

GEMÜ 652

Pulsation damper



Features

- Pre-defined compensation volume
- Defined pressure range
- CIP/SIP capable
- Autoclave capability, depending on version
- Suitable for inert, corrosive, liquid and gaseous media
- Valve body and diaphragm available in various materials and designs
- Compact design (ideal when space is at a premium)

Description

The GEMÜ 652 pulsation damper is designed for use with liquid and gaseous media in sterile areas of application. In many production plants, unwanted pressure surges arise which are generated by switching on pumps or quickly switching valves, for example. In addition, pressure surges may cause unwanted momentary opening of shut-off valves, thus contaminating media. Likewise, an increased pressure may arise in the medium pipe due to thermal expansion of the medium. This can cause damage to plant components such as filters, sensors or piping. As a solution to this GEMÜ has developed the pulsation damper GEMÜ 652, which is based on the proven diaphragm valve technology and is designed so that it releases a volume in a particular pre-defined pressure surge area, and consequently catches and compensates for the pressure surge. The valve body is open in-line with flow direction, and not intended to shut off the medium.

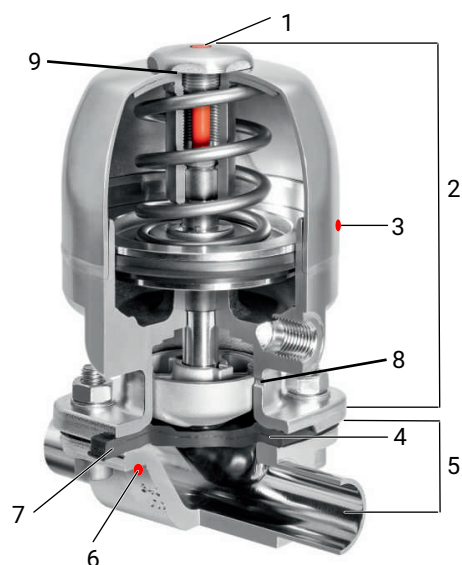
Technical specifications

- **Media temperature :** -10 to 100 °C
- **Sterilization temperature:** max. 150 °C
- **Ambient temperature:** 0 to 60 °C
- **Operating pressure :** 0 to 10 bar
- **Nominal sizes:** DN 15 to 80
- **Body configurations:** 2/2-way body
- **Connection types:** Spigot
- **Connection standards:** ANSI | ASME | BS | DIN | EN | ISO | JIS | SMS
- **Body materials:** 1.4435 (316L), forged material | 1.4435 (BN2), forged material | 1.4539 (904L), forged material
- **Diaphragm materials:** EPDM | PTFE/EPDM
- **Conformities:** BSE/TSE | EAC | FDA | Reg. (EU) No. 10/2011 | Regulation (EC) No. 1935/2004 | Regulation (EC) No. 2023/2006 | USP

Technical data depends on the respective configuration

Product description

Construction



Item	Name	Materials
1	Optical position indicator	PP
2	Actuator	Stainless steel
3	CONEXO actuator RFID chip (see "GEMÜ CONEXO", page 3)	
4	Diaphragm	EPDM, PTFE/EPDM
5	Valve body	1.4435 (F316L), forged body 1.4435 (BN2), forged body, $\Delta Fe < 0.5\%$ 1.4539, forged body
6	CONEXO body RFID chip (see "GEMÜ CONEXO", page 3)	
7	CONEXO diaphragm RFID chip (see "GEMÜ CONEXO", page 3)	
8	Leak detection hole	
9	Vent hole	

GEMÜ CONEXO

The interaction of valve components that are equipped with RFID chips and an associated IT infrastructure actively increase process reliability.



Thanks to serialization, every valve and every relevant valve component such as the body, actuator or diaphragm, and even automation components, can be clearly traced and read using the CONEXO pen RFID reader. The CONEXO app, which can be installed on mobile devices, not only facilitates and improves the "installation qualification" process, but also makes the maintenance process much more transparent and easier to document. The app actively guides the maintenance technician through the maintenance schedule and directly provides him with all the information assigned to the valve, such as test reports, testing documentation and maintenance histories. The CONEXO portal acts as a central element, helping to collect, manage and process all data.

For further information on GEMÜ CONEXO please visit:

www.gemu-group.com/conexo

Ordering

GEMÜ Conexo must be ordered separately with the ordering option "CONEXO".

