GEMÜ® 1435 ePos

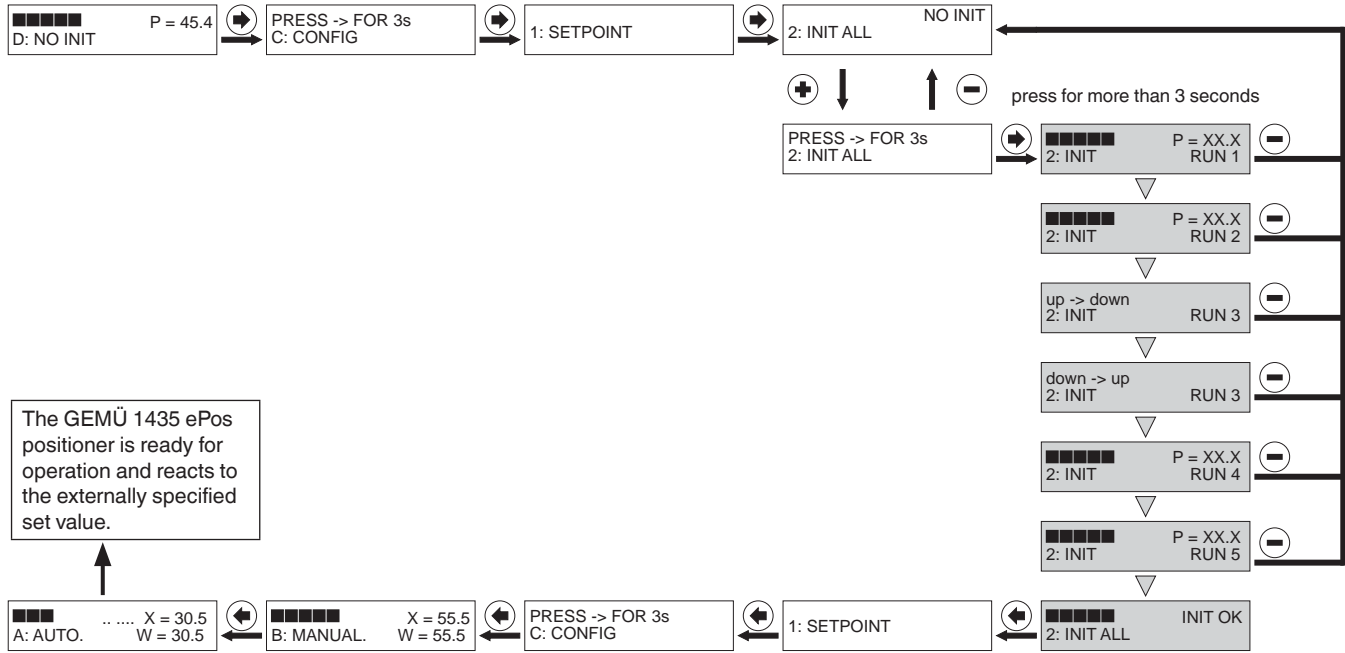## Intelligent Positioner

Status 08.11.16
From version 2.0.0.3

Quick commissioning of the GEMÜ 1435 ePos:

Prerequisites:

- Mounted to the valve
- Air supply, max. 6bar, connected
- 24 V DC supply voltage connected
- Set value signal need not be connected
- For correct commissioning proceed as described in the following flow chart:

After switching on · press for more than 3 seconds

```
■■■■■    P = 45.4   →   PRESS -> FOR 3s  →   1: SETPOINT  →   2: INIT ALL        NO INIT
D: NO INIT               C: CONFIG
```

(+) ↓ ↑ (−)   press for more than 3 seconds

```
PRESS -> FOR 3s  →   ■■■■■   P = XX.X  (−)
2: INIT ALL          2: INIT       RUN 1
                          ▽
                     ■■■■■   P = XX.X  (−)
                     2: INIT       RUN 2
                          ▽
                     up -> down      (−)
                     2: INIT       RUN 3
                          ▽
                     down -> up      (−)
                     2: INIT       RUN 3
                          ▽
                     ■■■■■   P = XX.X  (−)
                     2: INIT       RUN 4
                          ▽
                     ■■■■■   P = XX.X  (−)
                     2: INIT       RUN 5
                          ▽
```

The GEMÜ 1435 ePos positioner is ready for operation and reacts to the externally specified set value.

```
■■■    .. .... X = 30.5  ←  ■■■■■   X = 55.5  ←  PRESS -> FOR 3s  ←  1: SETPOINT  ←  ■■■■■   INIT OK
A: AUTO.    W = 30.5      B: MANUAL.  W = 55.5    C: CONFIG                          2: INIT ALL
```

Contents

GEMÜ®

1435 ePos

1 General safety information

Please read the following notes carefully and observe them.

1.1 General information

Important requirements to ensure the perfect function of this GEMÜ 1435 ePos:
- Correct transport and storage
- Installation and commissioning by trained personnel
- Operation according to these operating instructions
- Recommended maintenance

The GEMÜ 1435 ePos must be used in accordance with these directions. All information in these operating instructions regarding operation, servicing and maintenance must be observed and applied. If the information is not observed, the operator's guarantee rights and the manufacturer's legal liability cease. This could also lead to the loss of any rights to compensation. The manufacturer shall undertake no responsibility for the GEMÜ 1435 ePos if these safety notes are not observed.

Therefore, you must observe:
- the contents of these operating instructions
- the relevant safety regulations for the installation and operation of electrical systems
- that this device must not be used in potentially explosive areas.

The regulations, standards and guidelines named in these operating instructions are only applicable in Germany. If the GEMÜ 1435 ePos is used in other countries, the local applicable regulations must be observed. When dealing with harmonised European norms, standards and guidelines, these apply within the Single European Market. The operator must also adhere to national rules and guidelines, if applicable. The descriptions and instructions in these operating instructions refer to the standard version.

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The safety information does not take into account:
- ✗ Unexpected incidents and events, which may occur during installation, operation and servicing.
- ✗ Local safety regulations which must be adhered to by the operator and by any additional installation personnel.

In cases of uncertainty:
- ✗ Consult the nearest GEMÜ sales office.

1.2 Explanation of symbols and signs

Important information is identified in these operating instructions by the following symbols:

⚠ DANGER	This symbol indicates danger. There is **danger to life or health of persons** and/or **considerable material damage** can occur, if the instructions given here are not followed.
⚠	**Slight bodily injury** and damage to property can occur, if the **safety information** given in connection with this symbol is not observed.
i	This symbol indicates **notices** which give important information regarding your GEMÜ 1435 ePos

1.3 Safety notes

⚠ DANGER	- Only qualified and trained personnel should assemble, electrically connect and commission the GEMÜ 1435 ePos. Use qualified personnel for operation, servicing, inspection and assembly. The areas of responsibility, the monitoring of personnel and their competence areas should be defined precisely by the operator. Train personnel with insufficient knowledge or, if necessary, have them trained by the manufacturer / supplier on order of the operator. Ensure that all members of personnel understand the safety instructions. - Ensure that the power supply equipment is electrically safe. - Ensure that the electrical values are correct.

If the safety information is disregarded then persons, the environment and the GEMÜ 1435 ePos may be endangered. Furthermore, failure to observe the safety information may lead to a complete loss of claims rights.

Adhere to legal regulations.

1.4 Correct use

7 The GEMÜ 1435 ePos serves solely as a positioner and must be used according to the data sheet.

7 The GEMÜ 1435 ePos must not be used outdoors without heating element. The version with heating element may only be used outdoors in a rain-protected area.

7 Any other use or use above and beyond this is not permitted. GEMÜ shall not be liable for any consequential damage which is solely at the user's risk.

7 Please pay attention to the pertinent technical safety regulations when planning both the use and operation of the device. The designer, plant constructor or operator is always responsible for positioning and mounting of the GEMÜ 1435 ePos.

1.5 Information on use in damp conditions

i	Under no circumstances whatsoever may the GEMÜ 1435 ePos be cleaned with a high pressure cleaning device because the protection class IP 65 is not sufficient for this.

The following information is intended to help when mounting and operating the GEMÜ 1435 ePos in damp conditions:

● The GEMÜ 1435 ePos must be protected from direct impact of rain water.

● Lay cables and and pipework so that condensate or rain water that remains on the pipework / cables cannot enter the cable glands of the M12 plugs of the GEMÜ 1435 ePos.

● Check that all cable glands of the M12 plug and the fittings are mechanically secured.

● Check housing seal for correct position and damage each time before closing.

● Close keypad cover properly immediately after use.

● Lock all covers (throttles, check valve) immediately after use.

1.6 Mounting position

The mounting position of the GEMÜ 1435 ePos is optional. When mounted upside down it must be ensured that no liquids or dirt can enter the outlet of the pressure relief valve.

1.7 Tools required for installation and assembly

The tools required for installation and assembly are not included in the scope of delivery.

– Open-end wrench SW10 and SW27
– Allen key 3 mm and 4 mm
– Electric screwdriver 3.5 mm

2 Manufacturer's information

2.1 Transport

● Only transport the positioner by suitable means. Do not drop. Handle carefully.

● Dispose of packing material according to relevant local or national disposal regulations / environmental protection laws.

2.2 Delivery and performance

● Check that all parts are present and check for any damage immediately upon receipt.

● The scope of delivery is apparent from the dispatch documents and the design from the order number.

● The performance of the positioner is checked at the factory.

● If the GEMÜ 1435 ePos positioner is ordered as a complete unit with a valve, these parts and the accessories belonging to them are supplied ready assembled and factory set. The GEMÜ positioner is then ready for immediate operation.

2.3 Storage

● Store the positioner free from dust and moisture in its original packaging.

● Avoid UV rays and direct sunlight.

● Maximum storage temperature: 60 °C.

2.4 Function

The GEMÜ 1435 ePos is an intelligent electro-pneumatic positioner designed for mounting to pneumatic linear and quarter turn actuators.

The positioner can be directly mounted to the actuator using a suitable mounting kit. The mounting kit contains both the mounting bracket / adapter and the appropriate travel sensor with the relevant fastening screws.

Remote mounting is also possible, whereby the mounting bracket / adapter is not needed.

The travel sensor measures the current position of the valve and relays this position to the electronic control system of the GEMÜ 1435 ePos which correlates the actual value of the valve with the set value and adjusts the valve if necessary.

The information required can be called-up on the two-line display of the GEMÜ 1435 ePos. Self-explanatory help texts that explain the meaning of the parameters called-up are also displayed.

The GEMÜ 1435 ePos is operated using four keys.

2.5 Fail safe function

The GEMÜ 1435 ePos has a fail safe function which ensures that the outlets are vented during a pneumatic and electrical power supply failure.

This fail safe function is not a substitute for specific plant safety requirements. The GEMÜ 1435 ePos is not a safety control system.

3 Diagrammatic view of the inputs and outputs

Additional functions of the positioner:
– Automatic initialisation
– Easy to understand help texts for operating in system mode "ADVANCED"
– Stroke limiter and seal adjuster
– Close tight function
– Selectable or settable characteristic curve
– Safety position "fail safe"
– Freely programmable alarm outputs
– Etc.

Operating parameters

Set value input for positioning
0-10 V
0-20 mA
4-20 mA

Actual value input for position control using the travel sensor

Supply voltage
24 V DC

Inputs

Supply

Actual value output of positioner

0-10 V
4-20 mA (optional)

Binary outputs

24 V DC

Outputs

Operation

Keypad

4 Mechanical mounting

ℹ️	When operating with an actuator of control function 2 (opened by spring force), fit an external throttle (order number 1435 DR6Z) into the air supply line (connection P).

4.1 Mounting to linear actuators

4.1.1 Preparation of the actuator

1. The actuator must be in the zero position (actuator vented).
2. Should there be an optical position indicator in the actuator (a red spindle), it must be removed.
3. Should there be a thread cover in the top of the actuator, remove this too.

4.1.2 Assembling the travel sensor

⚠️ DANGER	**Pretensioned spring!** ➤ Damage to the device. ● Slowly relax spring.

⚠️	Attention: Damage to the spindle surface may lead to failure of the travel sensor!

In the standard version the travel sensor consists of the travel sensor, a compression spring and an operating bush (on larger actuators a guide bush is also supplied which is fitted behind the compression spring).

Travel sensor   a   Operating bush

Spindle   Spring

a
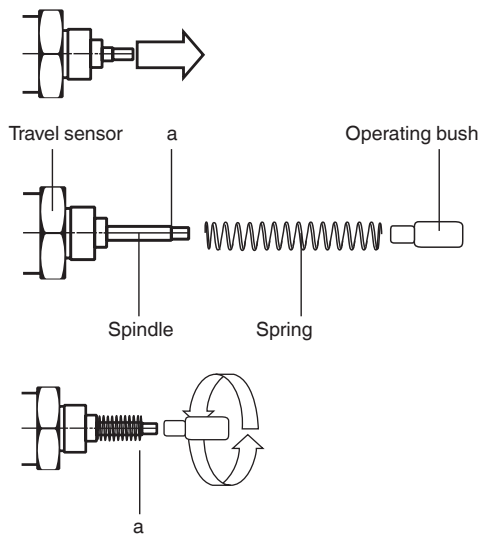
1. Pull out the spindle of the travel sensor up to the limit stop.
2. Push the spring over the spindle.
3. Fix the spindle at point **a**
   (the spindle must not be damaged during this process).
4. Screw the operating bush onto the spindle.

4.1.3 Mounting the positioner

1	Mounting bracket
2	Actuator
3	Travel sensor
4	Hexagon
5	M6 screws
6	M12 cable gland
7	M4 screws
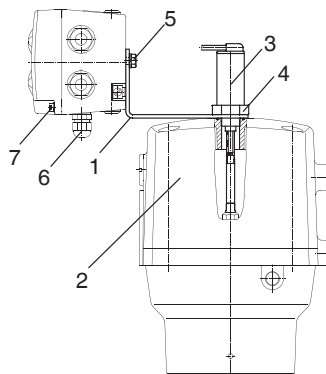
1. For control function 1 (normally closed) place the mounting bracket **1** between the actuator head **2** and travel sensor **3** and fix by turning the travel sensor at the hexagon **4**.
2. For control function 2 (normally open) and control function 3 (double acting) place the mounting bracket **1** between the threaded adapter and travel sensor **3** and also place a sealing ring there. Fix by turning the travel sensor at the hexagon **4**.
3. Attach the positioner to the mounting bracket **1** with 2 M6 screws **5**.
4. Loosen screws **7** on housing cover and swing the cover open.
5. Feed cable from linear travel sensor into the M12 cable gland **6** of the positioner and connect to the terminal board as shown in the wiring diagram (see chapter 6).
6. Then tighten the M12 gland. The cable must be held firmly on all sides.

4.2 Mounting to quarter turn actuators

4.2.1 Preparation of the actuator
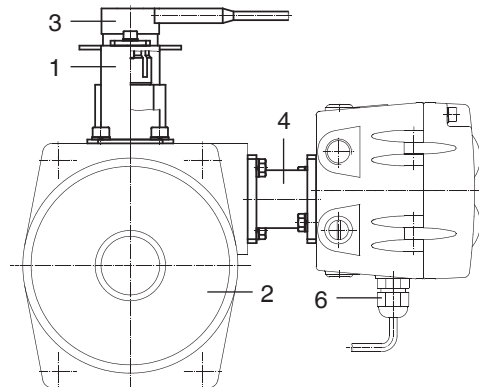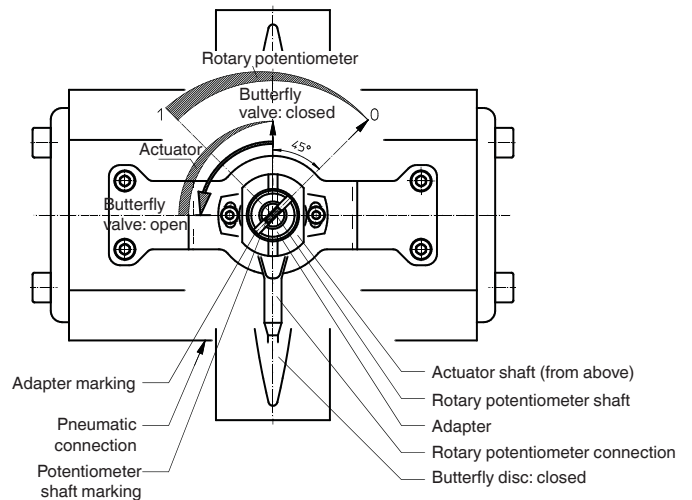
1. The actuator must be in the zero position (actuator vented). Double acting actuators should be moved to the valve "CLOSED" position.
2. Remove the screw which retains the optical position indicator.
3. Determine the turn direction of the actuator (seen from above the turn direction of the actuator must be anticlockwise, when the actuator moves from the "CLOSED" to the "OPEN" position).
4. Bolt rotary travel sensor **3** to the actuator with mounting bracket **1**.

