

Commissioning Instructions

VAC D500

Digital Positioner



VALVE ACCESSORIES & CONTROLS

200 Jade Park • Chelsea, AL 35043

TEL: 205.678.0507

info@vacaccessories.com

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1 Safety

1.1 General information and notes for the reader

You must read these instructions carefully prior to installing and commissioning the device.

These instructions are an important part of the product and must be kept for future reference.

These instructions are intended as an overview and do not contain detailed information on all designs for this product or every possible aspect of installation, operation and maintenance.

For additional information or if specific problems occur that are not discussed in these instructions, contact the manufacturer.

The content of these instructions is neither part of any previous or existing agreement, promise or legal relationship nor is it intended to change the same.

This product is built based on state-of-the-art technology and is operationally safe. It has been tested and left the factory in perfect working order from a safety perspective. The information in the manual must be observed and followed in order to maintain this state throughout the period of operation.

Modifications and repairs to the product may only be performed if expressly permitted by these instructions.

Only by observing all of the safety instructions and all safety / warning symbols in these instructions can optimum protection of both personnel and the environment, as well as safe and fault-free operation of the device, be ensured.

Information and symbols directly on the product must be observed. They may not be removed and must be fully legible at all times.

1.2 Intended use

Positioning of pneumatically controlled actuators; designed for mounting on linear and part-turn actuators.

The device is designed for use exclusively within the stated values on the name plate and in the specifications (see the "Specifications" section on the data sheet).

- The maximum operating temperature must not be exceeded.
- The permissible ambient temperature must not be exceeded.
- The housing protection type must be observed.

1.3 Target groups and qualifications

Installation, commissioning and maintenance of the product may only be performed by trained specialist personnel who have been authorized by the plant operator to do so. The specialist personnel must have read and understood the manual and comply with its instructions.

The operators must strictly observe the applicable national regulations with regards to installation, function tests, repairs, and maintenance of electrical products.

1.4 Plates and symbols

1.4.1 Safety / warning symbols, note symbols



DANGER – Serious damage to health / risk to life

This symbol in conjunction with the signal word "DANGER" indicates an imminent danger. Failure to observe this safety information will result in death or severe injury.



DANGER – Serious damage to health / risk to life

This symbol in conjunction with the signal word "DANGER" indicates an imminent electrical hazard. Failure to observe this safety information will result in death or severe injury.



WARNING – Bodily injury

This symbol in conjunction with the signal word "WARNING" indicates a potentially dangerous situation. Failure to observe this safety information may result in death or severe injury.



WARNING – Bodily injury

This symbol in conjunction with the signal word "WARNING" indicates a potential electrical hazard. Failure to observe this safety information may result in death or severe injury.



CAUTION – Minor injuries

This symbol in conjunction with the signal word "CAUTION" indicates a potentially dangerous situation. Failure to observe this safety information may result in minor or moderate injury. The symbol may also be used for property damage warnings.



NOTICE – Property damage

This symbol indicates a potentially damaging situation. Failure to observe this safety information may result in damage to or destruction of the product and / or other system components.



IMPORTANT (NOTE)

This symbol indicates operator tips, particularly useful information, or important information about the product or its further uses. The signal word "IMPORTANT NOTE" does not indicate a dangerous or harmful situation.

1.4.2 Name plate

1	PositionMaster EDP300	Supply press: 0,14 ... 1 MP a	9
2	Prod.- Opt. Code: EDP300 A1.....- S3	Input: analog 4 - 20 mA	10
3	Serial No.: *****	Ambient temperature: -40°C ... 85°C	11
4	Special Request: -/-	Output: double acting	12
5	HW-Rev.: 1.00 SW Rev.: 1.00	Loss of electr. Supply: fall safe	13
6	DOM: 2011-W11	IP65 HART®	14
7	ZELM 11 ATEX 0456 X II 1G Ex ia IIC T6 resp. T4 Ga II 1D Ex ia IIIC T55°C resp. T100°C Da Ta = -40°C to +40°C resp. +85°C Electr. and pneum. data see certificate WARNING - potential electrostatic charging hazard - see instructions	Options:	15
8	ABB Automation D - 32425 Minden Made in Germany	Slot1 Slot2	16
		Analog feedback output <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
		Digital feedback output <input type="checkbox"/> <input type="checkbox"/>	
		Universal analog input <input type="checkbox"/> <input type="checkbox"/>	
		Safety shut down <input type="checkbox"/> <input type="checkbox"/>	
		Pressure sensors <input type="checkbox"/>	
		Electr. limit switch <input checked="" type="checkbox"/>	
		Mech. limit switch, low <input type="checkbox"/>	
		Mech. limit switch, high <input type="checkbox"/>	
		Contactless pos. Sensor <input type="checkbox"/>	

M10154

Fig. 1: Name plate (sample)

1 Full type designation | 2 Order code | 3 Serial number | 4 Special version | 5 Hardware revision / Software revision | 6 Date of manufacture | 7 Explosion protection | 8 Manufacturer | 9 Supply pressure | 10 Input signal | 11 Ambient temperature range | 12 Output | 13 Safety function (no current) | 14 Communication protocol | 15 Degree of protection | 16 Options

1.5 Transport safety instructions

Observe the following instructions:

- Do not expose the device to moisture during transport. Pack the device accordingly.
- Pack the device so that it is protected against vibrations during transport, e.g., by using air-cushioned packaging.

1.6 Storage conditions

- The device must be stored in dry and dust-free conditions. The device is also protected by a desiccant in the packaging.
- The desiccant guarantees sufficient protection for approximately 150 days. It can be regenerated at a temperature of 90 °C (114 °F) within 4 h.
- Remove the desiccant prior to commissioning the actuator or the electronics.
- If you intend to store or transport the device for a prolonged period (> 6 months), we recommend that you wrap it in plastic film and add desiccant.
- Observe the permissible storage and transport temperatures.
- Protect uncovered metallic surfaces with an appropriate long-term corrosion inhibitor.
- Observe the relevant long-term storage temperatures.
- In principle, the devices may be stored for an unlimited period. However, the warranty conditions stipulated in the order confirmation of the supplier apply.

1.7 Installation safety instructions



CAUTION – Minor injuries

Incorrect parameter values can cause the valve to move unexpectedly. This can lead to process failures and result in injuries.

Before recommissioning a positioner that was previously in use at another location, always reset the device to its factory settings. Never start Auto Adjust before restoring the factory settings.

- Only qualified specialists who have been trained for these tasks are authorized to mount and adjust the unit, and to make the electrical connection.
- When carrying out any work on the device, always observe the local accident prevention regulations and the regulations concerning the construction of technical installations.

1.8 Safety instructions for electrical installation

The electrical connection may only be established by authorized specialist personnel and in accordance with the electrical circuit diagrams.

The electrical connection information in this manual must be observed; otherwise, the type of electrical protection may be adversely affected.

Safe isolation of electrical circuits which are dangerous if touched is only ensured if the connected devices satisfy the requirements of DIN EN 61140 (VDE 0140 Part 1) (basic requirements for safe isolation).

To ensure safe isolation, install supply lines so that they are separate from electrical circuits which are dangerous if touched, or implement additional isolation measures for them.

1.9 Safety instructions for operation

Before switching on the device, make sure that your installation complies with the environmental conditions listed in the chapter "Technical Data" or on the data sheet.

If there is a chance that safe operation is no longer possible, take the device out of operation and secure it against unintended startup.

Prior to installation, check the devices for possible damage that may have occurred as a result of improper transport. Details of any damage that has occurred in transit must be recorded on the transport documents. All claims for damages must be submitted to the shipper without delay and before installation.

1.10 Returning devices

Use the original packaging or a secure transport container of an appropriate type if you need to return the device for repair or recalibration purposes.

Include the return form once it has been properly filled out (see appendix in operating instructions) with the device.

According to the EU Directive governing hazardous materials, the owner of hazardous waste is responsible for its disposal or must observe the following regulations for shipping purposes: All devices delivered to ABB must be free from any hazardous materials (acids, alkalis, solvents, etc.).

Please contact Customer Center Service acc. to page 2 for nearest service location.

1.11 Integrated management system

ABB Automation Products GmbH operates an integrated management system, consisting of:

- Quality management system to ISO 9001:2008
- Environmental management system to ISO 14001:2004
- Occupational health and safety management system to BS OHSAS 18001:2007 and
- Data and information protection management system

Environmental awareness is an important part of our company policy.

Our products and solutions are intended to have minimum impact on the environment and on people during manufacturing, storage, transport, use, and disposal.

This includes the environmentally-friendly use of natural resources. We conduct an open dialog with the public through our publications.

1.12 Disposal

This product is manufactured from materials that can be recycled by specialist recycling companies.

1.12.1 Information on WEEE Directive 2002/96/EC (Waste Electrical and Electronic Equipment)

This product is not subject to WEEE Directive 2002/96/EC or relevant national laws (e.g., ElektroG in Germany).

The product must be disposed of at a specialist recycling facility. Do not use municipal garbage collection points.

According to the WEEE Directive 2002/96/EC, only products used in private applications may be disposed of at municipal garbage collection points. Proper disposal prevents negative effects on people and the environment, and supports the reuse of valuable raw materials.

If it is not possible to dispose of old equipment properly, ABB Service can accept and dispose of returns for a fee.

1.12.2 RoHS Directive 2002/95/EC

With the Electrical and Electronic Equipment Act (ElektroG) in Germany, the European Directives 2002/96/EC (WEEE) and 2002/95/EC (RoHS) are translated into national law. ElektroG defines the products that are subject to regulated collection and disposal or reuse in the event of disposal or at the end of their service life. ElektroG also prohibits the marketing of electrical and electronic equipment that contains certain amounts of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE) (also known as hazardous substances with restricted uses).

