-up bracket (pos. 646) (see Fig. 15).
   Do "NOT" tighten the nuts completely.
   The exact alignment of the positioner on the actuator is carried out in step 8.

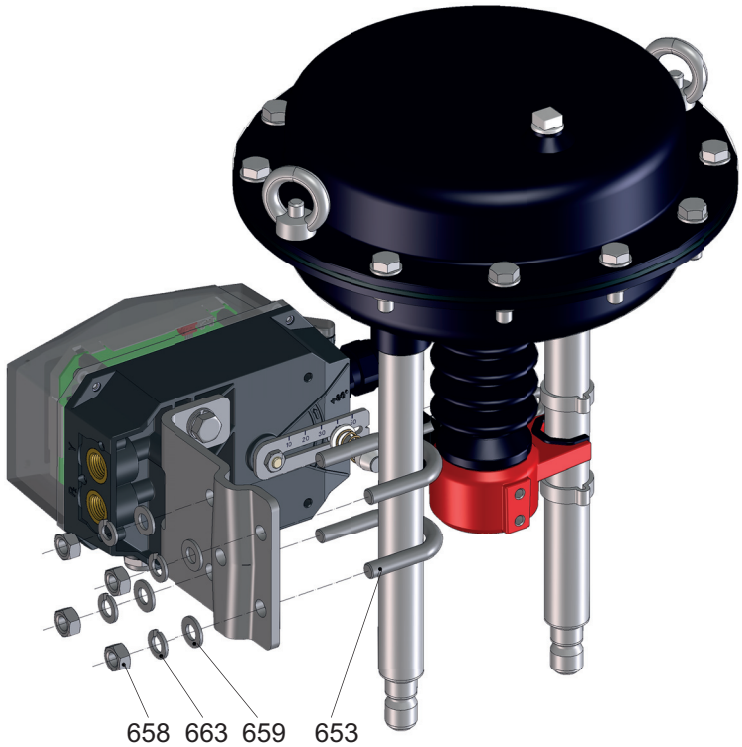


Fig. 14

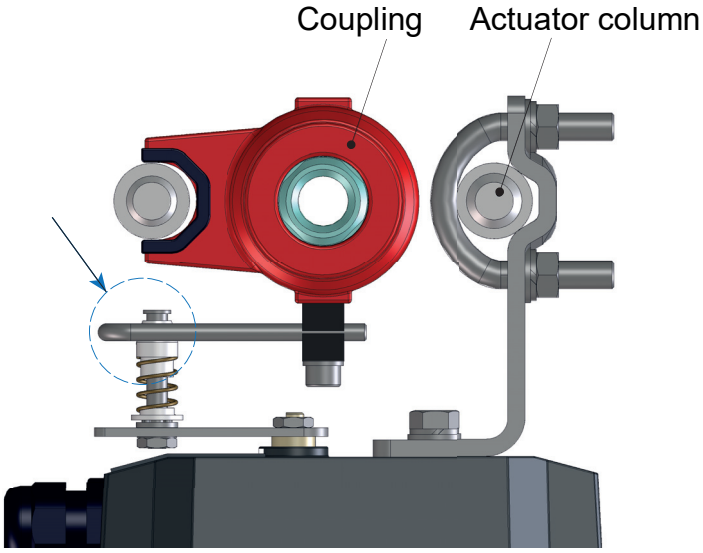


Fig. 15

7. Adjust the height of the ARI-STEVI-POS® by moving it axially along the actuator column, so that the carrier is deflected approx. 30° from the centre line (see Fig. 16) when the actuator is depressurised (valve in end position).

   The maximum +/-30° angles relative to the centre line are marked on the rear of the housing to simplify the adjustment as well as future checks.

   The direction of movement depends on the actuator's operating principle ("valve closes on air failure" (spring to extend) or "valve opens on air failure" (spring to retract).

   Make sure that the carrier movement is subsequently restricted to +/- 30° on either side of the centre line. The position of the non-rotation lock relative to the stroke indicator could indicate the actuator's future direction of movement.

   After approximate alignment, the hex nuts (pos. 658) can be temporarily tightened (see Fig. 14)

ARI-STEVI-POS® aligned with a spring-to-**close** actuator (depressurised)

ARI-STEVI-POS® aligned with a spring-to-**open** actuator (depressurised)

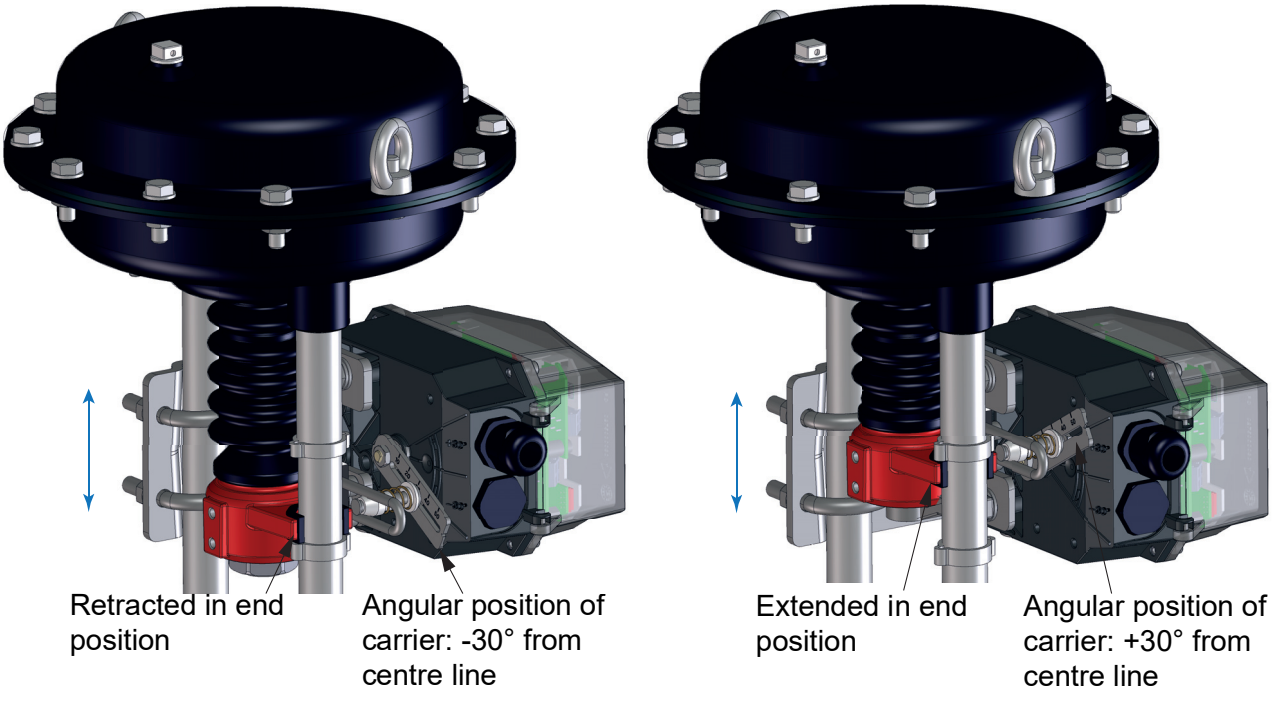


Fig. 16

8. Precise alignment of the positioner (see Fig. 25)

The carrier of the positioner must be at a right angle to the actuator or valve spindle axis at approx. 50% of the valve stroke.

Note !

- Incorrect placement of the positioner on the actuator column creates an offset between the carrier shaft and the actuator's anti-rotation device. This offset results in an inaccurate control mode as the valve stroke is not correctly detected.