⚠️	Observe correct fitting position of rotary travel sensor to "double flats".

5. Mount positioner directly on the quarter turn actuator **2** using a NAMUR adapter **4**.

6. Loosen screws on housing cover and swing the cover open.
7. Feed cable from linear travel sensor into the M12 cable gland **6** of the positioner and connect to the terminal board as shown in the wiring diagram (see chapter 6).
8. Then tighten the M12 gland. The cable must be held firmly on all sides.

4.3 Remote mounting

1. The actuator must be in the zero position (actuator vented).
2. Mount travel sensor as described in chapter 4.1 or 4.2.
3. Feed travel sensor cable into the M12 cable gland of the positioner and connect to the terminal board as shown in the wiring diagram (see chapter 6).
4. Then tighten the M12 gland. The cable must be held firmly on all sides.

5 Pneumatic connections

i	Filter strainers are installed in the pneumatic connectors of the positioner to protect against rough dirt particles. They can be ordered as spare parts with order number 1435 SFI. Each kit contains 3 filter strainers. These filter strainers are meant as an additional protection and do not replace the requirement to filter all site compressed air.

1. Make the connection between pneumatic positioner outlet **A1** (single acting) or **A1** and **A2** (double acting) and the pneumatic actuator control air inlet.
2. Connect the control air supply (additional air) to the air supply connection **P*** (max. 6 bar or 90 psi).
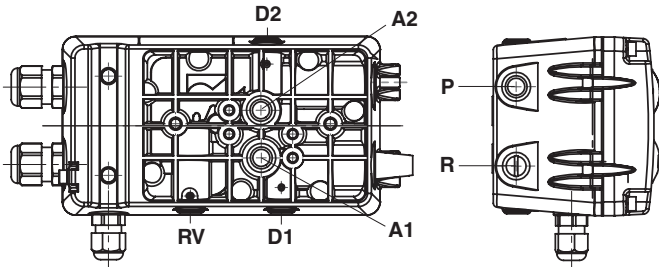
Connection	DIN ISO 1219-1	Description
P	1	Air supply connection G1/4
R	3	Venting connection G1/4 with silencer
D1	V1	Exhaust air throttle for A1
D2	V2	Exhaust air throttle for A2*
RV	V3	Non-return valve
A1	2	Working connection for process valve
A2	4	Working connection for process valve*
* only double acting type (code 3)		

5.1 Replacing the filter strainers

1. Switch off pneumatic control air supply.
2. Remove connection lines.
3. Carefully remove filter strainers from holes **P**, **A1** and **A2** (only double acting version).
4. Replace filter strainers (1435 SFI).
5. Re-connect connection lines.
6. Supply pneumatic control air.

6 Electrical connections

6.1 Version with terminals (standard)

1. Connect travel sensor (if not already done).
2. Connect analogue input 0/4-20 mA or 0-10 V to the appropriate terminals for specification of set values.
3. Connect 24 V DC supply voltage cable and potential earth.

CAUTION
Damage to the spindle surface may lead to failure of the travel sensor!

i	**Important:** In order to compensate for differences of earthing potential due to plant-specific installations, a jumper can be placed between terminals "GND" and "I_w-".

or	orange
gn	green
bl	blue
gr	grey
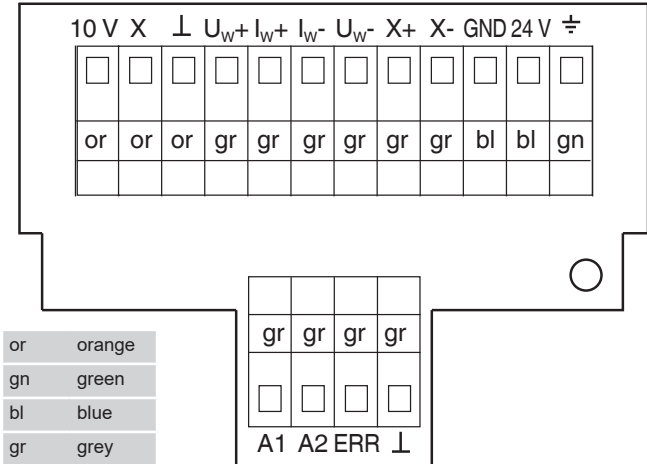
Legend		
10 V	green	
X	brown	Connection of external travel sensor
⊥	white	
I_w+		Set value input 0/4-20 mA
I_w-		
U_w+		Set value input 0-10 V
U_w-		
X+		Actual value output 0-10 V
X-		4-20 mA (optional) - internal supply
GND		Supply voltage 24 V DC
24 V		
⊥		Potential earth
A1		Alarm1, 24 V DC
A2		Alarm2, 24 V DC
ERR		Error message output
⊥		GND out

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6.2 Version with connector (optional)
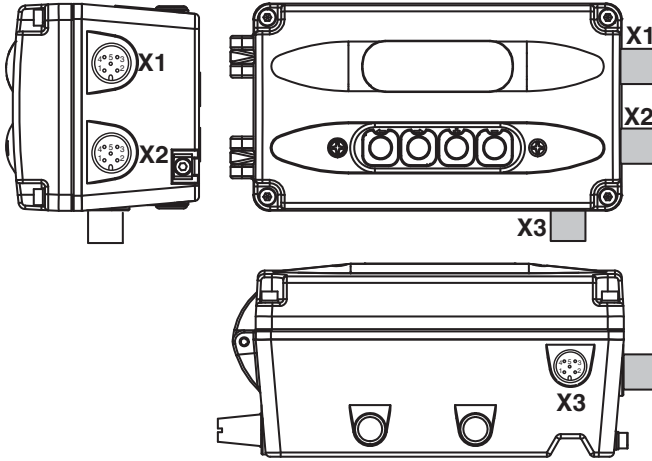
Connection	Pin	Signal name
X1 A-coded M12 plug	1	Uv, 24 V DC supply voltage
	2	Uo, error message output, 24 V DC
	3	Uv, GND supply voltage
	4	Uo, alarm output 1, 24 V DC
	5	Uo, alarm output 2, 24 V DC

Connection	Pin	Signal name
X2 A-coded M12 plug	1	Iw+, set value input 0/4-20 mA*
	2	Iw-, set value input 0/4-20 mA*
	3	X+, actual value output 0-10 V / 4-20 mA
	4	X-, actual value output 0-10 V / 4-20 mA
	5	n.c.

Connection	Pin	Signal name
X3 A-coded M12 socket	1	Uv, actual value supply 10 V DC
	2	Usig, actual value input 0-10 V DC
	3	Uv, actual value supply GND
	4	n.c.
	5	n.c.

* for set value input U_w = 0 - 10 V on-site rewiring is required

i **Important:**
For a set value input signal of 0-10 V DC the positioner must be opened and the two wires of the set value input must be reconnected from terminals "I_w+" and "I_w-" to terminals "U_w+" and "U_w-".

10 V	X	⊥	U_w+	I_w+	I_w-	U_w-	X+	X-	GND	24 V	⏚
or	or	or	gr	gr	gr	gr	gr	gr	bl	bl	gn
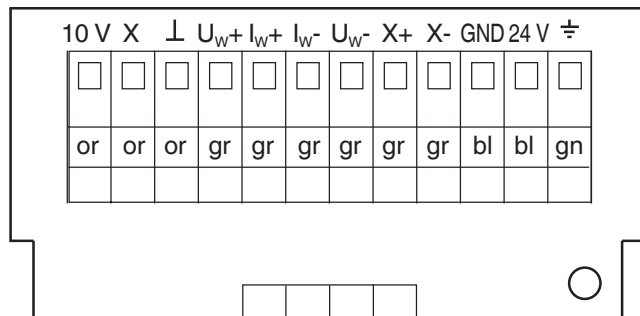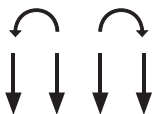
gr	gr	gr	gr
A1	A2	ERR	⊥

or	orange
gn	green
bl	blue
gr	grey

6.3 Checking the mounted assembly

1. Connect positioner to power and air supply.
2. The following message is displayed:

```
■■■■■     P=45.7
          D: No INIT
```

The mounted actuator can be moved to the OPEN and CLOSED positions using the [+] and [-] keys.

i The displayed valve position must be between 2 % and 98 %.

7 Operation

7.1 Operating and display elements

2-line display, 16-digit

Back key (yellow) ⬅ | Forwards key (green) ➡ | Plus key (red) [+] | Minus key (black) [-]
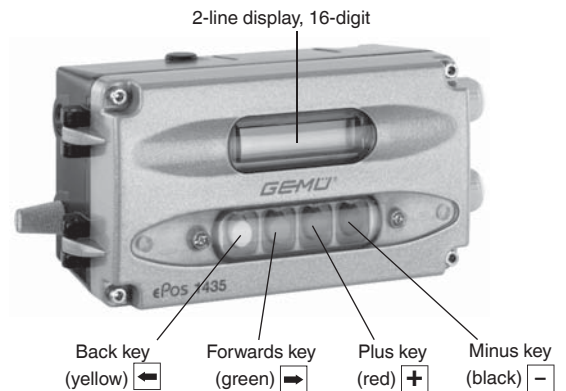
7.2 Operator interfaces

The GEMÜ 1435 ePos offers a choice of two different operator interfaces (System mode). These can be selected in the "SYSTEMMODE" parameter.

7.2.1 System mode "CLASSIC" (simple basic functions)

When "**CLASSIC**" is selected all available parameters are in a sequential chain.

7.2.2 System mode "ADVANCED" (extended diagnostic facilities)

When "**ADVANCED**" is selected all available parameters are divided into different categories and into different submenus. In addition a large number of additional parameters are available, providing additional information and adjustments to the GEMÜ 1435 ePos .
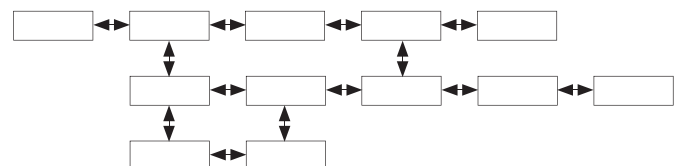
7.2.3 Changing the operator interfaces

In order to switch the operator interface from [CLASSIC] to [ADVANCED] proceed as follows:
1. Select parameter "50: SYSTEMMODE".
2. Switch from [CLASSIC] to[ADVANCED] and do not exit the parameter.
3. Switch off supply voltage.
4. Switch on supply voltage.

In order to switch the operator interface from [ADVANCED] to [CLASSIC] proceed as follows:
1. Select parameter "SYSTEMMODE" in the SetBasics menu.
2. Switch from [ADVANCED] to [CLASSIC] and confirm with "OK". Do not exit the parameter.
3. Switch off supply voltage.
4. Switch on supply voltage.

7.3 Menu levels

The GEMÜ 1435 ePos uses two menu levels. These are the working level (AUTO and MANUAL) and the configuration level (CONFIG).

7.3.1 Working level (AUTO and MANUAL)

The GEMÜ 1435 ePos is automatically at this level after the supply voltage is switched on.

A:AUTO
The positioner is triggered by an external set value signal when using the **AUTO** operating mode.

B: MANUAL
When **MANUAL** is selected the valve can be moved manually using the + and − keys.

7.3.2 Configuration level (CONFIG)

Various parameters can be set at this level in order to realise optimal adaptation to the application conditions.

8 Commissioning

> ⚠ ● The GEMÜ 1435 ePos must not be used outdoors without heating element. The version with heating element may only be used outdoors in a rain-protected area.
> ● The GEMÜ 1435 ePos must be protected from direct impact of rain water.

> ℹ If the GEMÜ 1435 ePos is delivered fully mounted to a valve ex works, it is already preset at the factory (at a control pressure of 5.5 - 6 bar without operating pressure) and is therefore ready for operation. A reinitialisation (see chapter 8.2) is recommended if the plant is operated with a different control pressure or if the mechanical end positions have been changed (e.g. seal replacement on the valve or actuator replacement).

1. Turn on the pneumatic air control supply (observe maximum control pressure for the positioner and the valve!)
2. Switch on supply voltage 24 V DC.
3. Specify an analogue set value 0/4-20 mA or 0-10 V.

8.1 General information

> ℹ Before adjustments are made to the settings and parameters of the GEMÜ 1435 ePos, the two screws on the keypad cover must be undone. The cover can be turned away by slightly pulling it out. All parameter settings and the initialisation are retained even in the event of voltage cutoff.

Use the ← and → keys to reach the various operating levels and parameters. To enter the configuration menu "C: CONFIG" the → key must be kept pressed for more than 3 seconds. Parameters can be changed by pressing the + key and then selecting the parameter using the ← key.
The value can then be changed using the + and the − keys. Then the cursor must be moved to the right-hand bracket using the → key and the set value confirmed using the + key.

8.2 Initial commissioning

8.2.1 Without factory setting (when supplied without a valve)

After assembly and all electrical and pneumatic connections, the positioner must be initialised.
Before being initialised the positioner is in the "**D: NO INIT**" operating mode. This operating state can also be reset to the factory default setting by selecting "DEFAULT" in the menu "**3: DEFAULT STATE**".
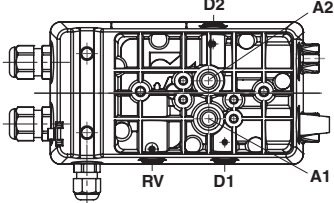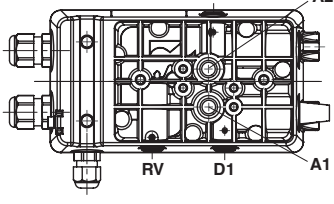
> ℹ − The mounted actuator can be moved to the OPEN and CLOSED positions using the + and − keys.
> − Pressing + and additionally − moves the actuator quickly to OPEN.
> − Pressing − and additionally + moves the actuator quickly to CLOSED.
> − The displayed valve position must be between 0 % and 100 %.
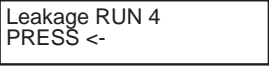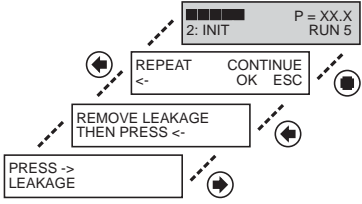
Starting automatic initialisation

After switching on

■■■■■ P = 45.4 D: NO INIT	➡	PRESS -> FOR 3s C: CONFIG	➡

press for more than 3 seconds

1: SETPOINT	➡	2: INIT ALL NO INIT

⊕ ↓   ↑ ⊖   press for more than 3 seconds

PRESS -> FOR 3s
2: INIT ALL   ➡

■■■■■   P = XX.X
2: INIT   RUN 1   ⊖
▽
■■■■■   P = XX.X
2: INIT   RUN 2   ⊖
▽
up -> down
2: INIT   RUN 3   ⊖
▽
down -> up
2: INIT   RUN 3   ⊖
▽
■■■■■   P = XX.X
2: INIT   RUN 4   ⊖
▽
■■■■■   P = XX.X
2: INIT   RUN 5   ⊖
▽

The GEMÜ 1435 ePos positioner is ready for operation and reacts to the externally specified set value.

