SIEMENS

SIPART

Electropneumatic positioners SIPART PS100

Operating Instructions

6DR71..

10/2018
A5E45863537-AA

armatec

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

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Note the following:

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Table of contents

Introduction and safety information

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1.1 Product compatibility

Manual edition	Comments	Device revision	Compatible version of device integration package
10/2018	First edition	FW: 1.00.00 Device revision 1	-

1.2 Precondition for use

This device left the factory in good working condition. In order to maintain this status and to ensure safe operation of the device, observe these instructions and all the specifications relevant to safety.

Observe the information and symbols on the device. Do not remove any information or symbols from the device. Always keep the information and symbols in a completely legible state.

1.3 Checking the consignment

Check the device packaging for damage. Inform your supplier of any damage. Retain the damaged parts for clarification.

Check the scope of delivery by comparing the shipping documents with your order for correctness and completeness.

Do not take damaged or incomplete devices into operation under any circumstances.

Special conditions for storage and transportation of device listed in Section "Rated conditions (Page 38)".

1.4 Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines, and networks.

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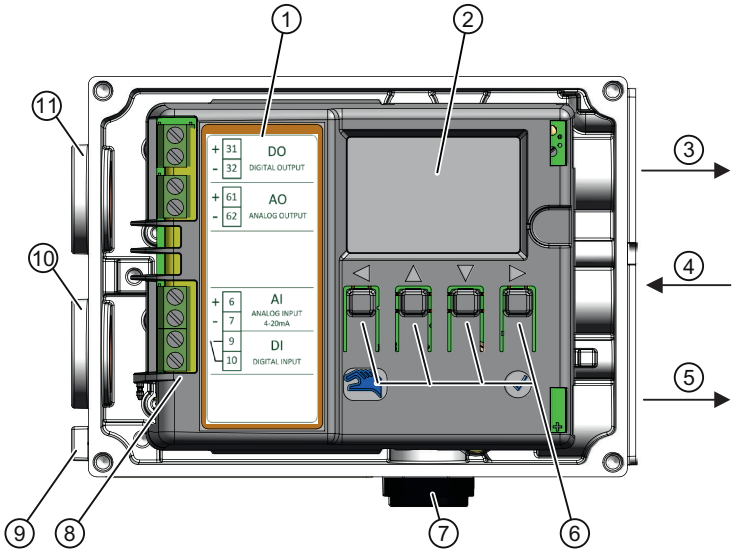
Description

2

2.1 Overview of device components



① Wiring diagram on module cover
② Display
③ Output: Actuating pressure Y1
④ Input: Supply air PZ
⑤ Output: Actuating pressure Y2 [1)]
⑥ Buttons
⑦ Exhaust air outlet with a sound absorber
⑧ Connecting terminals
⑨ Grounding, thread M4
⑩ Lower cable gland, thread M20x1.5
⑪ Upper cable gland, thread M20x1.5

[1)] For double-acting actuators

Figure 2-1 View of positioner with cover open

See also

Structure of pneumatic connection (Page 18)

Installing and mounting 3

⚠ WARNING

High operating force with pneumatic actuators

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.

⚠ CAUTION

Please note the following before working on the control valve and when attaching the positioner

Danger of injury.

- Prior to working on the control valve, you must move the control valve into a completely pressureless state. Proceed as follows:
  - Depressurize the actuator chambers.
  - Switch off the supply air PZ.
  - Lock the valve in its position.
- Make sure that the valve has reached the pressureless state.
- If you interrupt the pneumatic auxiliary power to the positioner, the pressureless position may only be reached after a certain waiting time.
- When mounting, observe the following sequence imperatively to avoid injuries or mechanical damage to the positioner/mounting kit:
  - Mount the positioner mechanically.
  - Connect the electrical auxiliary power supply.
  - Connect the pneumatic auxiliary power supply.
  - Commission the positioner.

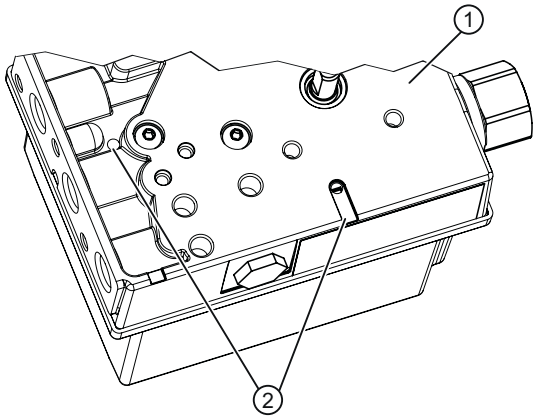
3.1 Freezing of the exhaust air outlets

NOTICE

Freezing of the exhaust air outlets

The exhaust air outlets ② can ice up. The function of the device is impaired.

- Do **not** install the positioner with the base plate ① pointing up.



① Base plate
② Exhaust air outlets

Figure 3-1 Exhaust air outlets, base plate

3.2 Mounting to linear actuator

Requirements

Depending on the stroke height, you will need the following mounting kit:

- 3 to 35 mm mounting kit 6DR4004-8V
- 35 to 130 mm mounting kit 6DR4004-8V and additional 6DR4004-8L

Parts list 6DR4004-8L

Serial no.	Quanti-ty	Name	Note
①	1	Lever	For the range of stroke from 10 to 130 mm

Parts list 6DR4004-8V

The numbers in "serial no." column refer to the images in the description of the procedure.

Serial no.	Quanti-ty	Name	Note
①	1	NAMUR mounting bracket IEC 60534	Standardized connection point for mount with fin, column or plane surface
②	1	Pick-up bracket	Guides the pulley with the carrier pin and rotates the lever arm.
③	2	Clamping piece	Installs the pick-up bracket on the actuator spindle
④	1	Carrier pin	Installation with pulley ⑤ on lever ⑥
⑤	1	Pulley	Installation with carrier pin ④ on lever ⑥
⑥	1	Lever	For the range of stroke from 3 to 35 mm
⑦	2	U–bolts	Only for actuators with columns

Serial no.	Quantity	Name	Note
⑧	4	Hexagon bolt	M8x20 DIN 933–A2
⑨	2	Hexagon bolt	M8x16 DIN 933-A2, torque, section "Technical specifications > Construction (Page 39)"
⑩	6	Spring lock washer	A8 - DIN 127–A2
⑪	6	Washer	B8.4 - DIN 125–A2
⑫	2	Washer	B6.4 - DIN 125–A2
⑬	1	Spring	VD-115E 0.70 x 11.3 x 32.7 x 3.5
⑭	1	Spring lock washer	A6 - DIN 137A–A2
⑮	1	Lock washer	3.2 - DIN 6799–A2
⑯	3	Spring lock washer	A6 - DIN 127–A2
⑰	3	Socket cap screw	M6x25 DIN 7984–A2
⑱	1	Hexagon nut	M6 - DIN 934–A4
⑲	1	Square nut	M6 - DIN 557–A4
⑳	4	Hexagon nut	M8 - DIN 934–A4

Procedure

1. Install the clamping pieces ③ on the actuator spindle. Use spring lock washers ⑯ and socket cap screws ⑰ for this purpose.
2. Slide the pick-up bracket ② into the milled recesses of the clamping pieces ③.

