

Construction

The GEMÜ 1436 cPos® is a digital electro-pneumatic positioner with an optional integrated process controller for the control of liquids, gases and steam in conjunction with pneumatically operated process valves.

The positioner exactly adjusts the stroke of the process valve.

When using the optional process controller the signals from a process sensor (e.g. flow, level, pressure, temperature) are detected and the media adjusted according to the specified set value. The membrane keypad and backlit display are arranged at the front of the housing. Pneumatic and electrical connections are at the rear. Integrated pneumatic throttles allow regulation of the control air to adapt the controller to different valve actuators and actuating speeds.

Features

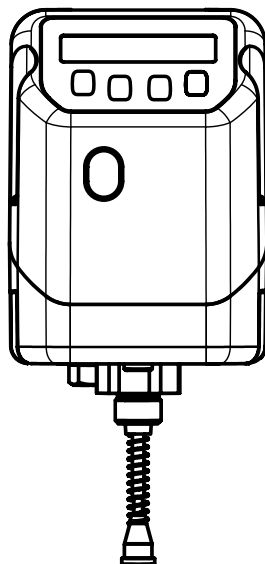
- Can be used for single or double acting linear or quarter turn actuators
- Multiple point calibration for optimum valve adaption
- Positioner and process controller are precisely synchronised with each other
- Parameterisation during operation
- Optimised initialisation and valve control (speed^{AP} function)
- Direct or remote positioner mounting to the process valve

Advantages

- Digital inputs (option) for variable function control for automation
- Fieldbus interfaces e.g. Profibus DP, DeviceNet (option)
- No air consumption when idle
- Simple mounting to various valve actuators
- Access rights via different user levels
- Integrated Web browser capability
- Simple commissioning and versatile operating facilities
 - fascia keys
 - PC connection with Internet Browser MS® Internet Explorer
- e.sv-com interface for connecting an industrial modem
- Optional Bluetooth module



Front view



Technical data

General information

Protection class to EN 60529	IP 65
Weight	approx. 600 g
Dimensions L x W x H	See dimensional drawing
Mounting position	Optional
Directives	
Low voltage directive	2006/95/CE
EMC directive	2004/108/CE
Standards	
Interference emission	DIN EN 61000-6-4 (09/2011) DIN EN 61326-1(industry) (10/2006)
Interference resistance	DIN EN 61000-6-2 (03/2006) DIN EN 61326-1(industry) (10/2006)

Particulars

Fail safe function in case of compressed air or power supply failure (see table on page 11)

Operating conditions

Ambient temperature	0 ... +60 °C
Storage temperature	0 ... +60 °C
Control medium	Quality classes to DIN ISO 8573-1: 2010
Dust content	≤ 10 mg/m ³ /particle size ≤ 40 µm (class 7)
Pressure dew point	≤ +3 °C (class 4)
Oil concentration	≤ 5 mg/m ³ (class 4)
Air supply	1.5 ... 7 bar
Air consumption	0 l/min (when idle)
Air output	150 / 200 / 300 l/min depending on version

Materials

Housing cover	PSU
Housing base	PP 30

Travel sensor integrated in directly mounted version

Linear version	
Stroke	0-30 / 0-50 / 0-75 mm
Resistance R	3 / 5 / 5 kΩ
Minimum stroke	≤ 8% of the travel length
Quarter turn design	
Angle of rotation	0 - 93°
Resistance R	3 kΩ

Electrical data

Power supply	
Power supply	U _v = 24 V DC +10 % / -5 %
Duty cycle	continuous duty
Reverse battery protection	yes
Current consumption	for flow rate code 01, 02 I _{typ} = 140 mA (@ 24 V DC) for flow rate code 03 I _{typ} = 175 mA (@ 24 V DC)

Input signals

Analogue inputs	
Set value / actual value	0/4 - 20 mA (selectable)
Input resistance	120 Ω (for device version code PA01)
Accuracy / Linearity	±0.3 % of full flow
Temperature drift	±0.3 % of full flow
Resolution	12 bit
Reverse battery protection	yes
Overload proof	yes (up to ± 24 V DC)

Travel sensor input*

External travel sensor input 0...10 V DC
(for travel length code S01)

Supply voltage output	UP+ typ. 10 V DC
Short-circuit proof:	yes
Resistance range ext. potentiometer	1...10 kΩ
Input voltage range	0... UP+
Accuracy / Linearity	± 0.3 % of full flow
Temperature drift	± 0.3 % of full flow
Resolution	12 bit
Overload proof	yes (up to ± 24 V DC)

* Travel sensor input galvanically isolated from supply voltage, not galvanically isolated from the set value/actual value inputs and actual value output.