↑

■■■ .. .... X = 30.5 A: AUTO. W = 30.5	⬅	■■■■■ X = 55.5 B: MANUAL. W = 55.5	⬅	PRESS -> FOR 3s C: CONFIG

⬅	1: SETPOINT	⬅	■■■■■ INIT OK 2: INIT ALL

Display	Error cause	Error elimination
PRESS <- ERROR RUN 1	Actuator's direction cannot be established. Cause: a) No compressed air supply b) Compressed air supply too low c) Travel sensor wrongly connected d) Valve stroke < 3mm	● Press ⬅ key a) Check compressed air supply (max. 6 bar) b) Check compressed air supply (max. 6 bar) c) Check connection assignment d) Check valve stroke
PRESS <- ERROR RUN 2.1	Zero point adjustment cannot be carried out. Cause: a) Incorrect travel sensor / mounting kit b) Adjust quarter turn travel sensor	● Press ⬅ key Adjust valve manually, display value P must be > 2.0 in CLOSED position. a) Check order no. b) Turn quarter turn travel sensor (only on quarter turn actuators) until value P > 2.0
PRESS <- ERROR RUN 2.2	Zero point adjustment cannot be carried out. Cause: a) Incorrect travel sensor / mounting kit b) Adjust quarter turn travel sensor	● Press ⬅ key Adjust valve manually, display value P must be < 98.0 in CLOSED position. a) Check order no. b) Turn quarter turn travel sensor (only on quarter turn actuators) until value P < 98.0
PRESS <- Stroke Error	Actuator does not move. Cause: a) No compressed air supply b) Compressed air supply too low c) Mechanical parts are defect	● Press ⬅ key a) Check compressed air supply (max. 6 bar) b) Check compressed air supply (max. 6 bar) c) Check mechanical parts
up -> down 2: INIT RUN 3 ADJUST NOZZLES (S) THEN PRESS <- ⬅ PRESS -> up -> down X.X ➡	Travel time (OPEN – CLOSED) of valve less than 1 second D2 A2 RV D1 A1	● Press ➡ key ● Adjust throttle D1 (on double acting actuators throttles D1 and D2) ● Press ⬅ key ● Repeat if necessary until travel time > 1 second
down -> up 2: INIT RUN 3 ADJUST NOZZLES (S) THEN PRESS <- ⬅ PRESS -> down -> up X.X ➡	Travel time (CLOSED – OPEN) of valve less than 1 second D2 A2 RV D1 A1	● Press ➡ key ● Adjust throttle D1 (on double acting actuators throttles D1 and D2) ● Press ⬅ key ● Repeat if necessary until travel time > 1 second

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Display	Error cause	Error elimination
Old positioners (up to software V1.3.1.8) Leakage RUN 4 PRESS <-	Leakage in the system	● Press ← key ● Remove leakage ● Restart automatic initialisation
New positioners (from software V2.0.0.0) ■■■■□ P = XX.X 2: INIT RUN 5 REPEAT CONTINUE <- OK ESC REMOVE LEAKAGE THEN PRESS <- PRESS -> LEAKAGE	Leakage in the system	● Press → key ● Remove leakage ● Press ← key ● Press ← key for another test ● Press + key to skip the leakage test ATTENTION! Skipping the leakage test may lead to bad control characteristics and increased wear.

8.2.2 With factory setting (positioner supplied mounted to the valve)
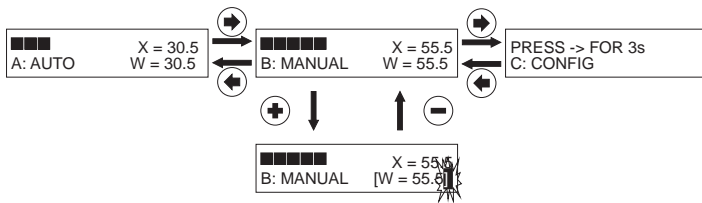
"**A: AUTO**" appears in the display. The positioner is ready for operation.

To adjust the valve manually, press the → key 1x. "**B: MANUAL**" appears.

Pressing the + key opens a bracket at the set value. The digit to be changed in the value must be selected using the ← key and set using the + or − keys. Then the cursor must be moved to the right-hand bracket using the → nd the set value confirmed using the + key.

> ℹ The positioner must be initialised again after replacing the valve or exchanging the valve seals. Proceed as described in chapter 8.2.1.

9 System mode CLASSIC

9.1 Operating modes

i	After a voltage cut-off, the positioner always starts up in the "A: AUTO" operating mode (provided that initialisation has already been carried out) and responds directly to the external set value signal.

9.1.1 Automatic operation (A:)AUTO)

Automatic operation is the normal operating mode. The initialised positioner responds to set value changes and adjusts the valve accordingly. The + and − keys have no function in this operating mode.
The current position (x) is shown as a percentage in the display and also as a bar chart.
The lower line shows the current operating mode and at the right is the current set value (w) in percent.
By pressing the ➡ key the operating mode "B: MANUAL" is reached.

9.1.2 Manual operation (B: MANUAL)

With manual mode the valve can be adjusted manually. Pressing the + key opens a bracket at the set value. The digit to be changed in the value must be selected using the ← key and set using the + or − keys. Then the cursor must be moved to the right-hand bracket using the ➡ nd the set value confirmed using the + key. The valve is then moved into the set position.

By pressing the ➡ key the operating mode "C: CONFIG" is reached.

9.1.3 Configuration (C: CONFIG)

Various parameter values of the positioner can be changed in the configuration menu. To reach the configuration menu the parameter "C: CONFIG" must be selected in the working level and then the ➡ key must be kept pressed for more than 3 seconds. The parameter value appears in the top line, the name and number of the parameter appear in the bottom line. Operation is as shown in the picture below.

9.1.3.1 Parameter setting - new positioners (from software V2.0.0.0)
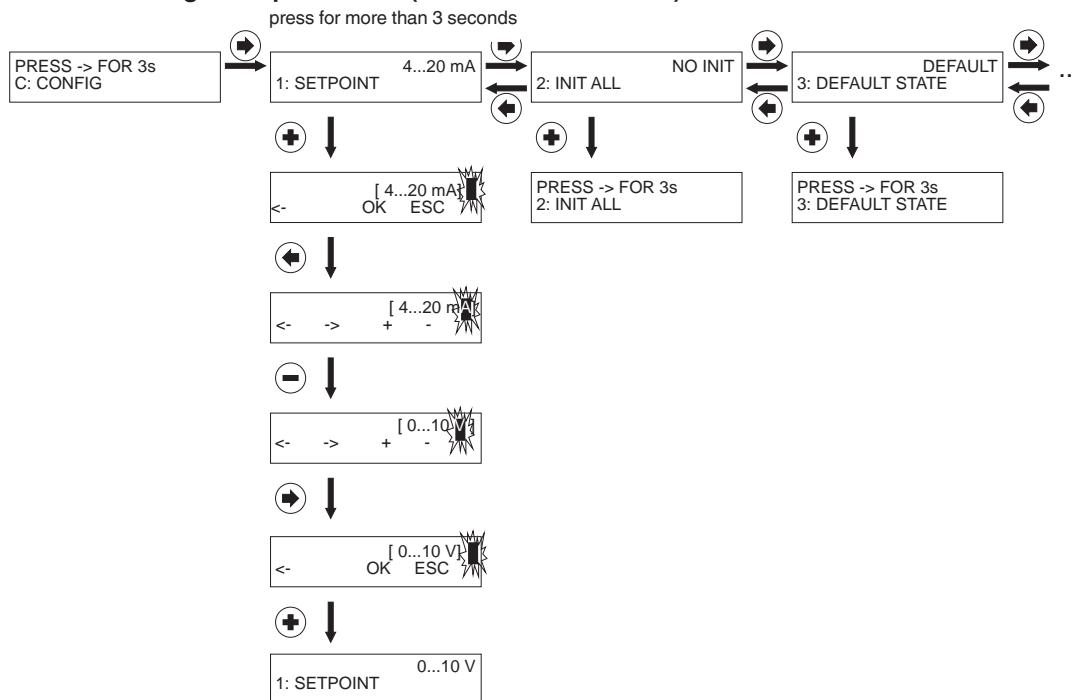
9.1.3.2 Parameter setting - old positioners (up to software V1.3.1.8)

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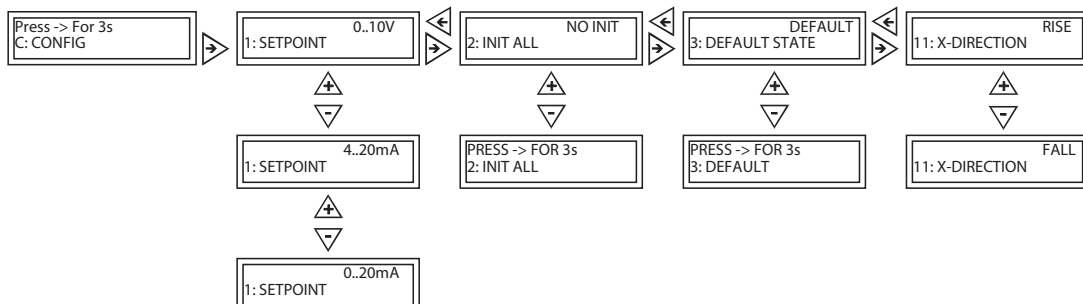
9.2 Parameter table

Display	Function	Value range	Unit	Factory setting
1:SETPOINT	Type of set value	0..10V 0..20mA 4..20mA	V mA mA	4..20mA
2:INIT ALL	Starting automatic initialisation	NO INIT Init OK	–	NO INIT
3:DEFAULT STATE	Return to factory setting	NO DEFAULT DEFAULT	–	DEFAULT
11:X-DIRECTION	Direction of X display and actual value output	RISE FALL		RISE
12:ALARM FUNCT	Determines the function of the alarm outputs (ALARM1 und ALARM 2)	OFF min/max min/min max/max		OFF
13:LEVEL ALARM1	Switch point of alarm 1	0.0...100.0		10.0
14:LEVEL ALARM2	Switch point of alarm 2	0.0...100.0		90.0
15:ERROR FUNCTN	Determines the function of the error message output (ERROR)	ERROR ERROR+INACTIVE RANGE ERROR + RANGE ERR+RANGE+INAC		ERROR + RANGE
16:ERROR TIME	Valve travel time monitoring (Error message output)	auto 0...100	S	auto
17:ERROR LEVEL	Maximum system deviation (Error message output)	auto 0.0...100.0	%	auto
18:RANGE FUNCTN	Range monitoring of set value input	< 4 mA > 20 mA <4mA or >20mA	mA	<4mA or >20mA
21:MIN POSITION	Limits the CLOSED position of the valve min. position	0.0...100	%	0.0
22:MAX POSITION	Limits the OPEN position of the valve max. position	0.0...100	%	100.0
23:CLOSETIGHT	Determines the function of the close tight function	no min max min & max		no
24:SETP DIRECTN	Direction of set value	NORMAL INVERSE		NORMAL
25:SETP RAMP	Ramp function - set value	auto 0...400	S	0
26:SPLIT START	Split range (set value range) start	0.0 ... 90	%	0.0
27:SPLIT END	Split range (set value range) end	10 ... 100	%	100
28:SETP FUNCTN	Defines the function of the control characteristic	Linear 1:25 1:50 free		Linear
30:FREE 0 % 31:FREE 10 % 32:FREE 20 % 33:FREE 30 % 34:FREE 40 % 35:FREE 50 % 36:FREE 60 % 37:FREE 70 % 38:FREE 80 % 39:FREE 90 % 40:FREE 100 %	Definition of the programmable characteristic curve 11 calibration points	0...100	%	2 3 4.4 6.5 9.6 14.1 20.9 30.9 45.7 67.6 100
42:DEADBAND	Size of dead band	auto 0.0...10.0	%	1,0 %, K-no. 2442: 2,0 %, K-no. 2443: 5,0 %
43:PROP GAIN	Proportional amplification (PD controller)	Kp = 0.1...100.0		1.0
44:DERIV TIME	Differential time consant (PD controller)	Tv = 0.00s...10.00s	S	0.1
45:FIELDBUS		SETP.ANALOG FIELDBUS		SETP.ANALOG
46:RELEASE VXX	Software release	V X.X.X.X		
50:SYSTEMMODE	Defines the type of operator interface	CLASSIC ADVANCED		CLASSIC

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9.3 Explanation of parameters

1: SETPOINT
Range of analogue set value input (Voltage: 0-10 V or power: 0/4-20 mA)

2: INIT ALL
Initialisation
Automatic initialisation is started by using ⊞ or ⊟ and pressing the ➡ key (> 3 sec). The progress of the initialisation is shown with "**run 1**" to "**run 5**" in the display.
During the initialisation process the positioner optimises its control parameters for controlling the valve concerned.

3: DEFAULT STATE
Default setting
Return to factory setting and resetting initialisation. The positioner is set to "DEFAULT" by using ⊞ or ⊟ and pressing the ➡ key (> 3 sec).

> **i** After "Default" the positioner must be initialised again. All actuation parameters established so far are deleted.

11: X-Direction
Correcting variable direction
Here the display direction (rising or falling) and the position feedback can be adjusted.

Pressuriza-tion state outlet A1	X-Direction	Displayed value	Allocated actual position x
vented pressurized	rise	0 % 100 %	0 % 100 %
vented pressurized	FALL	100 % 0 %	100 % 0 %

12: ALARM FUNCTN
Activates or deactivates the alarm function
The reaction of the alarms (limiting contacts) relates to the POSITION measurement (mechanical distance).
x = current actual value

min/max:

Position	State output A1	State output A2
x < Level Alarm1 < Level Alarm2	24V	0V
Level Alarm1 < x < Level Alarm2	0V	0V
Level Alarm1 < Level Alarm2 < x	0V	24V

min/min:

Position	State output A1	State output A2
x < Level Alarm1 < Level Alarm2	24V	24V
Level Alarm1 < x < Level Alarm2	0V	24V
Level Alarm1 < Level Alarm2 < x	0V	0V

max/max:

Position	State output A1	State output A2
x < Level Alarm1 < Level Alarm2	0V	0V
Level Alarm1 < x < Level Alarm2	24V	0V
Level Alarm1 < Level Alarm2 < x	24V	24V

13: LEVEL ALARM 1
Switch point for Alarm 1. When the switch point has been reached, digital output A1 (24V DC output) is switched.

14: LEVEL ALARM 2
Switch point for Alarm 2. When the switch point has been reached, digital output A2 (24V DC output) is switched.

15: ERROR FUNCTN
Function of error message output (24V DC output)

Setting	ERROR TIME	ERROR LEVEL	RANGE FUNCTN	C:CONFIG
ERROR	X	X		
ERROR+ INACTIVE	X	X		X
RANGE			X	
ERROR+ RANGE	X	X	X	
ERR+RANGE+ INAC	X	X	X	X

16: ERROR TIME
Monitoring time for setting the error messages (10 x travel time). The set value (s) serves as a specified value for the time within which the positioner must have reached the idle state. The associated trigger threshold is specified with parameter 17. When the set time has been exceeded the error message output ERR is set at 24 V DC.

17: ERROR LEVEL
Trigger threshold of error message
Here a value (%) can be set for the permissible size of system deviation for triggering the error message.
If parameters 16 and 17 are both set to "Auto" the error message is set if the slow-travel zone has not been reached within a set time. This time is 10x (parameter value AUTO) the initialisation travel time.

18: RANGE FUNCTN
Range monitoring of the set value signal
Here it is possible to set whether the RANGE error signal is triggered when it falls below 4mA (cable break monitoring) or exceeds 20 mA (short circuit monitoring).

21: MIN POSITION
Limits the CLOSED position of the valve
This function is equivalent to a mechanical seal adjuster.

22: MAX POSITION
Limits the OPEN position of the valve
This function is equivalent to a mechanical stroke limiter.

> **i** The mechanical regulating distance (from limit stop to limit stop) is limited to the set values with the parameters MIN POSITION and MAX POSITION. That way the actuator's mechanical positioning range range can be limited.
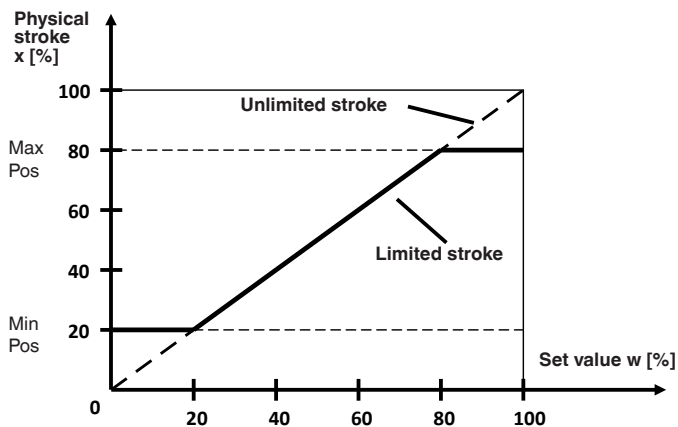
> **i** If parameter 23: CLOSETIGHT is activated the actuator is vented at a set value of < 0.5 %, even if there is a set MIN POSITION of, for example, 10 %. With a set value > 1.5 % the actuator is moved back to 10 %. With a set value > 99.5% the actuator is opened completely, even if the MAX POSITION is set to, for example, 90 %. With a set value < 98.5 % the actuator is moved back to 90 %.