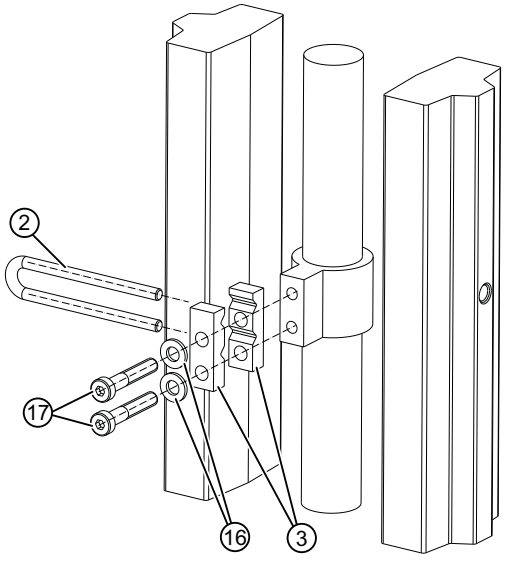


Figure 3-2 Pick-up bracket

3. Tighten the screws ⑰ so that you can still shift the pick-up bracket ②.

4. If you use a short lever, the carrier pin is already pre-mounted. If you use the long lever 6DR4004-8L, fasten the carrier pin ④ with the existing parts to the long lever.

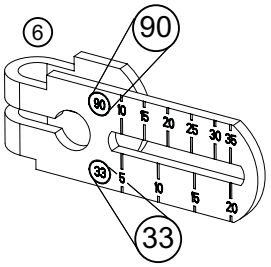


Figure 3-3 Short lever

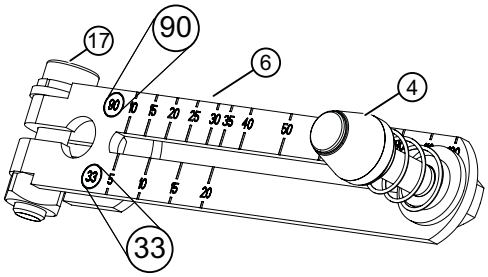


Figure 3-4 Long lever 6DR4004-8L with mounted carrier pin ④ and cylinder head screw ⑰

5. Position the carrier pin on the stroke value of the upper scale (90) of the lever ⑥. For strokes greater than 35 mm, use the long lever, article number 6DR4004-8L.
6. Push the pre-installed lever ⑥ up to the endstop on the positioner shaft. Fasten the lever ⑥ with socket cap screw ⑰.
7. Install the mounting bracket ① at the rear side of the positioner. Use 2 hexagon bolts ⑨, 2 spring lock washers ⑩ and 2 flat washers ⑪ for this purpose.

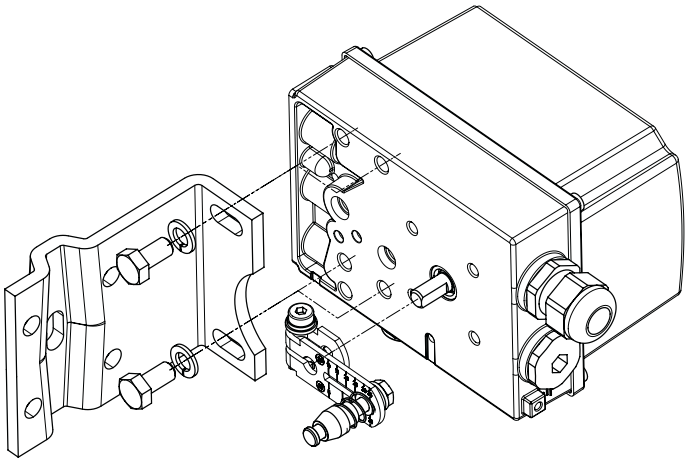


Figure 3-5 Installation with mounting bracket

8. Select the row of holes. The selection of the row of holes depends on the yoke width of the actuator. Select the row of holes in such a way that the carrier pin ④ meshes with the pick-up bracket ② near the spindle. Ensure that the pick-up bracket ② does not touch the clamping pieces ③.

9. Keep the positioner and the fastening bracket on the actuator. Ensure that the carrier pin ④ is guided inside the pick-up bracket ②.
10. Fasten the positioner on the yoke.

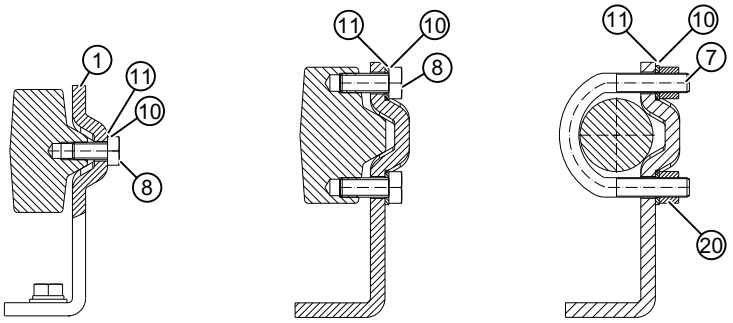


Figure 3-6 Fastening to various yoke types

3.3 Mounting to part-turn actuator

Requirements

- An actuator-specific VDI/VDE 3845 mounting console
- Mounting kit 6DR4004-8D

Procedure

"Part-turn actuator" mounting kit 6DR4004–8D			
Sr. no. *)	**Quantity**	**Name**	**Note**
①	1	Coupling wheel	Installation on positioner shaft
②	1	Carrier	Installing on the actuator shaft
③	1	Multiple plate	Display of the position, consisting of scale and pointer mark
	8	Scale	Different divisions
	2	Pointer mark	Reference point for scale
④		Mount	Actuator-specific, VDI/VDE 3845
⑤	4	Hexagon bolt	M6x12 DIN 933, torque see the section "Technical specifications > Construction (Page 39)"
⑥	4	Lock washer	S6
⑦	1	Socket cap screw	M6x16 DIN 84
⑧	1	Washer	6.4 DIN 125
⑨	1	Hex socket-head screw	M4 for coupling wheel
⑩	1	Square nut	M4 for coupling wheel
	1	Machinist's wrench	For hexagon socket-head screw ⑨

*) The numbers refer to the images of the description of the installation steps below.

1. Rest the actuator-specific VDI/VDE 3845 mount ④ on the rear side of the positioner.
2. Tighten the mount using the hexagon bolts ⑤ and lock washers ⑥.