Digital inputs

Function	selectable via software (DigIn 1; DigIn2; DigInW; DigInX) (Reference: GND X1:3)
Voltage	24 V DC
Logic level "1"	>14 V DC
Logic level "0"	< 8 V DC
Input current	typ. 2.5 mA DC (at 24 V DC)

Output signals

Analogue outputs

Actual value	4...20 mA
Output type	active
Accuracy	± 1 % of full flow
Temperature drift	±0.5 % of full flow
Load resistor	600 Ω
Resolution	12 bit
Overload proof	yes (up to ± 24 V DC)
Short-circuit proof	yes

Digital outputs

Switching output K1/K2	selectable via software
Type of contact	PNP
Switching voltage	Power supply
Switching current	0.5A
Drop voltage	max. 2.5 V DC at 0.5 A
Overload proof	yes (up to ± 24 V DC)
Short-circuit proof	yes
Pull down resistance	120 kΩ

Technical data

Controller data

Positioner

System deviation	≥ 0.1% (adjustable)
PD parameters	adjustable
Initialisation	automatic or manual

Process controller

Controller type	continuous controller
PID parameters	adjustable

Parameterisation

can be connected (version PA 01)
at the device: Menu selection
context sensitive or help texts
at the PC: Internet MS® Internet Explorer

Operating and display elements

Text display	Alphanumeric, 2-line display with 16 digits each with background light
LED front, top	Status, for Profibus-DP and DeviceNet option
LED front, bottom	Status, for Bluetooth option
Keys	4 membrane protected fascia keys

Interfaces

RS232	Parameterisation via web browser
Profibus DP	Parameterisation / process data
Transmission rates	9.6k / 19.2k / 45.45k / 93.75k / 500k 1.5M / 3M / 6 M / 12 M Baud
DeviceNet	Parameterisation / process data
Transmission rates	125k / 250k / 500k Baud
Bluetooth	Parameterisation via web browser

Functions

- Positioner + process controller combined and synchronized with each other
- Automatic or manual optimizing initialisation
- Multiple point calibration for optimized valve control
- Diagnostics, alarm messages
- Operation possible when controller is active
- 3 parameter sets can be saved and reloaded
- 3 user levels (access authorization)
- Operating hours counter, event list (for details see operating instructions)
- Digital inputs (option) for variable function control for automation

Order data - Positioner

Fieldbus	Code
Without	000
DeviceNet	DN
Profibus-DP	DP

Action	Code
Single acting	1
Double acting	3

Device version	Code
Position controller	SA01
Position + process controller	PA01

Options	Code
Without	00
2 additional digital inputs 24 V DC not possible with Profibus DP and DeviceNet version	01
Bluetooth interface integrated	02
2 additional digital inputs 24 V DC Bluetooth interface integrated not possible with Profibus DP and DeviceNet version	03

Flow rate	Code
Q = 150 l/min	01
Q = 200 l/min	02
Q = 300 l/min (only single acting)	03

Travel length	Code
Potentiometer, 30 mm length	030
Potentiometer, 50 mm length	050
Potentiometer, 75 mm length	075
Rotary potentiometer, 90°	090
For external potentiometer, M 12 connector, 5-pin	S01
Note: The required travel length depends on the max. stroke of the process valve and must be selected accordingly.	

Order example	1436	000	Z	1	SA01	00	01	030
Type	1436							
Fieldbus (code)		000						
Accessory			Z					
Action (code)				1				
Device version (code)					SA01			
Options (code)						00		
Flow rate (code)							01	
Travel length (code)								030