The products provided by ABB Automation Products GmbH do not fall within the current scope of regulations on hazardous substances with restricted uses or the directive on waste electrical and electronic equipment according to ElektroG. If the necessary components are available on the market at the right time, in the future these substances will no longer be used in new product development.

2 Use in potentially explosive atmospheres

Depending on the type of explosion protection, an Ex name plate is attached to the positioner, to the left of the main name plate. It displays the number of the Ex certificate together with the Ex designation of the device.

Requirements / preconditions for safe operation of the positioner:



IMPORTANT (NOTE)

Observe the specifications applicable to the device and special conditions in accordance with the relevant certificate.

- Manipulation of the device by users is not permitted. Modifications to the device may only be performed by the manufacturer or an explosion protection specialist.
- The device may only be supplied with instrument air that is free of oil, water, and dust.



IMPORTANT (NOTE)

Operation with flammable gas

- During operation with flammable gas, the device must be used in accordance with the specifications in the relevant certificate.
 - Only the design with the "Intrinsic Safety" type of protection has been approved for operation with natural gas. The pneumatic outputs must be vented in non-Ex areas.
 - The maximum ambient temperature must not exceed 60 °C (140 °F).
 - During operation with flammable gases in type of protection "Ex n", the device may only be operated with approved cable glands.
-



IMPORTANT (NOTE)

Use in areas with combustible dust

- To prevent loss of its type of protection, the housing may not be opened.
 - Only use cable glands that are approved for the type of protection and correspond to degree of protection \geq IP 6X.
 - Avoid hazardous electrostatic discharge.
-



IMPORTANT (NOTE)

Operation in temperature class T6

During operation in temperature class T6, when the equipment is partially or fully depressurized, ensure that there is no possibility of an explosive atmosphere getting into the pneumatic system or that any explosive atmosphere is removed prior to compression by taking suitable action.

When starting up in temperature class T6, flush the pneumatic system with 1.4 (+/- 0.1) bar until all traces of explosive mixture have been removed (at least 5 minutes). Ventilate and evacuate the EDP300 fully several times.

3 Mounting



CAUTION – Minor injuries

Incorrect parameter values can cause the valve to move unexpectedly. This can lead to process failures and result in injuries.

Before recommissioning a positioner that was previously in use at another location, always reset the device to its factory settings. Never start Auto Adjust before restoring the factory settings.

3.1 Operating conditions at installation site



IMPORTANT (NOTE)

Before installation, check whether the positioner meets the control and safety requirements for the installation location (actuator or valve).

See the "Specifications" section on the data sheet.

3.2 Mechanical mounting

3.2.1 General information

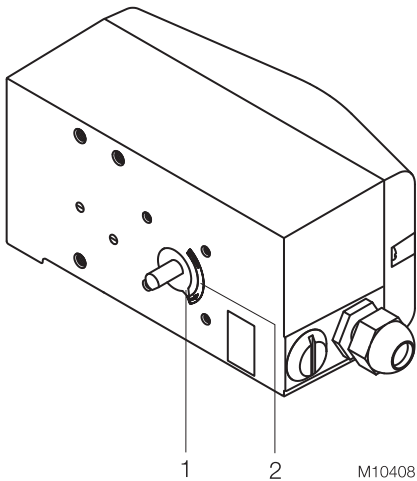


Fig. 2: Working range

The arrow (1) on the positioner feedback shaft (position feedback point) must move between the arrow marks (2).

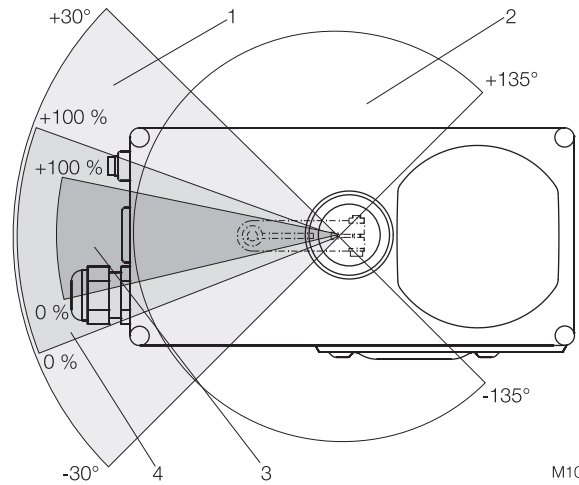


Fig. 3: Sensor and operating ranges of the positioner

- 1 Sensor range for linear actuators |
- 2 Sensor range for part-turn actuators |
- 3 Working range for linear actuators |
- 4 Working range for part-turn actuators



IMPORTANT (NOTE)

During installation make sure that the actuator travel or rotation angle for position feedback is implemented correctly.

The maximum rotation angle for position feedback is 60° when installed on linear actuators and 270° on part-turn actuators. The minimum rotation angle is always 25° .

3.2.2 Mounting on linear actuators

For mounting on a linear actuator in accordance with DIN / IEC 534 (lateral mounting as per NAMUR), the following mounting kit is available:

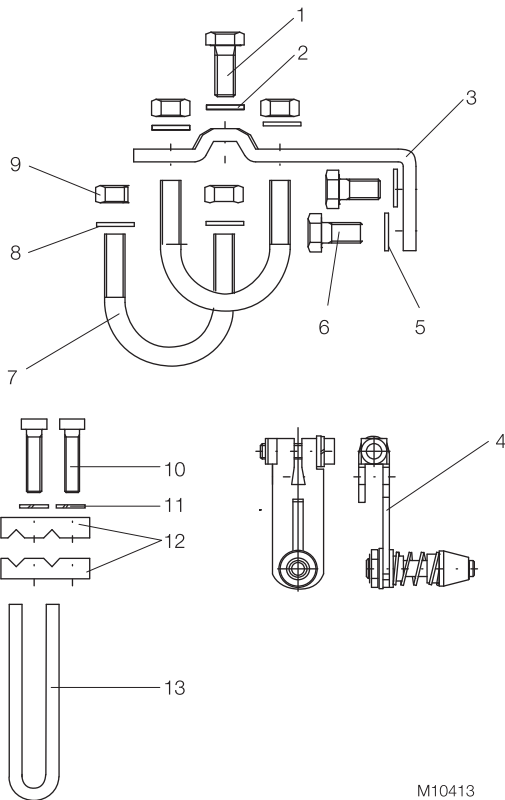


Fig. 4

- 1 Screw | 2 Shim | 3 Mount bracket |
 4 Lever with follower pin (for stroke adjustment 10 ... 35 mm (0.39 ... 1.38 inch) or 20 ... 100 mm (0.79 ... 3.94 inch) |
 5 Shims | 6 Screws | 7 U-bolts | 8 Shims | 9 Nuts |
 10 Screws | 11 Spring washers | 12 Clamp plates |
 13 Follower guides

Attaching a follower guide to the actuator

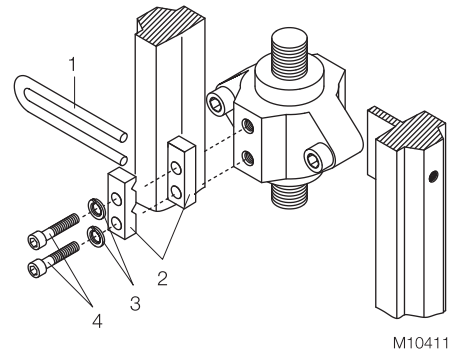


Fig. 5

1. Tighten the screws so that they are hand-tight.
2. Attach the follower guide (1) and clamp plates (2) with screws (4) and spring washers (3) to the actuator stem.

Mounting lever and bracket on positioner

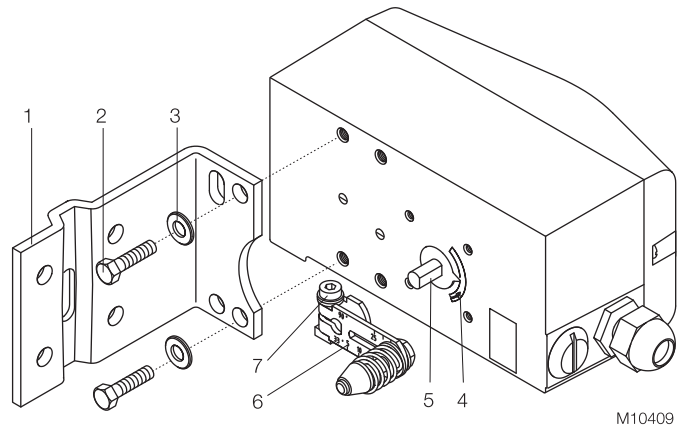


Fig. 6

1. Attach the lever (6) to the feedback shaft (5) of the positioner (can only be mounted in one position due to the cut shape of the feedback shaft).
2. Using the arrow marks (4), check whether the lever moves within the operating range (between the arrows).
3. Tighten the screw (7) on the lever so that it is hand-tight.
4. Hold the prepared positioner (with the mount bracket (1) still loose) on the actuator so that the follower pin for the lever enters the follower guide to determine which tap holes on the positioner must be used for the mount bracket.
5. Secure the mount bracket (1) with screws (2) and shims (3) using the relevant tap holes on the positioner housing. Tighten the screws as evenly as possible to ensure subsequent linearity. Align the mount bracket in the oblong hole to ensure that the operating range is symmetrical (lever moves between the arrow marks (4)).