Availabilities

Availability of grades of surface finish

Internal surface finishes for forged and block material bodies ¹⁾

Readings for Process Contact Surfaces	Mechanically polished ²⁾		Electropolished	
	Hygienic class DIN 11866	Code	Hygienic class DIN 11866	Code
Ra ≤ 0.80 µm	H3	1502	HE3	1503
Ra ≤ 0.60 µm	-	1507	-	1508
Ra ≤ 0.40 µm	H4	1536	HE4	1537
Ra ≤ 0.25 µm ³⁾	H5	1527	HE5	1516

Readings for Process Contact Surfaces according to ASME BPE 2016 ⁴⁾	Mechanically polished ²⁾		Electropolished	
	ASME BPE Surface Designation	Code	ASME BPE Surface Designation	Code
Ra Max. = 0.76 µm (30 µinch)	SF3	SF3	-	-
Ra Max. = 0.64 µm (25 µinch)	SF2	SF2	SF6	SF6
Ra Max. = 0.51 µm (20 µinch)	SF1	SF1	SF5	SF5
Ra Max. = 0.38 µm (15 µinch)	-	-	SF4	SF4

Ra acc. to DIN EN ISO 4288 and ASME B46.1

- 1) Surface finishes of customized valve bodies may be limited in special cases.
- 2) Or any other finishing method that meets the Ra value (acc. to ASME BPE).
- 3) The smallest possible Ra finish for pipe connections with an internal pipe diameter < 6 mm is 0.38 µm.
- 4) When using these surfaces, the bodies are marked according to the specifications of ASME BPE.
The surfaces are only available for valve bodies which are made of materials (e.g. GEMÜ material codes 40, 41, F4, 44)) and use connections (e.g. GEMÜ connection codes 59, 80, 88) according to ASME BPE.

Availability of valve bodies

Spigot

MG	DN	Connection type ¹⁾		
		17	59	60
		Material 40, 42, F4 ²⁾		
25	15	X	-	X
	20	X	X	X
	25	X	X	X
40	32	X	-	X
	40	X	X	X
50	50	X	X	X
	65	-	X	-
80	65	X	X	X
	80	X	X	X

MG = diaphragm size, X = standard

1) Connection type

Code 17: Spigot EN 10357 series A (formerly DIN 11850 series 2)/DIN 11866 series A

Code 59: Spigot ASME BPE/DIN 11866 series C

Code 60: Spigot ISO 1127/EN 10357 series C/DIN 11866 series B

2) Valve body material

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

Code F4: 1.4539, forged body

Order data

The order data provide an overview of standard configurations.

Please check the availability before ordering. Other configurations available on request.

Order codes

1 Type	Code
Pulsation damper, stainless steel piston actuator, electropolished, optical position indicator	652

2 DN	Code
DN 15	15
DN 20	20
DN 25	25
DN 32	32
DN 40	40
DN 50	50
DN 65	65
DN 80	80

3 Body configuration	Code
2/2-way body	D

4 Connection type	Code
Spigot	
Spigot EN 10357 series A (formerly DIN 11850 series 2)/DIN 11866 series A	17
Spigot ASME BPE/DIN 11866 series C	59
Spigot ISO 1127/EN 10357 series C/DIN 11866 series B	60

5 Valve body material	Code
Forged material	
1.4435 (F316L), forged body	40
1.4435 (BN2), forged body, $\Delta Fe < 0.5\%$	42
1.4539, forged body	F4

6 Diaphragm material	Code
EPDM	17
EPDM	19
PTFE/EPDM one-piece	54

7 Actuator version	Code
Actuator size 2T1	2T1
Actuator size 2T2	2T2
Actuator size 2T3	2T3
Actuator size 3T1	3T1
Actuator size 3T2	3T2
Actuator size 3T3	3T3
Actuator size 3T4	3T4
Actuator size 3T5	3T5
Actuator size 4T1	4T1
Actuator size 4T2	4T2
Actuator size 4T3	4T3
Actuator size 4T4	4T4
Actuator size 4T5	4T5

7 Actuator version	Code
Actuator size 5T1	5T1
Actuator size 5T2	5T2
Actuator size 5T3	5T3
Actuator size 5T4	5T4
Actuator size 5T5	5T5
Actuator size 5T6	5T6