Required parts for direct mounting

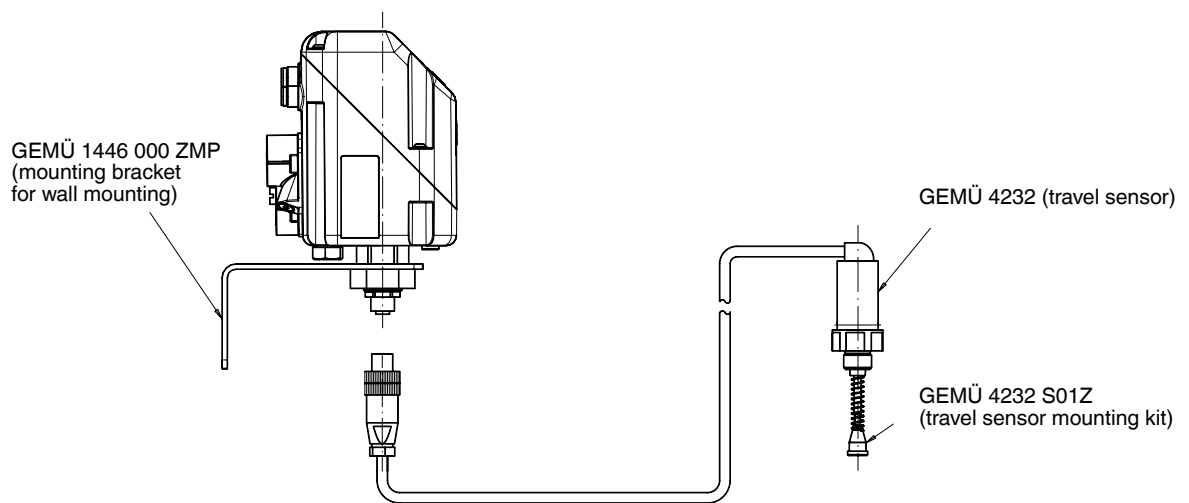
Linear actuators
GEMÜ 1436...030/050/075 (positioner)
GEMÜ 1436 S01 Z... (mounting kit)
GEMÜ 1436 S02 Z... (connection kit)

Quarter turn actuators
GEMÜ 1436...090 (positioner)
GEMÜ 1436 PTAZ... (mounting kit)
GEMÜ 1436 S02 Z... (connection kit)

Note: Mounting kit 1436 S01 Z... / 1436 PTAZ... (plastic spindle, spring, threaded adapter if applicable) depends on the valve type.
 Please order separately specifying valve type, DN and control function.
 Connection kit 1436 S02 Z... (connector plug). Please order separately!

Mounting kits for linear actuators

Remote mounting



Required parts for remote mounting to linear actuators

GEMÜ 1436...S01 (positioner)
GEMÜ 4232...4001 (travel sensor)
GEMÜ 4232 S01 Z... (travel sensor mounting kit)
GEMÜ 1446 000 ZMP (mounting bracket for wall mounting)
GEMÜ 1436 S02 Z... (electrical connection kit)

Order data - Travel sensor (linear actuator)

Housing material	Code	Cable length	Code
PP coated	05	Length 2.0 m	02M0
Aluminium, black anodized	14	Length 5.0 m	05M0
PVDF coated (suitable for High Purity)	20	Others on request	

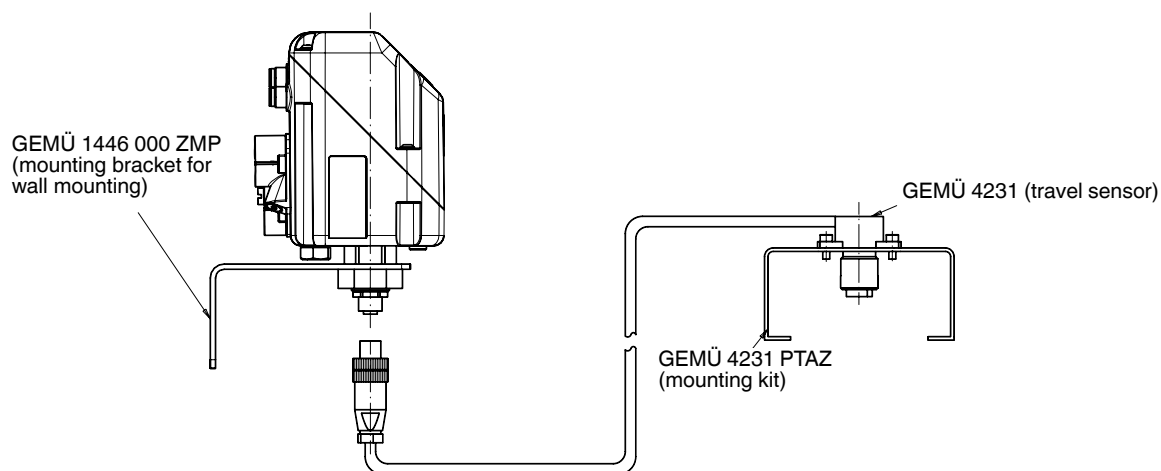
Travel length	Code	Cable connection	Code
Potentiometer, 30 mm length	030	M12 cable plug, straight, 5-pin, plastic	4001
Potentiometer, 50 mm length	050		
Potentiometer, 75 mm length	075		