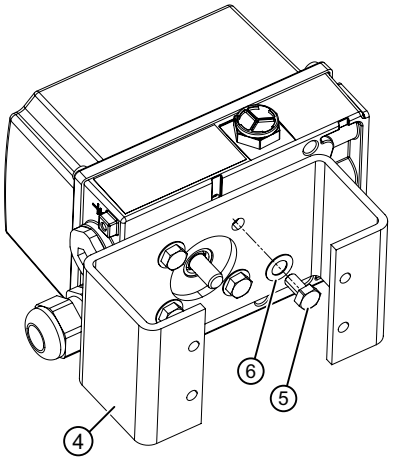
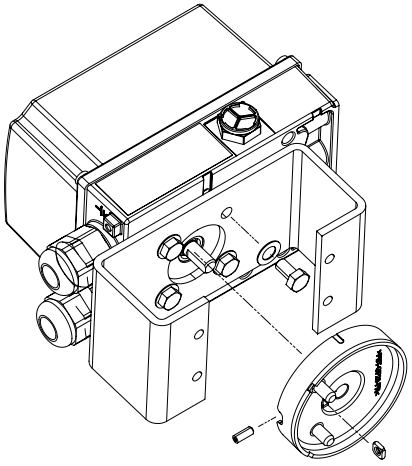


Figure 3-7 Mount

3. Insert the square nut ⑩ into the coupling wheel. Insert the hex socket head screw ⑨ into the square nut ⑩.



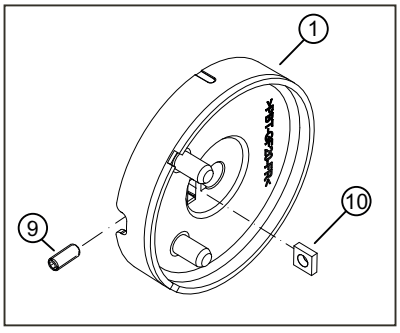


Figure 3-8 Coupling wheel

4. Push the coupling wheel ① or the stainless steel coupling up to the endstop on the positioner shaft.
5. Move the coupling wheel or the stainless steel coupling back by approximately 1 mm.
6. Tighten the hexagon socket-head screw ⑨ using the machinist's wrench provided. Maximum tightening torque = 1 Nm. If you are using the stainless steel coupling, omit the next step.

Note

Coupling wheel

Instead of the polycarbonate coupling wheel ①, it is possible to use a stainless steel coupling (article number TGX: 16300-1556).

7. Place the carrier ② on the actuator shaft.

8. Tighten the carrier ② using the cylinder head screw ⑦ and the washer ⑧.

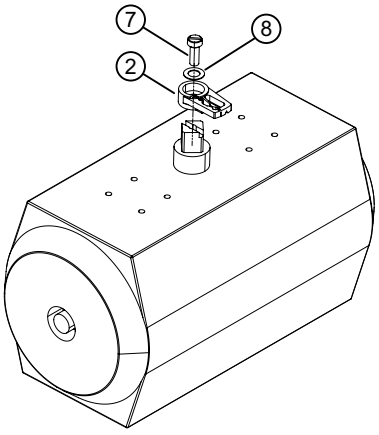


Figure 3-9 Carrier

9. Place the positioner and the mount on the actuator carefully. One of the two pins ⑫ of the coupling wheel ① must fit in the carrier ② when you do this.

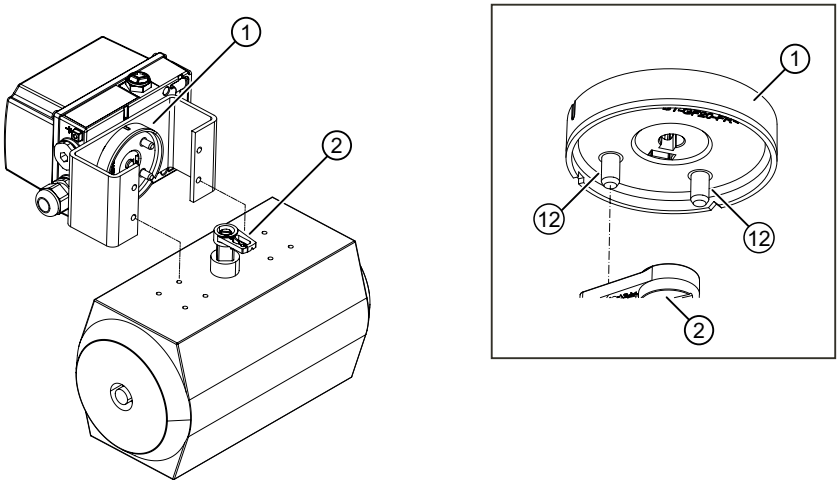


Figure 3-10 Orientation of mount

When using the stainless steel coupling (article number TGX: 16300-1556): Place the positioner and the mount on the actuator carefully. Place the stainless steel coupling on the actuator shaft.

10. Align the positioner/mount at the center of the actuator.
11. Tighten the positioner/mount unit.

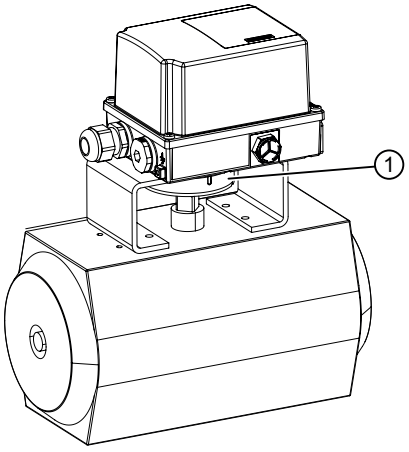


Figure 3-11 Positioner with mount attached to the part-turn actuator

Connecting

4

4.1 Lever for position detection

⚠ WARNING

Lever for position detection

Danger of crushing and shearing with mounting kits which use a lever for position detection. During commissioning and ongoing operation, severing or squeezing of limbs could occur as a result of the lever. Risk of injury when working on control valves due to the high operating force of the pneumatic actuator.

- Do not reach into the range of motion of the lever following mounting of the positioner and mounting kit.

Two-wire mode

NOTICE

Connection of voltage source to current input

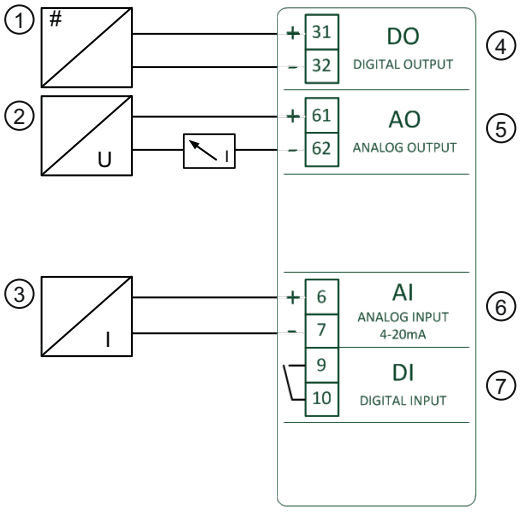
Device damage if a voltage source is connected to the current input I_w (terminals 6 and 7).

- Never connect the current input I_w to a low-resistance voltage source, otherwise the positioner may be destroyed.
- Always use a high-impedance power source.
- Observe the static destruction limit specified in the "Input (Page 37)".