23: CloseTight

'Close tight' variables
With this function the valve can be moved into the seat using the maximum possible actuating force (spring force). The close tight function can be activated for one end or both end positions. CLOSE TIGHT becomes effective when the set value falls below 0.5 % or exceeds 99.5 %.
The switch back hysteresis is 1 %.
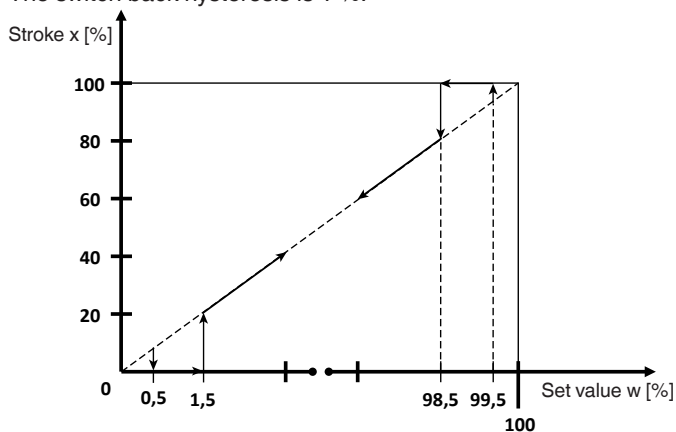
24: SETP DIRECTN

Set value direction
Setting the set value direction serves to reverse the direction of the set value. It is mainly required for split-range operation and for single acting actuators with the fail safe "OPEN" setting (control function 2).
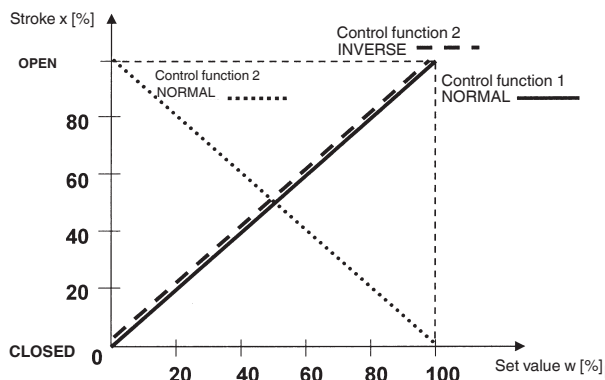
25: SETP RAMP

Set value ramp
The set value ramp is effective during automatic operation and limits the speed of change of the effective set value. When switching over from manual to automatic operation the effective set value is matched to the set value on the unit via the set value ramp.
In the position SETP RAMP = auto the slower of the two travel times which have been established during initialisation is used for the set value ramp.

26: SPLIT START

Set value split range start

27: SPLIT END

Set value split range end
Parameters 26 and 27 in conjunction with parameter 24 serve to limit the effective set value range. In this way split range tasks with the curves

☐ rising / falling
☐ falling / rising
☐ falling / falling
☐ rising / rising

are resolved.
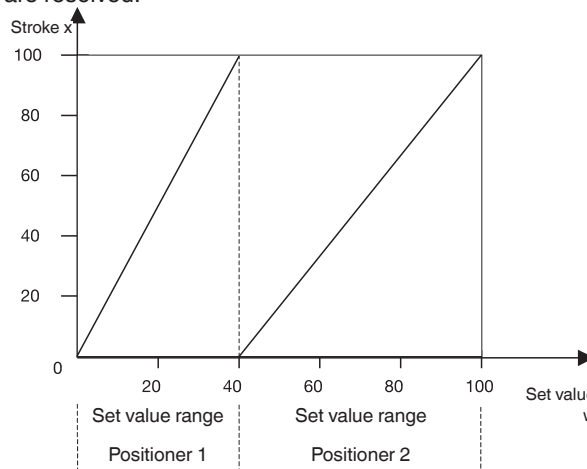
> **i** The difference between SPLIT START and SPLIT END values must be > 10 %.

28: SETP FUNCTN

Set value function
With this function non-linear valve characteristics can be linearised and with linear valve characteristics any flow characteristics can be reproduced.

Four valve characteristics are stored in the unit:

☐ equal-percentage 1 : 25
   (in CLOSED position valve remains 4 % open)
☐ equal-percentage 1 : 50
   (in CLOSED position valve remains 2 % open)
☐ linear
☐ free

When free is selected at 30: a characteristic with 11 calibration points can be entered.
30: FREE 0 %
:
:
40: FREE 100 %

At gaps of 10 % a flow characteristic value can be allocated to the set value calibration point concerned. These points make a traverse with 10 straight lines, which then provides a pattern of the valve characteristic.

> **i** Entering the set value calibration points is only possible at 28: SETP FUNCTN = free.

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Stroke x [%] **Linear and Equal-Percentage characteristic control curves**

42: DeadBand
Positioner's dead band
The dead band shows the maximum permissible system deviation between actual value and set value.
During initialisation, on DEADBAND = Auto the dead band is matched to the requirements of the control circuit. In the other discrete settings the fixed value for the dead band is used.

> **i** The height of the system deviation should always correspond to the requirements of the valve and the control circuit. It is recommended that you do not set a value of < 1.0% since this could (especially for actuators with discontinuous movement profiles) cause oscillating control characteristics. This could put a great deal of stress on the internal pilot valves and cause them to reach the end of their service life more quickly.
> Basically: the smaller the fixed value, the higher the wear and the shorter the service life. Therefore, the value should be set only as accurate as needed.

43: PROP GAIN
Proportional amplification
Adjusting the proportional amplification Kp
Kp = 0.1...100.0
The height of the amplification should always correspond to the requirements of the valve and the control circuit. The optimum setting is determined during automatic initialization but must be moved out of adjustment later if necessary.
The behaviour of the positioner is influenced as follows:

PROP GAIN	
Set value larger than determined value	**Set value smaller than determined value**
– The positioner controls faster (but tends to oscillate).	– The positioner controls slower.
– The set value is achieved in larger steps by increasing the correcting variable.	– The set value is achieved in smaller steps by decreasing the correcting variable.
– Control is less accurate.	– Control is more accurate.

44: DERIV TIME
Derivative action time
Adjusting the derivative action time Tv (time by which a specific correcting variable is reached earlier because of the D component than with a pure P-positioner)
Tv = 0.00 s...10.00 s

46: RELEASE VXX
Status of the current software version V X.X.X.X

50: SYSTEMMODE
Selection of operator interface
☐ CLASSIC
   menu configuration as described in chapter 7.2 System mode
☐ ADVANCED
   menu configuration as described in chapter 7.2 System mode

In order to switch the operator interface from [CLASSIC] to [ADVANCED] proceed as follows:
1. Select parameter "50: SYSTEMMODE".
2. Switch from [CLASSIC] to[ADVANCED] and do not exit the parameter.
3. Switch off supply voltage.
4. Switch on supply voltage.

In order to switch the operator interface from [ADVANCED] to [CLASSIC] proceed as follows:
1. Select parameter "SYSTEMMODE" in the SetBasics menu.
2. Switch from [ADVANCED] to [CLASSIC] and confirm with "OK". Do not exit the parameter.
3. Switch off supply voltage.
4. Switch on supply voltage.

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10 System mode ADVANCED

If the parameter "SYSTEMMODE" is set to "ADVANCED" the menu configuration is different, as are a certain number of new parameters.

> **i** To activate the system mode "ADVANCED" the parameter "SYSTEMMODE" must be changed to "ADVANCED" and then the supply voltage interrupted for more than 3 seconds.

10.1 Menu level

> **i** After a voltage cut-off, the positioner always starts up in the operating mode which was previously set in the "Mode" parameter.

10.1.1 Automatic operation (AUTO)

Automatic operation is the normal operating mode. The initialised positioner responds to set value changes and adjusts the valve accordingly. The ⊞ - or ⊟ keys have no function in this operating mode.
The current position (x) is shown in the top right of the display and in the middle is the applied set value signal (w) as a percentage.
In the bottom line a help text is shown describing the currently selected parameter.
The SETUP menu is reached by pressing the ➡ key.
By pressing the ➡ key again the "Mode" parameter is reached.

10.1.2 Select operating mode (Mode)

In this parameter the "AUTO" or "MANUAL operating mode is selected.
For this, pressing the ⊞ key takes it to changing the set value, this is displayed with two brackets. Then use the ⬅ key to place the cursor under the value to be changed which is then changed with the ⊞ or ⊟ key. Then the cursor is placed under the last bracket with the ➡ key. The message "OK" now appears in the bottom line of the display. This is now confirmed with the ⊞ key.

10.1.3 Manual operation (MANUAL)

With manual mode the valve can be adjusted manually. The required set value is set using the ⊞ or ⊟ key.
The SETUP menu is reached by pressing the ➡ key.

10.1.4 Configuration (SETUP)

Various parameter values of the positioner can be changed in the configuration menu. To reach the configuration menu the parameter "SETUP" must be selected in the working level and then the ⊞ key must be pressed.

10.2 Configuration menu (SETUP)

The configuration menu consists of five submenus with the following functions:

1. Service	This menu is used to read out all information/diagnostics regarding the positioner, the connected signals and errors that occur.
2. SetBasics	SetBasics is used to set the basic settings for the GEMÜ 1435 ePos such as the initialisation, selection of input signals and resetting to factory settings.
3. SetFunction	The special positioner functions are activated or deactivated here and the control parameters set.
4. SetCalibration	SetCalibration is used to set the directions of action, characteristic curves, stroke limiter and seal adjuster.
5. Communication	Without function

10.2.1 Menu structure 1. Service
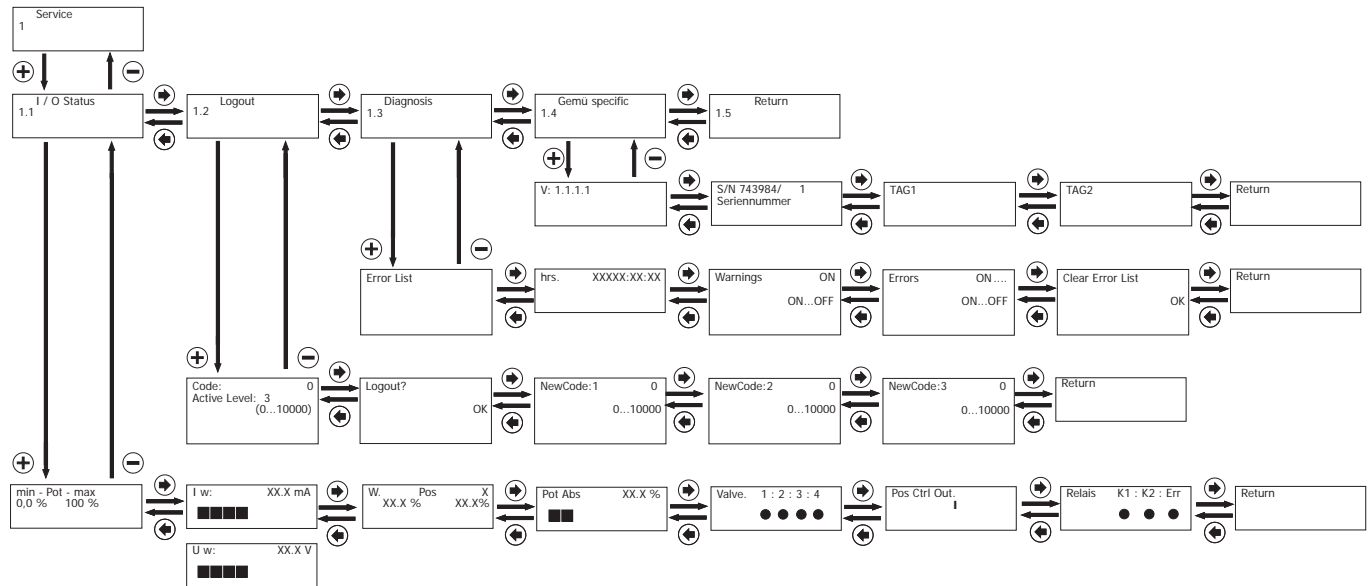
10.2.2 Menu structure 2. SetBasics

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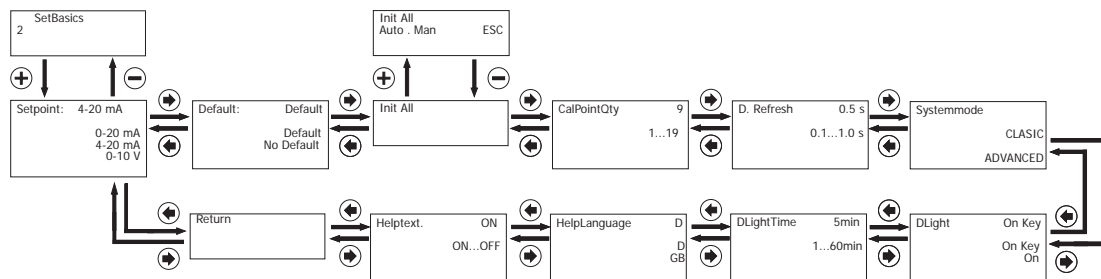
10.2.3 Menu structure 3. SetFunction

SetFunction
3

PosCtrl

Dead Band   Auto
0.0...10.0 %

Alarm Output

Alarm Fn   OFF
OFF
min/max
min/min
max/max

Level Alarm1   10.0 %
0.0...100.0 %

Level Alarm2   90.0 %
0.0...100.0 %

Return

Error Output

Error Functn   Error
Error+Inactive
Range
Error+Range
Err+Range+Inac

Error Time   Auto
0.0...100.0 s

Error Level...   Auto
0.0...100.0 %

Range Functn <4mA or >20mA
< 4mA
> 20mA
<4mA or > 20mA

Return

Position Output

Analog Out   0-10V
0-20mA *
4-20mA *

Out min   0.0 %
0.0...100.0 %

Out max   100.0 %
0.0...100.0 %

Return

CpyParaSet   OFF
P1<=W
P1=>P2
P1<=P2
P1=>P3
P1<=P3
P1=>P4
P1<=P4

Return

Prop Gain   1.0
0.1...100.0

Deriv Time   0.1 s
0.01...1 s

Min Pos   0.0 %
0.0...100.0 %

Max Pos   100.0 %
0.0...100.0 %

Close Tight   no
no
min
max
min & max

Return

10.2.4 Menu structure 4. SetCalibration

SetCalibration
4

X-DIR: RISE
RISE...FALL

SetpDir: NORMAL
NORMAL
INVERS

Setp Ramp: 0s
0...400 s

Split Start: 0.0 %
0.0...100 %

Split End: 100.0 %
0.0...100 %

Setp Fn: linear
linear
1:25
1:50
free

Setp Fn

Return

W 0%   2.0 %
0.0...100.0 %

W 10%   3.0 %
0.0...100.0 %

W 20%   4.4 %
0.0...100.0 %

W 30%   6.5 %
0.0...100.0 %

W 40%   9.6 %
0.0...100.0 %

W 50%   14.1 %
0.0...100.0 %

W 60%   20.9 %...
0.0...100.0 %

W 70%   30.9 %...
0.0...100.0 %

W 80%   45.7 %...
0.0...100.0 %

W 90%   67.7 %.
0.0...100.0 %

W 100%   100.0 % ...
0.0...100.0 %

Return
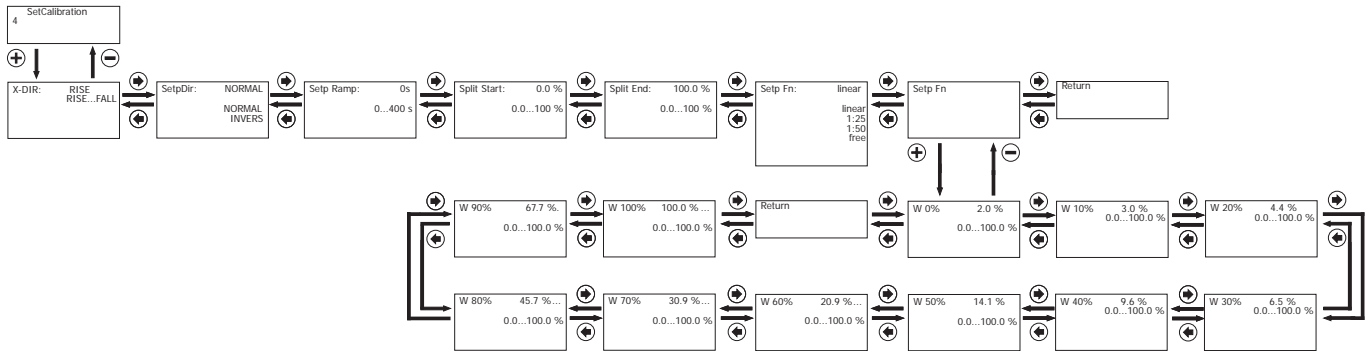
10.2.5 Menu structure 5. Communication