Order example	4232	000	Z	14	030	05M0	4001
Type	4232						
Fieldbus		000					
Accessory			Z				
Housing material (code)				14			
Travel length (code)					030		
Cable length (code)						05M0	
Cable connection (code)							4001

Note: Mounting kit 4232 S01 Z... (distance piece, mounting bracket) depends on the valve type.
Please order separately specifying valve type, DN and control function.

Mounting kits for quarter turn actuators

Remote mounting



Required parts for remote mounting to quarter turn actuators

GEMÜ 1436...S01 (positioner)
GEMÜ 4231...4001 (travel sensor)
GEMÜ 4231 PTAZ... (travel sensor mounting kit)
GEMÜ 1446 000 ZMP (mounting bracket for wall mounting)
GEMÜ 1436 S02 Z... (electrical connection kit)

Order data - Travel sensor (quarter turn actuator)

Housing material	Code
PAI	XF

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

Travel length	Code
Potentiometer, 90°	090

Cable connection	Code
M12 cable plug, straight, 5-pin, plastic	4001

Order example	4231	000	Z	XF	090	05M0	4001
Type	4231						
Fieldbus		000					
Accessory			Z				
Housing material (code)				XF			
Travel length (code)					090		
Cable length (code)						05M0	
Cable connection (code)							4001

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 - Travel sensor mounting kit

Mounting kit	Code
Mounting kit for quarter turn actuators	PTAZ

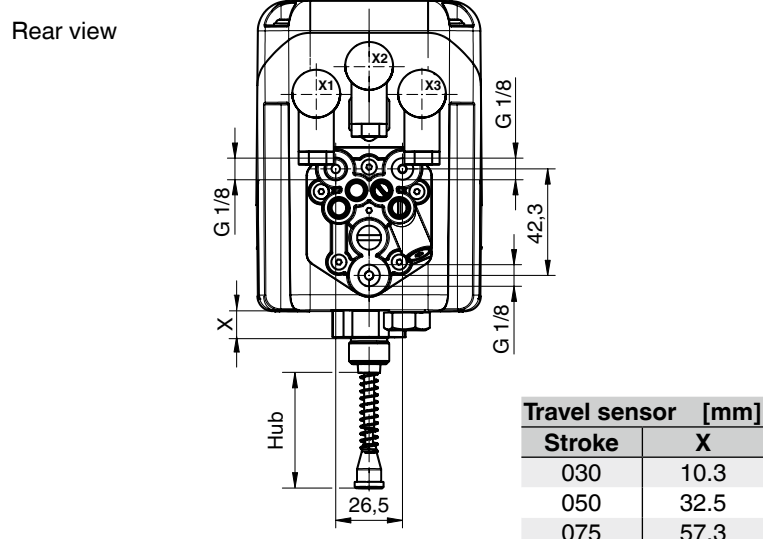
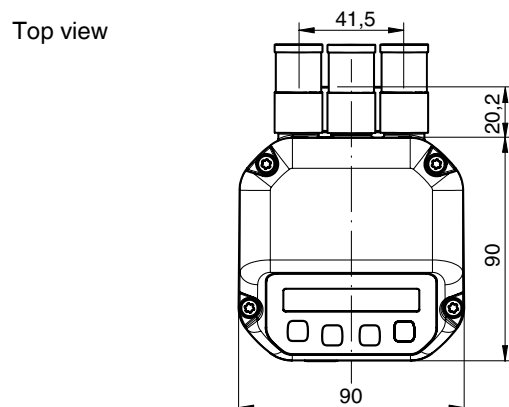
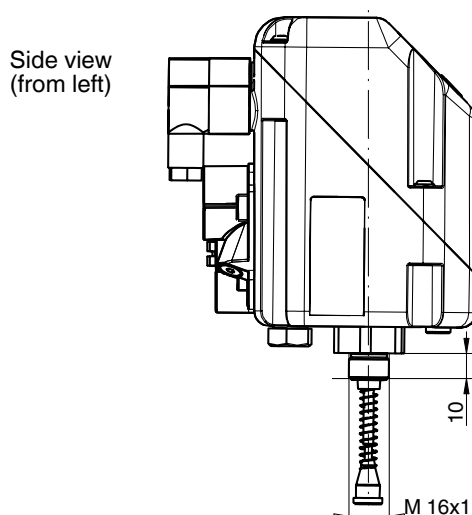
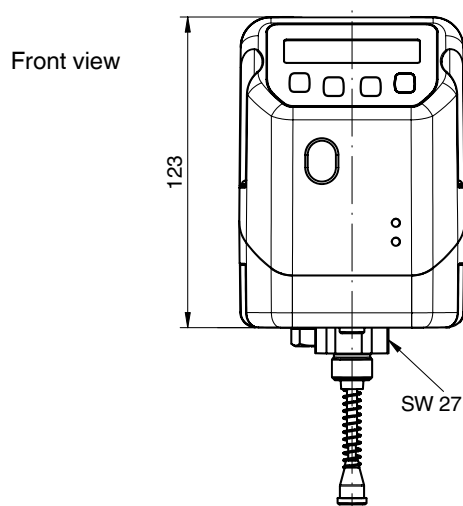
Measuring range	Code
Angle of rotation 90°	090

