

Intelligent Positioner

and integrated process controller

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.

A membrane key-pad and backlit display are on the front of the housing whilst pneumatic and electrical connections are on the rear. Integrated pneumatic throttles enable the control air to be regulated in a way that the positioner can be set to suit different valve actuators and operating times.

Features

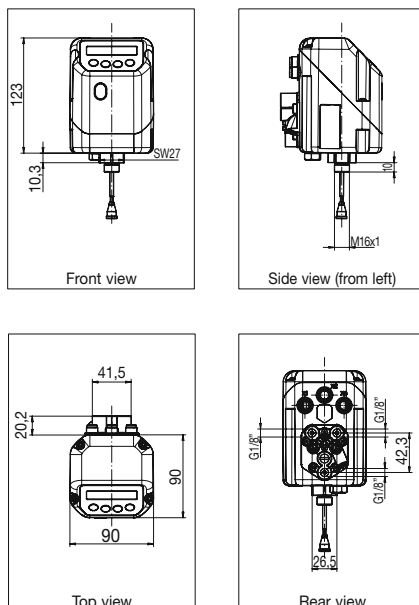
- For use with single and double acting linear and quarter turn actuators
- Multi point calibration for optimum valve adaptation
- Process and position controller are synchronized with each other
- Parameterisation during operation
- Optimized initialisation and valve control
- Choice of direct mounting to process valve or remote mounting

Advantages

- No air consumption when idle
- Simple mounting to various valve actuators
- Access rights via different user levels
- Integrated webserver
 - fascia buttons
 - PC connection with Internet browser
 - Field bus interfaces e.g. Profibus DP



Positioner dimensions - Linear actuators (mm)



For connection legend see last page

Technical data

General information

Protection class to EN 60529	IP 65
Weight	approx. 600 g
Dimensions L x W x H	see page 1
Mounting position	optional
Special feature	Safety function during air or power supply failure (see table on last page)

Directives

EC low voltage directive	73/23/EEC
EMC directive	89/336/EEC
Emission of interference	EN 50081-1
Immunity to interference	EN 61000-6-2

Electrical data

Power supply

Power supply	$U_V = 24 \text{ V DC} \pm 10\%$
Power consumption	for flow rate code 01 $I_{typ} = 100 \text{ mA} (@ 24 \text{ V DC})$ for flow rate code 02 $I_{typ} = 140 \text{ mA} (@ 24 \text{ V DC})$

Input signals

Analogue inputs

Set value	0/4 - 20 mA (selectable)
Actual value, external	0/4 - 20 mA (selectable) (for device version code PA01)
External travel sensor	$R_G 1 - 10 \text{ k}\Omega$ (for travel length code S01)

Digital inputs

Function	selectable (ON, OFF, safety position, loading of parameter set)
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Integrated digital inputs 2 inputs (use of analogue inputs 1)

Voltage	$U_{rated} = 24 \text{ V DC}$
Level "Logical1"	$14 \text{ V DC} \leq U_H \leq 28 \text{ V DC}$
Level "Logical0"	$0 \text{ V DC} \leq U_L \leq 8 \text{ V DC}$
Input current	$I_{typ} = 18 \text{ mA} (@ 24 \text{ V DC})$

Optional digital inputs	2 inputs
Voltage	$U_{rated} = 24 \text{ V DC}$
Level "Logical1"	$14 \text{ V DC} \leq U_H \leq 28 \text{ V DC}$
Level "Logical0"	$0 \text{ V DC} \leq U_L \leq 8 \text{ V DC}$
Input current	$I_{typ} = 2.5 \text{ mA} (@ 24 \text{ V DC})$

Output signals

Analogue outputs

Actual value position feedback	4 - 20 mA
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Digital outputs

Number	2 relay outputs
Switching voltage	$\hat{=} U_V$
Switching current	$\leq 0.5 \text{ A}$
Function	selectable (position, set values, actual value)

