

# **GEMÜ R639 eSyStep**

## **Motorized diaphragm valve**



### **Features**

- Hermetic separation between medium and actuator
- Installation for an optimised draining is possible
- Open/close function or with integrated positioner
- Integral optical position indicator
- Parameterizable via IO-Link
- Extensive diagnostic facilities
- Actuating speed max. 3 mm/s

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### **Description**

The GEMÜ R639 2/2-way diaphragm valve is electrically operated. The eSyStep actuator is available as an ON/OFF actuator or as an actuator with integrated positioner. An integral optical and electrical position indicator is standard.

### **Technical specifications**

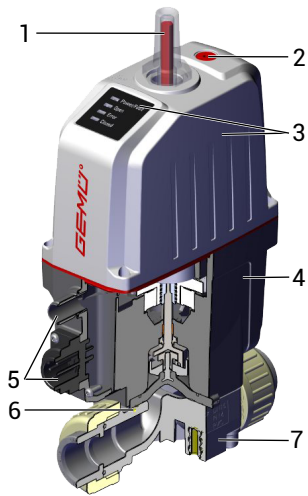
- Media temperature: -10 to 80 °C
- Ambient temperature\*: 0 to 50 °C
- Operating pressure\*: 0 to 6 bar
- Nominal sizes\*: DN 12 to 15
- Body configurations: 2/2-way body
- Connection types: Flange | Spigot | Union end
- Connection standards: BS | DIN | ISO
- Body materials: PP, reinforced | PP-H, natural | PVC-U, grey | PVDF
- Diaphragm materials: EPDM | NBR | PTFE TFM™ / FKM | PTFE/EPDM
- Supply voltage: 24 V DC
- Actuating speed: max. 3 mm/s
- Protection class: IP 65

\* depending on version and/or operating parameters



## Product description

### Construction



Item	Name	Materials
1	Optical position indicator	PA 12
2	Manual override	
3	Actuator top with LED display	Polyamide 50% glass fibre
4	Actuator base	Polyamide 50% glass fibre
5	Electrical connections	
6	Diaphragm	NBR, FPM, CR, EPDM, PTFE/EPDM
7	Valve body	PVC-U (grey), PP, PVDF, PP-H (natural)

## GEMÜ CONEXO

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

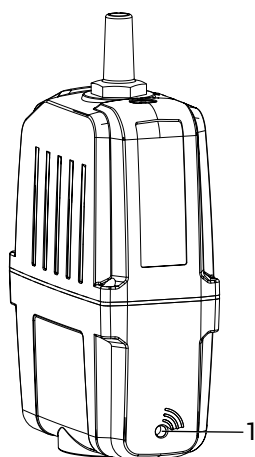


Thanks to serialization, every valve and every relevant valve component such as the body, actuator or diaphragm, and even automation components, can be clearly traced and read using the CONEXO pen RFID reader. The CONEXO app, which can be installed on mobile devices, not only facilitates and improves 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](http://www.gemu-group.com/conexo)

For electronic identification purposes, each replaceable component contained in the product is equipped with an RFID chip (1). Where you can find the RFID chip differs from product to product.



### Actuator RFID chip

The CONEXO pen helps read out information stored in these RFID chips. The CONEXO app or CONEXO portal is required to view this information.

**Overview of available functions**

Function	Control module - OPEN/CLOSE control (code AE)	Control module - Positioner (code S0)
OPEN/CLOSE control	X	X
Positioner		X
Manual override	X	X
Optical status and position indicator	X	X
On-site initialisation	X	X
Deactivation of on-site initialisation	X	X
Initialisation via digital input	X	X
Initialisation via IO-Link	X	X
Feedback for operating mode	X	X
Activation OPEN	X	X
Activation CLOSE	X	X
Activation, analogue		X
Position feedback OPEN	X	X
Position feedback CLOSED	X	X
Position feedback analogue		X
Location function	X	X
Error output	X	X
Actuating speed adjustable	X	
Actuating force adjustable	X	X
Inversion of LED colours	X	X
Cycle counter	X	
Error counter	X	
Operating time determination	X	X
Switch point setting (tolerance)	X	X
Inversion input / output logic	X	X
Adjustable error action	X	X
Safe/On	X	X
Direction reversal		X
Open tight		X
Close tight		X
Split range		X
Stroke limiter / seal adjuster		X