NAMUR size	Code
Hole spacing 80x30, shaft height 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

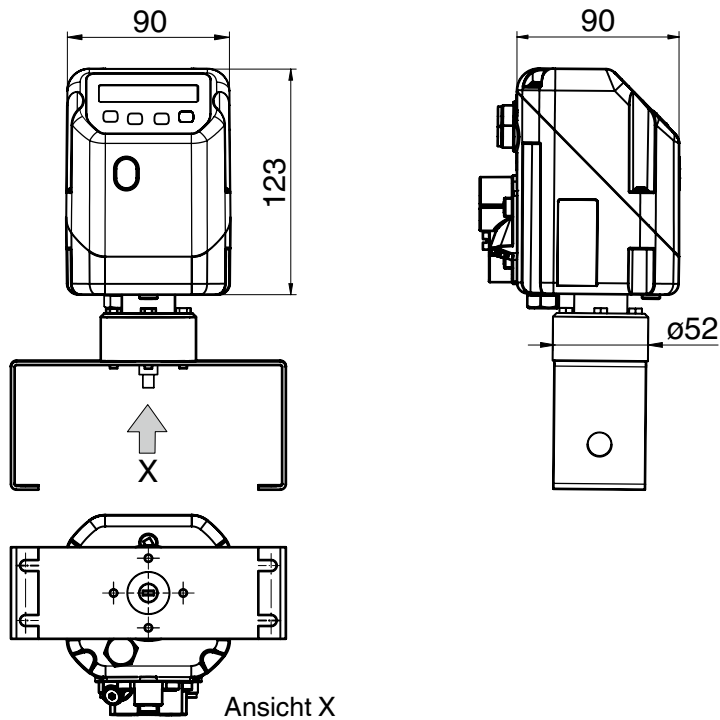
Control air connector	Code
Without	000

Order example	4231	PTAZ	00	090	000
Type	4231				
Mounting kit (code)		PTAZ			
NAMUR size (code)			00		
Measuring range (code)				090	
Control air connector (code)					000

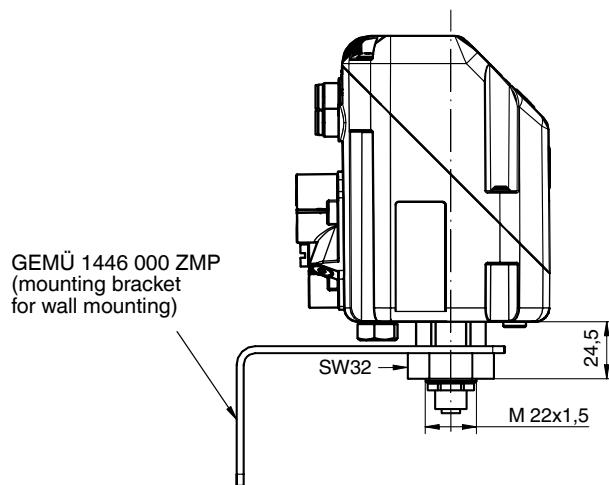
Positioner dimensions [mm]