To check the mounting position, the actuator must be positioned at 50% of the total valve stroke with the up/down keys in "MAN" mode.
(Measured at the actuator column - ***do not*** read this value from the display)

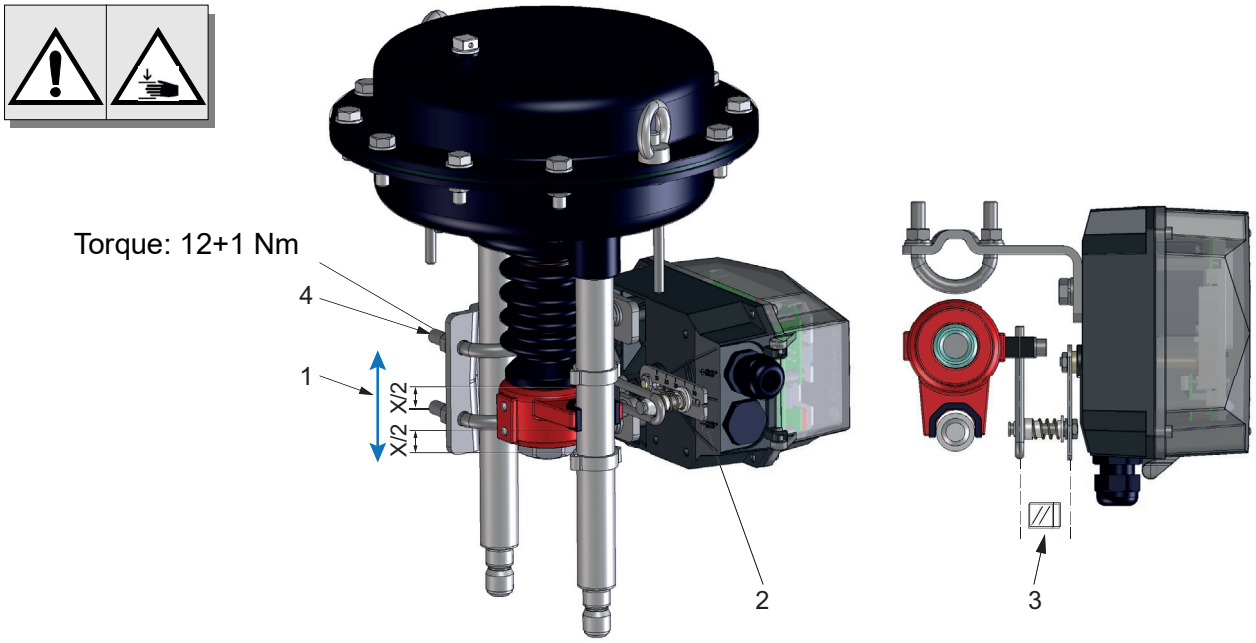


Fig. 17

- Check that the carrier is positioned at right angles (90°) to the valve spindle axis at 50% of the valve stroke or that it matches the centre line printed on the ARI-STEVI-POS® housing. If this is not the case, the height of the ARI-STEVI-POS® must be adjusted by moving it axially along the actuator column until the carrier is positioned at right angles to the valve spindle axis.

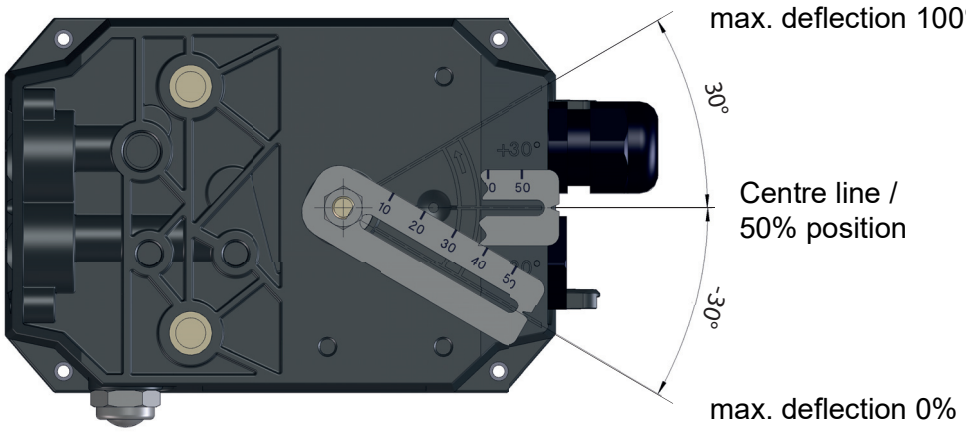


Fig. 18

- Check that the positioner is placed parallel to the two columns of the actuator (see Fig. 17).
- Check the angle of rotation of the carrier.
  This may move by a maximum of +/- 30° to the centre line when the actuator spindle is extended and retracted.
  The corresponding angles to the centre line (+/- 30°) are applied to the back of the housing.
- To fix the ARI-STEVI-POS® in the set position, the hex nuts (pos. 658) on the two brackets must be tightened (see Fig. 17).

5.3 Installing the pneumatic part-turn actuator

A rotational actuator mounting kit is required to mount the ARI-STEVI-POS® on the pneumatic part-turn actuator (see Fig. 25).

5.3.1 Prepare installation

Ensure that the following components are present before starting installation:

Positioner

- ARI-STEVI-POS® positioner
- 2 pcs push-in fittings
- 1 cable gland
- 1 screw plug
- 1 silencer