## Availability

### Availability of valve bodies

#### Union end

MG	DN	Connection types code <sup>1)</sup>											
		1			2	7				33	78		
		Material code											
		1	5	20	1	1	5	20	N5	1	5	20	N5
10	12	X	X	X	X	-	-	-	-	-	-	-	-
	15	-	-	-	-	X	X	X	X	X	X	X	X
	20	-	-	-	-	-	-	-	-	-	-	-	-

MG = diaphragm size, X = standard

#### 1) Connection type

Code 1: Threaded socket DIN ISO 228

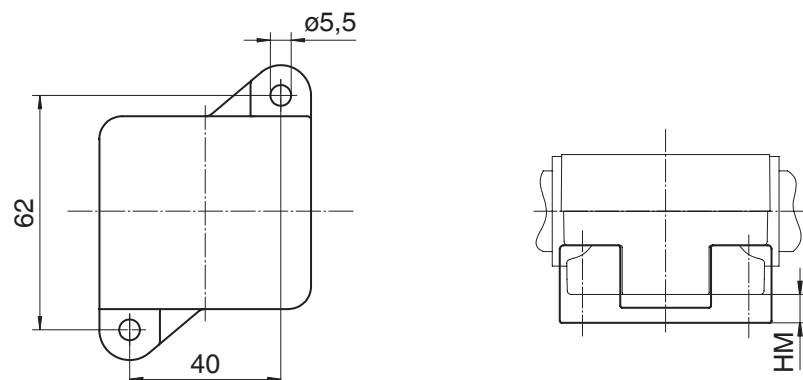
Code 2: Solvent cement socket DIN

Code 7: Union end with DIN insert (socket)

Code 33: Union end with inch insert - BS (socket)

Code 78: Union end with DIN insert (for IR butt welding)

### Availability of mounting plate



MG	DN	HM
10	12	5.0
	15	4.5
	20	4.5

Dimensions in mm, MG = diaphragm size

## 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
Diaphragm valve, electrically operated, eSyStep	R639

2 DN	Code
DN 12	12
DN 15	15
DN 20	20

3 Body configuration	Code
2/2-way body	D

4 Connection type	Code
Threaded socket DIN ISO 228	1
Solvent cement socket DIN	2
Union end with DIN insert (socket)	7
Spigot for IR butt welding, BCF	28
Union end with inch insert - BS (socket)	33
Flare connection with PVDF union nut	75
Union end with DIN insert (for IR butt welding)	78

5 Valve body material	Code
PVC-U, grey	1
PP, reinforced	5
PVDF	20
PP-H, natural	N5

6 Diaphragm material	Code
NBR	2
FPM	4

6 Diaphragm material	Code
EPDM	14
PTFE/EPDM one-piece	54

7 Voltage/Frequency	Code
24 V DC	C1

8 Control module	Code
Open/close control with additional end position feedback	AE
Open/close control with additional end position feedback, configured for emergency power module (NC)	A5
Open/close control with additional end position feedback, configured for emergency power module (NO)	A6
Positioner	S0
Positioner, configured for emergency power module (NC)	S5
Positioner, configured for emergency power module (NO)	S6

9 Actuator version	Code
Actuator size 0 Diaphragm size 10	0C

10 Mounting plate	Code
With mounting plate	M
Without mounting plate	O
Without	

## Order example

Order option	Code	Description
1 Type	R639	Diaphragm valve, electrically operated, eSyStep
2 DN	15	DN 15
3 Body configuration	D	2/2-way body
4 Connection type	7	Union end with DIN insert (socket)
5 Valve body material	1	PVC-U, grey
6 Diaphragm material	14	EPDM
7 Voltage/Frequency	C1	24 V DC
8 Control module	S0	Positioner
9 Actuator version	0C	Actuator size 0 Diaphragm size 10
10 Mounting plate		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.

### Temperature

**Media temperature:**

Code	Valve body material	
1	PVC-U, grey	10 to 60 °C
5	PP, reinforced	5 to 80 °C
20	PVDF	-10 to 80 °C
N5	PP-H, natural	5 to 80 °C

**Ambient temperature:**

Code	Valve body material	
1	PVC-U, grey	10 to 50 °C *
5	PP, reinforced	5 to 50 °C *
20	PVDF	0 to 50 °C *
N5	PP-H, natural	5 to 50 °C *

\* Depending on version and/or operating parameters (see chapter duty cycle and service life)

### Pressure

**Operating pressure:**

MG	DN	EPDM/FPM	PTFE
10	12	0 to 6	0 to 6
	15	0 to 6	0 to 6
	20	0 to 6	0 to 6

All pressures are gauge pressures. Operating pressure values were determined with static operating pressure applied on one side of a closed valve. Sealing at the valve seat and atmospheric sealing is ensured for the given values.