8 Surface	Code
Ra $\leq 0.8 \mu\text{m}$ (30 $\mu\text{in.}$) for media wetted surfaces, in accordance with DIN 11866 H3, mechanically polished internal	1502
Ra $\leq 0.8 \mu\text{m}$ (30 $\mu\text{in.}$) for media wetted surfaces, in accordance with DIN 11866 HE3, electropolished internal/external	1503
Ra $\leq 0.6 \mu\text{m}$ (25 $\mu\text{in.}$) for media wetted surfaces, mechanically polished internal	1507
Ra $\leq 0.6 \mu\text{m}$ (25 $\mu\text{in.}$) for media wetted surfaces, electropolished internal/external	1508
Ra $\leq 0.4 \mu\text{m}$ (15 $\mu\text{in.}$) for media wetted surfaces, in accordance with DIN 11866 H4, mechanically polished internal	1536
Ra $\leq 0.4 \mu\text{m}$ (15 $\mu\text{in.}$) for media wetted surfaces, in accordance with DIN 11866 HE4, electropolished internal/external	1537
Ra $\leq 0.25 \mu\text{m}$ (10 $\mu\text{in.}$) for media wetted surfaces *), in accordance with DIN 11866 H5, mechanically polished internal, *) for inner pipe diameters $< 6 \text{ mm}$, in the spigot Ra $\leq 0.38 \mu\text{m}$	1527
Ra $\leq 0.25 \mu\text{m}$ (10 $\mu\text{in.}$) for media wetted surfaces *), in accordance with DIN 11866 HE5, electropolished internal/external, *) for inner pipe diameters $< 6 \text{ mm}$, in the spigot Ra $\leq 0.38 \mu\text{m}$	1516
Ra max. $0.51 \mu\text{m}$ (20 $\mu\text{in.}$) for media wetted surfaces, in accordance with ASME BPE SF1, mechanically polished internal	SF1
Ra max. $0.64 \mu\text{m}$ (25 $\mu\text{in.}$) for media wetted surfaces, in accordance with ASME BPE SF2, mechanically polished internal	SF2
Ra max. $0.76 \mu\text{m}$ (30 $\mu\text{in.}$) for media wetted surfaces, in accordance with ASME BPE SF3, mechanically polished internal	SF3
Ra max. $0.38 \mu\text{m}$ (15 $\mu\text{in.}$) for media wetted surfaces, in accordance with ASME BPE SF4, electropolished internal/external	SF4
Ra max. $0.51 \mu\text{m}$ (20 $\mu\text{in.}$) for media wetted surfaces, in accordance with ASME BPE SF5, electropolished internal/external	SF5
Ra max. $0.64 \mu\text{m}$ (25 $\mu\text{in.}$) for media wetted surfaces, in accordance with ASME BPE SF6, electropolished internal/external	SF6

9 CONEXO	Code
Without	

9 CONEXO	Code
Integrated RFID chip for electronic identification and traceability	C

Order example

Ordering option	Code	Description
1 Type	652	Pulsation damper, stainless steel piston actuator, electropolished, optical position indicator
2 DN	50	DN 50
3 Body configuration	D	2/2-way body
4 Connection type	60	Spigot ISO 1127/EN 10357 series C/DIN 11866 series B
5 Valve body material	40	1.4435 (F316L), forged body
6 Diaphragm material	17	EPDM
7 Actuator version	4T1	Actuator size 4T1
8 Surface	1508	Ra ≤ 0.6 µm (25 µin.) for media wetted surfaces, electropolished internal/external
9 CONEXO		Without

Technical data

Medium

Working medium:	Corrosive, inert, gaseous and liquid media which have no negative impact on the physical and chemical properties of the body and diaphragm material.
Control medium:	Inert gases Connection of the control medium is only required for diaphragm replacement. Under normal working conditions, control air is not required.