Mounting on a cast iron yoke

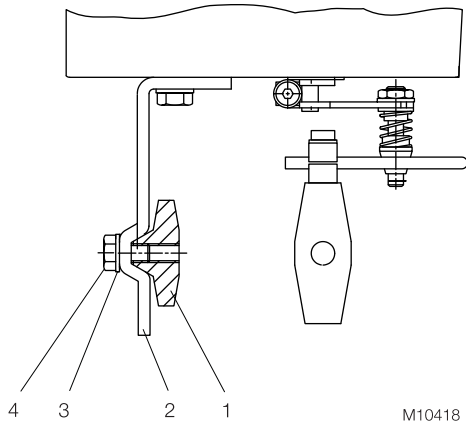


Fig. 7

1. Attach the mount bracket (2) with screw (4) and shim (3) to the cast iron yoke (1).

or

Mounting on a columnar yoke

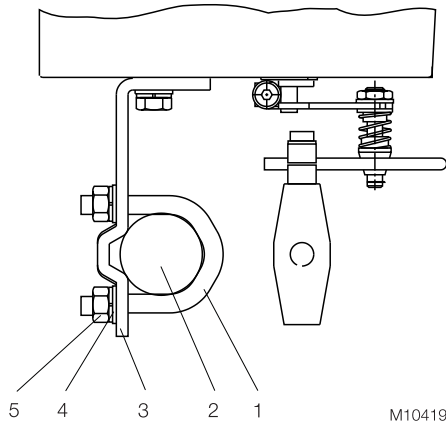


Fig. 8

1. Hold the mount bracket (3) in the appropriate position on the columnar yoke (2).
2. Insert the U-bolts (1) from the inside of the columnar yoke (2) through the holes of the mount bracket.
3. Attach the shims (4) and nuts (5).
4. Tighten the nuts so that they are hand-tight.

i IMPORTANT (NOTE)

Adjust the height of the positioner on the cast iron yoke or columnar yoke until the lever is horizontal (based on a visual check) at half stroke of the valve.

Positioner linkage

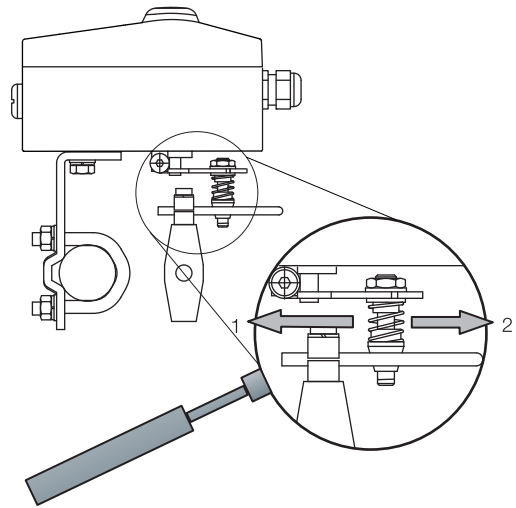


Fig. 9

1 Increasing linkage | **2** Reducing linkage

The scale on the lever indicates the link points for the various stroke ranges of the valve.

Move the bolt with the follower pin in the oblong hole of the lever to adjust the stroke range of the valve to the working range for the position sensor.

Moving the link point inwards increases the rotation angle of the sensor. Moving the link point outwards reduces the rotation angle of the sensor.

Adjust the actuator stroke to make use of as large an angle of rotation as possible (symmetrical around the center position) on the position sensor.

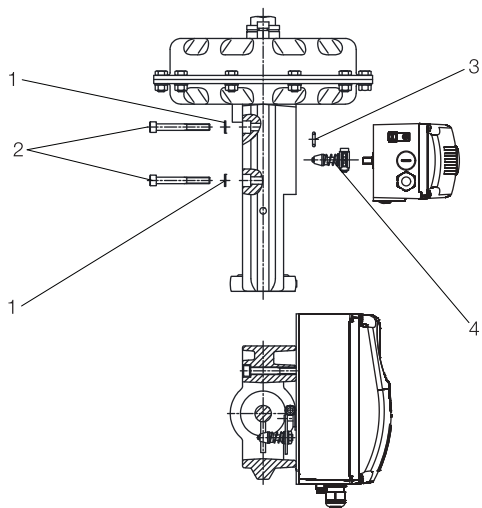
Recommended range for linear actuators: $-30 \dots 30^\circ$

Minimum angle: 25°

i IMPORTANT (NOTE)

After mounting, check whether the positioner is operating within the sensor range.

Integral mounting on control valves

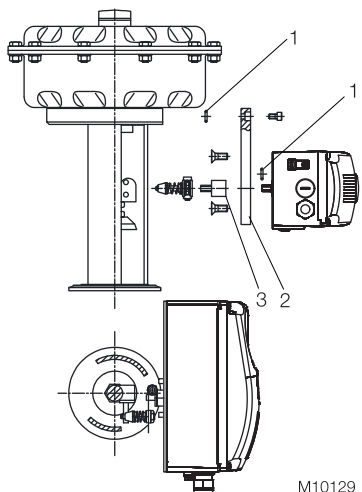


M10128

Fig. 10

1 Shims | 2 Screws | 3 O-ring | 4 Lever

Integral mounting on control valves using adapter plate



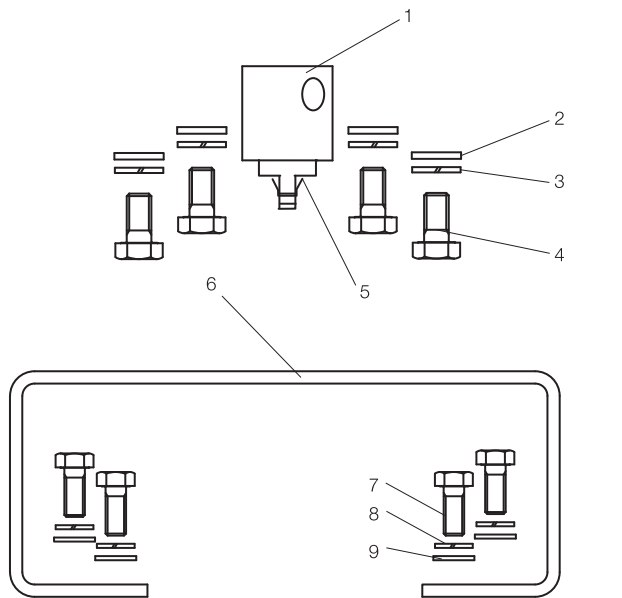
M10129

Fig. 11

1 O-ring | 2 Adapter plate | 3 Adapter

3.2.3 Mounting on part-turn actuators

For mounting on part-turn actuators in accordance with VDI / VDE 3845, the following mounting kit is available:



M00130

Fig. 12

- Adapter (1) with spring (5)
- Four screws M6 (4), four spring washers (3), and four shims (2) for attaching the mounting bracket (6) to the positioner
- Four screws M5 (7), four spring washers (8), and four shims (9) for attaching the mounting bracket to the actuator

Required tools:

- Wrench, size 8 / 10
- Allen key, size 3

Mounting the adapter on the positioner

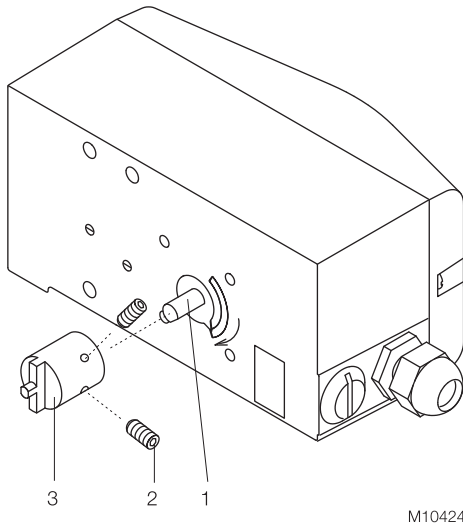


Fig. 13

1. Determine the mounting position (parallel to actuator or at 90° angle).
2. Determine the direction of rotation of the actuator (clockwise or counter-clockwise).
3. Move the part-turn actuator into the home position.
4. Pre-adjust feedback shaft.

To ensure the positioner will operate within the working range (see Fig. 2), the mounting position as well as the home position and direction of rotation of the actuator must be taken into account when determining the adapter position on the feedback shaft (1). For this purpose, the feedback shaft can be adjusted manually so that the adapter (3) can be attached in the correct position.

5. Attach the adapter to the feedback shaft in the correct position and fasten with threaded pins (2). One of the threaded pins must be locked in place on the flat side of the feedback shaft.

Screwing the mounting bracket onto the positioner

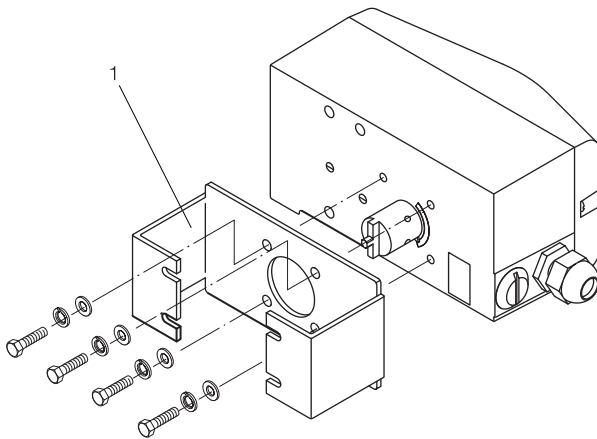


Fig. 14

1 Mounting bracket

Screwing positioner onto actuator

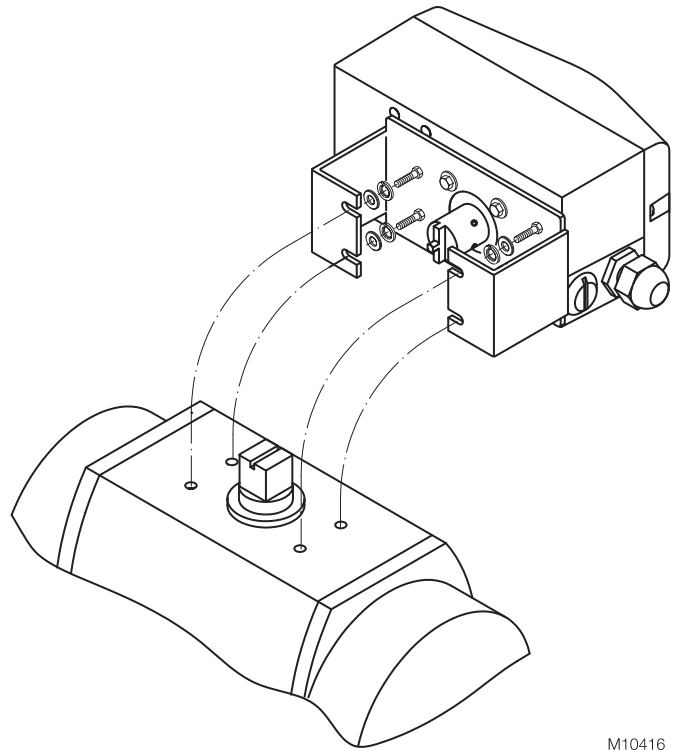


Fig. 15



IMPORTANT (NOTE)

After mounting, check whether the working range for the actuator matches the sensor range for the positioner.