Information on operating pressures applied on both sides and for high purity media on request.

**Pressure/temperature correlation:**

#### Pressure/temperature correlation PN 6

Valve body material		Temperature in °C (valve body)												
Materials	Code	-20	-10	±0	5	10	20	25	30	40	50	60	70	80
PVC-U	1	-	-	-	-	6.0	6.0	6.0	4.8	3.6	2.1	0.9	-	-
PP	5	-	-	-	6.0	6.0	6.0	6.0	6.0	6.0	5.5	4.0	2.7	1.5
PVDF	20	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.4	4.8	4.3	3.8	3.2	2.8
PP-natural	N5	-	-	-	6.0	6.0	6.0	6.0	5.1	4.2	3.3	2.4	1.6	0.9

The pressure rating (PN) depends on the connection code.

Data for extended temperature ranges on request. Please note that the ambient temperature and media temperature generate a combined temperature at the valve body which must not exceed the above values.

**Kv values:**

MG	DN	
10	12	2,8
	15	3,5
	20	3,5

MG = diaphragm size, Kv values in m<sup>3</sup>/h

Kv values determined acc.to DIN EN 60534 standard, inlet pressure 5 bar, Δp 1 bar, PVC-U valve body and soft elastomer diaphragm.

## Technical data

**Kv values:** The Kv values for other product configurations (e.g. other diaphragm or body materials) may differ. In general, all diaphragms are subject to the influences of pressure, temperature, the process and their tightening torques. Therefore the Kv values may exceed the tolerance limits of the standard.

## Product compliance

**Pressure Equipment Directive:** 2014/68/EU

**Machinery Directive:** 2006/42/EU

**Food:** Regulation (EC) No. 1935/2004\*  
Regulation (EC) No. 10/2011\*  
FDA\*  
USP\* Class VI  
\* depending on version and/or operating parameters

## Materials

**Materials:**

Diaphragm material	O-ring material
PTFE	FPM
NBR	EPDM
FPM	FPM
EPDM	EPDM

## Mechanical data

**Protection class:** IP 65 acc. to EN 60529

**Actuating speed:** Max. 3 mm/s

**Weight:** **Actuator**  
950 g

**Body**

Valve body	MG 10		
	DN 12	DN 15	DN 20
<b>Threaded socket code 1</b>	0.08	-	-
<b>Solvent cement socket code 2</b>	0.06	-	-
<b>Union end code 7</b>	-	0.18	-
<b>Union end code 28</b>	-	0.13	-
<b>Union end code 33</b>	-	0.13	-
<b>Flare connection code 75</b>	-	0.08	0.125
<b>Union end code 78</b>	-	0.20	-

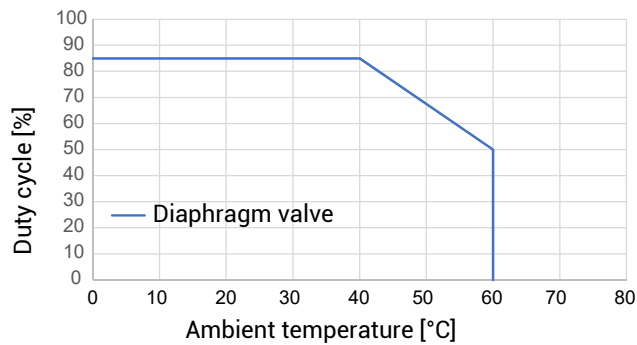
Weights in kg



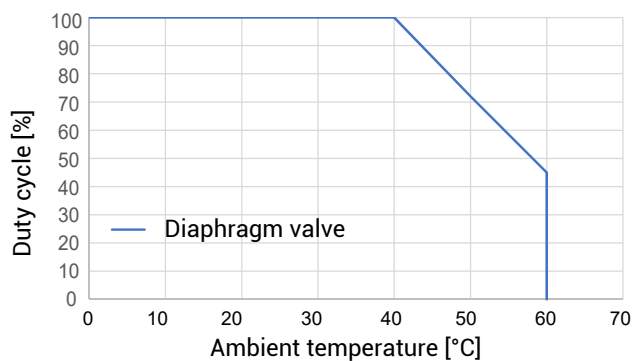
## Duty cycle and service life

**Service life:** **Control operation** - Class C according to EN 15714-2 (1,800,000 starts and 1200 starts per hour).  
**Open/Close duty** - At least 500,000 switching cycles at room temperature and permissible duty cycle.