4.2 Grounding

The positioner is grounded via the mounting kit or via grounding with thread M4 on the enclosure, ⑨ in Overview of device components (Page 7).

4.3 Electrical connection

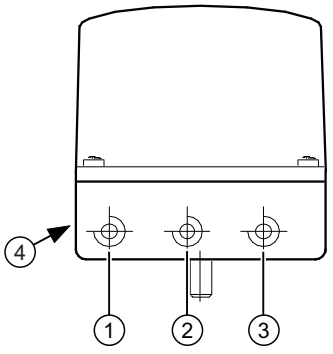


① Switching amplifier
② Power source 12 to 30 V DC
③ Signal source 4 to 20 mA
④ Digital output
⑤ Analog output of position feedback
⑥ Analog input current input 4 to 20 mA
⑦ Digital input (floating contact)

Figure 4-1 Wiring diagram

4.4 Pneumatic connection

4.4.1 Structure of pneumatic connection



① Output: Actuating pressure Y2 *)
② Input: Supply air PZ
③ Output: Actuating pressure Y1
④ Exhaust air outlet with sound absorber, thread G¼

*) for double-acting actuators

Figure 4-2 Pneumatic connection, example

See also

Overview of device components (Page 7)

4.4.2 Pneumatic connection

WARNING

Pneumatic auxiliary power

Owing to safety reasons, the pneumatic auxiliary power supply must be fed after installation only if the positioner is switched to the "NO INIT" mode when an electrical signal is available.

Note

Specifications regarding air quality

Observe the specifications regarding the air quality, see section "Technical specifications > Pneumatic data (Page 38)".

Note

Leakage

Besides continuous air consumption, a leakage can cause the positioner to try to compensate the position deviation. This will result in premature wear in the entire control device.

- Check with "LECKAGE TEST" [04] if there is leakage.
- If there is leakage, check the pneumatic connections for leaks.

4.4.3 Response to failure of auxiliary power

Overview

The following overview diagram shows the pneumatic connection versions for different actuator types, regulating action and safety position after an auxiliary power supply failure.

CAUTION

Before working on the control valve

Note that, before working on the control valve, you must first move it to the safety position. Make sure that the control valve has reached the safety position. If you only interrupt the pneumatic auxiliary power supply to the positioner, the safety position may in some cases only be attained after a certain delay period.

The difference between a failure of auxiliary pneumatic power and a failure of electrical auxiliary power:

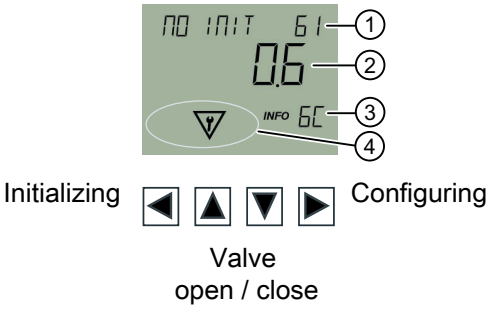
- Failure of **electrical auxiliary power** means the failure of the signal source at the analog input 4 to 20 mA.
- Failure of **auxiliary pneumatic power** means the supply air PZ is interrupted.

Actuator type	Response to failure of auxiliary power: The actuator moves into safety position	
	Failure of electrical auxiliary power	Failure of pneumatic auxiliary power
Single-acting	Y1 = vented	Y1 = vented
Double-acting	Y1 = pressurized Y2 = vented	Y1 = closed Y2 = closed

Operation via display and keys

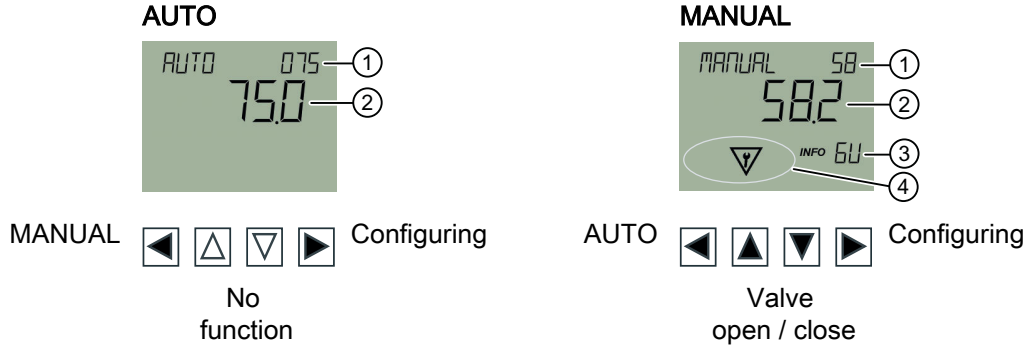
5

Navigating in "NO INIT" operating mode



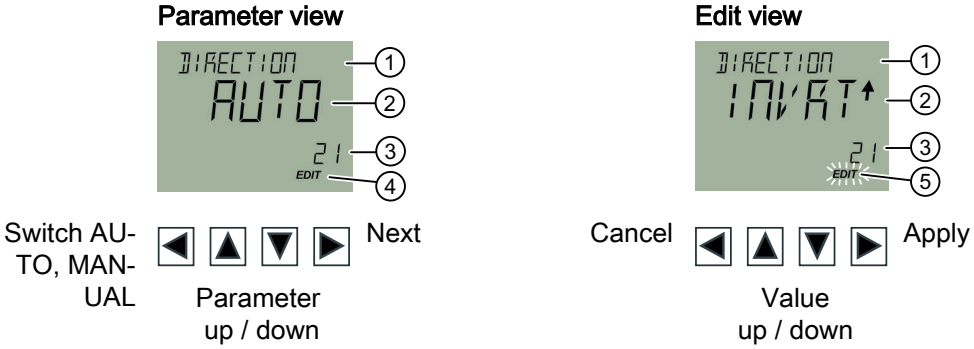
① Status line: Operating mode and setpoint in percent
② Main line: Angle of position detection in degrees
③ Info (Page 32)
④ Symbols for device status (Page 31)

Navigating in "AUTO" and "MANUAL" operating mode



① Status line: Operating mode and setpoint in percent
② Main line: Valve position as a percentage
③ Info
④ Symbols for device status

Navigating in parameter view and edit view



① Status line: Name or unit of the parameter
② Main line: Parameter value
③ Parameter ID
④ EDIT permanently activated
⑤ EDIT flashes

Commissioning

6

⚠ WARNING

Risk of crushing through lever of position detection

When the positioner is commissioned, immediate movement of the valve may occur.