Communication
5

Fieldbus   SETP.ANALOG
SETP.ANALOG
SETP.BUS

Return

Menu structure flowchart with the following elements:

Top row: Service 1 — SetBasics 2 — SetFunction 3 — SetCalibration 4 — Communication 5

Fieldbus SETP.ANALOG / SETP.BUS — Return

X-DIR: RISE / RISE...FALL — SetpDir: NORMAL / NORMAL INVERS — Setp Ramp: 0s (0...400 s) — Split Start: 0.0 % (0.0...100 %) — Split End: 100.0 % (0.0...100 %) — Setp Fn: linear / linear 1:25 1:50 free — Setp Functn — Return

W 90% 67.7 % (0.0...100.0 %) — W 100% 100.0 % (0.0...100.0 %) — Return — Setp Functn — W 0% 2.0 % (0.0...100.0 %) — W 10% 3.0 % (0.0...100.0 %) — W 20% 4.4 % (0.0...100.0 %)

W 80% 45.7 % (0.0...100.0 %) — W 70% 30.9 % (0.0...100.0 %) — W 60% 20.9 % (0.0...100.0 %) — W 50% 14.1 % (0.0...100.0 %) — W 40% 9.6 % (0.0...100.0 %) — W 30% 6.5 % (0.0...100.0 %)

Alarm Fn OFF / OFF min/max min/min max/max — Level Alarm1 10.0 % (0.0...100.0 %) — Level Alarm2 90.0 % (0.0...100.0 %) — Return

Analog Out 0-10V / 0-20mA / 4-20mA — Out min 0.0 % (0.0...100.0 %) — Out max 100.0 % (0.0...100.0 %) — Return

PosCtrl — Dead Band Auto (0.0...10.0 %) — Alarm Output — Error Output — Position Output — CpyParaSet OFF / P1<=W P1=>P2 P1<=P2 P1=>P3 P1<=P3 P1=>P4 P1<=P4 — Return

Error Functn Error / Error+Inactive Range Error+Range Err+Range+Inac — Error Time Auto (0.0...100.0 s) — Error Level Auto (0.0...100.0 %) — Range Functn <4mA or >20mA / < 4mA > 20mA <4mA or > 20mA — Return

Prop Gain 1.0 (0.1...100.0) — Deriv Time 0.1 s (0.01...1 s) — Min Pos 0.0 % (0.0...100.0 %) — Max Pos 100.0 % (0.0...100.0 %) — Close Tight no / no min max min & max — Return

Init All Auto Man ESC

Setpoint: 4-20 mA / 0-20 mA 4-20 mA 0-10 V — Default: Default / Default No Default — Init All — CalPointQty 9 (1...19) — D. Refresh 0.5 s (0.1...1.0 s) — Systemmode CLASIC / ADVANCED

Return — Helptext ON (ON...OFF) — HelpLanguage D (D / GB) — DLightTime 5min (1...60min) — DLight On Key / On Key On

Lower section: I / O Status 1.1 — Login 1.2 — Diagnosis 1.3 — Gemü specific 1.4 — Return 1.5

V: 1.1.1.1 — S/N 743984/ 1 Seriennummer — TAG1 — TAG2 — Return

Error List — hrs. XXXXX:XX:XX — Warnings ON (ON...OFF) — Errors ON (ON...OFF) — Clear Error List OK — Return

Code: 0 Active Level: 3 (0...10000) — Logout? OK — NewCode:1 0 (0...10000) — NewCode:2 0 (0...10000) — NewCode:3 0 (0...10000) — Return

min - Pot - max 0,0 % 100 % — I w: XX.X mA / U w: XX.X V — W. Pos X XX.X % XX.X% — Pot Abs XX.X % — Valve. 1 : 2 : 3 : 4 — Pos Ctrl Out I — Relais K1 : K2 : Err — Return

10.3 Parameter table

Config. level		Display	Function	Value range	Factory setting	read	write
		Mode	Select operating mode	AUTO MAN	AUTO	0	3
1 Service		Submenu for displaying inputs and outputs					
	I / O Status	min-Pot-max	Displays travel sensor position in percent			0	o.r.*
		I w / Uw	Value of set value signal in mA / V			0	o.r.*
		W Pos X	Comparison of set value and valve position			0	o.r.*
		Pot Abs	Travel sensor position			0	o.r.*
		Valve	Displays the current position of the internal pilot valves			0	o.r.*
		Pos Ctrl Out	Deviation between set value and actual value (positioner)			0	o.r.*
		Relais K1:K2:Err	Displays the current position of the internal outputs			0	o.r.*
		Submenu for setting access authorisations					
	Login	Code	Password entry	0...10000	0	0	0
		Logout	Block access	OK		0	0
		New Code: 1	Release the lowest priority	0...10000	0	1	1
		New Code: 2	Release the medium priority	0...10000	0	2	2
		New Code: 3	Release the top priority	0...10000	0	3	3
		Submenu for displaying diagnostic messages					
	Diagnosis	Error List	Displays error messages			0	o.r.*
		hrs	Displays operating hours			0	o.r.*
		Warnings	Display warnings during operation	ON / OFF	ON	0	3
		Errors	Display errors during operation	ON / OFF	ON	0	3
		Clear Error List	Delete error list	OK		0	3
	1435 specific	Submenu for displaying the tool identification					
		Release	Displays current software release		V2.0.0	0	o.r.*
		S/N	Displays current serial number			0	o.r.*
		TAG1	A TAG number can be entered			0	3
		TAG2	A TAG number can be entered			0	3

Config. level		Display	Function	Value range	Factory setting	read	write
2 SetBasics		Setpoint	Type of set value signal	4-20 mA 0-20 mA 0-10 V	4-20 mA	0	3
		Default	Reset to factory settings	Yes / No	Yes	3	3
	Init All	Submenu for carrying out the initialisation					
		GoClose	Scanning the closed position			3	3
		GoOpen	Scanning the open position			3	3
		AdjTime	Scanning the operating times			3	3
		FindCoefficent	Optimization of control characteristics			3	3
		InitPilot	Setting the minimum operating times for internal pilot valves			3	3
		CalPointQty	Quantity of calibration points when initialising	1...19	2	3	3
		D.Refresh	Time for display refresh	0.1...1.0 s	0.5 s	0	1
		Systemmode	Type of operator interface	Classic / Advanced	Classic	0	3
		DLight	Setting the display lighting	OnKey / On	OnKey	0	2
		DLightTime	Time for switching off display lighting during adjustment [OnKey]	1...60 min	5 min	0	2
		HelpLanguage	Text language	D / GB	D	0	1
		HelpText	Display the help text	ON / OFF	ON	0	1

* only readable

Config. level		Display	Function	Value range	Factory setting	read	write
3 SetFunction			Submenu for setting positioner parameters				
	PosCtrl	Prop Gain	P amplification of the positioner	0.1...100.0	X.X	0	3
		Deriv Time	Decay time of the D component of the positioner	0.00...10.00 s	0.1 s	0	3
		MinPos	Seal adjuster = lower position of control range	0...100 %	0.0 %	0	3
		MaxPos	Stroke limiter = upper position of control range	0...100 %	100 %	0	3
		CloseTight	Close tight function	no Min / Max Max Min	no	0	3
		DeadBand	Permissible system deviation	0,0...10 % auto	1,0 %, K-no. 2442: 2,0 %, K-no. 2443: 5,0 %	0	2
	AlarmOutput		Submenu for setting the alarm outputs				
		Alarm Fn	Determines the function of the alarm output	OFF Min / max Min / min Max / max	OFF	0	2
		Level Alarm 1	Switch point of alarm 1	0.0...100.0 %	10.0 %	0	1
		Level Alarm 2	Switch point of alarm 2	0.0...100.0 %	90.0 %	0	1
	Error Output		Submenu for setting the error output				
		Error Functn	Determines the function of the error message output (ERROR)	Error Error+Inactive Range Error+Range Err+Range+Inac	ERROR+ RANGE	0	3
		Error Time	Valve travel time monitoring (Error message output)	AUTO 0.0...100.0 s	AUTO	0	3
		Error Level	Maximum system deviation (Error message output)	AUTO 0.0...100.0 %	AUTO	0	3
		Range Functn	Range monitoring of set value input	< 4 mA > 20 mA < 4 mA or > 20 mA	< 4 mA or > 20 mA	0	3
	Position Output		Submenu for setting the actual value output				
		Analog Out	Determines the function of the actual value output	0-10 V 0-20 mA* 4-20 mA	0-10 V	0	2
		Out min	Valve position on actual value output signal 0 V (0/4 mA*)	0.0...100.0 %	0.0 %	0	2
		Out max	Valve position on actual value output signal 10 V (20 mA*)	0.0...100.0 %	100.0 %	0	2
		CpyParaSet	Copies parameters to various working memories (P1/P2/P3/P4)			3	3

* Only available on version with optional current output

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Config. level	Display	Function	Value range	Factory setting	read	write
4 SetCalibration	X-DIR	Direction of X display and actual value output	RISE FALL	RISE	0	3
	Setp Dir	Direction of set value	NORMAL INVERS	NORMAL	0	3
	Setp Ramp	Ramp function - set value	AUTO 0...400 s	0 s	0	3
	Split Start	Split range (set value range) start	0.0...90 %	0.0 %	0	3
	Split End	Split range (set value range) end	10...100 %	100 %	0	3
	Setp Fn	Defines the function of the control characteristic	Linear / free / 1:25 / 1:50	Linear	0	3
	Setp Functn	Submenu for setting the set value calibration points (only possible at Setp Fn: free)				
	W 0 %		0...100 %	2.0 %	0	3
	W 10 %		0...100 %	3.0 %	0	3
	W 20 %		0...100 %	4.4 %	0	3
	W 30 %		0...100 %	6.5 %	0	3
	W 40 %		0...100 %	9.6 %	0	3
	W 50 %		0...100 %	14.1 %	0	3
	W 60 %		0...100 %	20.9 %	0	3
	W 70 %		0...100 %	30.9 %	0	3
	W 80 %		0...100 %	45.7 %	0	3
	W 90 %		0...100 %	67.6 %	0	3
	W 100 %		0...100 %	100.0 %	0	3

11 Explanation of parameters

11.1 Service

11.1.1 Scanning the input and output signals
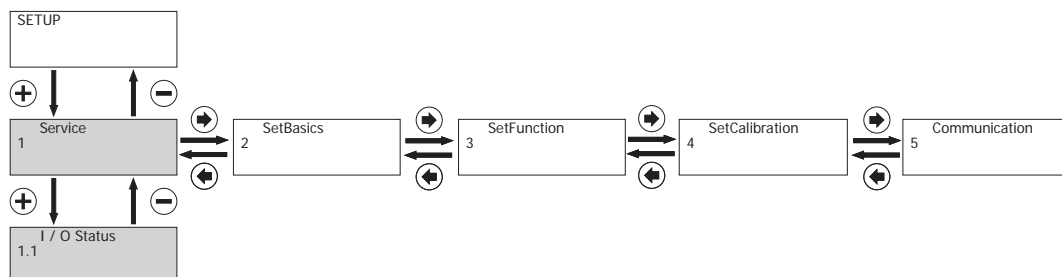
min-Pot-max:
Displays the minimum and maximum travel sensor position in percent. For perfect operation, this value must lie between 2 % and 98 %.

I w / Uw:
Displays the value of the current set value signal in mA (with setting SETPOINT 0-20 mA or 4-20 mA).
Displays the value of the current set value signal in V (with setting SETPOINT 0-10 V).

W Pos X:
Displays the value of the current set value signal compared to the current valve position in %.

Pot Abs:
Displays the current travel sensor position **(Caution, this value may be different to the Pos x value as the valve does not make full use of the full 0-100 % range of the travel sensor)**.

Valve:
Displays the current position of the internal pilot valves (● = valve open).

Pos Ctrl Out:
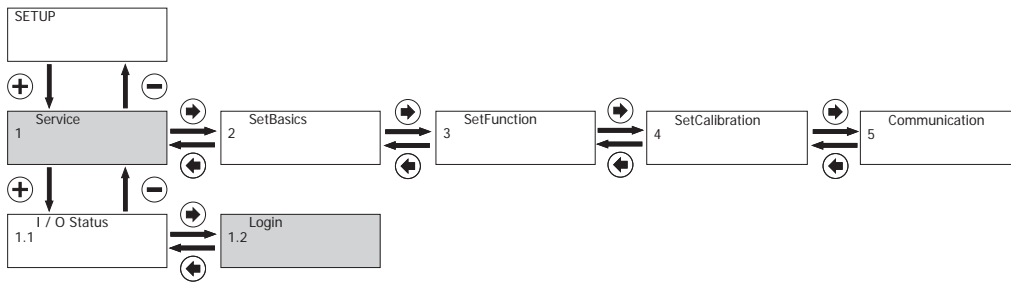Displays the speed with which the valve should be moved.

> ℹ️ If the deviation is too large, this is shown by a dot on the left-hand side or right-hand side of the display. In this case the valve must move at maximum speed.

Relay:
Displays the current position of the internal relays A1, A2 and Error (● = relay switched).

11.1.2 Activating or deactivating the user access

The configuration level of the GEMÜ 1435 ePos is protected in certain areas by various codes against improper changing of parameters.
All menu items are marked by symbols indicating their write and read protection.

Example:

Config. level	Display	Function	Value range	Factory setting	read	write
	Mode	Select operating mode	AUTO MAN	AUTO	0	3
1 Service	New Code: 1	Release the lowest priority	0...10000	0	1	1

The following symbols are used for this purpose:

r0:	no release required for reading
w0:	no release required for writing
r1:	lowest priority release code 1 required for reading
w1:	lowest priority release code 1 required for writing
r2:	medium priority release code 2 required for reading
w2:	medium priority release code 2 required for writing
r3:	top priority release code 3 required for reading
w3:	top priority release code 3 required for writing

The codes can be changed or activated in the following menu:
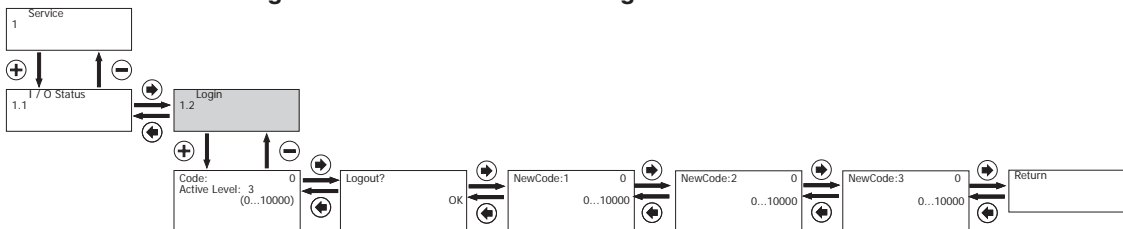
Code:
Enter code for user access. The currently released user level is displayed at Active Level.
Example:
In **Active Level 0** the positioner is disabled in all three user levels.
Only the parameters marked by the symbol **r0w0** can be read and changed.

Logout:
Serves to log out of write protected and read protected areas in the menu. This function disables various menus depending on the user level activated. User level 0 is displayed in parameter **Active Level**..

NewCode1:
Enter the new code for the lowest user level (user level 1) (factory setting 0).

NewCode2:
Enter the new code for the medium user level (user level 2) (factory setting 0).

NewCode3:
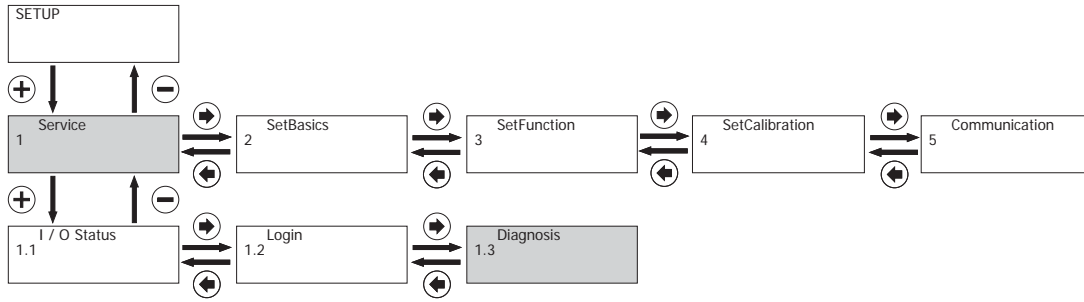Enter the new code for the top user level (user level 3) (factory setting 0).

i	Factory setting 0 means that all three codes are assigned 0. This means that all parameter menus are released.

Example:
If user level 2 is to be disabled, user level 2 and also user level 3 must be assigned a code.