Mounting kit for part-turn actuators

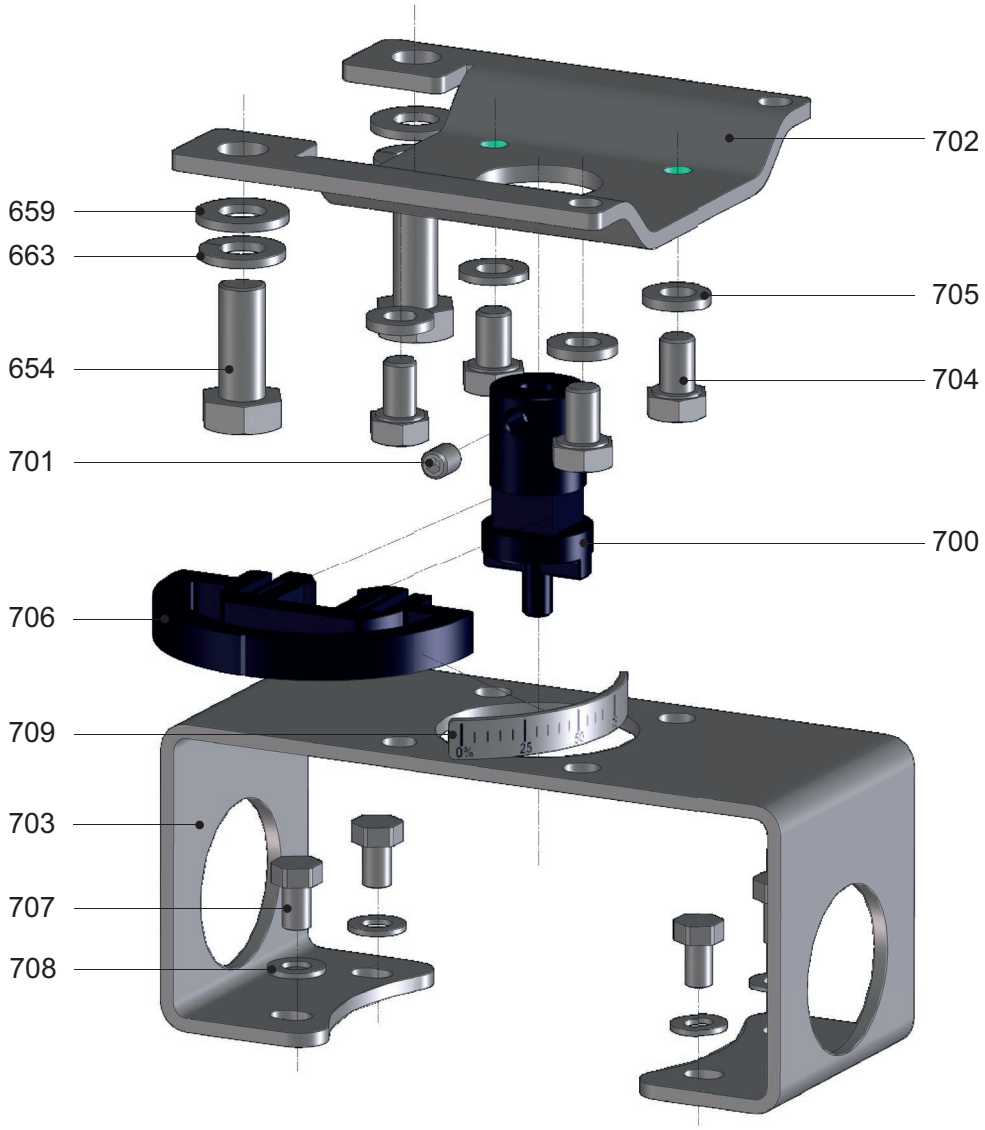


Fig. 19

No.	Description
654	Hex screw M8x20
659	Washer 8,4
663	Spring lock washer A8
700	STEVI-POS® carrier
701	Grub screws M4x8
702	STEVI-POS® adapter plate
703	Actuator-specific console acc. to VDI/VDE 3845

No.	Description
704	Hex screw M6x10
705	Washer 6,4
706	STEVI-POS® angle indicator
707	Hex screw M5x8 resp. Hex screw M6x10
708	Washer 5,3 resp. Washer 6,4
709	Scale

5.3.2 Positioner installation

1. Position the STEVI-POS® carrier (pos. 700) on the hall sensor shaft of the positioner (pos. 622) and fasten it with the grub screws M4x8 (pos. 701).

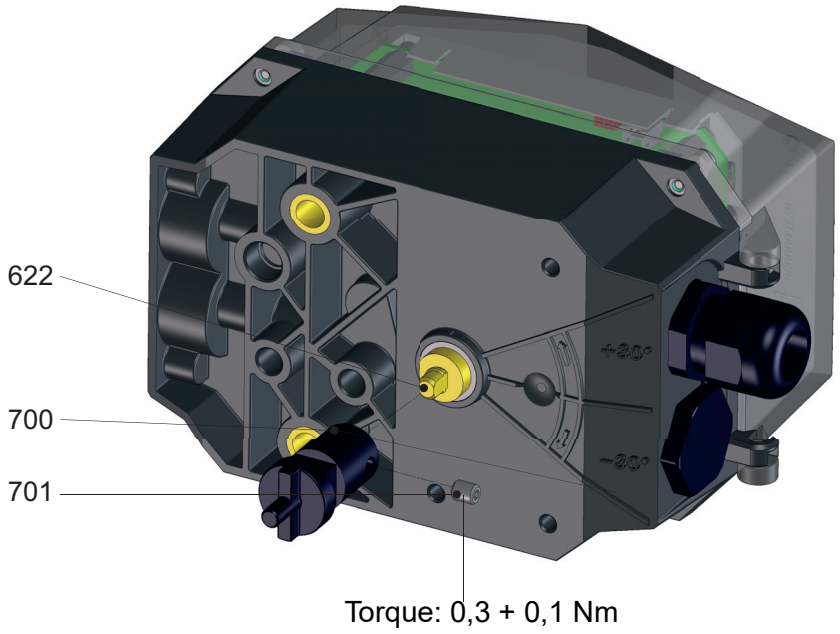


Fig. 20

2. Slide the spring lock washer A8 (pos. 663) and washer 8.4 (pos. 659) onto the hex screws M8x20 (pos. 654). Fit the adapter plate (pos. 702) to the rear of the positioner using these screws.

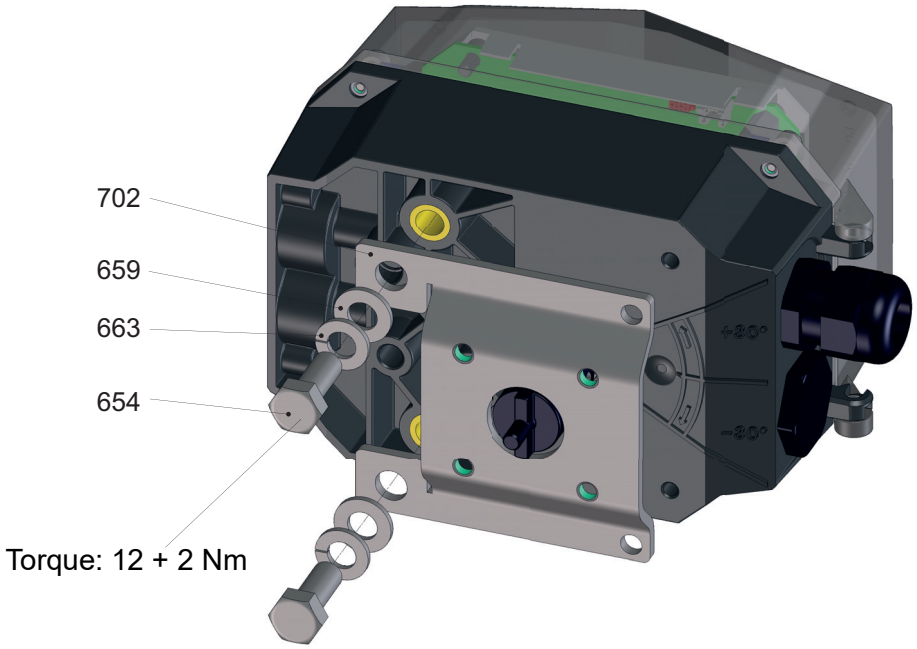


Fig. 21

3. Mount the console (pos. 703) on the adapter plate (pos. 702) using the hex screws M6x10 (pos. 704) and the washers 6.4 (pos. 705).

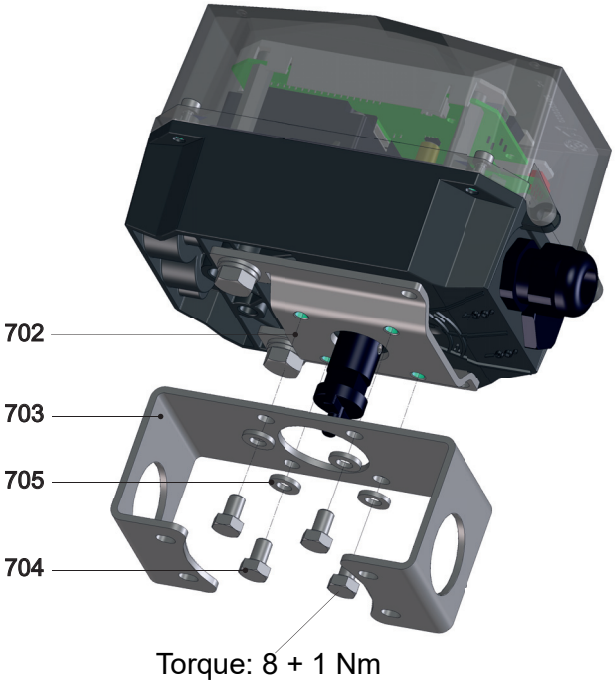


Fig. 22

4. Align the web of the carrier with the groove of the positioner holder on the part-turn actuator. Place the positioner with the mounted console (pos. 703) on to the pneumatic part-turn actuator. Place the washers (pos. 708) on the hex screws (pos. 707) and screw the console to the actuator.