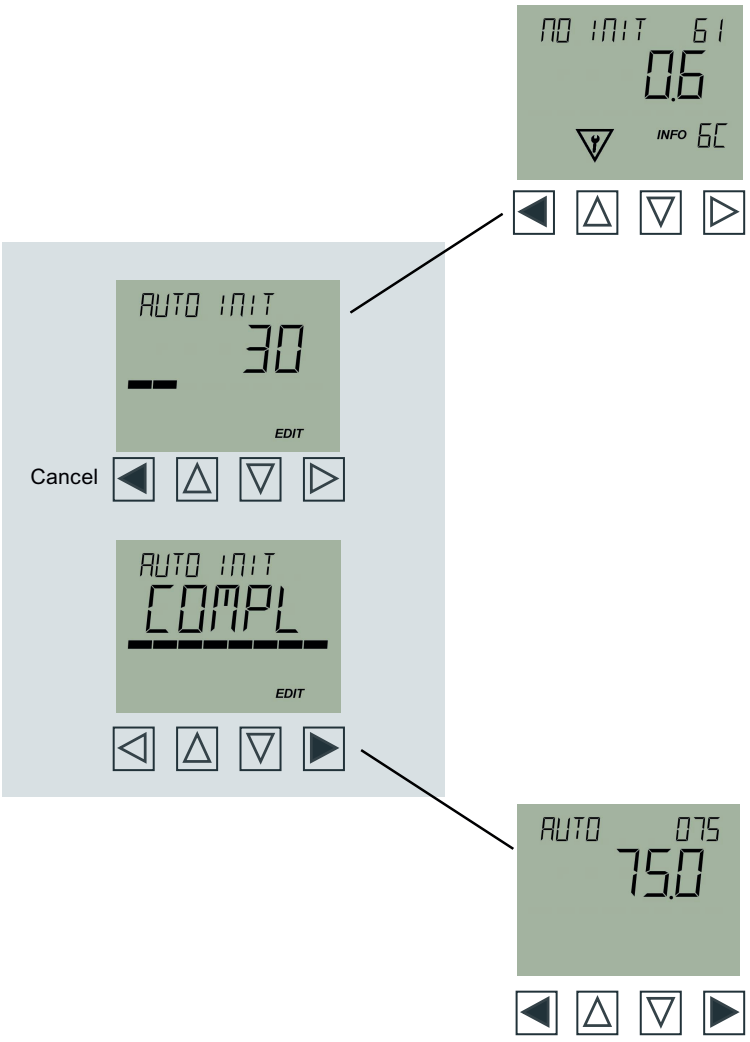
If the positioner is in "NO INIT" mode, the movement of the valve starts immediately as soon as you press the left button on the positioner.

Danger of crushing and shearing with mounting kits which use a lever for position detection. During commissioning and during ongoing operation, severing or squeezing of limbs could occur as a result of the lever. Risk of injury when working on control valves due to the high operating force of the pneumatic actuator.

- Do not reach into the range of motion of the lever following mounting of the positioner and mounting kit.

6.1 Initialize in "NO INIT" operating mode

If "NO INIT" appears in the display this means that the device is not initialized, Info ID (Page 32) [6C]. Commission the device by initializing it with "NO INIT".



Parameter assignment and addressing

7

7.1 Overview of the menu structure

The overview of the menu structure contains not only the menus and parameters but also the parameter IDs. These parameter IDs are added to the further explanations of the menus and parameters in [ ]. Example "AUTO INIT" [02]

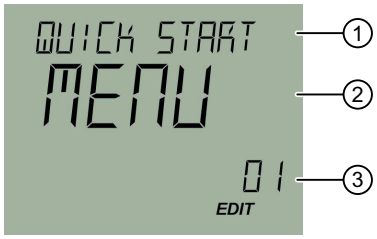
QUICK START	
AUTO INIT	02
MANUAL INIT	03
LEAKAGE TEST	04
SPEED TEST	05
OVERSHOOT	06
APPLICATION	10

SETUP		
DIGITAL IN	21	*)
DIGITAL OUT	24	*)
DIRECTION	28	
CLOSE TYPE	29	
CLOSE LIMIT	30	
OPEN TYPE	31	
OPEN LIMIT	32	
DBAND LIMIT	33	
DBAND VALUE	34	
LEAKAGE COMP	35	
MOUNTING	36	

MAINT/DIAGS	
SETPOINT	51
COUNTER	52
PEAK VALUES	60
RESET	70
FW VERSION	71
REPLACE ELEC	73

*) Available with installed device option 1 with digital input (DI) and digital output (DQ).

7.2 QUICK START [01]

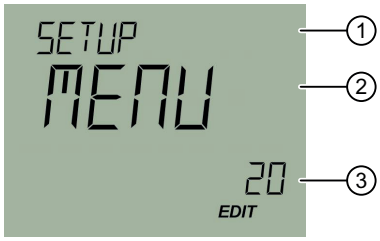


ID ③	Status line ①	Main line ②	Meaning
02	AUTO INIT	WIZ	Wizard for automatic initialization of the valve. The remaining end positions are automatically determined.
03	MANUAL INIT	WIZ	Wizard for manual initialization of the valve. Define the end positions manually using this wizard.
04	LEAKAGE TEST	WIZ	Wizard for determining the pneumatic leakage. Stroke movement in %/minute caused by leakage.
05	SPEED TEST	WIZ	Wizard for determining the positioning times in seconds.
06	OVERSHOOT	WIZ	Wizard for determining the overshooting in % in relation to the total stroke. An overshoot of less than 3% is shown in the display as "OK".
10	APPLICATION	Setting the application profile based on predefined selection options.	
		AUTO	Basic setting, suitable for all applications.
		TIGHT	Tight-closing valve. Move the valve to the end positions with maximum positioning force.
		FAST	Dynamic valve. Valve with fast control response
		EXACT	Valve with precise control response
		ONOFF	Open/close valve which moves to the end positions with maximum actuating force.
		BOOST	Valve with booster
		SMALL	Small valve with damped control response

WIZ = WIZARD

7.3 SETUP [20]

Setting the device parameters.



Factory-set parameter values are printed in bold in the table.

	ID ③	Status line ①		Main line ②	Meaning	
	21	DIGITAL IN		MENU	Menu for setting the digital inputs. Available with installed option with digital input (DI) and digital output (DQ).	
		22	BEHAVIOR DI	**NONE**	Digital input is not active.	
				HOLD	Holds the current valve position.	
				BUTTN	Enables the button lock. Operation no longer possible.	
				MSG	Activates the digital output.	
				GO CL	Moves to valve position when digital input is activated, as set in parameter "CLOSE LIMIT" [30].	
				GO OL	Moves to valve position, as set in parameter "OPEN LIMIT" [32].	
		23	POLARITY DI	**HIGH**	Normally Open: Normally open contact	
				LOW	Normally Close: Normally closed contact	
	24	DIGITAL OUT		MENU	Menu for setting the digital outputs. Available with installed option "Digital Input/Digital Output (DI/DO)".	
		25	BEHAVIOR DO	**NONE**	Digital output is not active.	
				ERR	Activates the digital output in case of control deviation or device fault.	
				ERR M	Activates the digital output in case of manual mode, control deviation or device fault.	
		26	POLARITY DO	**HIGH**	Normally Open: Normally open contact	
				LOW	Normally Close: Normally closed contact	
	28	DIRECTION		**AUTO**	Operating direction defined automatically during initialization	
				INVRT	Inverted operating direction	
*)	29	CLOSE TYPE		**FAST**	Fast response in end positions	
				TIGHT	Maximum actuating force in end positions	
				SLOW	Precise response in end positions	
				LIMIT	Precise response, controlled to the value of "CLOSE TYPE" [30].	
				Note To not travel to the end stop in the end position of the valve, assign the values "SLOW" or "LIMIT" to the "CLOSE TYPE" parameter.		