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11.1.3 Reading out, deleting and deactivating error messages

ErrorList:
The positioner stores the last 100 error messages in this menu.
The errors are also stored during operation in the operator interface "ePos".

hrs:
The positioner operating hours are counted here.

Warnings:
The warning messages can be masked or displayed.
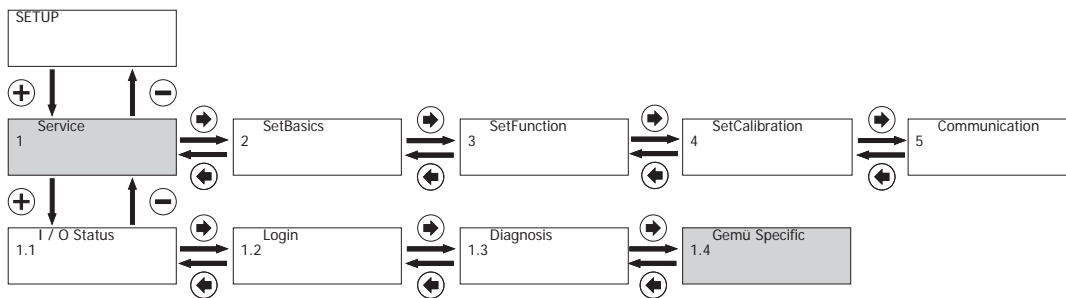The positioner continues normal operation when a warning is given. Messages are stored in **Error List**.

Errors:
Error messages can be masked or displayed.
Messages are stored in **Error List**.

Clear Error List:
Use + to delete the positioner error list.

11.1.4 Display serial number, software version and enter TAG no.

V:X.X.X.X:
Displays the current software release.
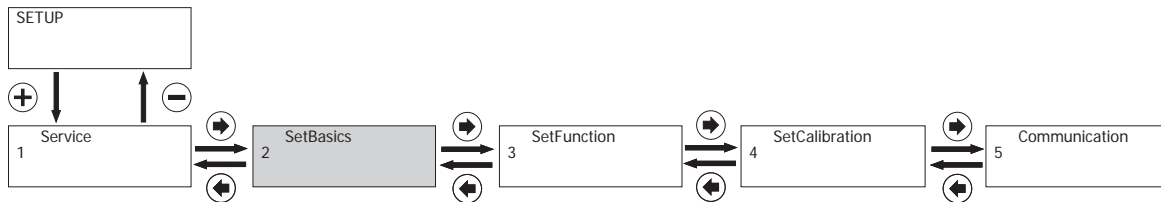
S/N:
Displays the positioner serial number.

TAG1:
An 11-digit TAG number can be entered for identification of the positioner.

TAG2:
An 11-digit TAG number can be entered for identification of the positioner.

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11.2 2 SetBasics

11.2.1 Definition of set value input

Setpoint
Setting the analogue set value input (Voltage: 0-10 V or power: 0/4-20 mA)

11.2.2 Reset

Default
Default setting Return to factory setting and resetting initialisation.
The parameters D.Refresh and the New Code 1-3 are not taken into account.

11.2.3 Initialisation

Init All
Automatic or manual initialisation (adaptation of the positioner to the valve) is started.
The menus for starting automatic or manual initialisation are on the following pages.

Init All = Auto: Automatic initialisation

The positioner adapts to the valve when automatic initialisation is started. All parameters are automatically scanned.
This procedure can take a few minutes, dependent on the valve.

i	It may be necessary to close the internal positioner throttles a little (D1 for single acting actuators and D1, D2 for double acting actuators) if the actuator volume is very low in order to increase the valve operating time.

| i	**Tip for use:** During automatic initialisation of actuators whose travel is not continuous (i.e. with undefined stops, e.g. with large size butterfly valves) the end positions cannot be clearly detected. In this case manual initialisation by the operator with sequential movement through the menu (next page) should be used.
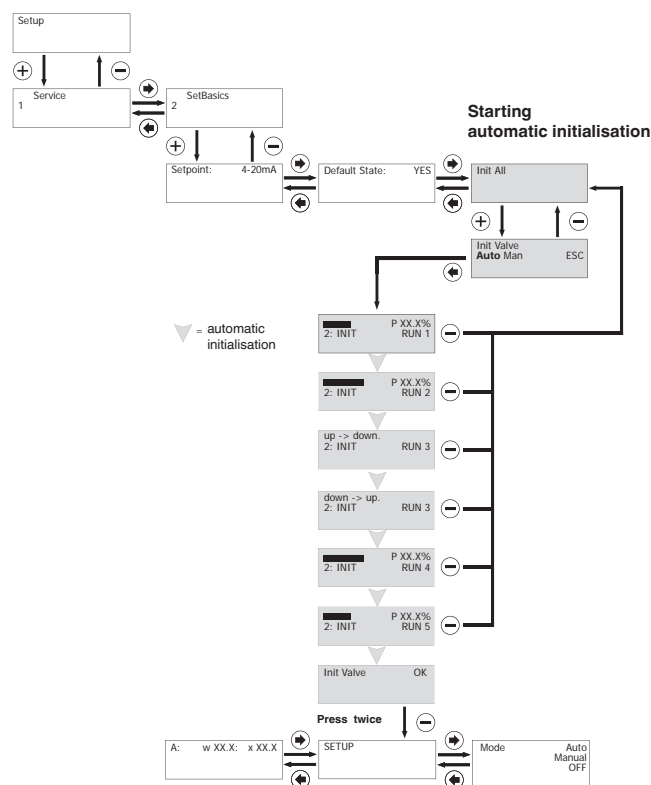
Init All = Man: Manual initialisation

When manual initialisation is started, the positioner runs through an initialisation program that is similar to the automatic initialisation. However the different program steps for the manual initialisation must be started and confirmed by the operator using the + key.

- Manual initialisation should only be used if automatic initialisation does not achieve satisfactory positioning.
- The menu items **goClose** and **goOpen** should be carried out several times for very small valve strokes in order to ensure an optimum adaptation of the positioner to the valve.
- It may be necessary to close the internal positioner throttles a little (D1 for single acting actuators and D1, D2 for double acting actuators) if the actuator volume is very low in order to increase the valve operating time.
- In order to prevent incorrect operation, the parameters from manual initialisation are only accepted when they comply with the requirements for correct function.
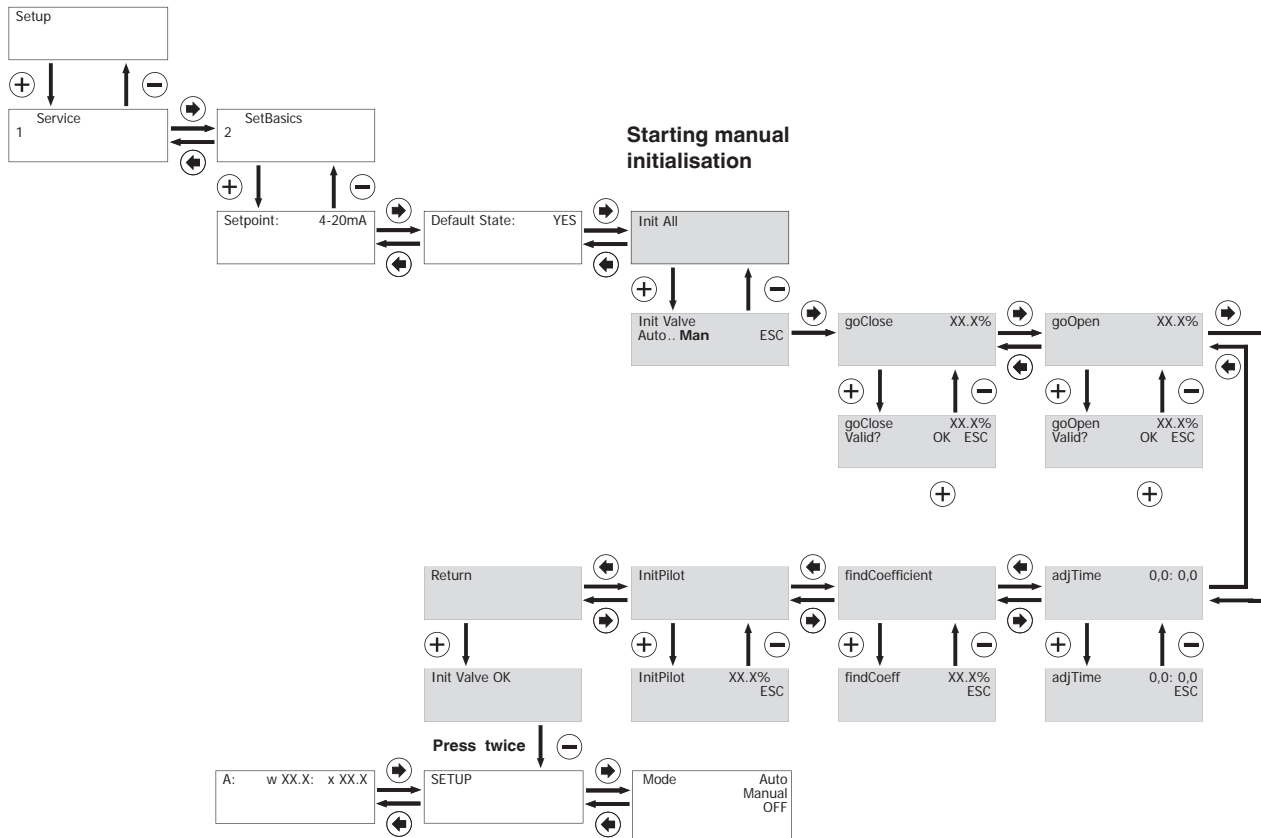
goClose:
The closed valve position is scanned during initialisation.
This function must be confirmed with the + key if initialising manually.

goOpen:
The open valve position is scanned during initialisation.
This function must be confirmed with the + key if initialising manually.

adjTime:
(only displayed when " goOpen" and "goClose" were carried out)
The minimum operating times for the valve are scanned during initialisation.

findCoefficent:
(only displayed if "adjTime" was carried out)
The valve is checked for control features at various positions between the end positions.

InitPilot:
The internal pilot valves are checked.

CalPointQty:
The quantity of calibration points when initialising can be changed.
Example:
QtyCalPoint=9 means: The valve will be examined for control features between the end position stops in 9 positions (10 % steps here).

11.2.4 Making the display settings

D.Refresh:
The time for display refresh can be changed.

System mode:
Selection of operator interface
☐ CLASSIC – menu configuration as described in chapter 7.2 System mode
☐ ADVANCED – menu configuration as described in chapter 7.2 System mode

DLight:
The features of the display lighting can be switched between the following settings:
OnKey – Display lighting is activated by pressing a key. The display lighting remains activated after the last key is pressed for the period set using **DLightTime**.
On – The display lighting is permanently activated.

DLightTime:
Time for automatically switching off display lighting when the parameter **DLight** is set on [OnKey].
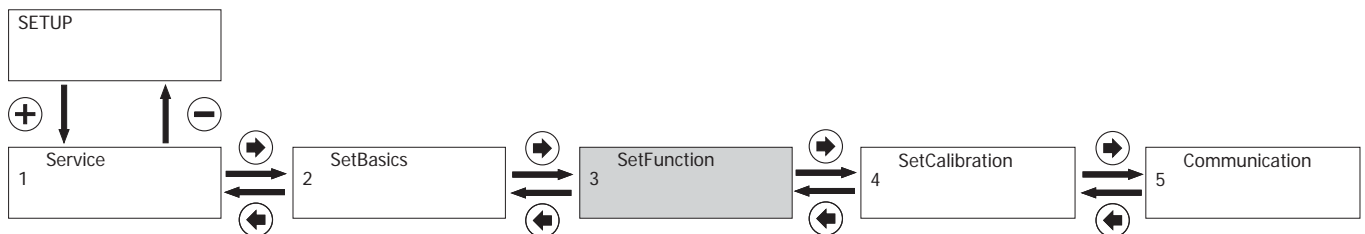
HelpLanguage:
The help text language may be selected between D-German and GB-English.

HelpText:
The help texts that appear as a default in the second line of the display can be masked.
If the help texts are masked, the key assignment is displayed.

11.3 3 SetFunction

11.3.1 Setting the positioner parameters

Prop Gain:
Proportional amplification
Adjusting the proportional amplification Kp
Kp = 0.1...100.0

The height of the amplification should always correspond to the requirements of the valve and the control circuit. The optimum setting is determined during automatic initialization but must be moved out of adjustment later if necessary.
The behaviour of the positioner is influenced as follows:

PROP GAIN	
Set value larger than determined value	**Set value smaller than determined value**
– The positioner controls faster (but tends to oscillate).	– The positioner controls slower.
– The set value is achieved in larger steps by increasing the correcting variable.	– The set value is achieved in smaller steps by decreasing the correcting variable.
– Control is less accurate.	– Control is more accurate.

Deriv Time:
Derivative action time
Adjusting the derivative action time Tv (time by which a specific correcting variable is reached earlier because of the D component than with a pure P-positioner)
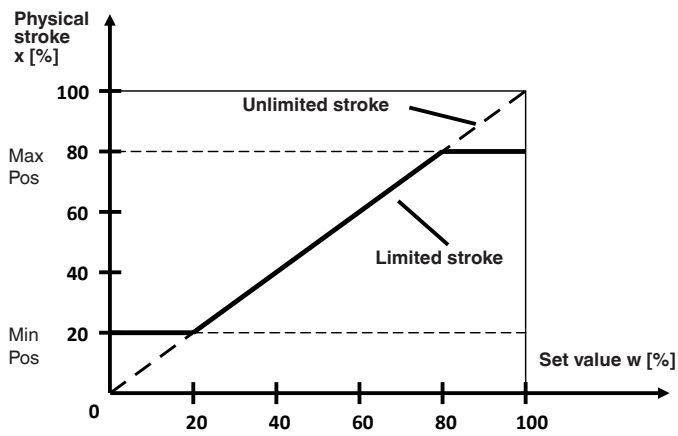Tv = 0.00 s...10.00 s

Min Pos:
Limits the CLOSED position of the valve.
This function is equivalent to a mechanical seal adjuster.

Max Pos:
Limits the OPEN position of the valve.
This function is equivalent to a mechanical stroke limiter.

i	The mechanical regulating distance (from limit stop to limit stop) is limited to the set values with the parameters MIN POS and MAX POS. That way the actuator's mechanical positioning range range can be limited. The parameter setting CLOSETIGHT is higher ranking!

CloseTight:

'Close tight' variables

With this function the valve can be moved into the seat using the maximum possible actuating force (spring force). The close tight function can be activated for one end or both end positions. CLOSE TIGHT becomes effective when the set value falls below 0.5 % or exceeds 99.5 %.

The switch back hysteresis is 1 %.
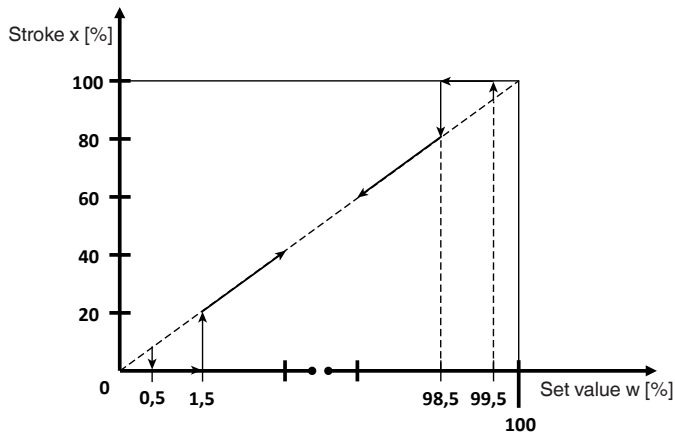
11.3.2   Setting the dead zone

DeadBand:

Positioner's dead band

The dead band shows the maximum permissible system deviation between actual value and set value.

During initialisation, on DeadBand = Auto the dead band is matched to the requirements of the control circuit. In the other discrete settings the fixed value for the dead band is used.

i	The height of the system deviation should always correspond to the requirements of the valve and the control circuit. It is recommended that you do not set a value of < 1.0% since this could (especially for actuators with discontinuous movement profiles) cause oscillating control characteristics. This could put a great deal of stress on the internal pilot valves and cause them to reach the end of their service life more quickly. Basically: the smaller the fixed value, the higher the wear and the shorter the service life. Therefore, the value should be set only as accurate as needed.