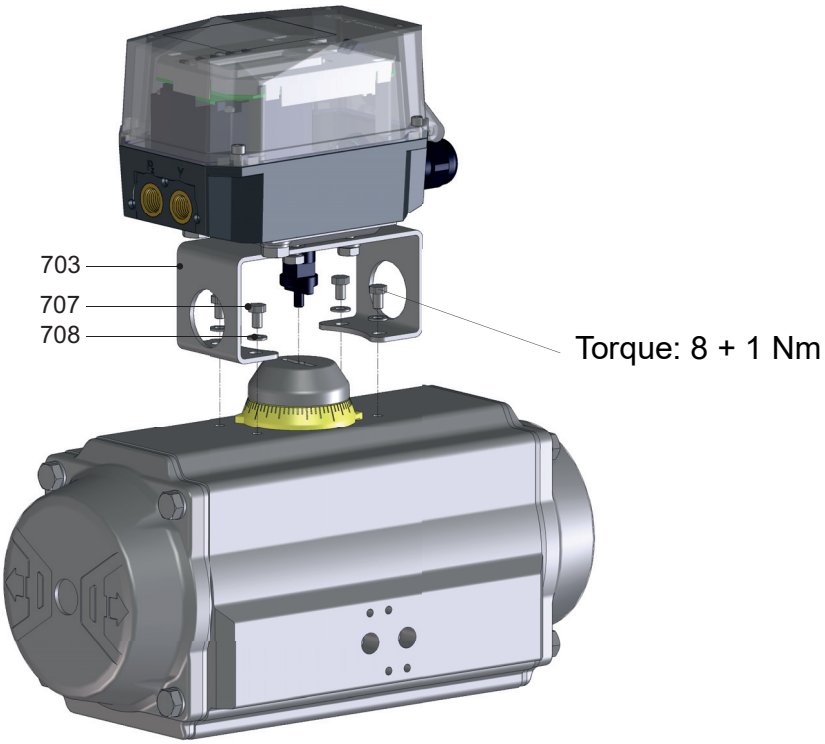


Fig. 23

5. Push the angle indicator (pos. 706) onto the square of the carrier (pos. 700) until it engages. Stick the scale (pos. 709) onto the angle indicator in the correct orientation.

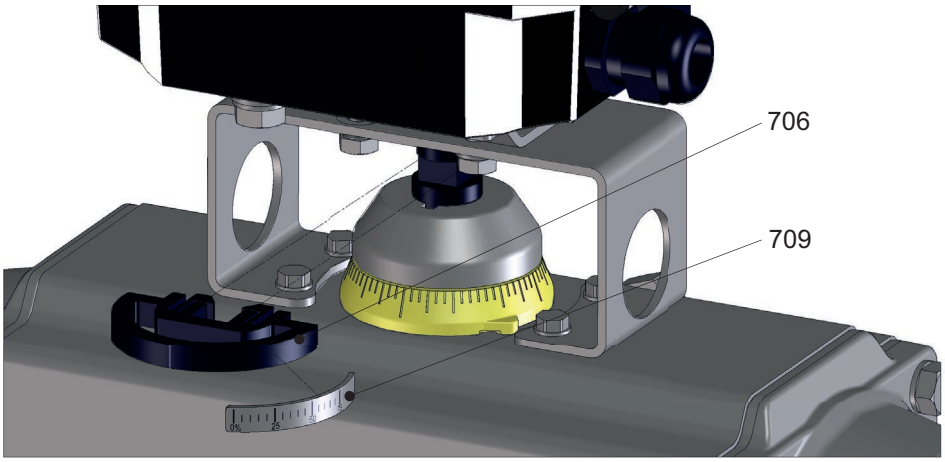


Fig. 24

5.4 Actuating pressure gauge (optional)

We recommend attaching air supply and actuating pressure gauges in order to monitor the positioner.

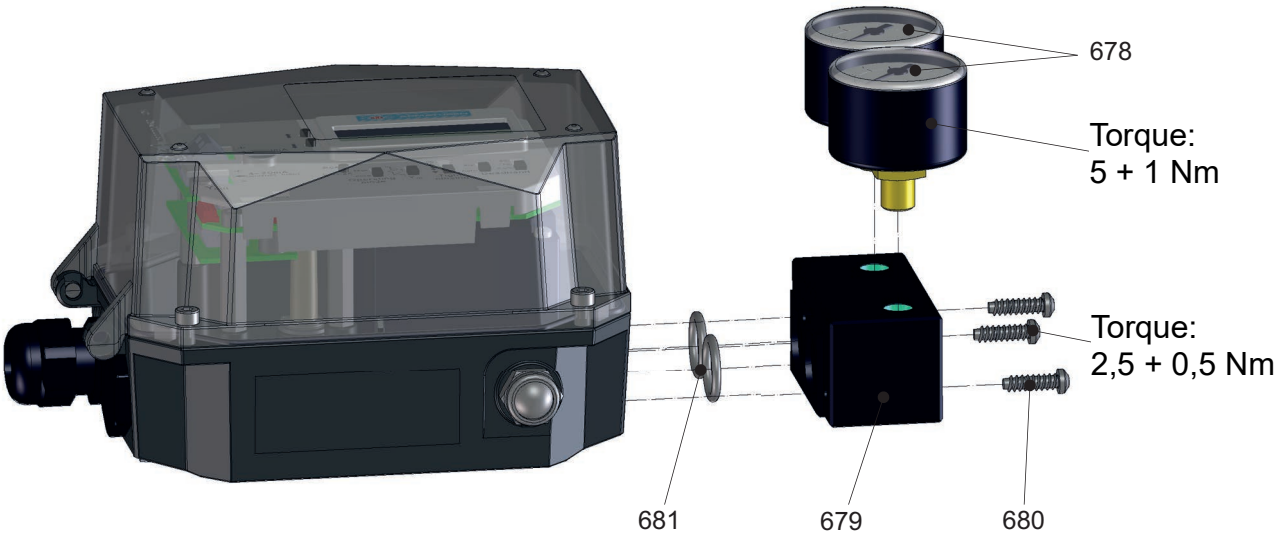


Fig. 25

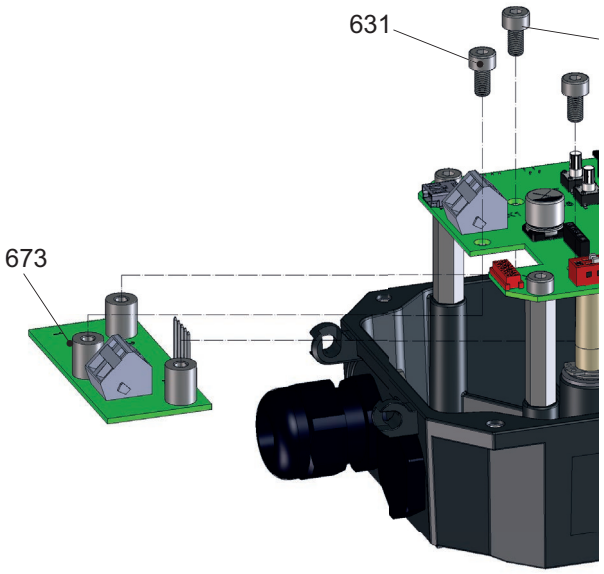
The pressure gauge block (pos. 679) for single-acting actuators is screwed to the positioner using three PT screws (pos. 680). The o-rings (pos. 681) serve as sealing elements.

No.	Description
678	Pressure gauge G1/8
679	STEVI-POS® pressure gauge
680	PT screw 5x16 - T25
681	O-ring14.00 x 3.00 - N

5.5 Analogue output card (optional)

The analogue output card indicates the current position of the valve spindle or the disc in the standard electrical signal 4...20 mA. The position feedback is designed as a two-wire current output (galvanically isolated).