	ID ③	Status line ①	Main line ②	Meaning	
*)	30	CLOSE LIMIT	**0.0** ... 100.0	Close valve to the set position, controlled to the value in % of "CLOSE TYPE" [29].	
*)	31	OPEN TYPE	**FAST**	Fast response in end positions	
			TIGHT	Maximum actuating force in end positions	
			SLOW	Precise response in end positions	
			LIMIT	Precise response, controlled to the value of "OPEN LIMIT" [32].	
			Note To not travel to the end stop in the end position of the valve, assign the values "SLOW" or "LIMIT" to the "OPEN TYPE" parameter.		
*)	32	OPEN LIMIT	0.0 ... **100.0**	Open valve to the set position, controlled to the value in % of "OPEN TYPE" [31].	
*)	33	DBAND LIMIT	0.1 ... 3.0	Maximum area of deadband in %	
*)	34	DBAND VALUE	x.x	Current deadband value	
	35	LEAKAGE COMP	**ON**	Enabled leakage compensation	
			OFF	Deactivated leakage compensation	
	36	MOUNTING	**AUTO**	Automatic determination of the actuator	
			LEVER	Mounting on linear actuator, carrier pin mounted on lever	
			STEM	Mounting on linear actuator, carrier pin mounted on spindle	
			TURN	Mounting to the part-turn actuator	

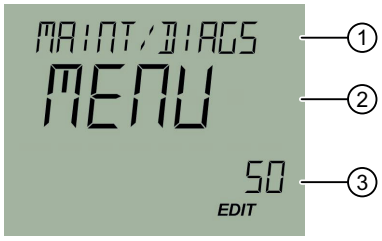
*) Visible when "APPLICATION" [10] is set to AUTO

See also

Response to failure of auxiliary power (Page 19)

7.4 MAINT/DIAGS [50]

Service menu



ID ③	Status line ①		Main line ②	Meaning
51	SETPOINT		##.##	Show actual setpoint in mA. ① alternately shows the parameter name or the set unit.
52	COUNTER		MENU	
	53	OPERATE TIME	####	Show number of operating hours.
	54	DIRECTN CHNG	####	Number of changes in direction
	55	STROKES	####	Display the total distances travelled. A distance corresponds to a sum of 200 %.
	56	PIEZO 1	####	Number of operating cycles pilot valve 1
	57	PIEZO 2	####	Number of operating cycles pilot valve 2
60	PEAK VALUES		MENU	
	61	TIME OPEN	##.#	Duration in seconds until valve is open.
	62	TIME CLOSE	##.#	Duration in seconds until valve is closed.
	63	ELEC TMP MIN	##.##	Lowest measured electronics temperature in °C
	64	ELEC TMP MAX	##.##	Highest measured electronics temperature in °C
70	RESET		FACT	Restore factory settings
71	FW VERSION		#####	Show FW version in the display.
73	REPLACE ELEC		WIZ	Wizard for adjusting new electronics. Required for PIN LOCK 2457

Troubleshooting

8

8.1 Device status symbols

The device status is displayed on the display with the help of symbols. Alarms are displayed on the display in the measurement view as symbol in the bottom line of the display. If multiple diagnostic states are pending at the same time, the symbol for the most critical status is displayed. The table below shows the possible causes for the device status and measures for the user or service. The order of the symbols in the table corresponds to the priority of the device status, starting with the most critical message.

Display symbols - NAMUR NE 107			Meaning
Symbol	Device status	Priority *	Priority *
	Failure	1	**Cause:** Output signal invalid due to fault in the field device or in the peripherals. **Measure:** Maintenance is required immediately.
	Maintenance required	3	**Cause:** The output signal is still valid but the wear reserve is coming to an end and/or functional restrictions will occur soon. **Measure:**Maintenance is recommend as soon as possible.
	Function test	2	**Cause:** Output signal temporarily invalid (e.g. frozen) due to work being performed on the device. **Measure:** Manual mode over HMI or disable the engineering system.
	Out of specification	3	**Cause:** Deviations from permissible ambient or process conditions detected by the device (by means of self-monitoring or based on warnings/errors in the device) indicate that the measured value is unreliable or that deviations from the set value in the actuators are most likely greater than anticipated under normal operating conditions. Process or ambient conditions can damage the device or result in unreliable results.

* The smallest number indicates the highest level of error severity.

8.2 Info IDs, error messages and corrective measures

The following table shows the IDs of diagnostic messages and possible causes and instructions for corrective actions.

Messages on the Display (Page 21)			Meaning / cause	Remedy
ID	Symbol	Status line		
6A		-	• Initialization errors • Insufficient supply of compressed air • Mounting kit not correctly mounted • Valve blocked	Eliminate the cause. Start the initialization process.
6C		NO INIT + set-point as percentage	Positioner is not initialized	Start the initialization with ◀.
6d		-	• Measuring range of position detection exceeded • Swivel area of the valve is larger than 110° • Positioner installed on a different actuator without re-initialization. • End positions of valve are worn	Check the mounting kit and the wear. Start the initialization process.
6E		-	Maintain valve position is activated through digital input (DI). Setting in parameter "DIGITAL IN" [21]	Configured response. Change the parameters until the message no longer appears.
6F		-	Approach valve position is activated through digital input (DI). Setting in parameter "CLOSE LIMIT" [30]	Configured response. Change the parameters until the message no longer appears.
6H		-	Approach valve position is activated through digital input (DI). Setting in parameter "OPEN LIMIT" [32]	Configured response. Change the parameters until the message no longer appears.
6L	-	-	Digital input (DI) is activated. This status is reported via the digital output (DO). Setting in parameter "BEHAVIOR DI[22]>MSG"	Not necessary.
6N		-	• Maximum angle span exceeded • Effective lever arm is not adjusted to the actuator travel • Mounting kit not correctly mounted	Position the carrier pin at a larger stroke value. Check the mounting kit. Use the electropneumatic positioner SIPART PS2 from Siemens with a swivel area of 185° (special version).
6P		-	• Value below minimum angle span • Effective lever arm is not adjusted to the actuator travel • Mounting kit not correctly mounted	Position the carrier pin at a smaller stroke value. Check the mounting kit.
6r		-	A pneumatic leakage is present	Remedy the pneumatic leak of the actuator and the piping.