4 Electrical connections

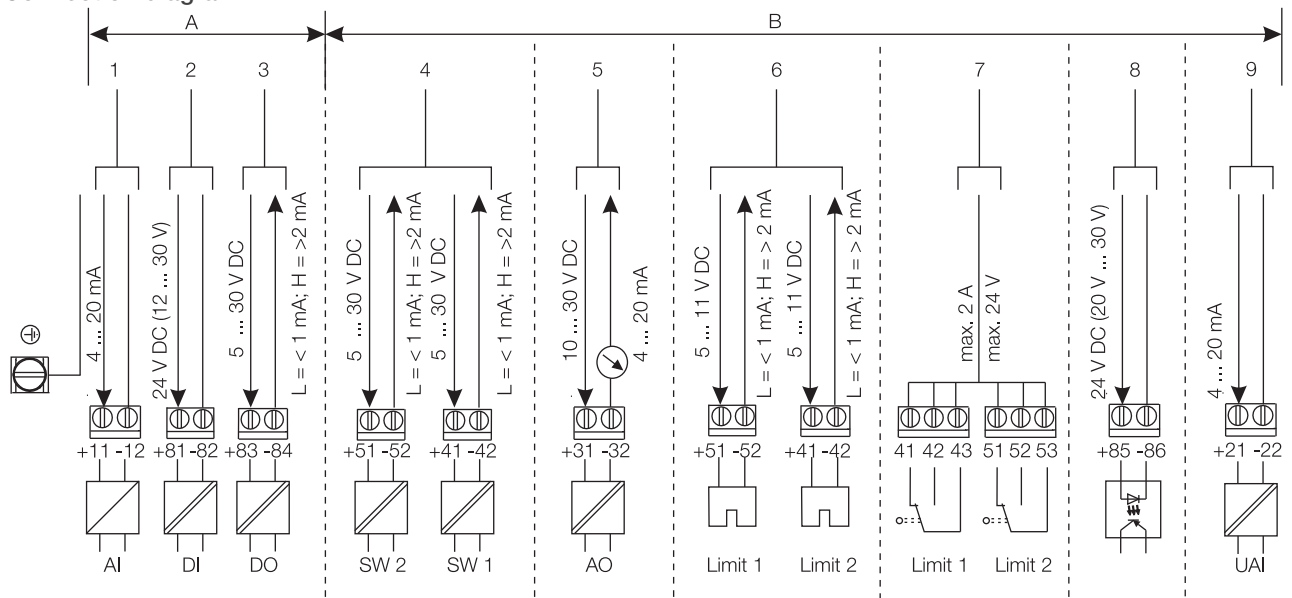


IMPORTANT (NOTE)

The cable terminals are delivered closed and must be unscrewed before inserting the cable.

- Strip the wire by approx. 6 mm (0.24 inch).
- To connect the signal lines, the emergency shutdown module, and the proximity switches or microswitches, insert the wire ends from the left into the respective screw terminals and tighten the screws so that they are hand-tight (access from above). To connect a plug-in module, insert the wire ends from above into the appropriate screw terminals and tighten the screws so that they are hand-tight (access from the side).

4.1 Connection diagram



M10239

Fig. 16

A Basic device | B Options

1 Analog input | 2 Digital input | 3 Digital output | 4 Binary feedback | 5 Analog feedback | 6 Proximity switches | 7 Microswitch | 8 Emergency shutdown module | 9 Universal input



IMPORTANT (NOTE)

Keep cable shields as short as possible and connect on both sides.

4.2 Cable entry

For the cable entry in the housing, there are two tap holes 1/2 - 14 NPT or M20 x 1.5 on the left-hand side of the housing. One of these holes has a cable gland and the other has a pipe plug.

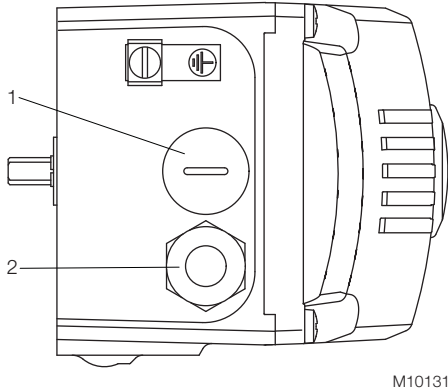


Fig. 17
1 Pipe plug | 2 Cable gland

4.3 Installing the option modules



IMPORTANT (NOTE)

If you are using the "emergency shutdown module", there must be a supply voltage of 24 V DC at terminals +41 / -42. Otherwise, the positioner will not be able to function pneumatically (device in pneumatic safety position).



IMPORTANT (NOTE)

A functional check of the "emergency shutdown module" (option) must be performed at least every 2 years. For this purpose, the positioner must move the valve into the safety position with the 24 V DC signal (terminals +85 / -86) interrupted.

4.3.1 Installing the pressure option

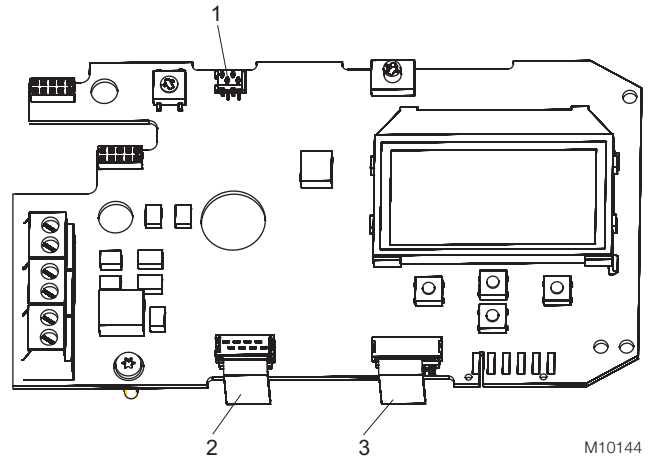


Fig. 18: Printed circuit board
1 I/P converter pneumatics | 2 Position sensor |
3 Pressure option

4.4 Setting the option modules

4.4.1 Setting the mechanical position indicator

1. Loosen the screws for the housing cover and remove it.
2. Rotate the position indicator on the feedback shaft to the desired position.
3. Attach the housing cover and screw it onto the housing. Tighten the screws so that they are hand-tight.
4. Attach the symbol label to mark the minimum and maximum valve positions on the housing cover.



IMPORTANT (NOTE)

The labels are located on the inside of the housing cover.

4.4.2 Setting the mechanical binary feedback with proximity switches

1. Loosen the screws for the housing cover and remove it.



CAUTION – Risk of injury

The device includes slot sensors with sharp edges. Only adjust the slot sensors using a screwdriver.

2. Set the upper and lower switching points for binary feedback as follows:
 - Select "Manual Adjustment" mode and move the valve by hand into the lower switching position.
 - Use a screwdriver to adjust the slot sensor for proximity switch 1 (lower contact) on the feedback shaft until it closes the contact (i.e., until shortly before entering the proximity switch). The slot sensor enters proximity switch 1 when the feedback shaft is rotated clockwise (as viewed from the front).
 - Move the valve by hand into the upper switching position.
 - Use a screwdriver to adjust the slot sensor for proximity switch 2 (upper contact) on the feedback shaft until it closes the contact (i.e., until shortly before entering the proximity switch). The slot sensor enters proximity switch 2 when the feedback shaft is rotated counter-clockwise (as viewed from the front).
3. Attach the housing cover and screw it onto the housing.
4. Tighten the screws so that they are hand-tight.

4.4.3 Setting the mechanical binary feedback with 24 V microswitches

1. Loosen the screws for the housing cover and remove it.
2. Select "Manual Adjustment" operating mode and move the valve by hand into the desired switching position for contact 1.
3. Set maximum contact (1, lower washer).
Fasten the upper washer with the special adjustment retainer and rotate the lower washer manually.
4. Select "Manual Adjustment" operating mode and move the valve by hand into the desired switching position for contact 2.
5. Set minimum contact (2, upper washer);
Fasten the lower washer with the special adjustment retainer and rotate the upper washer manually.
6. Connect the microswitch.
7. Attach the housing cover and screw it on to the housing.
8. Tighten the screws so that they are hand-tight.

5 Pneumatic connection

i IMPORTANT (NOTE)

The positioner must only be supplied with instrument air that is free of oil, water, and dust (in the gas exhaust with dried natural gas). The purity and oil content must meet the requirements of Class 3 according to DIN/ISO 8573-1.

i IMPORTANT (NOTE)

On double-acting drives with spring-return mechanism, a chamber pressure that significantly exceeds the supply pressure value can be generated during operation by the springs in the chamber opposite the springs.

! NOTICE – Potential damage to parts

Contamination on the air pipe and positioner can damage components. Dust, splinters, and any other particles of dirt must be blown off the pipe before it is connected.