5.5.1 Installation



No.	Description
602	STEVI-POS® option board, complete - 1x STEVI-POS® option board (pos. 673) - 3x Cylinder screw M4x8 ISO 4762 (631)

Fig. 26

ATTENTION !

- The analogue output card must be installed in a de-energised state because it could be permanently damaged if handled incorrectly.

Open the hood and remove the STEVI-POS® protective cover (pos. 618) from the board, then position the analogue output card (pos. 673) on the underside of the main board and check that the male connector is plugged into the female connector correctly. Now secure the card with three cylinder screws (pos. 631) and attach the STEVI-POS® protective cover to the board again.

The analogue output card must have a separate 9…32 V DC power supply.

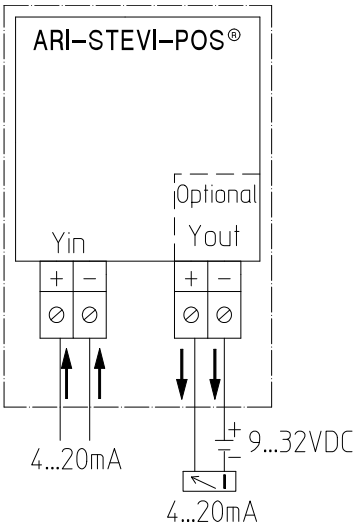


Fig. 27: Circuit diagram

6.0 ARI-STEVI-POS® connections

6.1 Pneumatic connections

ATTENTION !
- The air supply must be free from oil, dust and water!

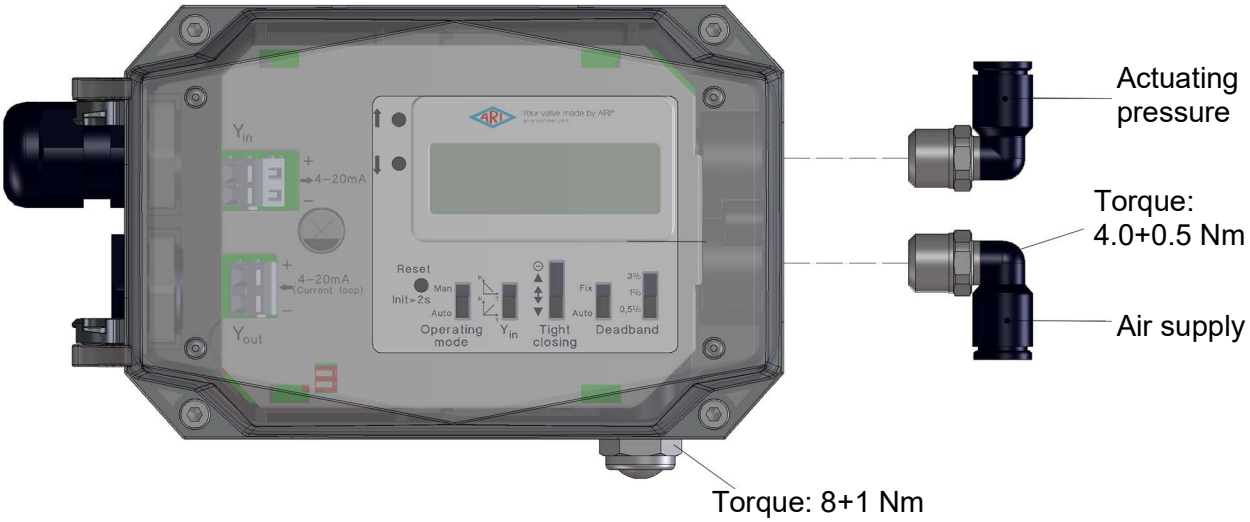


Fig. 28

- Female G1/4 thread for air supply PZ (input) and actuating pressure Y (output).
- Exhaust air outlet with silencer, G1/4 thread.
- Push-in L fitting, G1/4 thread.

6.1.1 Supply pressure

The required supply air pressure depends on the spring or actuating pressure range of the pneumatic actuator. This data can be found on the rating plate of the corresponding actuator.

NOTE !
- Supply pressure: 1.4 to 7 bar
- The air supply must be free from oil, dust and water! The internal filter of the ARI-STEVI-POS® can filter particles with a size of 100 µm or larger.
- The maintenance instructions for upstream reducing stations must be observed.
- Dry air, pressure dew point at least 10°K less than ambient temperature.
- Comply with ANSI / ISA-57.3 1975(R1981) or ISA S7.3-1975(R1981).
- The maximum pressure of the filter regulator must be 10% higher than the operating pressure of the pneumatic actuator.

6.1.2 Piping

Make sure that the inside of pipes is free from particulates, dirt and other obstructions. Blow through pipes thoroughly prior to connecting them.

Do not use pipes which are dented or which show any other signs of damage.

Pipes should have an inside diameter of more than 6 mm (outside diameter: max. 10 mm) in order to ensure a constant flow.

Longer pipes can impair the flow due to friction on the inside. Shorter pipes should be preferred for this reason.

6.2 Electrical connections

ATTENTION !

- Only a current source and not a voltage source should be used to supply electric power to the positioner.

- At less than 3.6 mA, a control signal failure is detected and the actuator is depressurised.

NOTE !

For maximum interference immunity:

- Lay signal cables separately from cables with voltages > 60 V.

- Use cables with twisted wires.

- Keep the product and cables at a distance from strong electromagnetic fields.

- If the supply cable is longer than 30 m, it must be shielded. The shield must be earthed either at the higher-level control end or separately.

Open the positioner hood.

The positioner must be in manual mode (set the “Operating mode” switch to “Man”), to prevent uncontrolled movements when the actuator is connected.

Feed the cables for the 4…20 mA control signal through the M20x1.5 gland and connect them to the Y_{in} terminal as shown in the diagram below.

- Clamping range of the M20x1.5 cable gland: Ø 8 - 13 mm.
- Clamping range of the spring clamp: 0.08 to 2.5 mm².

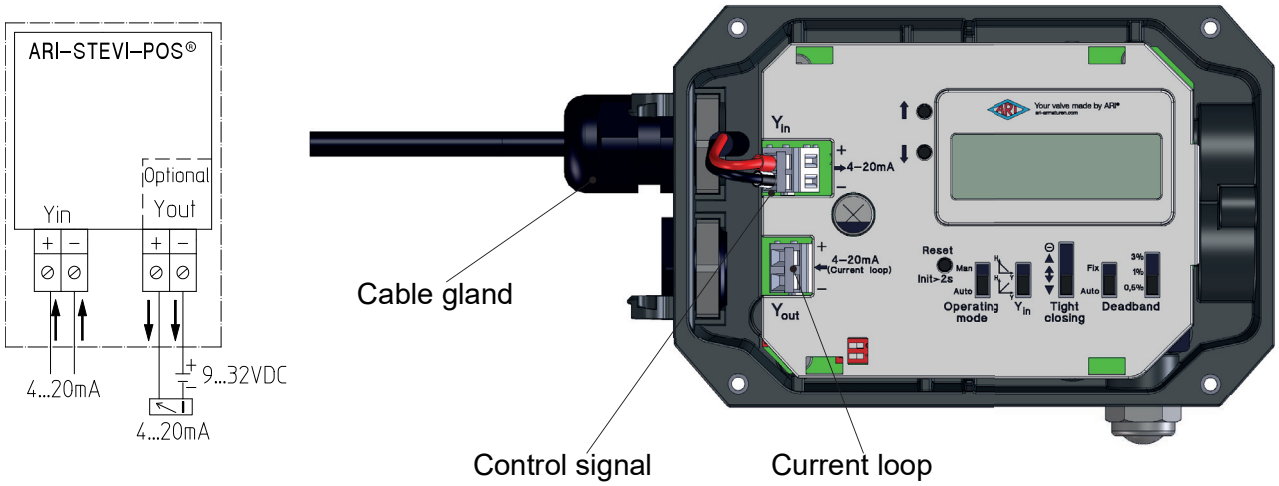

ARI–STEVI–POS®
Optional
Yout
Yin
4...20mA
9...32VDC
4...20mA
Cable gland
Control signal
Current loop
Reset
Operating mode
Tight closing
Deadband