**Duty cycle:** control module Open/Close control (Code AE)  
 Duty cycle with full valve lift and playing time 10 minutes.



Control module Positioner (code S0), Open/Close duty



## **Electrical data**

**Supply voltage U<sub>v</sub>:** 24 V DC ± 10%

**Rating:** 20 W

### **Analogue input signals – Control module Positioner (code S0)**

#### **Set value**

**Input signals:** 0/4 - 20 mA; 0 - 10 V (function selectable via IO-Link)

**Input type:** passive

**Input resistance:** 250 Ω

**Accuracy/linearity:** ≤ ±0.3% of full flow

**Temperature drift:** ≤ ±0.1% / 10°K

**Resolution:** 12 bit

**Reverse battery protection:** Yes (up to ± 24 V DC)

#### **Digital input signals**

**Inputs:** Function selectable via IO-Link (see table Overview of available functions – Input and output signals)

**Input voltage:** 24 V DC

**Logic level "1":** > 15.3 V DC

**Logic level "0":** < 5.8 V DC

**Input current:** typically < 0.5 mA

### **Analogue output signals – Control module Positioner (code S0)**

#### **Actual value**

**Output signal:** 0/4 - 20 mA; 0 - 10 V (function selectable via IO-Link)

**Output type:** active

**Accuracy:** ≤ ±1% of full flow

**Temperature drift:** ≤ ±0.1% / 10°K

**Load resistor:** ≤ 750 kΩ

**Resolution:** 12 bit

**Short-circuit proof:** Yes

**Digital output signals**

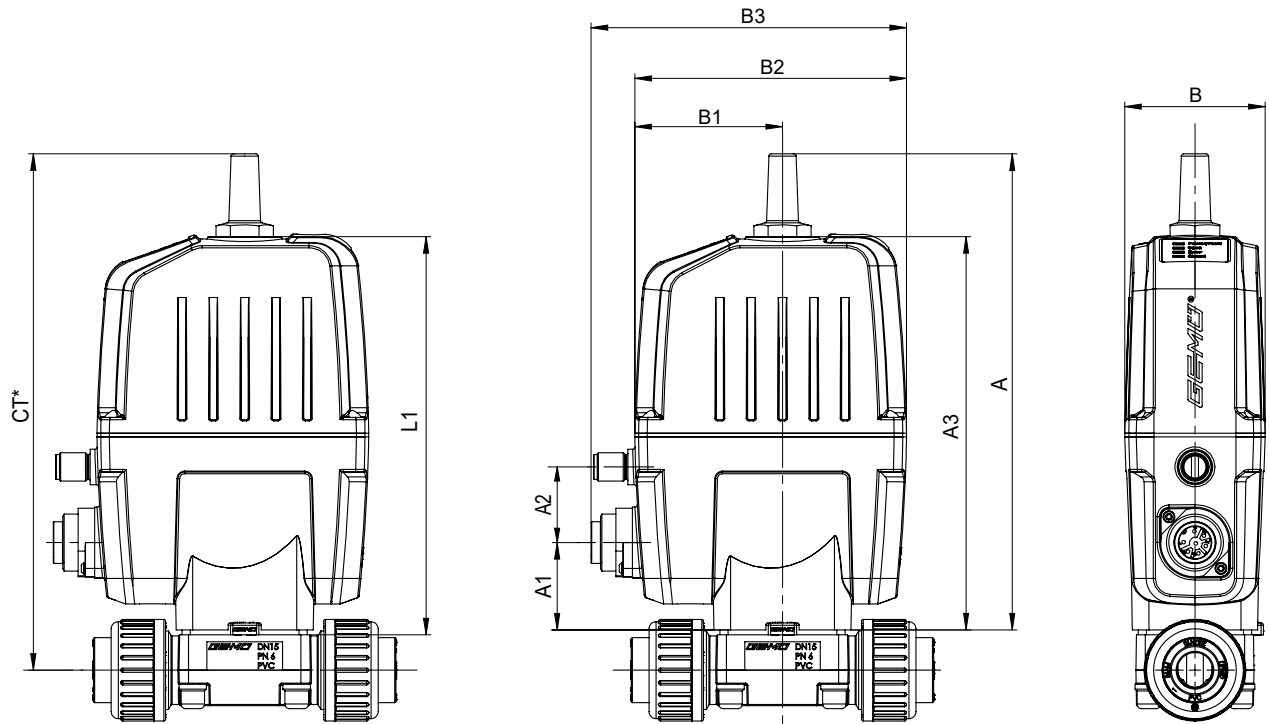
<b>Outputs:</b>	Function selectable via IO-Link (see table Overview of available functions – Input and output signals)
<b>Type of contact:</b>	Push-Pull
<b>Switching voltage:</b>	Power supply U <sub>v</sub>
<b>Switching current:</b>	≤ 140 mA
<b>Short-circuit proof:</b>	Yes