Temperature

Media temperature:	-10 – 100 °C						
Sterilization temperature:	<table> <tr> <td>EPDM (Code 17)</td><td>max. 150 °C, max. 180 min per cycle</td></tr> <tr> <td>EPDM (Code 19)</td><td>max. 150 °C, max. 180 min per cycle</td></tr> <tr> <td>PTFE/EPDM (Code 54)</td><td>max. 150 °C, permanent temperature per cycle</td></tr> </table> <p>The sterilization temperature is only valid for steam (saturated steam) or superheated water. If the sterilization temperatures listed above are applied to the EPDM diaphragms for longer periods of time, the service life of the diaphragms will be reduced. In these cases, maintenance cycles must be adapted accordingly. This also applies to PTFE diaphragms exposed to high temperature fluctuations. The maintenance cycles must be adapted accordingly.</p>	EPDM (Code 17)	max. 150 °C, max. 180 min per cycle	EPDM (Code 19)	max. 150 °C, max. 180 min per cycle	PTFE/EPDM (Code 54)	max. 150 °C, permanent temperature per cycle
EPDM (Code 17)	max. 150 °C, max. 180 min per cycle						
EPDM (Code 19)	max. 150 °C, max. 180 min per cycle						
PTFE/EPDM (Code 54)	max. 150 °C, permanent temperature per cycle						
Control medium temperature:	0 – 60 °C						
Ambient temperature:	0 – 60 °C						

Autoclavability:	<table> <tr> <th>Actuator version</th><th>Autoclavability</th></tr> <tr> <td>2T1, 2T2, 2T3</td><td>Autoclavable</td></tr> <tr> <td>3T1, 3T2, 3T3, 3T4, 3T5</td><td rowspan="3">with special version</td></tr> <tr> <td>4T1, 4T2, 4T3, 4T4, 4T5</td></tr> <tr> <td>5T1, 5T2, 5T3, 5T4, 5T5, 5T6</td></tr> </table>	Actuator version	Autoclavability	2T1, 2T2, 2T3	Autoclavable	3T1, 3T2, 3T3, 3T4, 3T5	with special version	4T1, 4T2, 4T3, 4T4, 4T5	5T1, 5T2, 5T3, 5T4, 5T5, 5T6
Actuator version	Autoclavability								
2T1, 2T2, 2T3	Autoclavable								
3T1, 3T2, 3T3, 3T4, 3T5	with special version								
4T1, 4T2, 4T3, 4T4, 4T5									
5T1, 5T2, 5T3, 5T4, 5T5, 5T6									

Pressure

Operating pressure: 0 – 10 bar

The external leak tightness is ensured up to the specified operating pressure. The pressure ranges for compensation can be seen in the following table (operating range).

Operating range:

MG	AG	Diaphragm material				
		EPDM				PTFE/EPDM
		Code 17 [bar]	Code 19 [bar]	max. displaced volume [ml]	Code 54 [bar]	max. displaced volume [ml]
25	2T1	4.0 – 6.0	4.0 – 6.0	8	4.0 – 6.0	8
	2T2	4.5 – 8.0	6.0 – 8.0	10	4.0 – 8.0	10
	2T3	5.5 – 9.5	7.0 – 9.5	9	4.5 – 9.5	9
40	3T1	2.5 – 7.0	2.5 – 7.0	30	2.0 – 7.0	27
	3T2	2.5 – 7.0	3.0 – 7.0	28	2.0 – 7.0	28
	3T3	3.5 – 8.0	3.5 – 8.0	29	3.0 – 8.0	29
	3T4	5.5 – 10.0	5.5 – 10.0	25	4.5 – 10.0	24
	3T5	7.5 – 10.0	7.5 – 10.0	17	6.5 – 10.0	17
50	4T1	2.0 – 6.0	2.5 – 6.0	55	1.5 – 6.0	55
	4T2	3.0 – 8.5	3.5 – 8.5	61	2.5 – 9.0	62
	4T3	5.0 – 10.0	5.5 – 10.0	52	4.0 – 10.0	51
	4T4	5.5 – 10.0	5.5 – 10.0	51	4.5 – 10.0	49
	4T5	7.5 – 10.0	7.5 – 10.0	23	6.5 – 10.0	29
80	5T1	1.5 – 7.5	1.5 – 7.5	282	1.5 – 7.5	230
	5T2	2.0 – 10.0	2.5 – 10.0	290	2.0 – 10.0	260
	5T3	3.5 – 10.0	3.5 – 10.0	250	3.5 – 10.0	225
	5T4	4.0 – 10.0	4.5 – 10.0	220	4.0 – 10.0	175
	5T5	5.0 – 10.0	5.5 – 10.0	168	4.5 – 10.0	129
	5T6	6.0 – 10.0	6.5 – 10.0	130	5.5 – 10.0	75

MG = diaphragm size

The normal operating pressure in the plant should be as close as possible to the lower area of the operating range of the pulsation damper.