Fig. 29

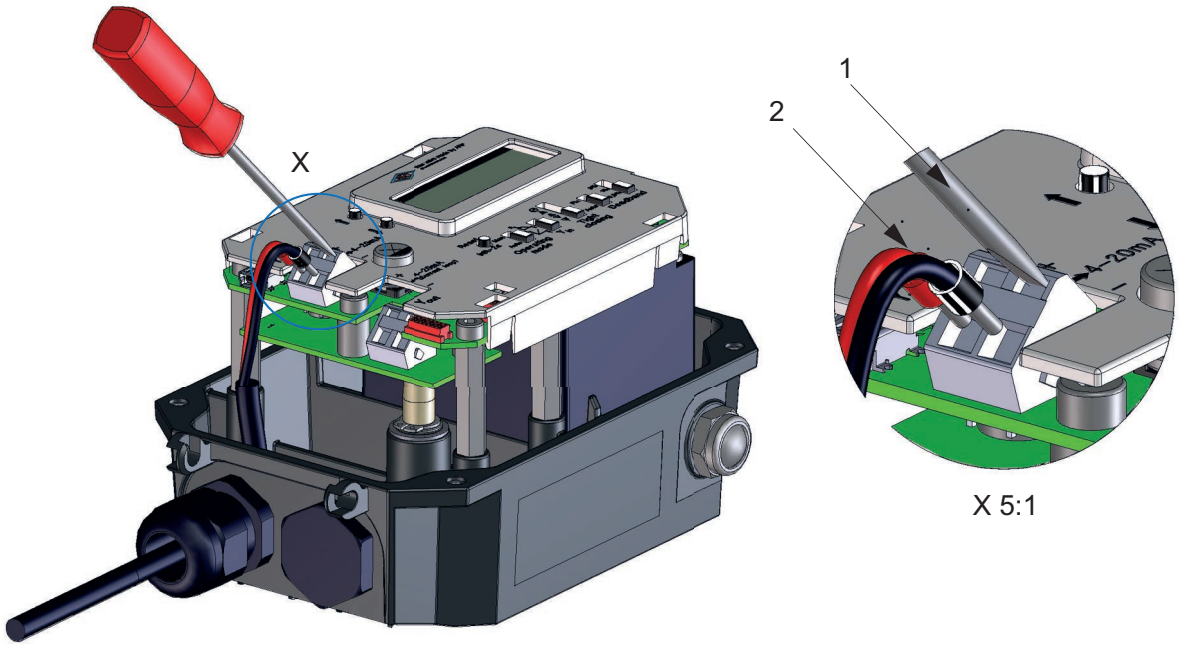

X
1
2
X 5:1

Fig. 30

7.0 Commissioning

7.1 Initialisation

To start initialisation, press the Reset button (pos. 619.4) and hold it for two seconds.

The positioner performs an initialisation run and adapts to the control valve or butterfly valve and the actuator. The positioner successively determines the end positions, the directional specification, the angle of rotation and the adjustment times of the actuator and uses the measured values to adjust the control parameters for the dynamic control behaviour of the actuator.

The initialisation can be cancelled by pressing the Reset button again. In this case, the old control parameters are retained.

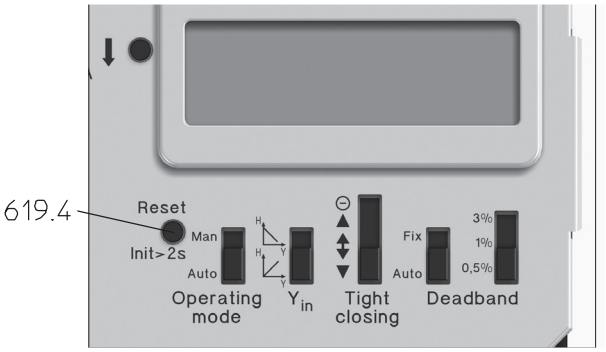


Fig. 31

7.2 Final steps

After executing the above commissioning steps, close the hood and secure it tight with the 4 cylinder screws (pos. 630). These screws must be tightened to the specified torque to ensure that no leakage occurs from the housing.

ATTENTION !

- The cylinder screws (pos. 630) may only be tightened manually.
***Do not** use an electric screwdriver to tighten the screws.*

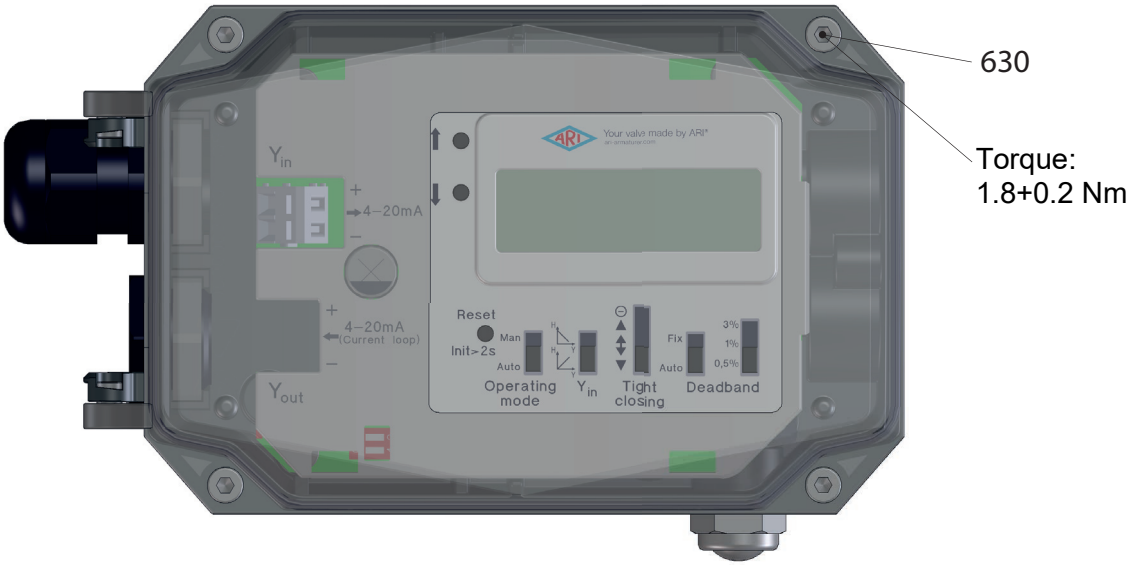


Fig. 32

8.0 Parameters and settings

8.1 Navigation

The slide switches provided on the positioner can be used for all the most important settings.

Some special functions and diagnostic parameters can also be accessed and set on the display.

In automatic mode (slide switch set to “Auto”), you can navigate the display menu using the two arrow keys and the “Reset” button.

In addition to the main view, there is a menu level with three submenus, which you can access on the display: Settings, Diagnostic data and Archive data. By pressing one of the arrow keys in the main view, you go directly to the menu level.

You select a submenu using the arrow keys and then open it with the “Reset” button. The lower menu levels can be accessed in the same way. Press “Reset” again to close the submenus (exception: “Settings”) and return to the main view.