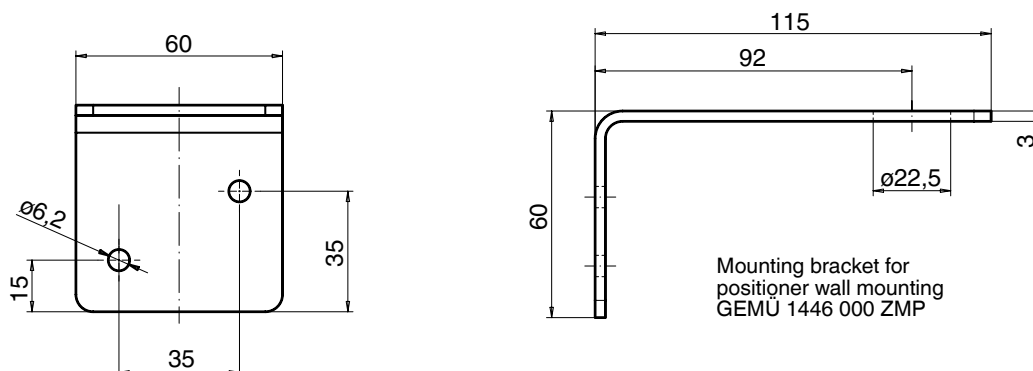
Dimensions - Positioner for quarter turn actuators [mm]



Dimensions - Positioner for remote mounting [mm]

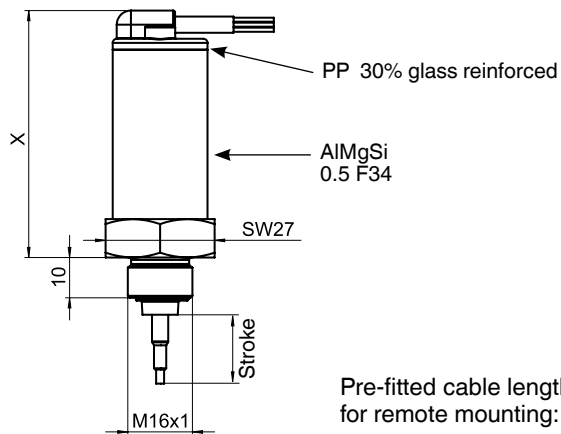


Accessories for remote mounting, mounting bracket [mm]



Materials and dimensions - Travel sensor GEMÜ 4232 for linear actuators, remote mounting [mm]

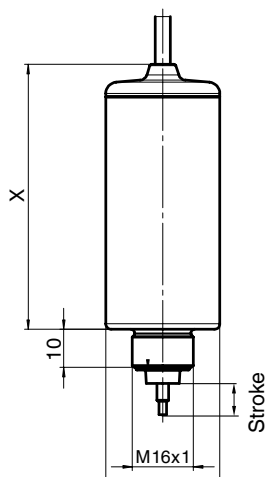
Material version - Aluminium



Pre-fitted cable lengths
for remote mounting: 2m, 5m up to max. 20m

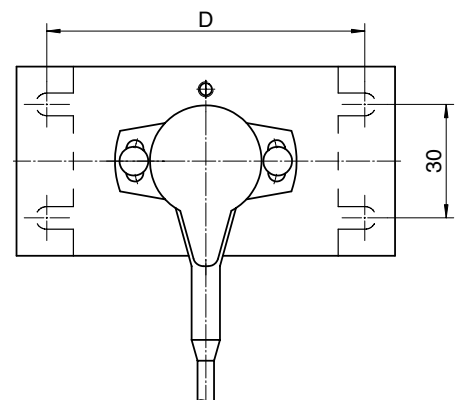
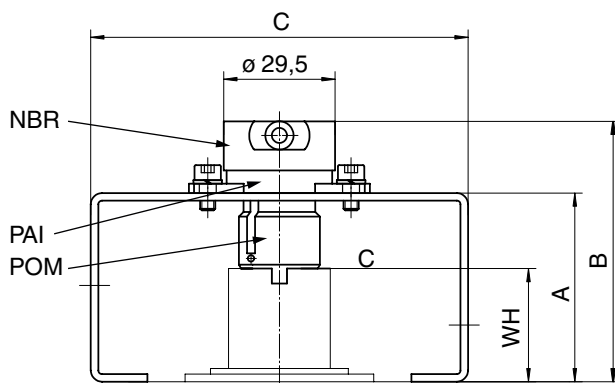
Travel sensor	
Stroke	X
30	62.2
50	84.2
75	109.2