All pneumatic piping connections are located on the right-hand side of the positioner. G1/4 or 1/4 18 NPT tap holes are provided for the pneumatic connections. The positioner is labeled according to the tap holes available.

We recommend that you use a line with dimensions of 12 x 1.75 mm. The level of supply air pressure required to apply the actuating force must be adjusted in line with the output pressure in the actuator.

The working range for the positioner is between 1.4 ... 10 bar (20 ... 145 psi).

Connect the connections according to their labeling:

Designation	Pipe connection
SUP / ZUL IN	Air supply, pressure 1.4 ... 10 bar (20 ... 145 psi)
Y1 / OUT1	Actuating pressure for actuator
Y2 / OUT2	Actuating pressure for actuator (2nd connection with double-acting actuator)

! NOTICE – Potential damage to parts

Pressure above 10 bar (145 psi) can damage the positioner or actuator. Provisions must be made (e.g., use of a pressure regulator) to ensure that the pressure does not rise above 10 bar (145 psi), even in the event of a fault.

i IMPORTANT (NOTE)

On double-acting drives with spring-return mechanism, a stop valve must be fitted in the supply line. Otherwise, the Auto Adjust function is aborted and the valve cannot be regulated.

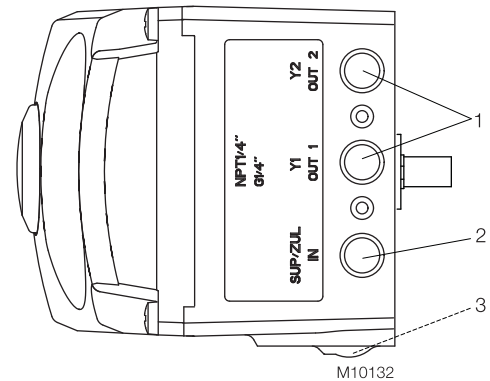


Fig. 19: Pneumatic connections

1 Pneumatic outputs | 2 Supply air |
3 Filter screw (on underside of housing)

6 Commissioning

During commissioning, the mechanical mounting on the linear and part-turn actuators is checked. For this purpose, the actuator is first moved into the end positions and Auto Adjust is then carried out.

6.1 Checks prior to commissioning

Air pressure in the compressed air connecting line:

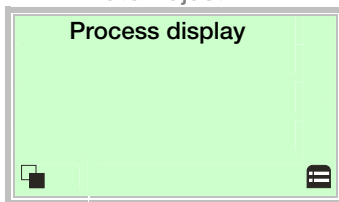
1.4 ... 10 bar (20 ... 145 psi)


Current input active:

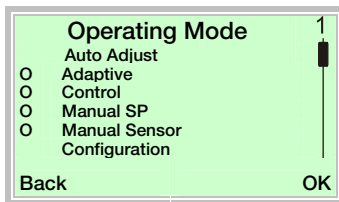
4 ... 20 mA



6.2 Mechanical mounting checks



6.2.1 Moving to end positions following completion of Auto Adjust

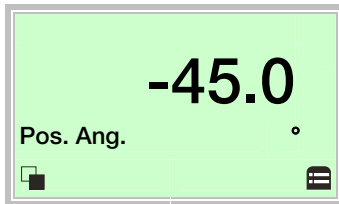


1. Use  to switch to the Operating Mode menu.



2. Use  or  to select the "Manual Sensor" operating mode.

3. Use  and  to move to the relevant end positions.



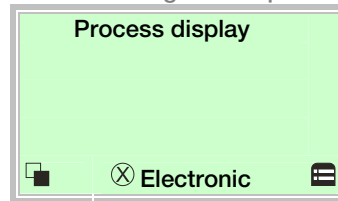
Check the end positions. The angle of rotation is displayed in degrees.



Recommended range:

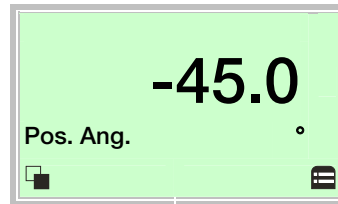
— between -30 ... 30° for linear actuators

— between -45 ... 45° for part-turn actuators

6.2.2 Moving to end positions with a new device



1. Use  and  to move to the relevant end positions.



Check the end positions. The angle of rotation is displayed in degrees.

Recommended range:

— between -30 ... 30° for linear actuators

— between -45 ... 45° for part-turn actuators

Auto Adjust must then be performed. The "Starting Auto Adjust" section describes how Auto Adjust is performed.

7 Configuration, parameterization

7.1 Operation

The LCD display features operating buttons which enable the device to be operated with the housing cover open.

7.1.1 Menu navigation

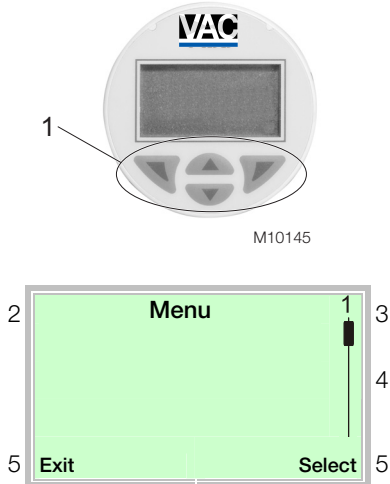









Fig. 20: LCD display


- 1 Operating buttons for menu navigation |
- 2 Menu name display | 3 Menu number display |
- 4 Marker for indicating the relative position within the menu |
- 5 Display showing the current functions of the  and  operating buttons

You can use the  or  operating buttons to browse through the menu or select a number or character within a parameter value.

Different functions can be assigned to the  and  operating buttons. The function that is currently assigned to them (5) is shown on the LCD display.

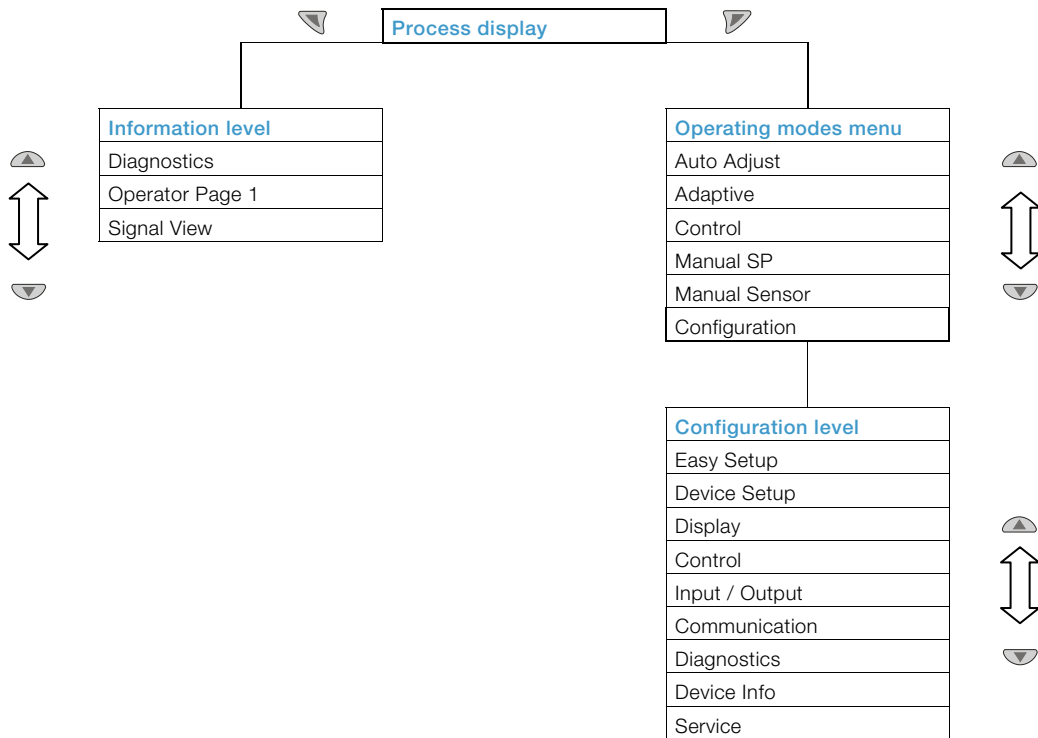
Control button functions

	Meaning
Exit	Exit menu
Back	Go back one submenu
Abort	Cancel a parameter entry
Next	Select the next position for entering numerical and alphanumeric values

	Meaning
Select	Select submenu / parameter
Edit	Edit parameter
OK	Save parameter entered

7.2 Menu levels

There are two levels under the process display.



Process display	The process display shows the current process values.
Information level	The information level contains the parameters and information that are relevant for the operator. The device configuration cannot be changed on this level.
Operating modes menu	In the operating modes menu, the Auto Adjust function can be started for commissioning purposes. You can also change the operating modes and switch to the configuration level.
Configuration level	The configuration-, parameterization instruction contains all the parameters required for device commissioning and configuration. The device configuration can be changed on this level.



NOTICE – Property damage

During external configuration via a PC, the positioner no longer responds to the setpoint current. This may lead to process failures. Prior to external configuration, always move the actuator to the safety position and activate manual adjustment.

7.2.1 Process display

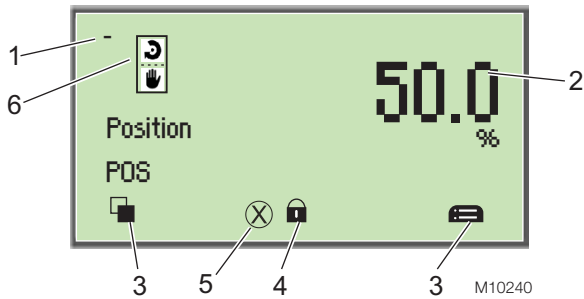


Fig. 21: Process display (example)

- 1 Measuring point identifier |
- 2 Display showing current process values |
- 3 Symbol indicating button function |
- 4 Symbol indicating "Parameterization protected"
- 5 Diagnostic message | 6 Operating mode symbol

The process display appears on the LCD display when the device is switched on. It shows information about the device and current process values.