Electrical connection

Voltage + input/output signals	3 x M12 plug, 5-pin (see connection set page 7)
Travel sensor connection	1 x M12 socket, 5-pin (for travel length code S01)

Travel sensor integrated in directly mounted version

Linear version

Stroke	0-30 / 0-50 / 0-75 mm
Resistance R	3 / 5 / 5 k Ω
Minimum stroke	$\leq 8\%$ of the travel length

Quarter turn version

Angle of rotation	0-93°
Resistance R	3 k Ω

Controller information

Positioner

Deviation	$\geq 0.1\%$ (adjustable)
P D parameters	adjustable
Initialisation	automatic or manual

Process controller

Type of controller	can be connected (with device version PA 01) continuous controller
PID parameters	adjustable

Parameterization

at the device: menu selection
context sensitive or help texts
at the PC: Internet Browser

Operating and display elements

Text display	2-line display with 16 digits each background light
LED	Profibus status (only with field bus option code DP)
Buttons	4 fascia membrane protected buttons

Interfaces

PC Interface	RS 232 with PPP protocol for Internet Browser
IR Interface	Communication in preparation
Field bus	Profibus DP V1 Profibus Interface - certified

Operating conditions

Ambient temperature	0 to +60°C
Storage temperature	0 to +60°C
Air supply	1.5 to 7 bar
Control medium	air or inert gases, filtered 50 μm , lubricated or unlubricated
Air consumption (when idle)	0 l/min
Air output	100 l/min / 180 l/min depending on version

Functions

Positioner + process controller combined and synchronized with each other
Automatic or manual optimizing initialisation
Multiple point calibration for optimized valve control
Diagnosis, 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)

Materials

Housing cover	PSU
Housing base	PP 30

) Analogue inputs can be used as digital inputs by external wiring with a resistor according to the operating instructions and software function.

Order data

Field bus		Options	
	Code		Code
Without field bus	000	Without options	00
Profibus-DP	DP	2 additional digital inputs 24 V DC not possible with Profibus DP version	01
		Further accessories upon request	

Action		Flow rate	
	Code		Code
Single acting	1	Q = 100 l/min	01
Double acting	3	Q = 180 l/min (only single acting)	02

Device version		Travel length	
	Code		Code
Position controller	SA01	Potentiometer, 30 mm length	030
Position + process controller	PA01	Potentiometer, 50 mm length	050
		Potentiometer, 75 mm length	075
		Rotary potentiometer, 90°	090
		For external potentiometer, M12 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							
Field bus		000						
Accessories			Z					
Action (code)				1				
Device version (code)					SA01			
Options (code)						00		
Flow rate (code)							01	
Travel length (code)								030