11.3.3 Setting alarm output functions and switch points

AlarmOutput:
Submenu for setting the alarm outputs

Alarm Fn:
Activates or deactivates the alarm function.
The reaction of the alarms (limiting contacts) () relates to the POSITION measurement (mechanical distance).

x = current actual value

min/max:

Position	State output A1	State output A2
x < Level Alarm1 < Level Alarm2	24 V	0 V
Level Alarm1 < x < Level Alarm2	0 V	0 V
Level Alarm1 < Level Alarm2 < x	0 V	24 V

min/min:

Position	State output A1	State output A2
x < Level Alarm1 < Level Alarm2	24 V	24 V
Level Alarm1 < x < Level Alarm2	0 V	24 V
Level Alarm1 < Level Alarm2 < x	0 V	0 V

max/max:

Position	State output A1	State output A2
x < Level Alarm1 < Level Alarm2	0 V	0 V
Level Alarm1 < x < Level Alarm2	24 V	0 V
Level Alarm1 < Level Alarm2 < x	24 V	24 V

Level Alarm 1:
Switch point for Alarm 1. When the switch point has been reached, digital output A1 (24 V DC output) is switched.

Level Alarm 2:
Switch point for Alarm 2. When the switch point has been reached, digital output A2 (24 V DC output) is switched.

11.3.4 Setting error output functions

Error Output:
Submenu for setting the error output

Error Functn:
Function of error message output (24 V DC output)

Setting	Error Time	Error Level	Range Functn	Mode [OFF]
ERROR	X	X		
ERROR+ INACTIVE	X	X		X
RANGE			X	
ERROR+RANGE	X	X	X	
ERR+RANGE+INAC	X	X	X	X

Error Time:
Monitoring time for setting the error messages (10 x travel time).
The set value (s) serves as a specified value for the time within which the positioner must have reached the idle state. The associated trigger threshold is specified with parameter ERROR LEVEL.
When the set time has been exceeded the error message output ERR is set at 24 V DC.

Error Level:
Trigger threshold of error message
Here a value (%) can be set for the permissible size of system deviation for triggering the error message.
If parameters ERROR TIME and ERROR LEVEL are both set to "Auto" the error message is set if the slow-travel zone has not been reached within a set time. This time is 10 times the initialisation travel time.

Range Functn:
Range monitoring of the set value signal
Here it is possible to set whether the RANGE error signal is triggered when it falls below 4mA (cable break monitoring) or exceeds 20 mA (short circuit monitoring).

11.3.5   Setting position feedback function and limiting values

Position Output:
Submenu for setting the actual value output

Analog Out:
Determines the function of the actual value output.
0-10 V
0-20 mA (only available on version with optional current output)
4-20 mA (only available on version with optional current output)

Out min:
Defines the valve position at which an output signal of 0 V (0/4 mA) is emitted.

Out max:
Defines the valve position at which an output signal of 10 V (20 mA) is emitted.

11.3.6   Storing parameter sets

CpyParaSet:
The current positioner settings can be copied and read out in different memories.

(P1<=W)   Write from W to P1

(P1=>P2)   Write from P1 to P2

(P1<=P2)   Read from P2 to P1

(P1=>P3)   Write from P1 to P3

(P1<=P3)   Read from P3 to P1

(P1=>P4)   Write from P1 to P4

(P1<=P4)   Read from P4 to P1

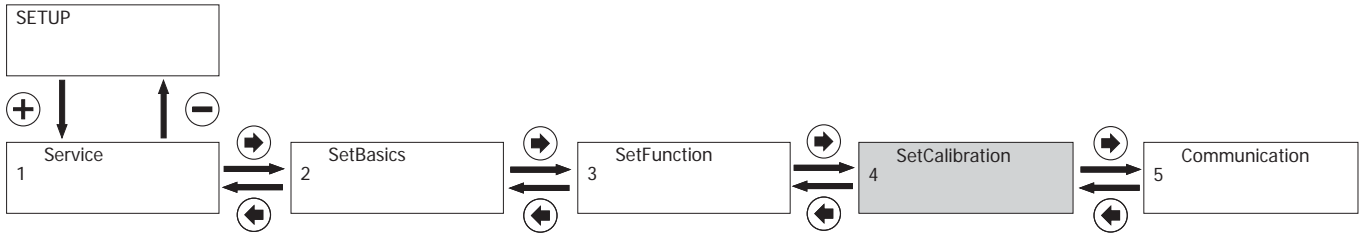(OFF)   Storage function deactivated

P1: Memory 1

P2: Memory 2

P3: Memory 3

P4: Memory 4

W: Factory setting

The GEMÜ 1435 ePos automatically stores all parameters in working memory P1.

11.4 4 SetCalibration

11.4.1 Setting direction of actual value display
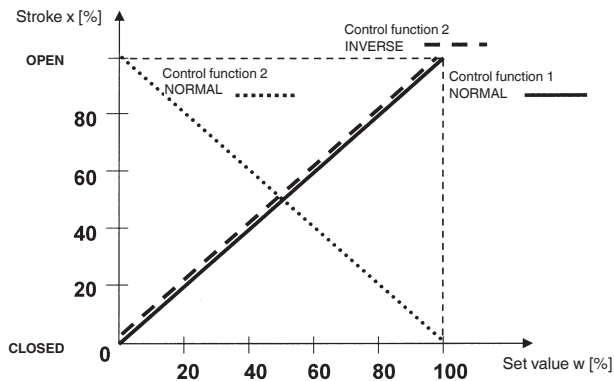
X-DIR:
Correcting variable direction
Here the display direction (rising or falling) and the position feedback can be adjusted.

Pressurization state Outlet A1	X-Direction	Displayed x-value	Allocated actual position x
vented pressurized	RISE	0 % 100 %	0 % 100 %
vented pressurized	FALL	100 % 0 %	100 % 0 %

Setp Dir:0
Set value direction
Setting the set value direction serves to reverse the direction of the set value. It is mainly required for split-range operation and for single acting actuators with the fail safe "OPEN" setting (control function 2).

Setp Ramp:
Set value ramp
The set value ramp is effective during automatic operation and limits the speed of change of the effective set value. When switching over from manual to automatic operation the effective set value is matched to the set value on the unit via the set value ramp.
In the position SETP RAMP = auto the slower of the two travel times which have been established during initialisation is used for the set value ramp.
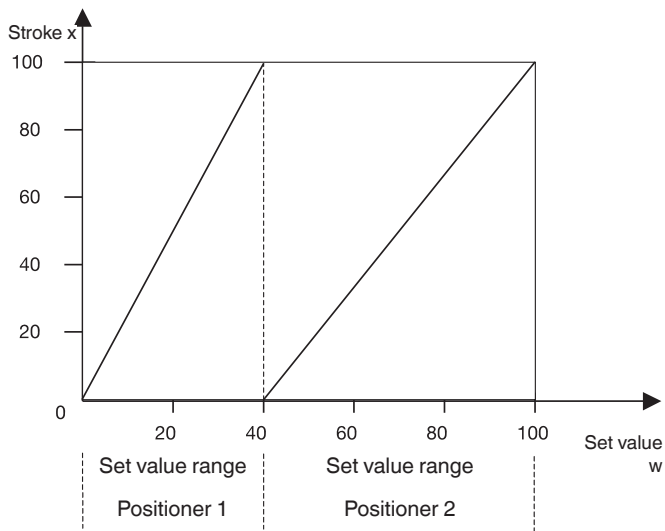
Split Start:
Set value split range start

Split End:
Set value split range end
The parameters SPLIT START and SPLIT END in conjunction with the parameter SETP DIRECTN serve to limit the effective set value range. In this way split range tasks with the curves

☐ rising / falling
☐ falling / rising
☐ falling / falling
☐ rising / rising

are resolved.

Stroke x

100
80
60
40
20
0

20   40   60   80   100   Set value w

Set value range — Positioner 1

Set value range — Positioner 2

ℹ️ **Important:**
The difference between the SPLIT START and SPLIT END values must be > 10 %.

Setp Functn:
Set value function
With this function non-linear valve characteristics can be linearised and with linear valve characteristics any flow characteristics can be reproduced.

Four valve characteristics are stored in the unit:
☐ equal-percentage   1 : 25   (in CLOSED position valve remains 4 % open)
☐ equal-percentage   1 : 50   (in CLOSED position valve remains 2 % open)
☐ linear
☐ free

When free is selected a characteristic with 11 calibration points can be entered.
30: FREE 0 %
.
.
.
40: FREE 100 %

At gaps of 10 % a flow characteristic value can be allocated to the set value calibration point concerned. These points make a traverse with 10 straight lines, which then provides a pattern of the valve characteristic.

ℹ️ **Entering the set value calibration points is only possible at SETP FUNCTN = free.**

Stroke x [%]   **Linear and Equal-Percentage characteristic control curves**

Linear

1:25

1:50

Set value w [%]
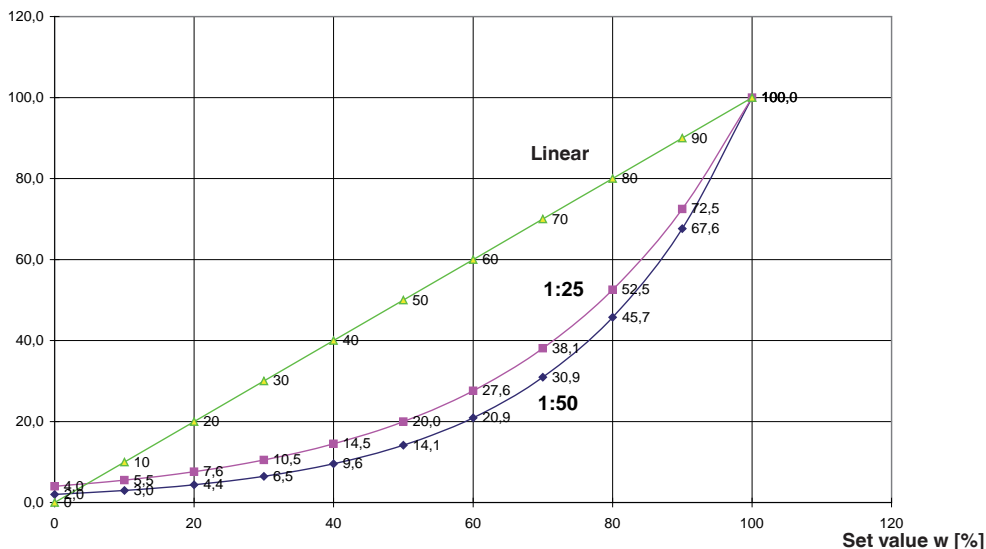
12 Error messages

Error no.	Error	Warn- ing	Error text	Description	Condition for the occurrence of the error	Error clearance
000			NO ERROR	There are no errors		
010		3	Setp.Range	The set value signal is outside the defined range	The positioner is in automatic mode	Check set value signal
022	3		Error Run 1	Actuator's direction cannot be established. Cause: a) No compressed air supply b) Too little control pressure c) Travel sensor wrongly connected d) Valve stroke < 3 mm	The positioner is in automatic initialisation	a,b) Connect compressed air supply (max. 6 bar) and check for correct pneumatic connection. c) Check connection assignment. d) Check valve stroke
023	3		Error Run 2.1	Zero point adjustment could not be carried out. Cause: a) Incorrect travel sensor / mounting kit b) Adjust quarter turn travel sensor	The positioner is in automatic initialisation	Adjust valve manually → display value P must change. In CLOSED position display value P must be > 2.0. a) Check order no. b) Turn quarter turn travel sensor (only on quarter turn actuators) until value P > 2.0
024	3		Error Run 2.2	Zero point adjustment could not be carried out. Cause: a) Incorrect travel sensor / mounting kit b) Adjust quarter turn travel sensor	The positioner is in automatic initialisation	Adjust valve manually → display value P must change. In OPEN position display value P must be < 98.0. a) Check order no. b) Turn quarter turn travel sensor (only on quarter turn actuators) until value P < 98.0
025	3		AD Nozzle (s)	Valve travel time less than 1 second	The positioner is in automatic initialisation	Adjust throttle(s) D1 (on single acting actuators) or D1 and D2 (on double acting actuators) until travel time > 1 second Clockwise = travel time longer Then press arrow key (yellow key)
026	3		Leackage Run 4	Leak in pneumatic system	The positioner is in automatic initialisation	Check external pneumatic connections for leaks (tighten fittings)
040		3	Error Drive	Actuator does not move	The positioner is in automatic or manual mode	a) Check pneumatics b) Check mechanics
041	3		Stroke Error	Actuator does not move	The positioner is in initialisation	a) Check pneumatics b) Check mechanics

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13 Table for changes to the factory settings

Config. level	Display	Function	P1	P2	P3	P4	Factory setting
1 Service	New Code: 1	Release the lowest priority		X	X	X	0
	New Code: 2	Release the medium priority		X	X	X	0
	New Code: 3	Release the top priority		X	X	X	0
	Warnings	Display warnings during operation					ON
	Errors	Display errors during operation					ON

Config. level	Display	Function	P1	P2	P3	P4	Factory setting
2 SetBasics	Setpoint	Type of set value signal					4-20 mA
	D.Refresh	Time for display refresh		X	X	X	0.5 s
	Systemmode	Type of operator interface		X	X	X	Classic
	DLight	Setting the display lighting					OnKey
	DLightTime	Time for switching off display lighting during adjustment [OnKey]					5 min
	HelpLanguage	Text language					D
	HelpText	Display the help text					ON

Config. level	Display	Function	P1	P2	P3	P4	Factory setting
3 SetFunction	Prop Gain	P amplification of the positioner					X.X
	Deriv Time	Decay time of the D component of the positioner					1.00 s
	Min Pos	Seal adjuster = lower position of control range					0.0 %
	Max Pos	Stroke limiter = upper position of control range					100 %
	CloseTight	Lower close tight function					no
	DeadBand	Permissible system deviation					1,0 %, K-no. 2442: 2,0 %, K-no. 2443: 5,0 %
	Alarm Functn	Determines the function of the alarm output					OFF
	Level Alarm 1	Switch point of alarm 1					10.0 %
	Level Alarm 2	Switch point of alarm 2					90.0 %
	Error Functn	Determines the function of the error message output (ERROR)					ERROR + RANGE
	Error Time	Valve travel time monitoring (Error message output)					AUTO
	Error Level	Maximum system deviation (Error message output)					AUTO
	Range Functn	Range monitoring of set value input					< 4 mA or > 20 mA
	Analog Out	Determines the function of the actual value output					0-10 V (4-20 mA)
	Out min	Valve position on actual value output signal 0 V (0/4 mA)					0.0 %
	Out max	Valve position on actual value output signal 10 V (20 mA)					100.0 %

Config. level	Display	Function	P1	P2	P3	P4	Factory setting
4 SetCalibration	X-DIR	Direction of X display and actual value output					RISE
	Setp Dir	Direction of set value					NORMAL
	Setp Ramp	Ramp function - set value					0 s
	Split Start	Split range (set value range) start					0.0 %
	Split End	Split range (set value range) end					100 %
	Setp Functn	Defines the function of the control characteristic					Linear
	W 0 %						2.0
	W 10 %						3.0
	W 20 %						4.4
	W 30 %						6.5
	W 40 %						9.6
	W 50 %						14.1
	W 60 %						20.9
	W 70 %						30.9
	W 80 %						45.7
	W 90 %						67.6
	W 100 %						100

14 Disposal

- All parts must be disposed of according to relevant local or national disposal regulations / environmental protection laws.
- Pay attention to adhered residual material and gas diffusion from penetrated media.

15 Returns

- Clean the positioner.
- Request a goods return declaration form from GEMÜ.
- Returns must be made with a completed declaration of return.

If not completed, GEMÜ cannot process
✗ credits or
✗ repair work
but will dispose of the goods at the operator's expense.

☞ **Note for returns:**
Legal regulations for the protection of the environment and personnel require that the completed and signed goods return declaration is included with the dispatch documents. Returned goods can be processed only when this declaration is completed.

16 Information

☞ **Note on staff training:**
Please contact us at the address on the last page for staff training information.

Should there be any doubts or misunderstandings in the preceding text, the German version of this document is the authoritative document!

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1435 ePos

17 Technical data

General information

Protection class to EN 60529	IP 65
Dimensions L x W x H	160 x 90 x 84 mm
Weight	1.6 kg
Mounting position	Optional

Directives

EMC directive	2014/30/EU

Particulars
- Fail safe function in case of compressed air or power supply failure (see data sheet page 11)
- For control function 2 (NO function) please order throttle 1435DR_Z.