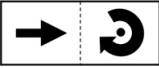
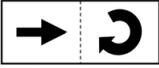
The way in which the current process values (2) are shown can be adjusted on the configuration level.

Description of symbols




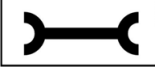
Symbol	Description
	Call up information level. When Autoscroll mode is enabled, a U symbol appears here and the operator pages are automatically displayed one after the other.
	Call up configuration level.
	The device is protected against changes to the parameter settings.

Description of operating modes

Symbol	Operating mode
	<p>Adaptive control active</p> <p>When the PositionMaster EDP300 positioner is operated in "Adaptive Mode", the control parameters are automatically optimized to the operating conditions in small increments. This is especially helpful if valves and fittings could not be operated with reference conditions while the Auto Adjust function was in progress.</p> <p>The self-optimization process in "Adaptive Mode" is affected by several factors that can result in incorrect adjustments in the long term. It is recommended that this operating mode is only activated over several hours and that the "Fixed control" operating mode is selected following this.</p>
	<p>Fixed control</p> <p>In contrast to the "Adaptive control" operating mode, the control parameters are not automatically adjusted.</p>
	<p>Manual setpoint, adaptive control</p> <p>The valve is adjusted manually within the stroke range using the or direction buttons.</p> <ol style="list-style-type: none"> 1. Press and hold the relevant operating button for the desired direction. 2. Additionally, press if the device is to be switched to high-speed mode.
	<p>CAUTION – Risk of crushing</p> <p>Configured stroke limit positions and stroke times are not effective in manual mode. When the actuator moves, there is a risk of crushing. You must make sure that no-one is present within the actuator's working range.</p>

Symbol	Operating mode
	<p>Manual setpoint, fixed control</p> <p>The valve is adjusted manually within the stroke range using the  or  direction buttons.</p> <ol style="list-style-type: none"> 1. Press and hold the relevant operating button for the desired direction. 2. Additionally, press  if the device is to be switched to high-speed mode.
	<p>CAUTION – Risk of crushing</p> <p>Configured stroke limit positions and stroke times are not effective in manual mode. When the actuator moves, there is a risk of crushing. You must make sure that no-one is present within the actuator's working range.</p>
	<p>Moving the actuator manually</p> <p>The valve is adjusted manually within the valve range using the  or  direction buttons. The position indicator shows the position in angular degrees for the purpose of checking the mounting conditions.</p> <ol style="list-style-type: none"> 1. Press and hold the relevant operating button for the desired direction. 2. Additionally, press  if the device is to be switched to high-speed mode.
	<p>CAUTION – Risk of crushing</p> <p>If air escapes due to a leakage, the position will not be readjusted. Configured stroke limit positions and stroke times are not effective in manual mode. When the actuator moves, there is a risk of crushing. You must make sure that no-one is present within the actuator's working range.</p>
	<p>Setpoint via HART, adaptive control</p>
	<p>Setpoint via HART, fixed control</p>
	<p>Activated binary input, adaptive control</p>
	<p>Activated binary input, fixed control</p>

Description of the message symbols

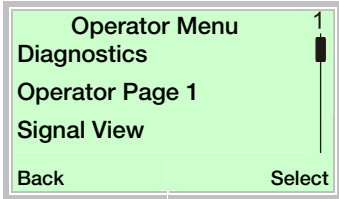
Symbol	Message symbol
	Universal input activated
	Diagnostic message pending
	Error pending
	Maintenance message pending



7.2.2 Switching to the information level (Operator Menu)

On the information level, the operator menu can be used to display diagnostic information and choose which operator pages to display.



1. Use  to switch to the information level.



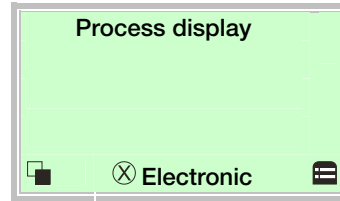
2. Use  or  to select a submenu.

3. Use  to confirm your selection.





Menu	Description
... / Operator Menu	
Diagnostics	Displays the alarms and messages that are currently pending and which occurred in the past. The messages to be displayed can be selected on the configuration level, under "Diagnostics".
Operator Page 1	Switches to the process display.
Signal View	Selects the "Signal View" submenu (for service, only). The following signal values (plus units) can be displayed: Position Pos[%] Position Pos[°] Setpoint SP[%] Setpoint SP[mA] Control deviation DEV [%] Electronics temperature [°C, °F, °R, K] Supply pressure PIN [unit] Pressure output 1 PY1 [unit] Pressure output 2 PY2 [unit] Differential pressure DP [unit] Universal input value UIN [unit]

Error messages

In the event of an error, a message consisting of a symbol and text (e.g., electronics) appears at the bottom of the process display. The text displayed provides information about the area in which the error has occurred.



The error messages are divided into four groups in accordance with the NAMUR classification scheme. The group assignment can only be changed using a DTM or EDD.

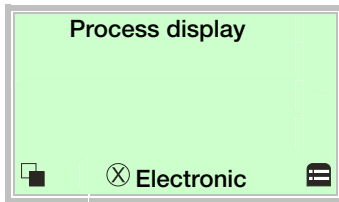
Symbol	Description
	Error / Failure
	Function check
	Outside of specifications
	Maintenance required


The error messages are also divided into the following areas:

Area	Description
Actuator	Diagnostic messages affecting the valve or the pneumatic actuator
Operation	Diagnostic messages with a negative effect on the operation of the positioner
Process	Diagnostic messages relating to the process and displaying problems or states
Sensor	Alarms indicating problems affecting the reading of the valve position
Electronic	Displays errors in the device electronics
Configuration	Detects if the positioner configuration is missing or faulty




Calling up the error description

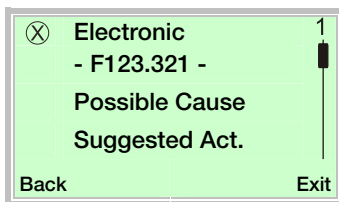
Additional details about the error that has occurred can be called up on the information level.



1. Use  to switch to the information level.



2. Use  or  to select the "Diagnostics" submenu.
3. Use  to confirm your selection.



The first line shows the area in which the error has occurred. The second line shows the unique error number. The next lines show a brief description of the error and information on how to remedy it.

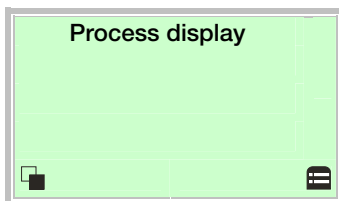



IMPORTANT (NOTE)

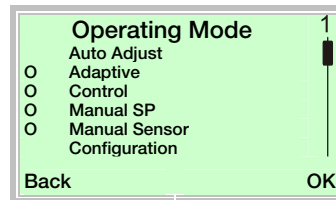
For a detailed error description and information on troubleshooting, refer to the "Error messages" section in the operating instructions.




7.2.3 Start Auto Adjust function

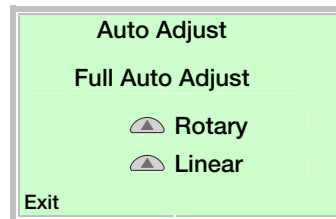
The Auto Adjust function of the device can be configured and started in the "Operating Mode" menu.





1. Use  to switch to the Operating Mode menu.



2. Use  or  to select the "Auto Adjust" operating mode.
3. Use  to confirm your selection. Press and hold down the control button for at least 4 seconds (wait for the time to count down on the top left of the display).

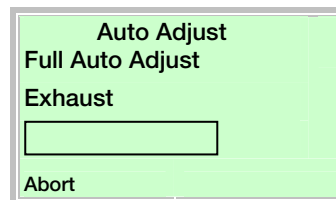


1. Use  or  to select the "Actuator type". Select "Rotary" for part-turn actuators. Select "Linear" for linear actuators.



IMPORTANT (NOTE)

"Auto Adjust Mode" can be set by default at configuration level under "Easy Setup -> Auto Adjust Mode".



The progress of the Auto Adjust function is shown in a bar graph. The function can be terminated with "Abort" if necessary. Once Auto Adjust has been completed successfully, "Auto Adjust Complete" is displayed. The device then switches to the process display automatically.



IMPORTANT (NOTE)

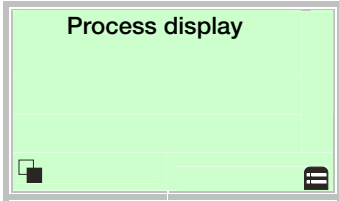
Auto Adjust does not always result in optimum control conditions.

When Auto Adjust is started via shortcut keys, the position of the valve is determined automatically.

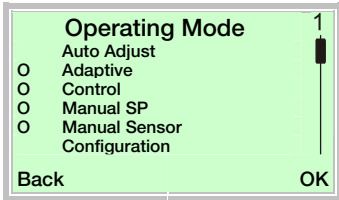
7.2.4 Switching the operating mode

The operating mode is displayed and changed in the operating modes menu.

Additionally, it is possible to switch to the configuration level from there.



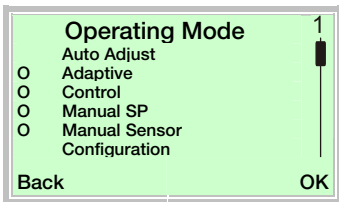
1. Use to switch to the operating modes menu.



2. Use or to select the required operating mode.
3. Use to confirm your selection.

7.2.5 Switching to the configuration level (parameterization)

The device parameters can be displayed and changed on the configuration level.