Pressure rating: PN 16

Control pressure: **Note:** A control medium is only required for diaphragm replacement.

Actuator version 2T	2.5 – 7 bar
Actuator version 3T	3.5 – 7 bar
Actuator version 4T	3.5 – 7 bar
Actuator version 5T	3.5 – 7 bar

Kv values: The Kv values cannot be specified as with GEMÜ diaphragm valves. The basis of the Kv values is piping of the relevant standard of the connection type. In general, the Kv values are up to 10% less than those of comparable piping due to flow turbulences in the seat area.

Product conformity

Pressure Equipment Directive:	2014/68/EU
Machinery Directive:	2006/42/EC
Food:	Regulation (EC) No. 1935/2004 Regulation (EC) No. 10/2011 FDA USP Class VI

Mechanical data

Weight:

Actuator

Actuator size	Weight
2T1, 2T2, 2T3	2.3
3T1, 3T2, 3T3, 3T4, 3T5	4.7
4T1, 4T2, 4T3, 4T4, 4T5	9.2
5T1, 5T2, 5T3, 5T4, 5T5, 5T6	20.6

Weights in kg

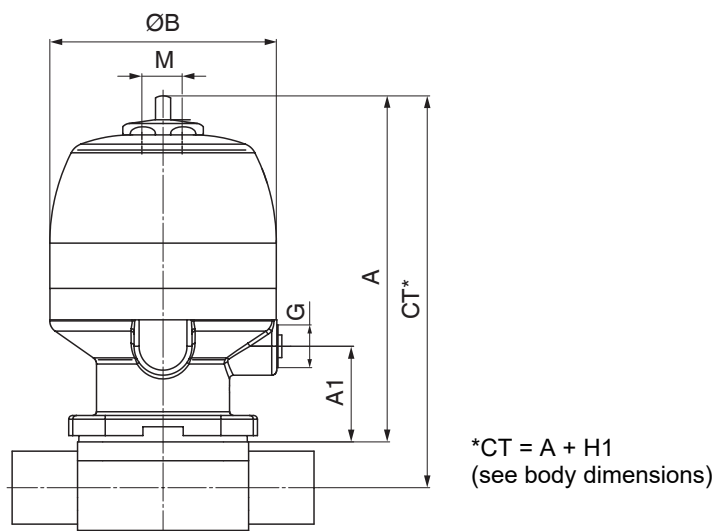
Body

Connection type code		17	59	60
Valve body		Spigot		
MG	DN			
25	15	0.65	-	0.62
	20	0.60	0.63	0.52
	25	0.50	0.55	0.41
40	32	1.40	-	1.20
	40	1.20	1.30	0.90
50	50	2.10	2.20	1.60
	65	-	1.30	-
80	65	7.50	8.00	6.30
	80	5.00	6.50	4.80

MG = diaphragm size, weight in kg

Dimensions

Actuator dimensions

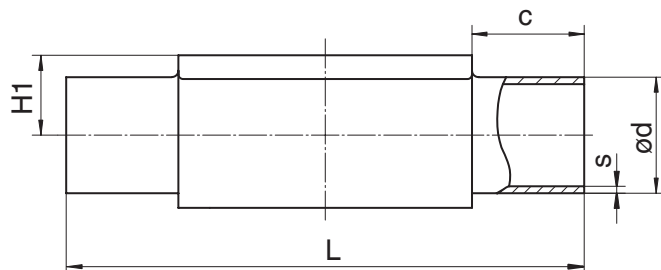


MG	DN	Actuator version	A	A1	ø B	G	M
25	15, 20, 25	2T1, 2T2, 2T3	137.5	38.0	90.0	G 1/4	M16x1
40	32, 40	3T1, 3T2, 3T3, 3T4, 3T5	173.0	53.0	114.0	G 1/4	M16x1
50	50, 65	4T1, 4T2, 4T3, 4T4, 4T5	223.0	52.0	144.0	G 1/4	M16x1
80	65, 80	5T1, 5T2, 5T3, 5T4, 5T5, 5T6	283.0	78.0	240.0	G 1/4	M26x1.5

Dimensions in mm, MG = diaphragm size

Body dimensions

Spigot DIN/EN/ISO (code 17, 60)