Messages on the Display (Page 21)			Meaning / cause	Remedy
ID	Symbol	Status line		
6t		-	• Control deviation • Insufficient supply of compressed air • Mounting kit not correctly mounted • Valve blocked	Eliminate the cause.
6U		MANUAL	Device in manual mode	Switch with ◀ to "AUTO" mode.
L		-	Button lock is activated. Digital input (DI) is activated. Setting in parameter "BEHAVIOR DI[22]>BUTTN"	Switch the digital input (DI).
LP		-	Parameters and device functions are write-protected with a user PIN.	Disable the write protection with user PIN LOCK 2457.

See also

QUICK START [01] (Page 26)

SETUP [20] (Page 27)

Service and maintenance 9

⚠ WARNING

Impermissible repair of the device

- Repair must be carried out by Siemens authorized personnel only.

NOTICE

Penetration of moisture into the device

Device damage.

- Make sure when carrying out cleaning and maintenance work that no moisture penetrates the inside of the device.

9.1 Cleaning the enclosure

Cleaning the enclosure

- Clean the outside of the enclosure with the inscriptions and the display window using a cloth moistened with water or a mild detergent.
- Do not use any aggressive cleansing agents or solvents, e.g. acetone. Plastic parts or the painted surface could be damaged. The inscriptions could become unreadable.

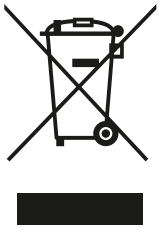
9.2 Return procedure

Enclose the bill of lading, return document and decontamination certificate in a clear plastic pouch and attach it firmly to the outside of the packaging.

Required forms

- Delivery note
- Return document (http://www.siemens.com/processinstrumentation/returngoodsnote) with the following information:
  - Product (item description)
  - Number of returned devices/replacement parts
  - Reason for returning the item(s)
- Decontamination declaration (http://www.siemens.com/sc/declarationofdecontamination) With this declaration you warrant "that the device/replacement part has been carefully cleaned and is free of residues. The device/replacement part does not pose a hazard for humans and the environment."
  If the returned device/replacement part has come into contact with poisonous, corrosive, flammable or water-contaminating substances, you must thoroughly clean and decontaminate the device/replacement part before returning it in order to ensure that all hollow areas are free from hazardous substances. Check the item after it has been cleaned. Any devices/replacement parts returned without a decontamination declaration will be cleaned at your expense before further processing.

9.3 Disposal



Devices described in this manual should be recycled. They may not be disposed of in the municipal waste disposal services according to the Directive 2012/19/EC on waste electronic and electrical equipment (WEEE).

Devices can be returned to the supplier within the EC, or to a locally approved disposal service for eco-friendly recycling. Observe the specific regulations valid in your country.

Further information about devices containing batteries can be found at: Information on battery/product return (WEEE) (https://support.industry.siemens.com/cs/document/109479891/)

Technical specifications

10

10.1 Input

Analog input (AI), terminal 6 and 7	
Nominal signal range	4 ... 20 mA
Minimum current to maintain the operation	3.8 mA
Maximum load voltage	6.5 V corresponds to 325 Ω at 20 mA
Static destruction limit	± 40 mA

Digital input (DI), terminals 9 and 10	
Galvanic isolation	Galvanically connected to analog input Galvanically isolated from the outputs
Signal status 0, floating contact open	> 300 kΩ
Signal status 1, floating contact closed	< 3 kΩ
Contact load	Can only be used for floating contact; Max. contact load < 20 µA, 3 V

10.2 Output

Analog output (AQ), terminals 61 and 62	
Type of connection	2-wire connection
Nominal signal range	4 ... 20 mA
Dynamic range I_O	3.6 ... 20.5 mA
Supply voltage U_H	12 ... 30 V
External load R_B[kΩ]	≤ (U_H [V] - 12 V)/I_O [mA]
Resolution in relation to the nominal signal range	0.05%
Transmission error in relation to the nominal signal range	± 0.3%
Effect of ambient temperature	± 0.1%/10 K
Maximum residual ripple	± 0.5%
Galvanic isolation	Galvanically isolated from the other electrical inputs and outputs

Digital output (DQ), terminals 31 and 32	
Maximum supply voltage U_H	35 V
Current consumption external, to be limited to	50 mA

Digital output (DQ), terminals 31 and 32	
Signal status High	Conductive, maximum terminal voltage 3 V
Signal status Low The status is also Low if the device is faulty or analog input (AI) is = 0 mA.	Blocked, I < 60 µA

10.3 Rated conditions

Rated conditions	
Ambient conditions for operation according to IEC 60068-2	For use indoors and outdoors.
• Ambient temperature	-20 ... +80 °C (-4 ... +176 °F)
• Relative humidity	0 ... 100%
Pollution degree according to IEC 61010-1	2
Overvoltage category according to IEC 61010-1	II
Degree of protection according to IEC 0529	IEC
Vibration resistance	
• Harmonic oscillations (sine) according to IEC 60068-2-6	3.5 mm (0.14"), 2 ... 27 Hz, 3 cycles/axle
	98.1 m/s² (321.84 ft/s²), 27 ... 300 Hz, 3 cycles/axle
• Bump (half-sine) according to IEC 60068-2-27	150 m/s² (492 ft/s²), 6 ms, 1000 shocks/axle
• Noise (controlled digitally) according to IEC 60068-2-64	10 ... 200 Hz; 1 (m/s²)²/Hz (3.28 (ft/s²)²/Hz)
	200 ... 500 Hz; 0.3 (m/s²)²/Hz (0.98 (ft/s²)²/Hz)
	4 hours/axle

10.4 Pneumatic data

Pneumatic data	
Pneumatic operating medium	Compressed air, carbon dioxide (CO2), nitrogen (N), noble gases
• Operating pressure	1.4 ... 7 bar (20.3 ... 101.5 psi)
Quality class compressed air according to ISO 8573-1	
• Solid impurities	Class 3
• Pressure dew point	Min. 20 K (36 °F) below ambient temperature
• Oil content	Class 3
Flow rate	
• Aerate process drive	
Supply pressure 4 bar (58 psi)	7.1 m³/h (31.3 USgpm)
Supply pressure 6 bar (87 psi)	9.8 m³/h (43.1 USgpm)
• Depressurize process drive	

Pneumatic data	
Actuating pressure 4 bar (58 psi)	13.7 m³/h (60.3 USgpm)
Actuating pressure 6 bar (87 psi)	19.2 m³/h (84.5 USgpm)
Leakage actuator chamber (positioner portion)	< $6 \cdot 10^{-4}$ m³/h (0.0026 USgpm)
Consumption at operating medium in the controlled state	< $3.6 \cdot 10^{-2}$ m³/h (0.158 USgpm)
Sound pressure level	$L_{A\,eq}$ < 75 dB $L_{A\,max}$ < 80 dB