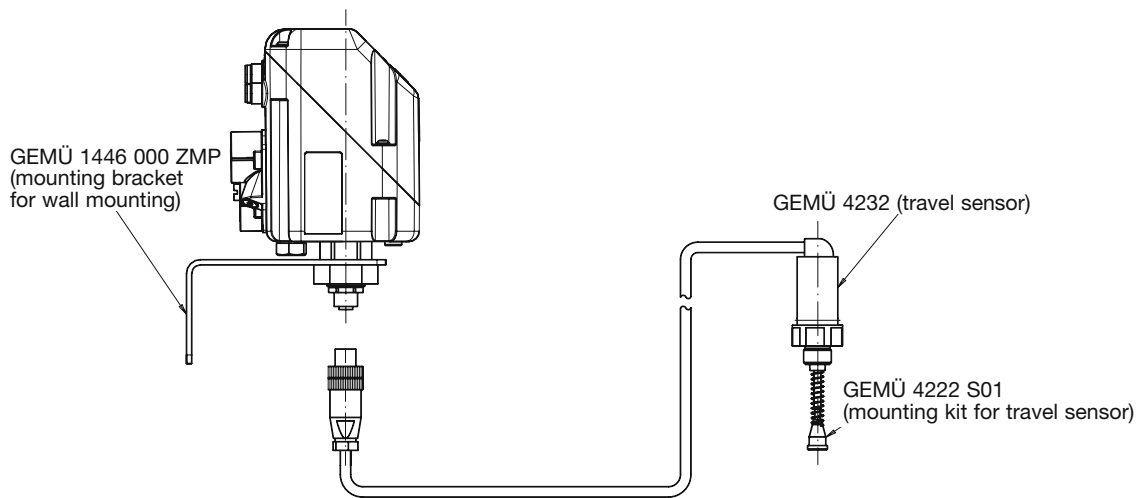
Parts required for direct mounting

Linear actuators	Quarter turn actuators
GEMÜ 1436...030/050/075 (positioner)	GEMÜ 1436...090 (positioner)
GEMÜ 4222 S01Z... (mounting kit for travel sensor)	GEMÜ 4231 S01Z... (mounting kit for travel sensor)
GEMÜ 1440...(air connections)	GEMÜ 1440...(air connections)
GEMÜ 1219 S01Z...(electrical connection set)	GEMÜ 1219 S01Z...(electrical connection set)

Note: Mounting kit 4222S01Z... / 4231S01Z... (plastic spindle, spring, threaded adapter, if applicable) depends on the valve type. Please order separately specifying valve type, DN and control function. Please order air connections 1440 (fittings for 6 mm tube) if required, (double acting = 2x). Connection set 1219S01Z... (connector plug). **Please order separately!**

Mounting kits for linear actuators

External mounting



Parts required for external mounting to linear actuators

- GEMÜ 1436...S01 (positioner)
- GEMÜ 4232...4001 (travel sensor)
- GEMÜ 4222 S01Z... (mounting kit for travel sensor)
- GEMÜ 1440... (air connections)
- GEMÜ 1446 000 ZMP (mounting bracket for wall mounting)
- GEMÜ 1219S01Z... (electrical connection set)

Travel sensor (linear)

Housing material

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

Cable length

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

Travel length

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

Cable connection

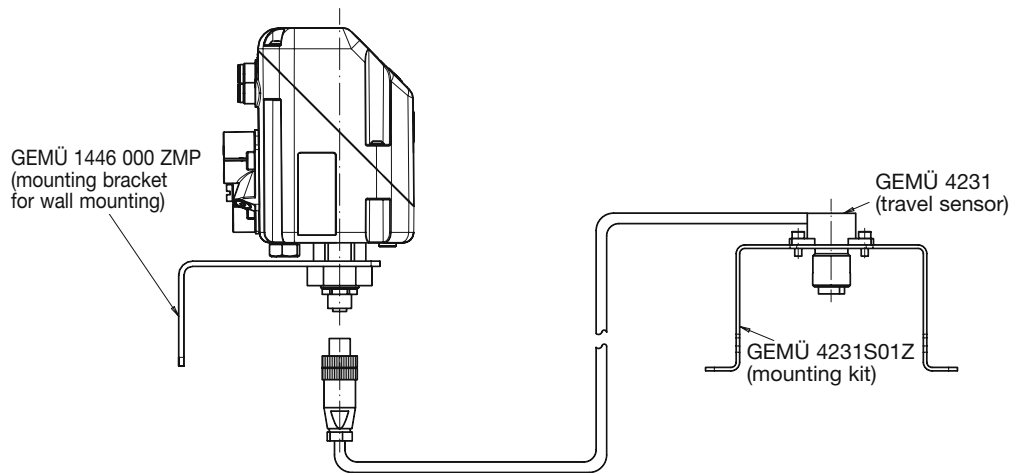
Cable connection	Code
M12 cable plug, straight, 5-pin, plastic	4001

Order example

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

Mounting kits for quarter turn actuators

External mounting



Parts required for external mounting to quarter turn actuators

- GEMÜ 1436...090 (positioner)
- GEMÜ 4231...4001 (travel sensor)
- GEMÜ 4231 S01Z... (mounting kit for travel sensor)
- GEMÜ 1440... (air connections)
- GEMÜ 1446 000 ZMP (mounting bracket for wall mounting)
- GEMÜ 1219S01Z... (electrical connection set)