Connection type spigot DIN/EN/ISO (code 17, 60)¹⁾, forged material (code 40, 42, F4)²⁾

MG	DN	NPS	c (min)	ød		s		H1		L
				Connection type		Connection type		Connection type		
				17	60	17	60	17	60	
25	15	1/2"	25.0	19.0	21.3	1.5	1.6	14,1	13,2	120.0
	20	3/4"	25.0	23.0	26.9	1.5	1.6	14,1	16,0	120.0
	25	1"	25.0	29.0	33.7	1.5	2.0	17,1	18,8	120.0
40	32	1¼"	25.0	35.0	42.4	1.5	2.0	20,3	23,5	153.0
	40	1½"	25.0	41.0	48.3	1.5	2.0	23,3	26,5	153.0
50	50	2"	30.0	53.0	60.3	1.5	2.0	29,3	32,5	173.0
80	65	2½"	30.0	70.0	76.1	2.0	2.0	51,3	54,4	216.0
	80	3"	30.0	85.0	88.9	2.0	2.3	58,8	60,5	254.0

Dimensions in mm

MG = diaphragm size

1) Connection type

Code 17: Spigot EN 10357 series A (formerly DIN 11850 series 2)/DIN 11866 series A

Code 60: Spigot ISO 1127/EN 10357 series C/DIN 11866 series B

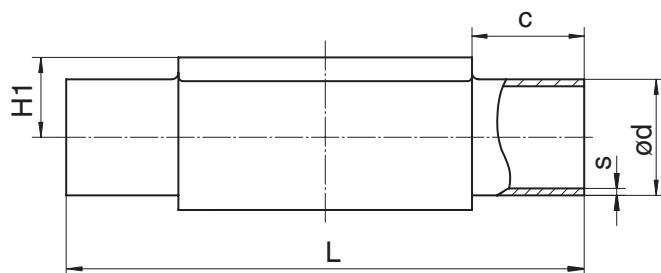
2) Valve body material

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

Code F4: 1.4539, forged body

Spigot ASME/BS (code 59)



Connection type spigot ASME/BS (code 59)¹⁾, forged material (code 40, 42, F4)²⁾

MG	DN	NPS	c (min)	ød	s	H1	L
25	20	3/4"	25.0	19.05	1.65	14,0	120.0
	25	1"	25.0	25.40	1.65	15,2	120.0
40	40	1½"	25.0	38.10	1.65	21,7	153.0
50	50	2"	30.0	50.80	1.65	28,1	173.0
	65	2½"	30.0	63.50	1.65	34,0	173.0
80	65	2½"	30.0	63.50	1.65	48,4	216.0
	80	3"	30.0	76.20	1.65	54,8	254.0

Dimensions in mm

MG = diaphragm size

1) Connection type

Code 59: Spigot ASME BPE/DIN 11866 series C

2) Valve body material

Code 40: 1.4435 (F316L), forged body

Code 42: 1.4435 (BN2), forged body, Δ Fe < 0.5%

Code F4: 1.4539, forged body

Add-on components

Electrical position indicators



GEMÜ 1235

Electrical position indicator

The GEMÜ 1235 electrical position indicator is suitable for installation on pneumatically operated linear actuators and, with specific mounting parts, likewise suitable for pneumatically operated quarter turn actuators as well as further selected actuator versions. The position of the valve spindle is reliably electronically detected and evaluated using play-free and non-positive mounting. Intelligent microprocessor-controlled functions facilitate commissioning and support during operation. The current position of the valve is displayed via high-visibility LEDs and fed back via electrical signals.



GEMÜ 1236

Electrical position indicator

The GEMÜ 1236 electrical position indicator is suitable for installation on pneumatically operated linear actuators. The position of the valve spindle is reliably electronically detected and evaluated using play-free and non-positive mounting. Intelligent microprocessor-controlled functions facilitate commissioning and support during operation. The current position of the valve is displayed via high-visibility LEDs and fed back via electrical signals.

Accessories

Mounting brackets and mounts



GEMÜ 1216

Mounting bracket for proximity switches

GEMÜ 1216 is an open proximity switch mount for two proximity switches M8 x 1 for pneumatically operated linear actuators. It has two adjustable trip cams and can be ordered either with or without stroke limiter. The switching interval is dependent on the proximity switches used. The basic version does not contain any proximity switches.