**Communication**

<b>Interface:</b>	IO-Link
<b>Function:</b>	Parameterization/process data
<b>Transmission rate:</b>	38.4 kBaud

## Dimensions

### Installation and actuator dimensions

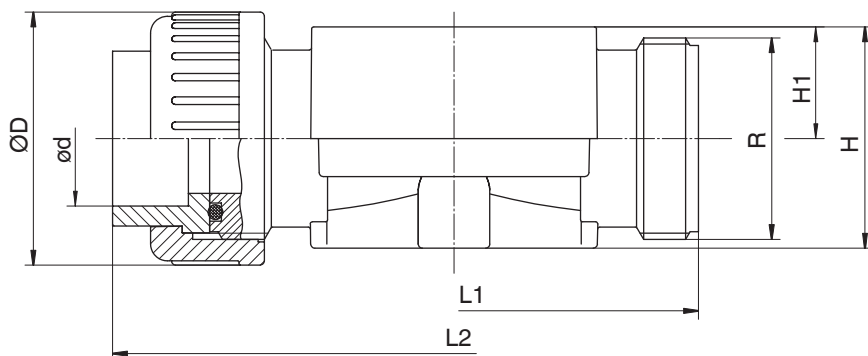


MG	DN	Actuator version	A	A1	A2	A3	B	B1	B2	B3	L1
10	12	0A	201.5	37	32	166.5	59.4	62.5	115	133.5	166.5
	15	0A	201.5	37	32	166.5	59.4	62.5	115	133.5	166.5

Dimensions in mm, MG = diaphragm size  
 Dimension A2 only for control module – positioner (code S0)  
 \* CT = A + H1 (see body dimensions)

## Body dimensions

### Union end, connection type code 7



MG	DN	Connection type code 7 <sup>1)</sup>									
		Material code 2)									
		R	øD	ød	L1	L2		H		H1	
1, 20	5, N5					1, 20	5, N5	1, 20	5, N5		
10	15	G1	43	20	90	128	125	30	41	15	16

Dimensions in mm, MG = diaphragm size

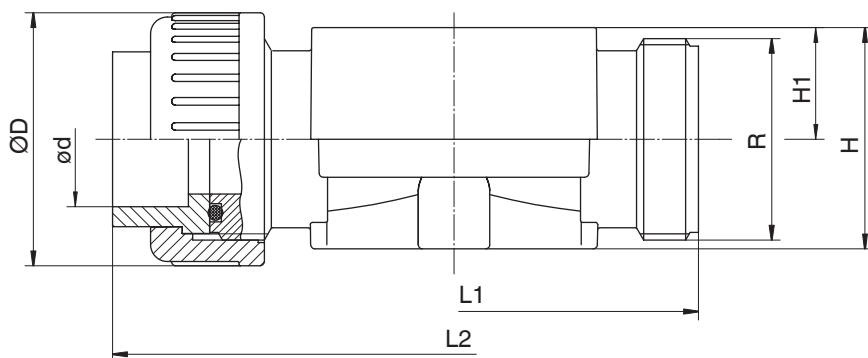
1) **Connection type**

Code 7: Union end with DIN insert (socket)

2) **Valve body material**

Code 1: PVC-U, grey  
 Code 5: PP, reinforced  
 Code 20: PVDF  
 Code N5: PP-H, natural

### Union end, connection type code 33



MG	DN	Connection type code 33 <sup>1)</sup>						
		Material code 1 <sup>2)</sup>						
		L1	L2	H	H1	øD	ød	R
10	15	90	128	30	15	43	21.4	G1