4. Use or to select the "Configuration" operating mode.
5. Use to confirm your selection.

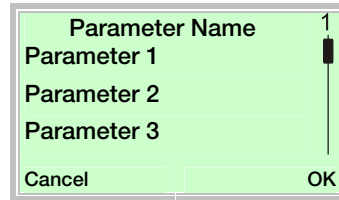
7.2.6 Selecting and changing parameters

Entry from table

When an entry is made from a table, a value is selected from a list of parameter values.



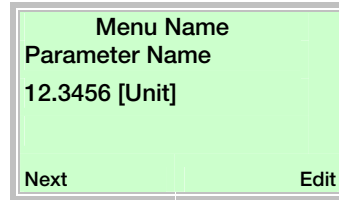
1. Select the parameters you want to set in the menu.
2. Use to call up the list of available parameter values. The parameter value that is currently set is highlighted.



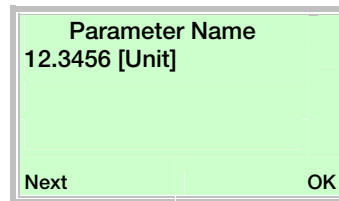
3. Use or to select the required value.
 4. Use to confirm your selection.
- This concludes the procedure for selecting a parameter value.

Numerical entry

When a numerical entry is made, a value is set by entering the individual decimal positions.



1. Select the parameters you want to set in the menu.
2. Use to call up the parameter for editing. The position that is currently selected is highlighted.



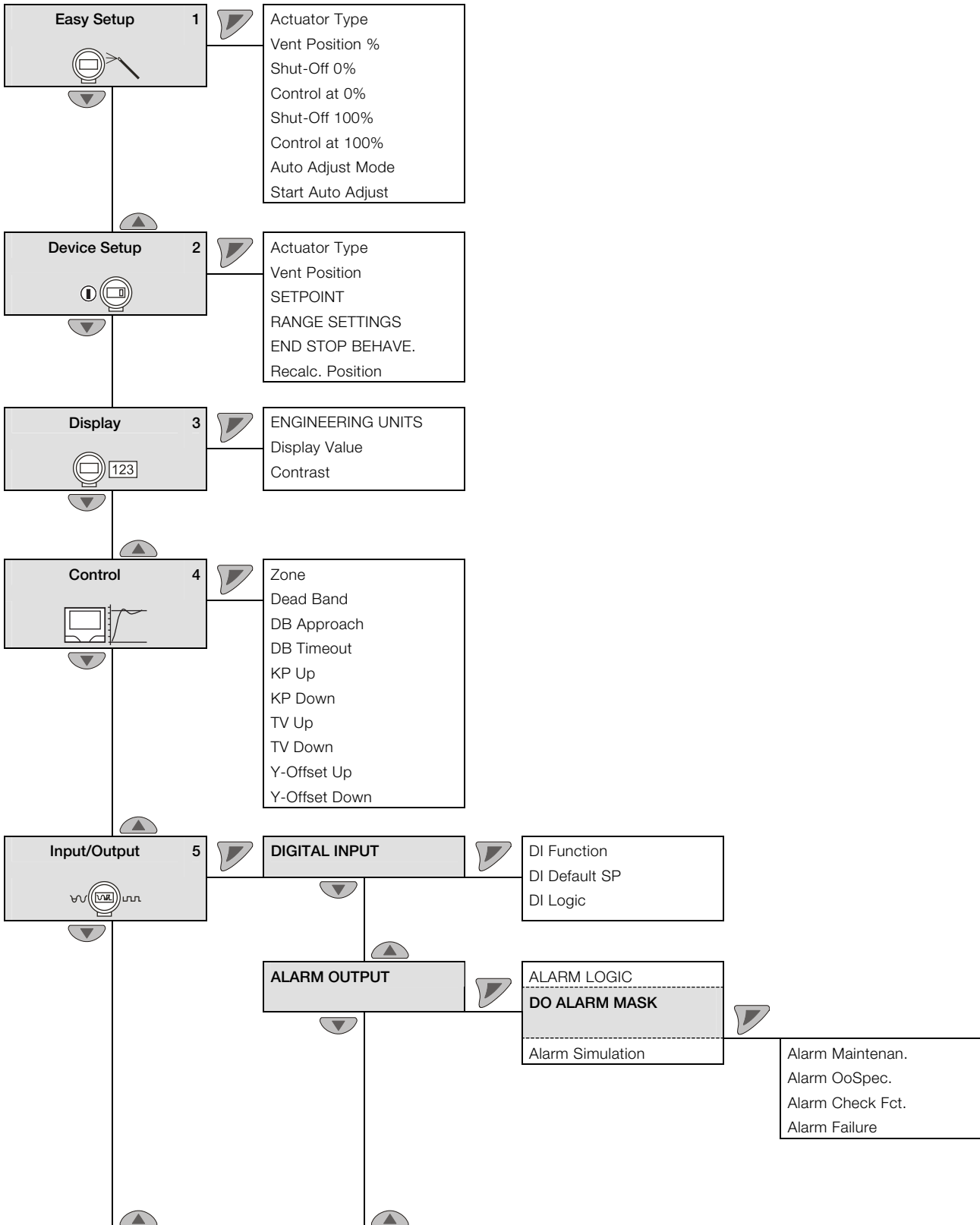
3. Use to select the decimal position to be changed.
 4. Use or to set the required value.
 5. Use to select the next decimal position.
 6. If necessary, select and set other decimal positions using the same procedure as described in steps 3 and 4.
 7. Use to confirm your settings.
- This concludes the procedure for changing a parameter value.

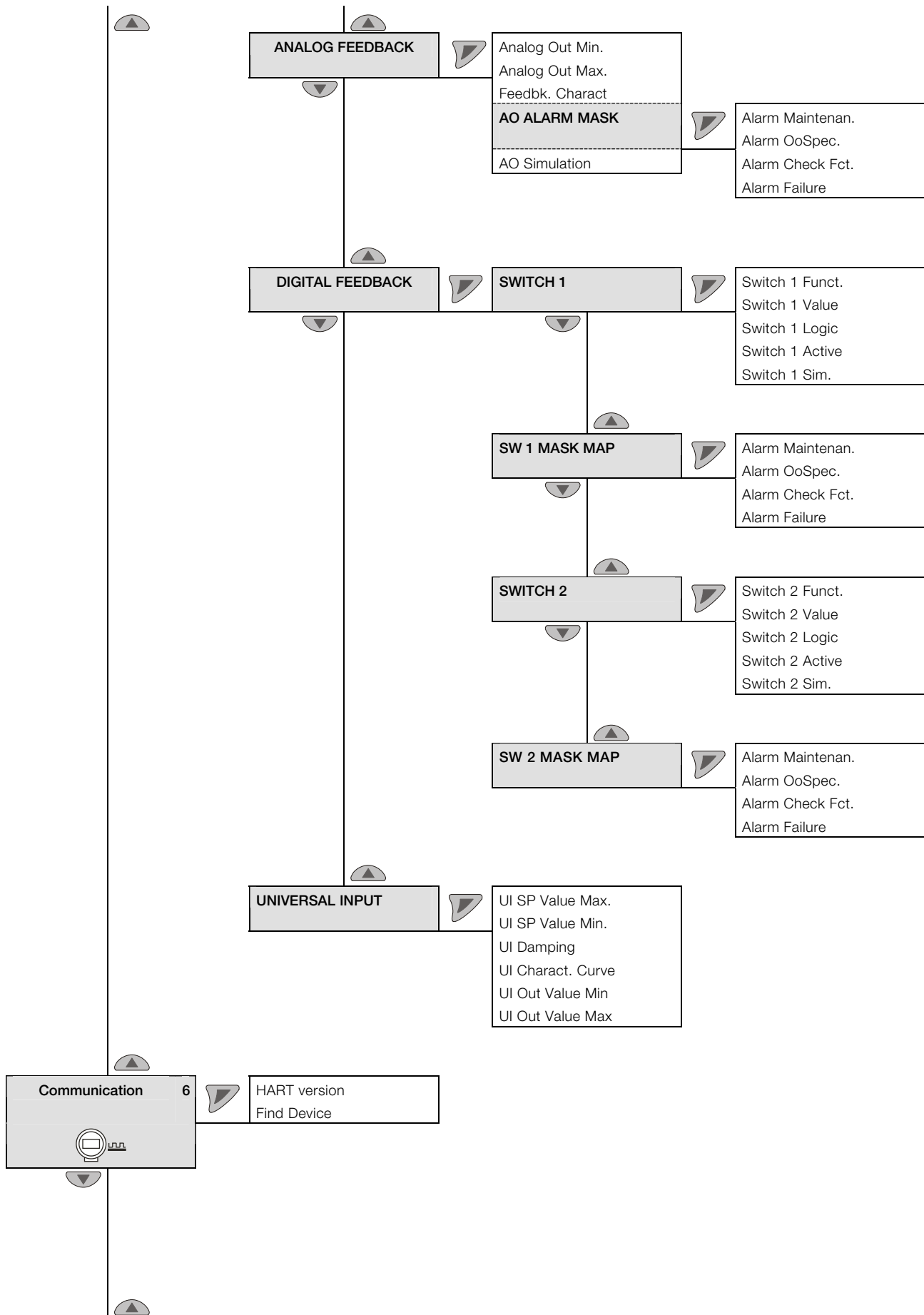
7.3 Overview of parameters on the configuration level