Material version - PVDF or PP



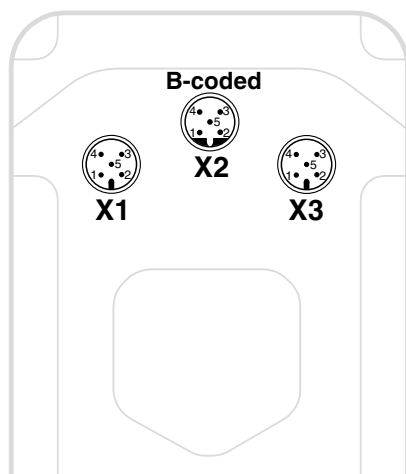
Travel sensor	
Stroke	X
30	69.6
50	91.6
75	116.6

Materials and dimensions - Rotary travel sensor GEMÜ 4231 incl. bracket, remote mounting [mm]



Shaft height WH	Hole spacing D	A	B	C
20	80	40	59	100
30	80	50	69	100
50	130	70	89	150

Electrical connection - Standard version (Code 000)



Connection	Pin	Signal name
X1 A-coded M12 plug	1	Uv, 24VDC supply voltage
	2	Switching output K1 (switches Uv*)
	3	GND, (supply voltage, DigIn1+2+W +X; K1+2)
	4	Switching output K2 (switches Uv*)
	5	Digital input 1 (optional**)

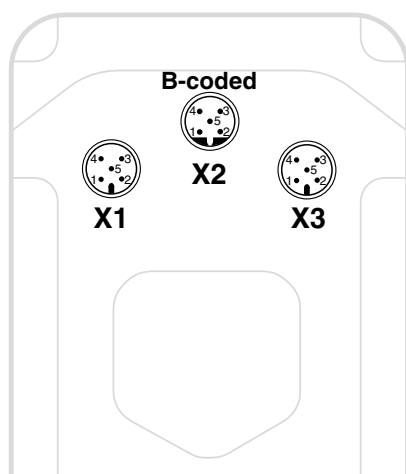
Connection	Pin	Signal name
X2 B-coded M12 plug	1	I+, actual value output
	2	I-, actual value output
	3	RxD, RS 232
	4	TxD, RS232
	5	GND, RS232

Connection	Pin	Signal name
X3 A-coded M12 plug	1	W+, set value input
	2	W-, set value input / Digital In W**
	3	X+, process actual value input
	4	X-, process actual value input / Digital In X**
	5	Digital input 2 (optional**)

* Switching output switches device supply voltage Uv - drop voltage

** For options code 01 and 03

DeviceNet (Code DN)

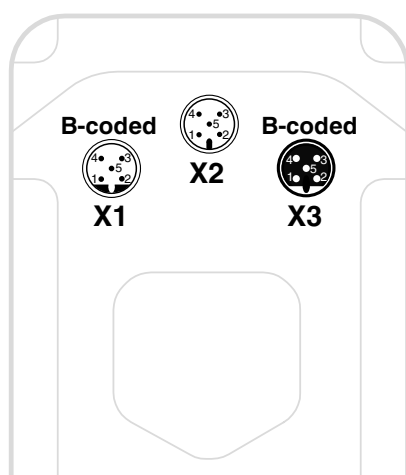


Connection	Pin	Signal name
X1 A-coded M12 plug	1	Uv, 24 V DC supply voltage
	2	n. c.
	3	GND, (supply voltage, DigIn1 + 2; K1 + 2)
	4	n. c.
	5	n. c.

Connection	Pin	Signal name
X2 B-coded M12 plug	1	n. c.
	2	n. c.
	3	n. c.
	4	n. c.
	5	n. c.

Connection	Pin	Signal name
X3 A-coded M12 plug	1	Shield
	2	V+
	3	V-
	4	Can H
	5	Can L

Fieldbus Profibus DP (Code DP)



Connection	Pin	Signal name
X1 B-coded M12 plug	1	n. c.
	2	PB-
	3	n. c.
	4	PB+
	5	n. c.