Dimensions in mm, MG = diaphragm size

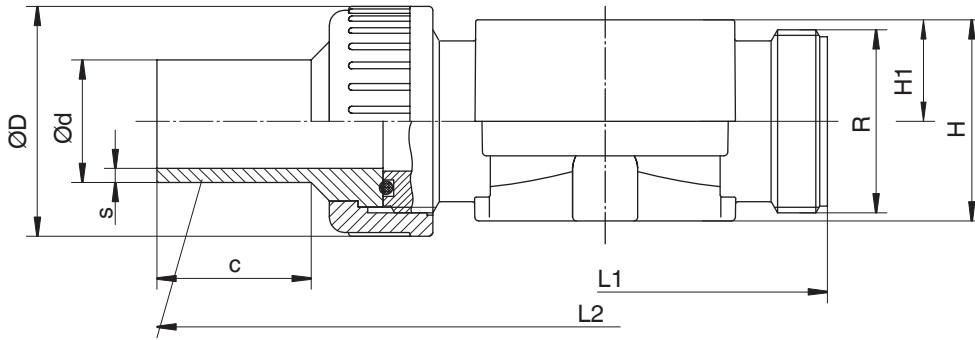
1) **Connection type**

Code 33: Union end with inch insert - BS (socket)

2) **Valve body material**

Code 1: PVC-U, grey

**Union end, connection type code 78**

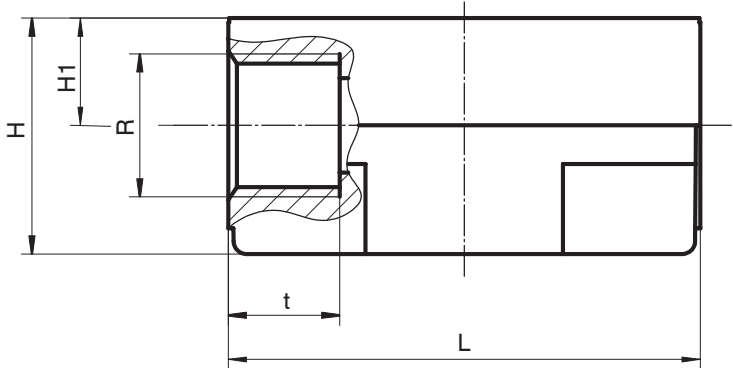


MG	DN	Connection type code 78 <sup>1)</sup>											
		Material code <sup>2)</sup>								5	20, N5	5	20, N5
		R	L1	L2	ØD	Ød	s	c	H		H1		
10	15	1	90	196	42	20	1,9	36	30	41	15	16	

Dimensions in mm, MG = diaphragm size

- 1) **Connection type**  
Code 78: Union end with DIN insert (for IR butt welding)
- 2) **Valve body material**  
Code 5: PP, reinforced  
Code 20: PVDF  
Code N5: PP-H, natural

**Threaded socket, connection type code 1**

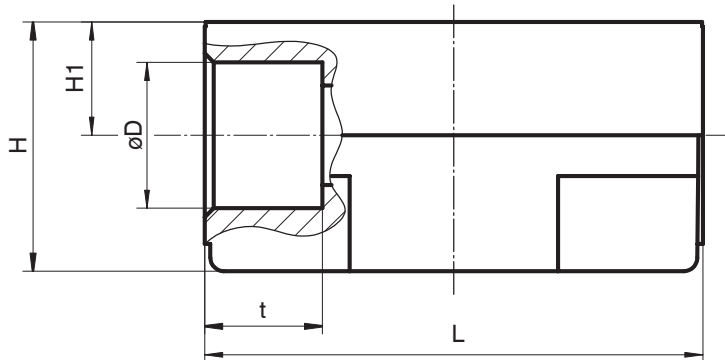


MG	DN	Connection type code 1 <sup>1)</sup>							
		Material code <sup>2)</sup>				1,5	20	1,5	20
		L	R	t	H	H	H1	H1	
10	12	55	G3/8	13	27.5	31.5	12.5	12.5	

Dimensions in mm, MG = diaphragm size

- 1) **Connection type**  
Code 1: Threaded socket DIN ISO 228
- 2) **Valve body material**  
Code 1: PVC-U, grey  
Code 5: PP, reinforced  
Code 20: PVDF