Travel sensor (rotary)

Housing material	Code
PAI	XF

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

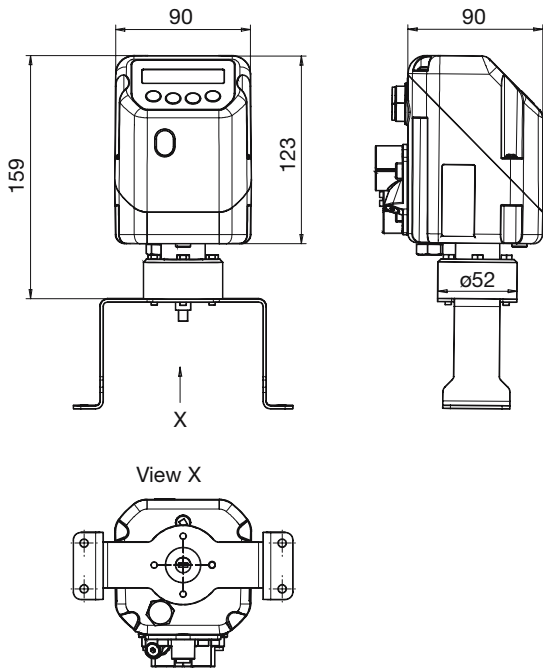
Travel length	Code
Potentiometer, 90°	090

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

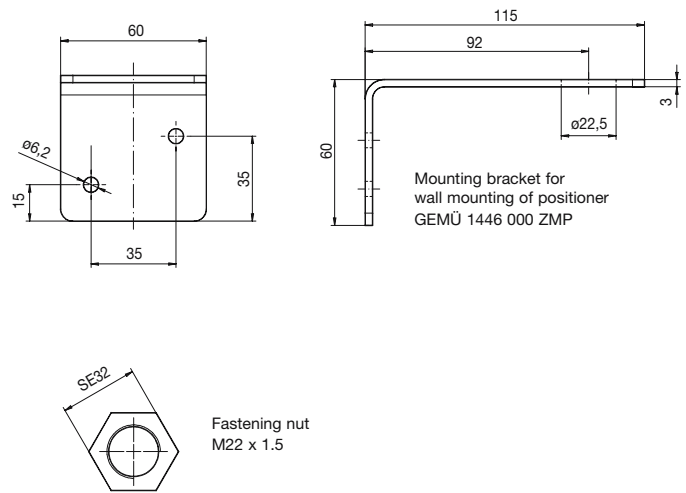
Order example	4231	000	Z	XF	090	05M0	4001
Type	4231						
Field bus		000					
Accessories			Z				
Housing material (code)				XF			
Travel length (code)					090		
Cable length (code)						05M0	
Cable connection (code)							4001

Note: Mounting kit 4231S01Z... (distance piece, mounting bracket) depends on the valve type.
Please order separately specifying valve type, DN and control function.
Please order air connections 1440 (fittings for 6 mm tube) if required (double acting = 2x)

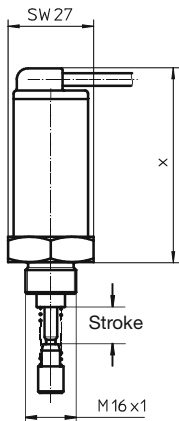
Dimensions - Positioner for quarter turn actuators