Connection	Pin	Signal name
X2 A-coded M12 plug	1	Uv, 24 V DC supply voltage
	2	n. c.
	3	GND, (supply voltage, DigIn1 + 2; K1 + 2)
	4	n. c.
	5	n. c.

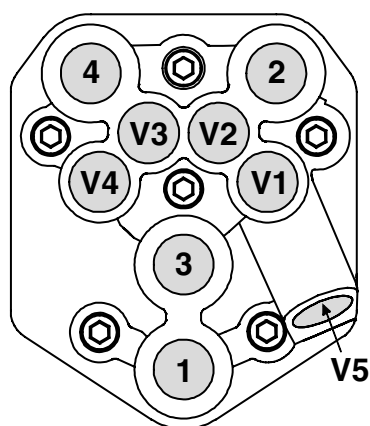
Connection	Pin	Signal name
X3 B-coded M12 socket	1	PB_5V
	2	PB+
	3	PB_GND
	4	n. c.
	5	n. c.

Version with external actual value potentiometer (Code S01) for DeviceNet and Profibus DP



Connection	Pin	Signal name
X4 A-coded M12 socket	1	UP+, output potentiometer supply voltage (+)
	2	UP, input potentiometer wiper voltage
	3	UP-, output potentiometer supply voltage (-)
	4	n. c.
	5	n. c.

Pneumatic connection



Connection	DIN ISO 1219-1	Designation	Size
P	1	Air supply connection	G1/8
R	3	Venting connection with silencer	G1/8
V1	V1	Supply air throttle for A1	-
V2	V2	Exhaust air throttle for A1	-
V3	V3	Exhaust air throttle for A2*	-
V4	V4	Supply air throttle for A2*	-
V5	V5	Check valve	-
A1	2	Working connection for process valve	G1/8
A2	4	Working connection for process valve	G1/8

* only double acting type (code 3)

Fail safe function

No.	Error	Outlet A1	Outlet A2
1	Power supply failure	Single acting: vented Double acting: vented	Single acting: non existent Double acting: pressurized
2	Compressed air supply failure	Single acting: vented Double acting: not defined	Single acting: non existent Double acting: closed

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

Adjustable safety reactions

No.	Error	Outlet A1	Outlet A2
1	Set value < 4.0 mA (Range adjustable from 0...22 mA under I Min W)	Single acting: adjustable function Double acting: adjustable function (open, close, hold)	Single acting: - Double acting: adjustable function (open, close, hold)
2	Set value > 20.0 mA (Range adjustable from 0...22 mA under I Max W)		
3	Actual value < 4.0 mA (Range adjustable from 0...22 mA under I Min X)		
4	Actual value > 20.0 mA (Range adjustable from 0...22 mA under I Max X)		

No. 3 and 4 only available for device version code PA01

Order data - Connection kit

Fieldbus	Code
Connection kit	S02

Accessory	Code
Accessory	Z

Connections X1* and X3*, A-coded	Code
Without connector socket, with M12 protection cap	0000
M12 socket, A-coded, angle, without cable, screw terminal	00M0
M12 socket, A-coded, angle, with 5 m PUR cable, 0.34 mm ²	05M0
M12 socket, A-coded, angle, with 10 m PUR cable, 0.34 mm ²	10M0
M12 socket, B-coded, angle, can be shielded, M12 plug, B-coded, angle, can be shielded, for Profibus DP (only connection X2, B-coded DPM0 available)	DPM0

Connection X2**, B-coded	Code
Without connector socket, with M12 protection cap	0000
M12 socket, B-coded, angle, without cable, screw terminal	00M0
Y cable + 1 x M12 socket, B-coded, angle without cable, screw terminal	00Y0
Y cable + M12 socket, B-coded, angle, with 5 m PUR cable, 0.34 mm ² 5 m Sub-D connecting cable	05Y0
Y cable + M12 socket, B-coded, angle, with 10 m PUR cable, 0.34 mm ² 10 m Sub-D connecting cable	10Y0
M12 socket, A-coded, angle, can be shielded, without cable for Profibus DP (only connection X1/X3, A-coded DPM0 available)	DPM0

* X1 and X3 with Profibus DP version: B-coded

** X2 with Profibus DP version: A-coded

Order example	1436	S02	Z	00M0	00M0
Type	1436				
Fieldbus (code)		S02			
Accessory (code)			Z		
Connections X1* and X3*, A-coded (code)				00M0	
Connection X2**, B-coded (code)					00M0