**Solvent cement socket, connection type code 2**

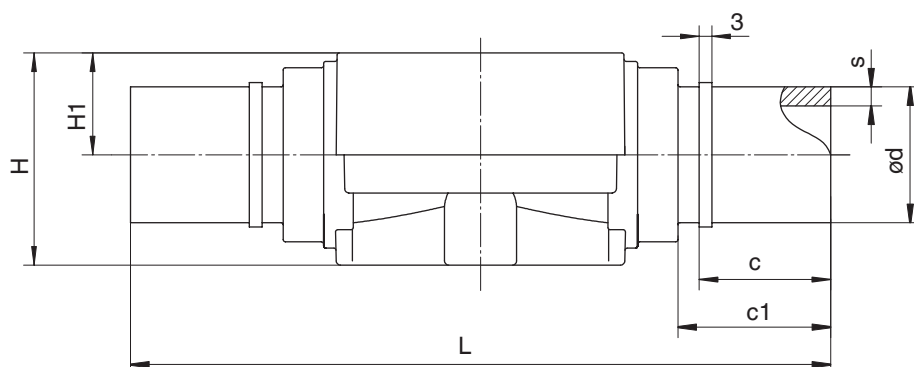


MG	DN	Connection type code 2 <sup>1)</sup>				
		Material code 1 <sup>2)</sup>				
		ø D	t	H	H1	L
10	12	16	13	27.5	12.5	55.0

Dimensions in mm, MG = diaphragm size

- 1) **Connection type**  
Code 2: Solvent cement socket DIN
- 2) **Connection type**  
Code 1: Threaded socket DIN ISO 228

**Spigot, connection type code 28**

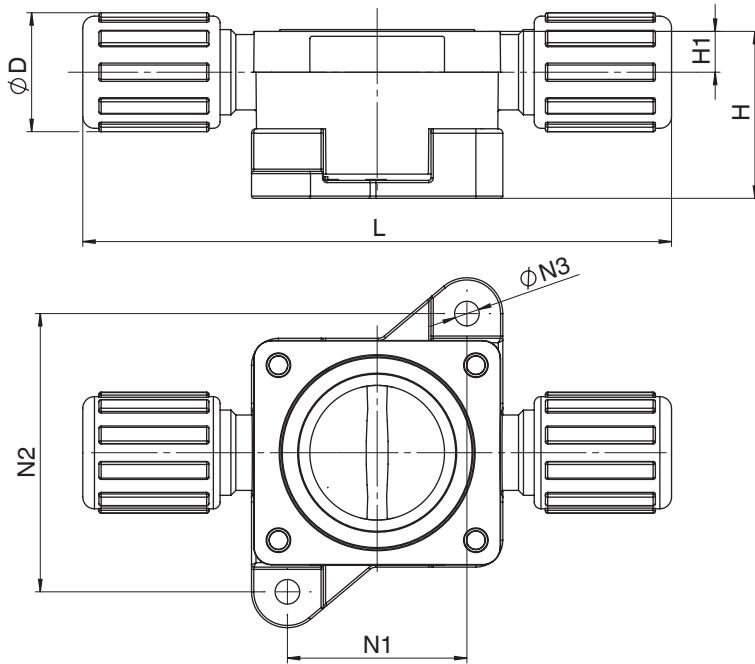


MG	DN	Connection type code 28 <sup>1)</sup>						
		Material code 20 <sup>2)</sup>						
		L	H	H1	ød	s	c	c1
10	15	134	41	16	20	1.9	31	37

Dimensions in mm, MG = diaphragm size

- 1) **Connection type**  
Code 28: Spigot for IR butt welding, BCF
- 2) **Valve body material**  
Code 20: PVDF

**Flare connection, code 75**

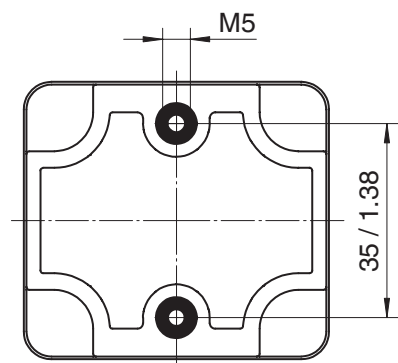


MG	DN	Connection type code 75						
		Material code N5						
		L	H	H1	ØD	N1	N2	ØN3
10	15	132	38.1	10	26.5	40	62	5.5
	20	134	44.5	15	26.5	40	62	5.5