You select the various settings in the “Settings” menu with the arrow keys and the “Reset” button. Set the individual parameters using the arrow keys and press “Reset” to confirm. The display then shows the main view again. By selecting “Leave settings”, you can also leave the main “Settings” menu directly and return to the main view by pressing the “Reset” button.

In manual mode (slide switch set to “Man”), you can move the actuator manually using the two arrow keys; you cannot access the menu level in this mode.

The main view shows the input and output control signals (Yi and Yo) as progress bars in percent. You also see this view after leaving the menus and submenus or after switching between “Manual” and “Automatic” mode.

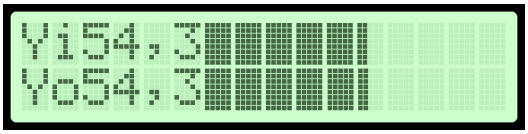


Fig. 33

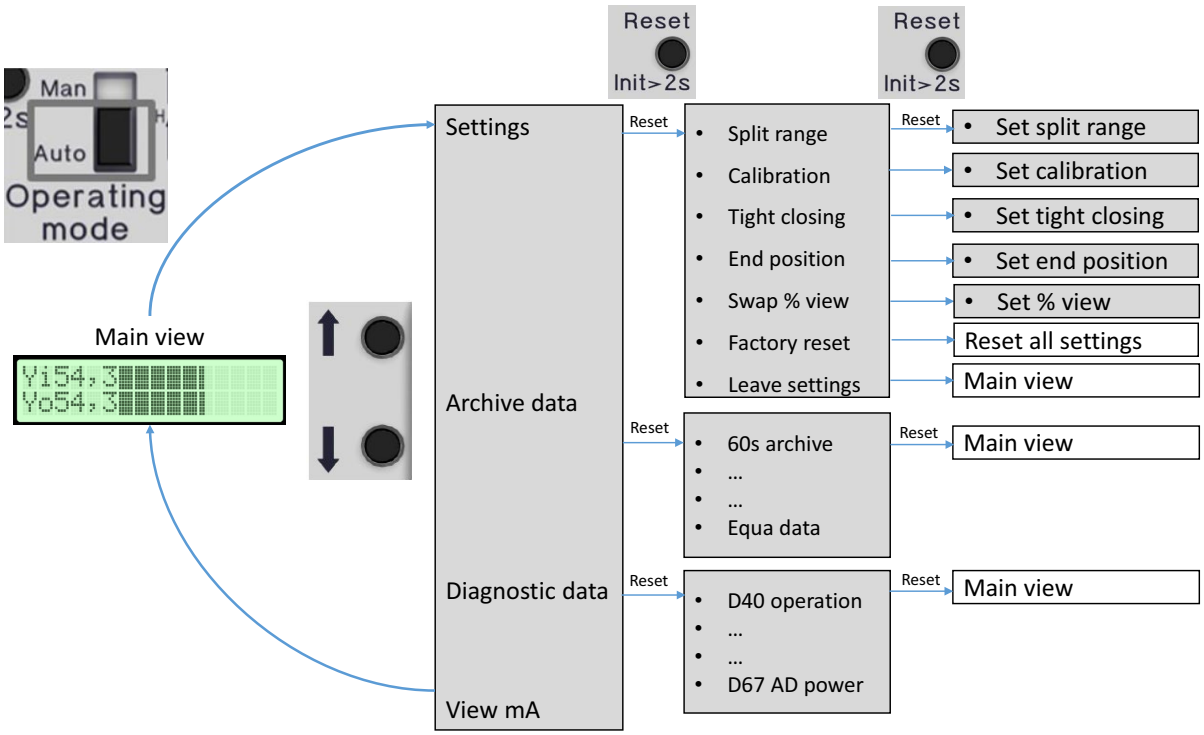


Fig. 34

8.2 Input control signal calibration

You calibrate the input control signal in the “Settings” submenu.

The calibration is display-guided. First, you set the 4 mA control signal and confirm it with the arrow down button. Then you set the 20 mA control signal and confirm it with the arrow up button. If the calibration was successful, “Calibration successful” appears on the display and you automatically return to the main view.

8.3 Split range

In the “Settings” submenu, you can set the positioner to operate in split range mode.

In this case, the control signal (4…20 mA) is split between two or more actuators. The split range must be specified in percent in order to activate this mode. The difference between the start and end values must be at least 30%.

If you set a split range, this is indicated in the main view with Ys for the input control signal.

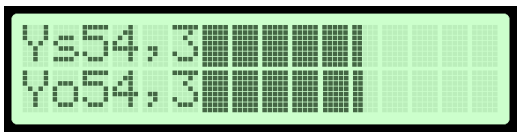


Fig. 35

Parameter	Function	Parameter value
Splitr. min.	Low range (**4...**15.2 mA)	**0**...70%
Splitr. max.	High range (8.8...**20 mA**)	30...**100%**

Example: If you split the control signal into 4 mA to 12 mA for positioner A and 12 mA to 20 mA for positioner B, the configuration will be as follows:

Positioner A	Splitr. min.	0%
	Splitr. max.	50%
Positioner B	Splitr. min.	50%
	Splitr. max.	100%

8.4 Tight closing

You define the tight closing function with the “Tight closing” slide switch (refer to “4.3 Operation / operating elements”).

In the “Settings” submenu, you can set a tight closing range for the positioner using the arrow keys. The tight closing range specifies when the maximum operating force is applied as a percentage when the end position is approached. You can specify a value between 1 and 30% of the control signal range here and save it with the “Reset” button.

Parameter	Function	Parameter value
T. close range	Range (1...**3**...30%)	1...30%

8.5 End position

In the “Settings” submenu, starting from the high or low end position, you can specify a value for the 1…20% stroke range at which the positioner should switch off the actuator.

Parameter	Function	Parameter value
L. Down-dir.	Low range (**1...**20%)	**1**...20%
L. Up-dir.	High range (**1...**20%)	**1**...20%

8.6 Reversal of the position display (inversion of the % view)

In the “Settings” menu level it is possible to invert the stroke display (0% - 100%). The standard setting is "spdl. rtrctd" = 100%", which means that 0% stroke is displayed when the drive spindle is fully extended. With the "swap % view" function, the display can be inverted ("spdl. rtrctd = 0%"), where 0% stroke is displayed when the drive spindle is fully retracted.

By pressing the up arrow key you can choose between “spdl. rtrctd= 0%" or "spdl. rtrctd= 100%"

Display in the standard setting "spdl. rtrctd" = 100%":

- Extended drive spindle: 0%
- Retracted drive spindle: 100%

Display in the standard setting "spdl. rtrctd" = 0%":

- Extended drive spindle: 100%
- Retracted drive spindle: 0%

„“spdl. “rtrctd” means “spindle retracted”.

8.7 Factory reset

In the “Settings” submenu, you can restore the factory settings for all operating parameters by selecting “Factory reset”. Diagnostic and archive data remain unchanged.

8.8 Archive data

In the “Archive data” submenu, you can show all changes to the input control signal during the last 60 seconds, 15 minutes, 60 minutes, 8 hours or 4 days. Prolonged, unwanted actuator downtime can be detected in this way in the absence of analogue feedback. You can also query the change rate of the control signal in this submenu.