Accessories for external mounting



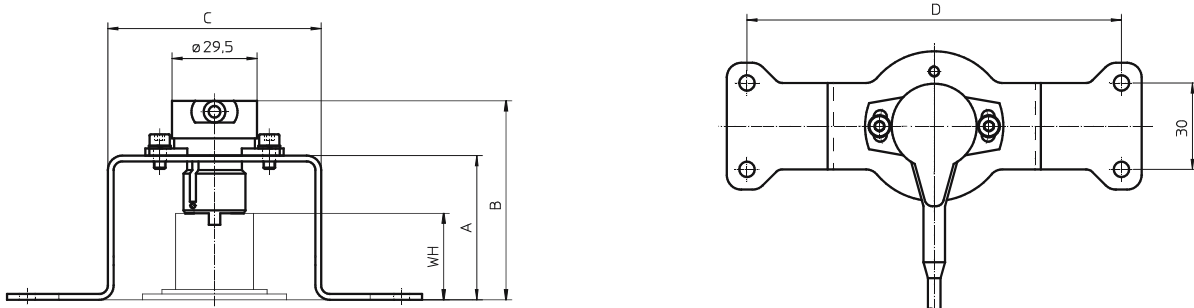
Dimensions - Travel sensor GEMÜ 4232 for linear actuators (mm), external mounting



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

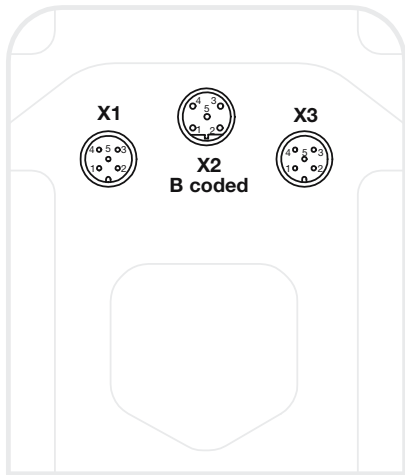
Travel length (stroke in mm)	x
30	62.2
50	84.2
75	109.2

Dimensions - Rotary travel sensor GEMÜ 4231 incl. bracket (mm), external mounting



Shaft height WH	Hole spacing D	A	B	C
20	80	40	59	64
30	130	50	69	74
50	130	70	89	109

Electrical connection - Standard version

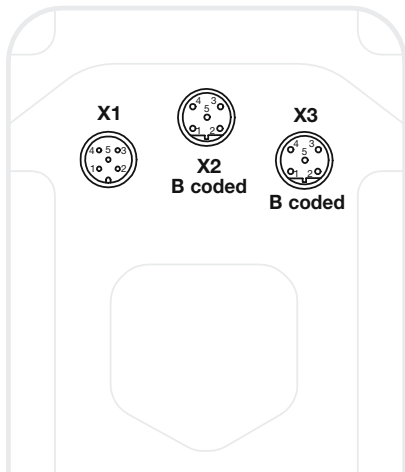


Connection	PIN	Signal name
X1 A coded M12 plug	1	Uv, 24 V DC supply voltage
	2	Make-contact, output K1, 24 V DC
	3	Uv, GND
	4	Make-contact, output K2, 24 V DC
	5	Digital input 1 (optional)

Connection	PIN	Signal name
X2 B coded M12 plug	1	I+, actual value output } 4-20 mA
	2	I-, actual value output } internal supply; active
	3	RxD, Receive Data, RS 232
	4	TxD, Transmit Data, RS232
	5	GND, RS232

Connection	PIN	Signal name
X3 A coded M12 plug	1	I+, set value input
	2	I-, set value input
	3	I+, actual value input
	4	I-, actual value input
	5	Digital input 2 (optional)

Electrical connection - Field bus Profibus DP



Connection	PIN	Signal name
X1 A coded M12 plug	1	Uv, 24 V DC supply voltage
	2	n.c.
	3	Uv, GND
	4	n.c.
	5	n.c.

Connection	PIN	Signal name
X2 B coded M12 plug	1	n.c.
	2	RxD/TxD-N
	3	n.c.
	4	RxD/TxD-P
	5	Shield

Connection	PIN	Signal name
X3 B coded M12 plug	1	BUS-VDC, +5V DC
	2	RxD/TxD-N
	3	DGND
	4	RxD/TxD-P
	5	Shield

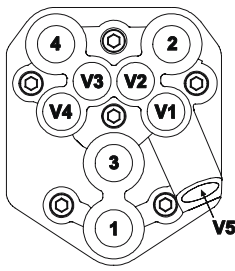
For serial wiring in the bus system please add connection set **1219S01ZDPM0DPM0** to your order.