Dimensions in mm, MG = diaphragm size

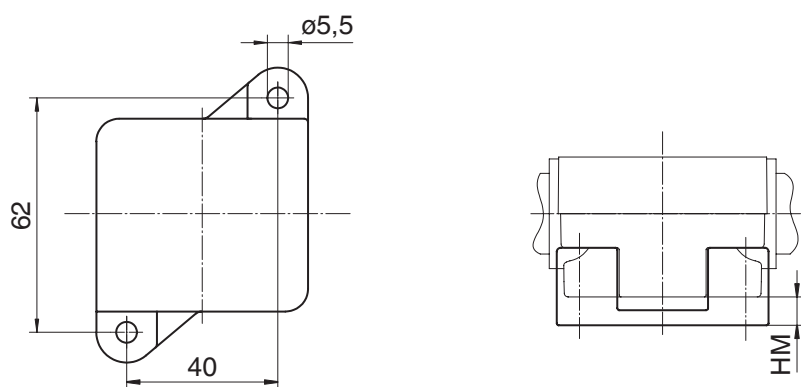


### Valve body mounting



Dimensions in mm, MG = diaphragm size

### Mounting plate

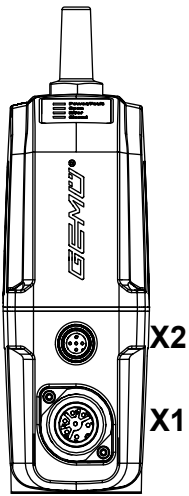


MG	DN	HM
10	12	5.0
	15	4.5
	20	4.5

Dimensions in mm, MG = diaphragm size

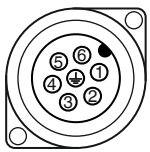
## Electrical connection

### Position of the connectors



## Electrical connection

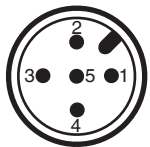
### Connection X1



7-pin plug, Binder, type 693

Pin	Signal name
1	Uv, 24 V DC supply voltage
2	GND
3	Digital input 1
4	Digital input 2
5	Digital input / output
6	Digital output, IO-Link
7	n. c.

### Connection X2 (only for control module code S0)



5-pin M12 plug, A-coded

Pin	Signal name
1	I+/U+, set value input
2	I-/U-, set value input
3	I+/U+, actual value output
4	I-/U-, actual value output
5	n. c.

## Overview of available functions – Input and output signals

	Function	Default settings		
		Control module AE	Control module A5	Control module A6
Digital input 1	Off Open Close Safe/On Initialization	Open	Open	Open
Digital input 2	Off Open Close Safe/On Initialization	Close	Safe/On	Safe/On
Digital input/output	Open Close Error Error+warning Initialization	Open	Open	Open
Digital output	Open Close Error Error+warning	Close	Close	Close

### NOTICE

When configuring the emergency power module (code A5 / A6), the control of the valve changes. Valve is controlled 1-pole via digital input 1. Level logic 1 moves the valve OPEN, level logic 0 moves the valve CLOSE.

	Function	Default settings		
		Control module S0	Control module S5	Control module S6
Digital input 1	Off Open Close Safe/On Initialization	Initialization	Initialization	Initialization
Digital input 2	Off Open Close Safe/On Initialization	Off	Safe/On	Safe/On
Digital input/output	Open Close Error Error+warning Initialization	Error	Error	Error
Digital output	Open Close Error Error+warning	Close	Close	Close
Analogue input	4 – 20 mA 0 – 20 mA 0 – 10 V	4 – 20 mA	4 – 20 mA	4 – 20 mA

	Function	Default settings		
		Control module S0	Control module S5	Control module S6
Analogue output	4 – 20 mA 0 – 20 mA 0 – 10 V	4 – 20 mA	4 – 20 mA	4 – 20 mA

## Accessories

### GEMÜ 1218



The GEMÜ 1218 is a connector (cable socket / cable plug), 7-pin. Straight and/or 90° angled plug type.

#### Ordering information

GEMÜ 1218 Binder connector			
<b>Connection X1 – supply voltage, relay outputs</b>			
Binder plug	Mating connector 468/ eSy series	Terminal compartment/ screws, 7-pin	88220649
		Terminal compartment/ screws, 7-pin, 90°	88377714 <sup>1)</sup>

1) provided in the scope of delivery

### GEMÜ 1219



#### Cable socket / cable plug M12

The GEMÜ 1219 is a connector (cable socket / cable plug) M12, 5-pin. Straight and/or 90° angled plug type. Defined cable length or with threaded connection without cable. Various materials available for the fixing nut.

#### Ordering information

Suitable for electrical connection of the connector X2

Description	Length	Order number
5-pin, angle	without cable	88205545
	2 m cable	88205534
	5 m cable	88205540
	10 m cable	88210911
	15 m cable	88244667
5-pin, straight	without cable	88205544
	2 m cable	88205542
	5 m cable	88205543
	10 m cable	88270972
	15 m cable	88346791



GEMÜ Gebr. Müller Apparatebau GmbH & Co. KG  
Fritz-Müller-Straße 6-8, 74653 Ingelfingen-Criesbach,  
Germany  
Phone +49 (0)7940 123-0 · info@gemue.de  
www.gemu-group.com