8.9 Diagnostic data

The diagnostic data which can be accessed via the “Diagn. data” menu level comprises the following information:

Parameter	Function
D40 Operation	Operating time (general) (days, hours, minutes)
D41 Manual mode	Operating time in “Manual” mode (days, hours, minutes)
D42 Auto mode	Operating time in “Auto” mode (days, hours, minutes)
D43 Init mode	Operating time in “Initialisation” mode (days, hours, minutes)
D44 Low power	Low power time (control signal less than 3.8 mA) (days, hours, minutes)
D45 Deadband	Current deadband in %
D46 Slide switches	Current slide switch positions
D47 Temp. <-20	Time for which internal temperature is less than -20°C (days, hours, minutes)
D48 Temp. -20..0	Time for which internal temperature is between -20 and 0°C (days, hours, minutes)
D49 Temp. 0..40	Time for which internal temperature is between 0 and +40°C (days, hours, minutes)
D50 Temp. 40..70	Time for which internal temperature is between +40 and +70°C (days, hours, minutes)
D51 Temp. >70	Time for which internal temperatures is greater than +70°C (days, hours, minutes)
D52 Blockage UP	Number of blockages in opening direction
D53 Blockage DOWN	Number of blockages in closing direction
D54 SW WatchDog	Number of watchdog actions
D55 Counter init	Number of initialisation processes
D56 Warmstarts	Number of warm starts (tripped by reset or watchdog)
D57 Coldstarts	Number of cold starts (in de-energised state)
D58 Counter_surge	Number of rejected control signal values (significant variation in measurement series)
D59 Full strokes	Number of full actuator strokes (partial strokes are added together to obtain full strokes)
D60 Software-ver	Positioner firmware version
D61 Hardware-ver	Control board hardware version
D62 Customer-ver	Customer-specific versions
D63 C. pressure lost	Number of air failures
D64 Eeprom	Section error in EEPROM
D65 Init. last	Duration of last initialisation process in seconds
D66 Leakage	Leakage detected during initialisation

9.0 Troubleshooting table

ATTENTION !

- Read section 10.0 before carrying out installation and repair work!
- Read section 7.0 before recommissioning!

Fault	Possible cause	Corrective measures
E0: No init	No or invalid initialisation parameters	The actuator must be reinitialised (press and hold the Reset button >2 s).
E1: Internal temp. max. > 85°C	Internal temperature is / was above specification	Check the internal temperature. Acknowledge the error by pressing the Reset button.
E2 Blockage in up-dir.	Blockage determined in up direction (actuator spindle retracting / disc closing)	Check that the valve stroke or the rotational range of the disc can be moved without restriction.
E3 Blockage in down-dir.	Blockage determined in down direction (actuator spindle extending / disc opening)	Check that the valve stroke or the rotational range of the disc can be moved without restriction.
E4 Low power	Low power determined	Check the control signal. It should be at least 3.6 mA.
E5 Leakage > 50%	Leakage determined	Check the valve / connections, etc. for leakage.
E6 No pressure	Air failure detected, i.e. valve open but positioner does not detect any change in valve stroke or disc position.	Check the supply of compressed air to the positioner and / or the pneumatic actuator. Attention: The compressed air line must be depressurised before disconnection!
E7 Out of range check mechanism	Actuator moved more than 5% outside end positions taught during initialisation	Check the carrier mechanism. The carrier should be securely attached to the Hall sensor shaft. For linear actuators: The carrier pin must be firmly screwed in and in the correct position according to the valve stroke. Make sure that the actuator spindle and the valve stem are attached to one another securely.
E8 Surge analogue input	More than 5 consecutive analogue control signal measurements rejected because variation too large	Check the control signal quality for coupled interference.

Fault	Possible cause	Corrective measures
E9 Init. err. no pressure	No movement determined during initialisation (no or not enough supply pressure)	Check the supply of compressed air to the positioner and / or the pneumatic actuator. Attention: The compressed air line must be depressurised before disconnection!
E10 Init. err. valve detect	During initialisation, the actuator size and/or the directional specification was not detected.	Check the carrier mechanism. The carrier should be securely attached to the Hall sensor shaft. For linear actuators: The carrier pin must be firmly screwed in and in the correct position according to the valve stroke. Make sure that the actuator spindle and the valve stem are attached to one another securely.
E11 Init. err. stroke too small	Positioner determined angle of rotation < 20° during initialisation. Valve stroke recorded by carrier is too small	Check the stroke setting on the carrier. Make sure that the carrier is securely attached to the Hall sensor shaft.
E12 Init. err. min. steps u fail	Actuator does not move in pressurisation direction during initialisation	Make sure the pneumatic connections are correctly mounted. Check the supply of compressed air.
E13 Init. err. min. steps d fail	Actuator does not move in depressurisation direction during initialisation	Make sure the pneumatic connections are correctly mounted.
E14 Init. err. valve swings	Actuator's dynamic response is not stable during initialisation.	Check the pneumatic actuator and the pneumatic connections for leaks. Check the supply of compressed air.
E15 Setpoint below 3.6 mA	Control signal outside the specification.	Check the control signal. It must be at least 3.6 mA.

10.0 Maintenance

The positioner requires no maintenance.

All repair work must be carried out by authorised persons!

No liquid must be allowed to come into contact with or get inside the electronics!

Remove any externally visible dirt from the positioner from time to time, depending on the operating conditions.

The positioner must not be cleaned with liquids or aggressive cleaning products that are a health hazard, nor must it be cleaned using flammable cleaning products or solvents.

The housing and hood of the ARI-STEVI-POS® can be cleaned using a cloth that has been moistened with detergent.

11.0 Disassembly of the ARI-STEVI-POS®

ATTENTION !

- The system must be shut down so that the depressurised state is reached. Otherwise, the valve plug or disc would be guided by the system pressure, as it cannot be held without the compressed air supply of the pneumatic actuator.

11.1 Prepare disassembly

1. Depressurize the compressed air supply to the ARI-STEVI-POS®.
2. Switch off the power supply (the control signal) to the ARI-STEVI-POS®.
3. Remove the air supply and signal pressure lines from the positioner.
4. Loosen the cylinder screws on the hood of the ARI-STEVI-POS® and open the hood.
5. Disconnect all cables leading into the positioner from the outside and remove them from the positioner.
6. Close the hood and screw it down with the cylinder screws.

11.2 Disassembly of the positioner on the pneumatic linear actuator

1. Loosen the hex nuts of the two brackets on the spacer column of the linear actuator (see Fig. 15 on page 17).
2. Remove the positioner from the actuator column.
3. Loosen the cylinder screws on the anti-rotation device of the actuator and remove the spring lock washer, the clamping parts and the pick-up bracket (see Fig. 13 on page 16).

11.3 Disassembly of the positioner on the part-turn actuator

1. Loosen the hex screws (pos. 707) between the bracket and the part-turn actuator (see Fig. 23 on page 22).
2. Remove the positioner with console from the pneumatic part-turn actuator.

12.0 Disposal

The products described in these instructions should be recycled.

Under Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), they must not be disposed of as unsorted municipal waste.

For eco-friendly recycling, the products can be returned to the supplier within the EU or to a locally approved waste management business. Observe the specific regulations valid in your country.

13.0 Warranty / Guarantee

The extent and period of warranty cover are specified in the "Standard Terms and Conditions of Albert Richter GmbH & Co. KG“ valid at the time of delivery or, by way of departure, in the contract of sale itself.

We guarantee freedom of faults in compliance with state-of-the-art technology and the confirmed application.

No warranty claims can be made for any damage caused as the result of incorrect handling or disregard of operating and installation instructions, technical data sheets and relavant regulations.

This warranty also does not cover any damage which occurs during operation under conditions deviating from those laid down by specifications or other agreements.

Justified complaints will be eliminated by repair carried out by us or by a specialist appointed by us.

No claims will be accepted beyond the scope of this warranty. The right to replacement delivery is excluded.

The warranty shall not cover maintenance work, installation of external parts, design modifications or natural wear.

Any damage incurred during transport should not be reported to us but rather to the competent cargo-handling depot, the railway company or carrier company immediately or else claims for replacements from these companies will be invalidated.

Importer to UK and responsible for compilation of the documentation:

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