Electrical connection - Remote travel sensor version (base of cPos)



Connection	PIN	Signal name
X4 A coded M12 socket	1	U+ , Potentiometer signal voltage Plus
	2	U _r , Potentiometer signal output
	3	U- , Potentiometer signal voltage Minus
	4	n. c.
	5	n. c.

Pneumatic connections



Connection	DIN ISO 1219-1	Description
P	1	Air supply connection G1/8"
R	3	Venting connection G1/8" with a silencer
V1	V1	Air throttle for A1
V2	V2	Outgoing air throttle for A1
V3	V3	Outgoing air throttle for A2
V4	V4	Air throttle for A2
V5	V5	Non-return valve
A1	2	Working connection for process valve c.f. 1+2/3 (opening)
A2	4	Working connection for process valve c.f. 3 (closing)

Safety function

Error code	Error	Outlet A1	Outlet A2
1	Electrical power supply failure	Single acting: vented Double acting: vented	Single acting: not available Double acting: pressurized
2	Pneumatic supply failure	Single acting: vented Double acting: vented	Single acting: not available Double acting: closed
3	Set value < 4.0 mA (Range adjustable from 0.0...22.0 mA under I Min W)	Single acting: adjustable function Double acting: adjustable function (open, close, hold)	Single acting: not available Double acting: adjustable function (open, close, hold)
4	Set value > 20.0 mA (Range adjustable from 0.0...22.0 mA under I Max W)	Single acting: adjustable function Double acting: adjustable function (open, close, hold)	Single acting: not available Double acting: adjustable function (open, close, hold)
5	Actual value < 4.0 mA (Range adjustable from 0.0...22.0 mA under I Min X)	Single acting: adjustable function Double acting: adjustable function (open, close, hold)	Single acting: not available Double acting: adjustable function (open, close, hold)
6	Actual value > 20.0 mA (Range adjustable from 0.0...22.0 mA under I Max X)	Single acting: adjustable function Double acting: adjustable function (open, close, hold)	Single acting: not available Double acting: adjustable function (open, close, hold)

These error codes are not a substitute for specific plant safety requirements.

Connection set

Field bus	Code	Connection X2, B coded	Code
Connection set	S01	without connector socket, with M12 protection cap	0000
Accessories	Code	M12 socket, angle, B coded, without cable, screw terminal	00M0
Accessories	Z	M12 socket, angle, B coded, can be shielded, without cable, for Profibus DP	DPM0
Connections X1 and X3*, A coded	Code	Y cable + 1 x M12 socket, angle, B coded without cable, screw terminal	00Y0
without connector socket, with M12 protection cap	0000	Y cable + M12 socket, angle, B coded with 5 m PUR cable, 0.34 mm ²	05Y0
M12 socket, angle, A coded, without cable, screw terminal	00M0	5 m Sub-D connecting cable	05Y0
M12 socket, angle, A coded, without cable, adapter cable socket / socket B coded, M12 plug, B coded for Profibus DP**	DPM0	Y cable + M12 socket, angle, B coded with 10 m PUR cable, 0.34 mm ²	10Y0
M12 socket, angle, A coded with 5 m PUR cable, 0.34 mm ²	05M0	10 m Sub-D connecting cable	10Y0
M12 socket, angle, A coded with 10 m PUR cable, 0.34 mm ²	10M0		

* X3 is B coded with Profibus DP version

** Required for Profibus DP version and serial wiring in bus system

Order example

	1219	S01	Z	00M0	00M0
Type	1219				
Field bus		S01			
Accessories			Z		
Connection X1 and X3, A coded				00M0	
Connection X2, B coded					00M0

For further positioners, accessories and other products, please see our Product Range catalogue and Price List. Contact GEMÜ.



GEMÜ® VALVES, ACTUATORS
AND CONTROL SYSTEMS