Electrical data

Power supply

Power supply	24 V DC -5/+10 %
Power consumption	≤ 4.2 W (when idle)
Standard ≤ 6.5 W	
(Control operation, single acting 50 l/min)	
≤ 9.8 W	
(Control operation double/single acting 90 l/min)	
Option with heating element	≤ 25 W
Duty cycle	continuous duty
Reverse battery protection	yes
System deviation	1 % (factory setting)
	≥ 0,1 % (can be set)
	≤ 2,0 % (factory setting, K-no. 2442)
	≤ 5,0 % (factory setting, K-no. 2443)

Analogue input 0/4-20 mA

Set value	0/4-20 mA
Accuracy / Linearity	≤ ±0.3 % of full flow
Input type	passive
Input resistance	50 Ω
Resolution	12 bit
Reverse battery protection	yes

Analogue input 0-10 V

Set value	0-10 V
Accuracy / Linearity	≤ ±0.3 % of full flow
Input type	passive
Input resistance	100 Ω
Resolution	12 bit
Reverse battery protection	yes

Analogue output 0-10 V

Actual value output	0-10 V
Accuracy	≤ ±1 % of full flow
Output type	active
On-load current	max. 10 mA
Resolution	12 bit
Short-circuit proof	yes

Analogue output 0/4-20 mA (optional)

Actual value output	0/4-20 mA
Accuracy	≤ ±1 % of full flow
Output type	active
Load resistor	max. 600 Ω
Resolution	12 bit
Short-circuit proof	yes

Digital outputs

Switching outputs	Alarm output 1,
	Alarm output 2,
	Error message output
Type of contact	PNP
Pull-down resistance	120 kΩ
Switching voltage	Power supply
On-load current	max. 0.5A
Short-circuit proof	yes

Electrical connections
Standard

Power supply	M16 cable entry
Input signal	M16 cable entry
Travel sensor	M12 cable entry
Recommended diameter of connection cable	5 - 10 mm
Terminals	Wago 236
Cross section of wire	0.5...2.5 mm²
	AWG 20...12

Optional

Power supply, alarm outputs	M12 plug, 5-pin
Input/output signals	M12 plug, 5-pin
Travel sensor	M12 socket, 5-pin

Travel sensor

Linear design

Mounting	Remote
Stroke	0-30 / 0-50 / 0-75 mm
Permissible minimum stroke	3.0 / 5.0 / 7.5 mm
Resistance R	3.0 / 5.0 / 5.0 kΩ
Connection	Pre-fitted cable (max. 20 m)

Quarter turn design

Mounting	Remote
Angle of rotation	0-93°
Resistance R	3 kΩ
Connection	Pre-fitted cable (max. 20 m)

Main functions

Control function	· Normally closed
	· Normally open
	· Double acting

- Automatic initialisation of actuator and positioner
- Position standardization Min. Position
- Position standardization Max. Position
- Close tight function at MIN/MAX POSITION
- Linearization function for set value -> Position (linear, 1:25, 1:50, freely programmable)
- Definition of programmable characteristic curve via 11 calibration points

For details see parameter table of operating instructions

Option with heating element

Temperature	≤ 5 °C	Heating active
	≥ 15 °C	Heating inactive

Operating conditions

Ambient temperature	0 to 60 °C
	-20 to 60 °C with heating element
Storage temperature	0 to 60 °C
Control medium*	Quality classes to DIN ISO 8573-1
Dust content	Class 3
	(max. particle size 5 µm)
	(max. particle density 5 mg/m³)
Pressure dew point	Class 4
	(max. pressure dew point 3 °C)
Oil concentration	Class 3
	(max. oil concentration 1 mg/m³)
Air supply	0 - 6 bar
Air output	50, 90 Nl/min,
	depending on type (P_Z = 6 bar)
Air consumption (when idle)	0 Nl/min

Materials

Housing	Aluminium, epoxy coated
Display cover	PMMA
Keypad cover	PMMA
Travel sensor	Anod. alu. } Linear design
	PEEK
	PAI } Quarter turn design
	NBR

Note

Filter strainers are installed in the pneumatic connectors of the positioner to protect against rough dirt particles. They can be ordered as spare parts with order number 1435 SFI. Each kit contains 3 filter strainers. These filter strainers are meant as an additional protection and do not replace the requirement to filter all site compressed air.

18 Order data

Fieldbus	Code
Without	000

Accessory	Code
Accessory	Z

Action	Code
Single acting	1
Double acting	3

Explosion-proof class	Code
Without explosion-proof rating	0

Option	Code
Without	0
Electrical connections M12 5-pin	1*
4-20 mA actual value output	2
4-20 mA actual value output Electrical connections M12 5-pin	3*
4-20 mA actual value output and heating element	4
Electrical connections M12 5-pin and heating element	5*
Heating element	6
4-20 mA actual value output Electrical connections M12 5-pin and heating element	7*
* For versions with M12 connections, suitable cable sockets/plugs are supplied	

Version	Code
Electro-pneumatic, 50 l/min	01
Electro-pneumatic, 90 l/min only for action code 1 (single acting)	02

Order example	1435	000	Z	1	0	0	01
Type	1435						
Fieldbus (code)		000					
Accessory (code)			Z				
Action (code)				1			
Explosion-proof class (code)					0		
Option (code)						0	
Version (code)							01

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1435 ePos

Required parts for direct mounting

Linear actuators
GEMÜ 1435... (positioner)
GEMÜ 1445 000 Z... (mounting kit)

Quarter turn actuators
GEMÜ 1435... (positioner)
GEMÜ 1445 PTAZ... (mounting kit)

Note: Mounting kit 1445 000 Z... (plastic spindle, spring, threaded adapter if applicable) depends on the valve type. Please order separately specifying valve type, DN and control function.

Mounting kit for direct mounting - Linear actuators

Direct mounting: with mounting bracket
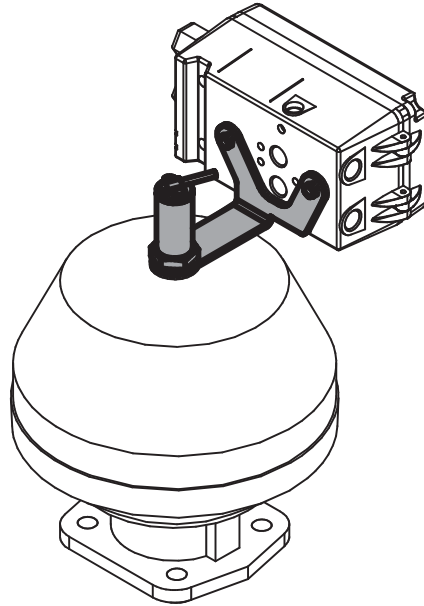
GEMÜ 1445 000 Z 10

Order data - Mounting kit for direct mounting - Linear actuators

Order example	1445	000	Z	10
Type	1445			
Field bus (code)		000		
Accessory (code)			Z	
Mounting kit (code)				10

Note: The mounting kit 1445 000 Z... includes the travel sensor and the mounting parts.

Mounting kits for direct mounting - Quarter turn actuators

GEMÜ 1445 PTAZ ...000...
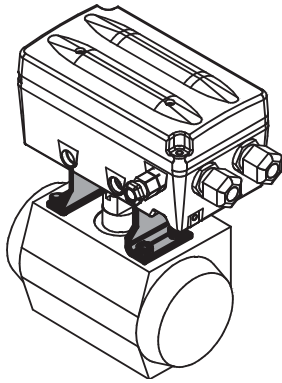
Mounting:
Mounting bracket
Control air connector code 000
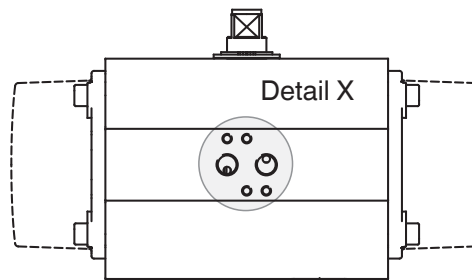
GEMÜ 1445 PTAZ ...V...

4 / (2)*

2 / (4)*
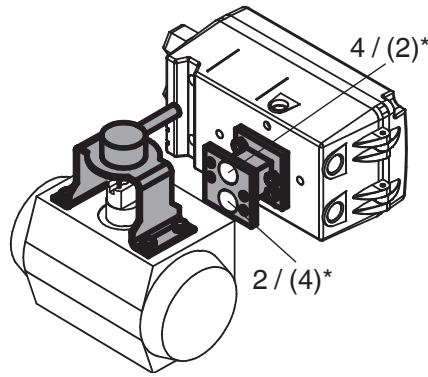
Mounting:
NAMUR adapter V
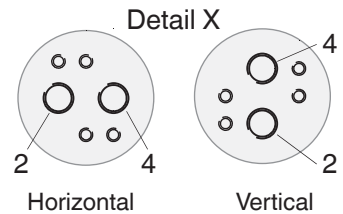Control air connector code -V-

GEMÜ 1445 PTAZ ...H...

4 / (2)*

2 / (4)*
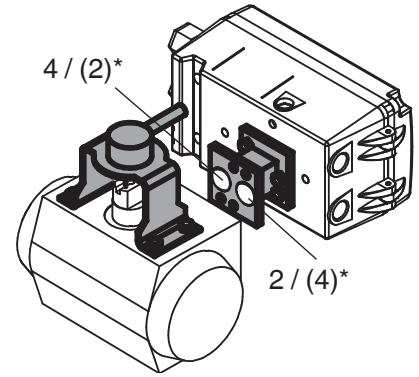
Mounting:
NAMUR adapter H
Control air connector code -H-

Please note the connection of the acuator

Detail X

Connection

Detail X

4

2   4

2

Horizontal

Vertical

Order data - Mounting kits for direct mounting - Quarter turn actuators

Mounting kit	Code
Mounting kit - quarter turn actuators	PTAZ

NAMUR size	Code
Hole spacing 50x25, shaft height 15	00
Hole spacing 80x30, shaft height 20	01
Hole spacing 80x30, shaft height 30	02
Hole spacing 130x30, shaft height 30	03
Hole spacing 130x30, shaft height 50	04

Measuring range	Code
Angle of rotation 90°	090

Control air connector (NAMUR)	Code
Without	000
Control air connector G 1/8 and G 1/4, Horizontal connection pattern	4HL
Control air connector G 1/8 and G 1/4, Vertical connection pattern	4VB
Control air connector G 1/8 and G 1/4, Vertical connection pattern	4VT*
Control air connector G 1/8 and G 1/4, Horizontal connection pattern	4HR*
Control air connector G 3/8 and G 1/2, Horizontal connection pattern	BHL
Control air connector G 3/8 and G 1/2, Vertical connection pattern	BVB
Control air connector G 3/8 and G 1/2, Vertical connection pattern	BVT*
* Control direction reversed	

Order example	1445	PTAZ	00	090	000
Type	1445				
Mounting kit (code)		PTAZ			
NAMUR size (code)			00		
Measuring range (code)				090	
Control air connector (code)					000

Note: The mounting kit 1445 PTAZ... includes the travel sensor and the mounting parts.

Required parts for remote mounting

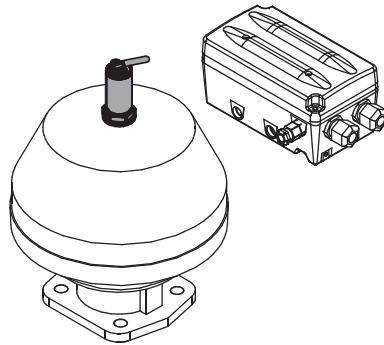| Linear actuators |
|---|
| GEMÜ 1435... (positioner) |
| GEMÜ 4232... (travel sensor) |
| GEMÜ 4232 S01 Z... (travel sensor mounting kit) |
| GEMÜ 1445 000 Z MP (mounting bracket) |

Quarter turn actuators
GEMÜ 1435... (positioner)
GEMÜ 4231... (travel sensor)
GEMÜ 4231 PTAZ... (travel sensor mounting kit)
GEMÜ 1445 000 Z MP (mounting bracket)

Note: Mounting kit 4231 PTAZ.../4232 S01 Z... (threaded adapter if applicable, ...) depends on the valve type. Please order separately specifying valve type, DN and control function.

Mounting kit for remote mounting - Linear actuators

GEMÜ 4232 (travel sensor)
GEMÜ 4232 S01 (travel sensor mounting kit)

Order data - Travel sensor (linear actuators)

Field bus	Code
Without	000

Accessory	Code
Accessory	Z

Housing material	Code
PP coated	05
Aluminium, black anodized	14
PVDF coated (suitable for High Purity)	20

Travel	Code
Potentiometer, 30 mm length	030
Potentiometer, 50 mm length	050
Potentiometer, 75 mm length	075

Cable length	Code
Length 2.0 m	02M0
Length 5.0 m	05M0
Others on request	

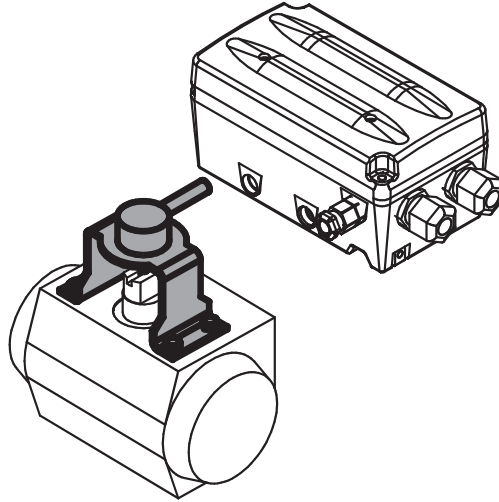| Cable connection	Code
Open wires with multicore cable ends	0000
M12 cable plug, straight, 5-pin, plastic	4001*
* required for positioner version with M12 5-pin electrical connections	

Order example	4232	000	Z	14	030	05M0	0000
Type	4232						
Field bus (code)		000					
Accessory (code)			Z				
Housing material (code)				14			
Travel (code)					030		
Cable length (code)						05M0	
Cable connection (code)							0000

Note: Mounting kit 4232 S01 Z... (plastic spindle, spring, threaded adapter if applicable) for travel sensor 4232 depends on the valve type. Please order separately specifying valve type, DN and control function.

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Mounting kit for remote mounting - Quarter turn actuators

GEMÜ 4231 (travel sensor)
GEMÜ 4231 PTAZ (travel sensor mounting kit)

Order data - Travel sensor (quarter turn actuators)

Field bus	Code
Without	000

Accessory	Code
Accessory	Z

Housing material	Code
PAI	XF

Travel	Code
Potentiometer, 90°	090

Cable length	Code
Length 2.0 m	02M0
Length 5.0 m	05M0
Others on request	

Cable connection	Code
Open wires with multicore cable ends	0000
M12 cable plug, straight, 5-pin, plastic	4001*

* required for positioner version with M12 5-pin electrical connections

Order example	4231	000	Z	XF	090	05M0	0000
Type	4231						
Field bus (code)		000					
Accessory (code)			Z				
Housing material (code)				XF			
Travel (code)					090		
Cable length (code)						05M0	
Cable connection (code)							0000

Note: Mounting kit 4231 PTAZ... (distance piece, mounting bracket) depends on the valve type. Please order separately specifying valve type, DN and control function.

Order data - Mounting kit for travel sensor - Quarter turn actuators

Mounting kit	Code
Mounting kit for quarter turn actuators	PTAZ

Measuring range	Code
Angle of rotation 90°	090

NAMUR size	Code
Hole spacing 80x30, shaft height 20	01
Hole spacing 80x30, shaft height 30	02
Hole spacing 130x30, shaft height 30	03
Hole spacing 130x30, shaft height 50	04

Control air connector	Code
Without	000

Order example	4231	PTAZ	01	090	000
Type	4231				
Mounting kit (code)		PTAZ			
NAMUR size (code)			01		
Measuring range (code)				090	
Control air connector (code)					000

19 Fail safe function

Fail safe function		
Error	Outlet A1	Outlet A2
Electrical power supply failure	Single acting: vented Double acting: vented	Single acting: non existent Double acting: pressurized
Pneumatic supply failure	Single acting: vented Double acting: undefined, dependent on the operating conditions of the actuator	Single acting: non existent Double acting: undefined, dependent on the operating conditions of the actuator

This fail safe function is not a substitute for specific plant safety requirements

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EU Declaration of Conformity

Hereby we,   **GEMÜ Gebr. Müller Apparatebau GmbH & Co. KG**
Fritz-Müller-Straße 6-8
D-74653 Ingelfingen

declare that the product listed below complies with the following directive:

- EMC Directive 2014/30/EU

Product: GEMÜ 1435

Joachim Brien
Head of Technical Department

Ingelfingen-Criesbach, September 2016

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