10.5 Construction

Construction	
Supported drive types	
• Linear actuator, range of stroke	10 ... 130 mm (0.39 ... 5.12")
• Part-turn actuator, angle-of-rotation area	10 ... 100°
Weight, positioner without accessories	Approx. 1.0 kg (2.20 lb)
Material	
• Enclosure	Aluminum EN AC-AlSi(Fe)
• Pressure gauge block	Aluminum, anodized or stainless steel 316
• Manometer	Plastic, plant brass
	Stainless steel, plant brass nickel-plated
	Stainless steel, plant stainless steel 316
Torques	
• Cover fixing screws	1.5 Nm (1.1 ft lb)
• Part-turn actuator fixing screws DIN 933 M6x12-A2	5 Nm (3.7 ft lb)
• Linear actuator fixing screws DIN 933 M8x16-A2	12 Nm (8.9 ft lb)
• Gland pneumatic G¼	15 Nm (11.1 ft lb)
• Pneumatic gland 1/4-18 NPT	
Without sealant	12 Nm (8.9 ft lb)
With sealant	6 Nm (4.4 ft lb)
• M20 cable gland, plastic	4 Nm (3 ft lb)
• M20 cable gland, metal	6 Nm (4.4 ft lb)
• Cable gland 1/2-14 NPT metal	15 Nm (11.1 ft lb)
• Cable gland for NPT bushing in the NPT adapter NOTE: To avoid damage to the device, the NPT adapter must be held in place while the NPT gland is screwed into the NPT adapter.	68 Nm (50 ft lb)
• Screw cap made of plastic	2.5 Nm (1.8 ft lb)
• Screw cap made of metal	4 Nm (3 ft lb)
• Pressure gauge block fixing screws	6 Nm (4.4 ft lb)
Manometer	

Construction	
• Degree of protection	
Manometer plastic, plant brass	IP31
Manometer stainless steel, plant brass nickel-plated	IP44
Manometer stainless steel, plant stainless steel 316	IP54
Connections, electrical	
• Screw terminals	2.5 mm^2 AWG30-14
• Cable gland	M20x1.5 or 1/2-14 NPT with NPT adapter
Connections, pneumatic	G¼ or ¼-18 NPT

10.6 Controller

Controller	
Control unit	
• Five-point controller	Adaptive
• Dead zone	
Adjustable peak value	± 0.1 ... 3%
Minimization of the peak value	Always active
Analog input (AI), terminal 6 and 7	
• Sampling interval	50 ms
• Resolution	0.05%
Position detection	
• Sampling interval	10 ms
• Resolution at 10 mm stroke height	0.1%
• Temperature influence	0.1%/10 K (0.1%/18 °F)

Dimension drawings

11

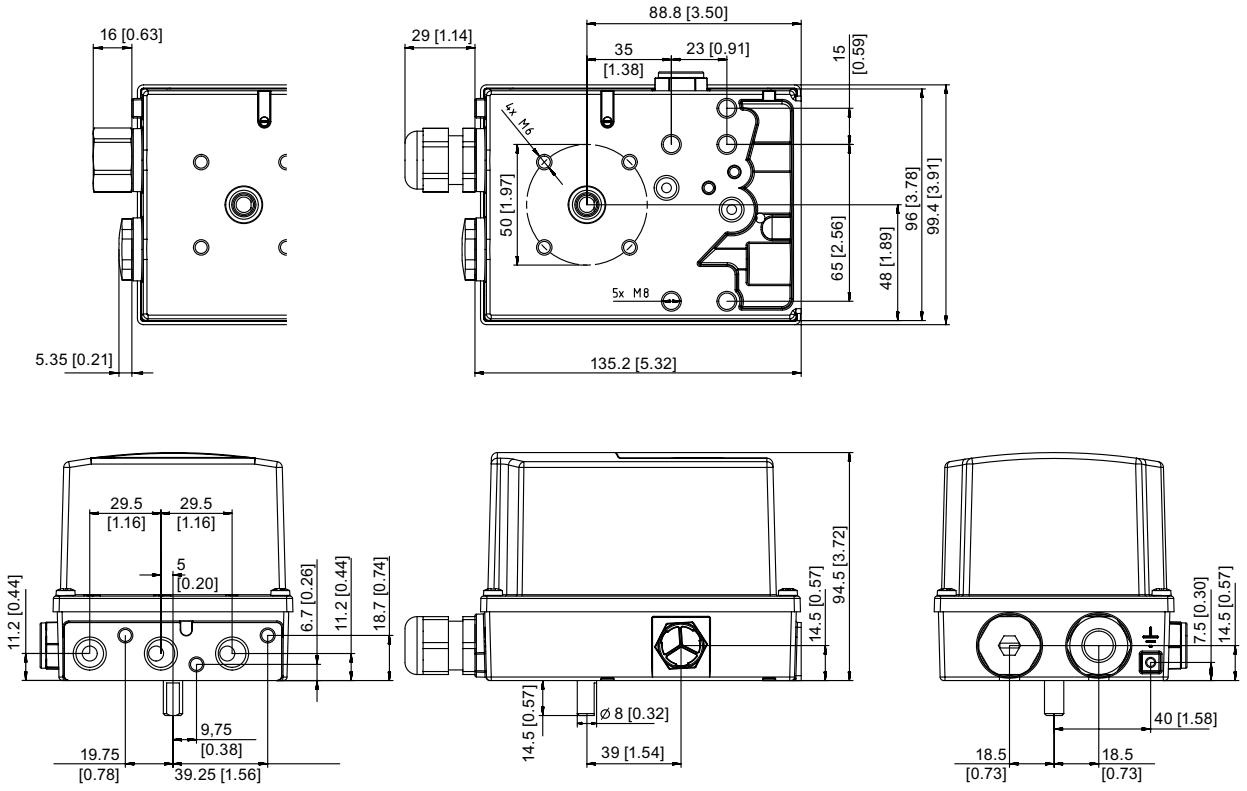


Figure 11-1 Dimension drawing, dimensions in mm (inch)

Technical support

A

A.1 Technical support

Technical Support

If this documentation does not provide complete answers to any technical questions you may have, contact Technical Support at:

- Support request (http://www.siemens.com/automation/support-request)
- More information about our Technical Support is available at Technical support (http://www.siemens.com/automation/csi/service)

Internet Service & Support

In addition to our documentation, Siemens provides a comprehensive support solution at:

- Service&Support (http://www.siemens.com/automation/service&support)

Personal contact

If you have additional questions about the device, please contact your Siemens personal contact at:

- Partner (http://www.automation.siemens.com/partner)

To find the personal contact for your product, go to "All Products and Branches" and select "Products & Services > Industrial Automation > Process Instrumentation".

Documentation

You can find documentation on various products and systems at:

- Instructions and manuals (http://www.siemens.com/processinstrumentation/documentation)

See also

E-mail (mailto:support.automation@siemens.com)

SIPART PS2 product information (http://www.siemens.com/sipartps2)

Process instrumentation catalog (http://www.siemens.com/processinstrumentation/catalogs)

A.2 QR code label

A QR code label can be found on the device. With the use of a smart phone, the QR code provides a direct link to a website with information specific to the device, such as manuals, FAQs, certificates, etc.