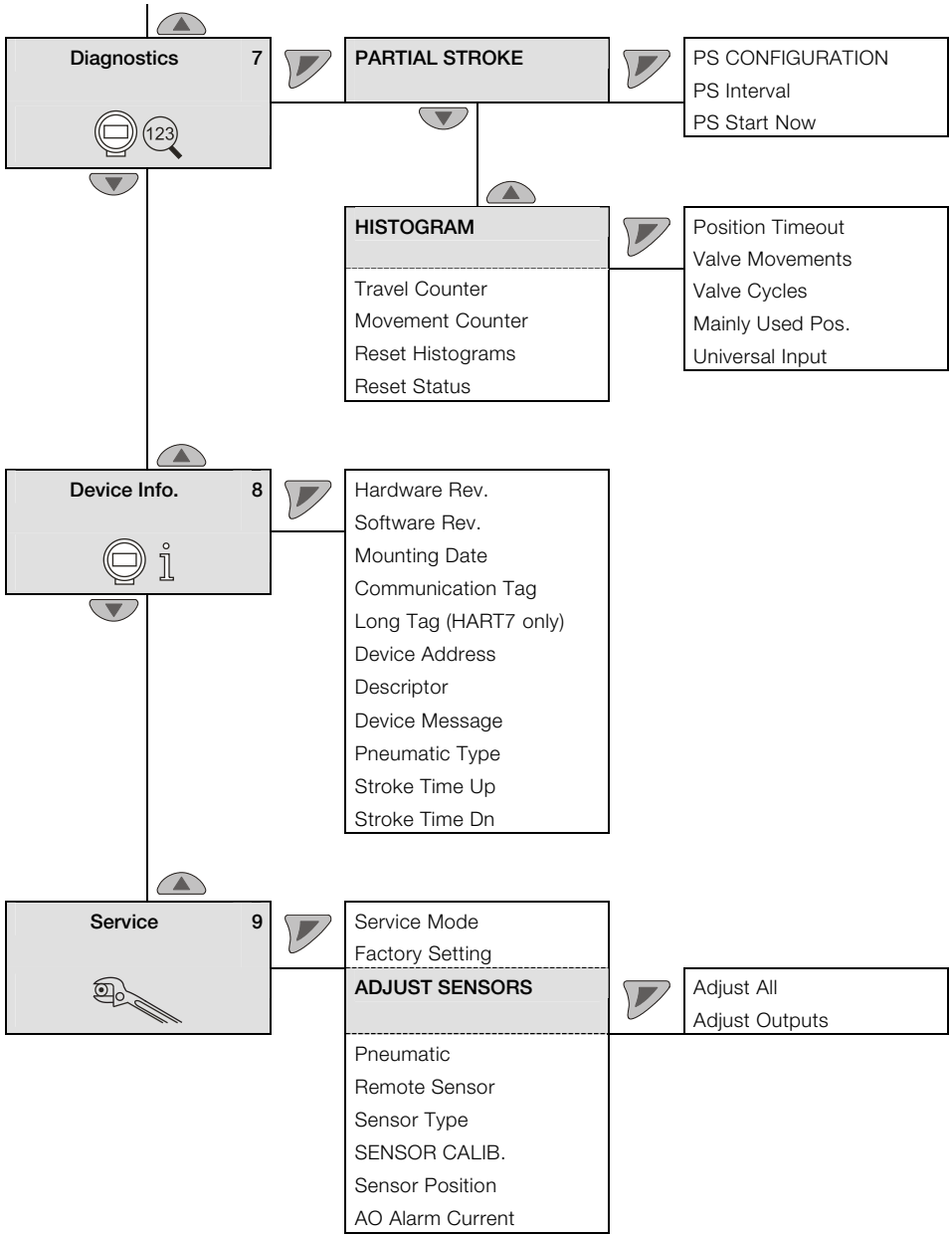


IMPORTANT (NOTE)

This overview of parameters shows all the menus and parameters available on the device. Depending on the version and configuration of the device, not all of the menus and parameters may be visible on it.







8 Ex relevant specifications

8.1 Intrinsic safety gas and dust ATEX / IECEx

ZELM 11 ATEX 0456 X (EC type examination certificate)

II 1G Ex ia IIC T6 or T4 Ga

II 1D Ex iaD IIIC T55°C or T100°C Da

Ta = -40 ° ... 40 ° or 85 °C

IECEX ZLM 11.0001 X

Ex ia IIC T6 or T4 Ga

Ex iaD IIIC T55 °C or T100°C Da

Ta = -40 ° ... 40 ° or 85 °C

Temperature class	Ambient temperature	Surface temperature
T4	-40 ... 85 °C (-40 ... 185 °F)	100 °C (212 °F)
T6	-40 ... 40 °C (-40 ... 104 °F)	55° C (131 °F)

8.2 Electrical connections gas and dust ATEX / IECEx Signal circuit (AI) (terminals +11 -12)

Temperature class T1 – T4	Temperature class T6
---------------------------	----------------------

$U_i = 30 \text{ V}$

$U_i = 28 \text{ V}$

$I_i = 320 \text{ mA}$

$I_i = 320 \text{ mA}$

$P_i = 1.1 \text{ W}$

$P_i = 0.8 \text{ W}$

$C_i = 6.5 \text{ nF}$ without pressure option

$C_i = 8.8 \text{ nF}$ with pressure option

$L_i =$ negligibly small

Switching input (DI) (terminals +81 -82)

Temperature class T1 – T4	Temperature class T6
---------------------------	----------------------

$U_i = 30 \text{ V}$

$U_i = 28 \text{ V}$

$P_i = 500 \text{ mW}$

$P_i = 400 \text{ mW}$

$C_i = 4.2 \text{ nF}$

$L_i =$ negligibly small

Switching output (DO) (terminals +83 -84)

Temperature class T1 – T4	Temperature class T6
---------------------------	----------------------

$U_i = 30 \text{ V}$

$U_i = 28 \text{ V}$

$P_i = 500 \text{ mW}$

$P_i = 400 \text{ mW}$

$C_i = 4.2 \text{ nF}$

$L_i =$ negligibly small

Shutdown module (terminals +41 -42)

Temperature class T1 – T6

$U_i = 30 \text{ V}$

$P_i = 1 \text{ W}$

$C_i = 5.3 \text{ nF}$

$L_i =$ negligibly small

Analog feedback module (terminals +31 -32)

Temperature class T1 – T4	Temperature class T6
---------------------------	----------------------

$U_i = 30 \text{ V}$

$U_i = 28 \text{ V}$

$I_i = 320 \text{ mA}$

$I_i = 320 \text{ mA}$

$P_i = 1 \text{ W}$

$P_i = 0.8 \text{ W}$

$C_i = 11.3 \text{ nF}$

$L_i = 150\mu\text{H}$

Universal analog input module (terminals +21 -22)

Temperature class T1 – T4	Temperature class T6
---------------------------	----------------------

$U_i = 30 \text{ V}$

$U_i = 28 \text{ V}$

$I_i = 320 \text{ mA}$

$I_i = 320 \text{ mA}$

$P_i = 1 \text{ W}$

$P_i = 0.8 \text{ W}$

$C_i = 11.3 \text{ nF}$

$L_i = 150\mu\text{H}$

Digital feedback module

(terminals: SW 1: +41 -42, SW 2: +51 -52)

Temperature class T1 – T4	Temperature class T6
---------------------------	----------------------

Per output:

Per output:

$U_i = 30 \text{ V}$

$U_i = 28 \text{ V}$

$P_i = 0.5 \text{ W}$

$P_i = 0.4 \text{ W}$

$I_i = 250 \text{ mA}$

$C_i = 2.2 \text{ nF}$ per output

$L_i =$ negligibly small

Digital output module (proximity switches)¹ (terminals limit 1: +51 -52, limit 2: +41 -42)

Temperature class T1 – T4	Temperature class T6
---------------------------	----------------------

According to EC type examination certificate

PTB 00 ATEX 2049X

¹ No IECEx

8.3 Equipment in type of protection "n" or device dust ignition protection through housing "tb"

ZELM 11 ATEX 0456 X (EC type examination certificate)		
II 3G Ex nA IIC T6 or T4 Gc		
II 2D Ex tb IIIC T55°C or T100°C Db		
Ta = -40 ° ... 40 ° or 80		
IECEX ZLM 11.0001 X		
Ex nA IIC T6 or T4 Gc		
Ex tb IIIC T55 °C or T100°C Db		
Ta = -40 ° ... 40 ° or 80		
Temperature class	Ambient temperature	Surface temperature
T4	-40 ... 80 °C (-40 ... 176 °F)	100 °C (212 °F)
T6	-40 ... 40 °C (-40 ... 104 °F)	55° C (131 °F)

8.4 Electrical connections non-sparking ATEX/IECEX

Equipment in type of protection "n" or device dust ignition protection through housing "tb"

Signal circuit (AI) (terminals +11 -12):

$$I_N \leq 22 \text{ mA}$$

$$U_{\max} \leq 30 \text{ V}$$

Switching input (DI) (terminals +81 -82):

$$U_N \leq 30 \text{ V}$$

Switching output (DO) (terminals +83 -84):

$$U_N \leq 30 \text{ V}$$

Shutdown module (terminals +41 -42):

$$U_N \leq 30 \text{ V}$$

Analog feedback module (UAI) (terminals +31 -32)

$$I_N \leq 22 \text{ mA}$$

$$U_N \leq 30 \text{ V}$$

Universal analog input module (terminals +21 -22)

$$I_N \leq 22 \text{ mA}$$

$$U_{\max} \leq 30 \text{ V}$$

Digital feedback module

(terminals: SW 1: +41 -42, SW 2: +51 -52)

Per output:

$$U_N \leq 30 \text{ V}$$

Digital output module (proximity switches)

(terminals limit 1: +51 -52, limit 2: +41 -42)

Per output:

$$I_N \leq 25 \text{ mA}$$

$$U_N \leq 16 \text{ V}$$

When using proximity switch SJ2_S1N (NO), the positioner may only be used at an ambient temperature range of -25 ... 80 °C (-13 ... 176 °F).



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200 Jade Park • Chelsea, AL 35043
TEL: 205.678.0507

info@vacaccessories.com