GEMÜ R639 eSyStep

Motorized diaphragm valve

Features

- Hermetic separation between medium and actuator
- Installation for optimized 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

Description

The GEMÜ R639 is a motorized 2/2-way diaphragm valve. The eSyStep electric actuator is available as ON/OFF or with integrated positioner. An integral optical and electrical position indicator is standard. The self-locking actuator holds its position in a stable manner when idle and in the event of power supply failure.

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 32
- Body configurations: 2/2-way body
- Connection types: Flare | Solvent cement socket | Spigot | Threaded connection | 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

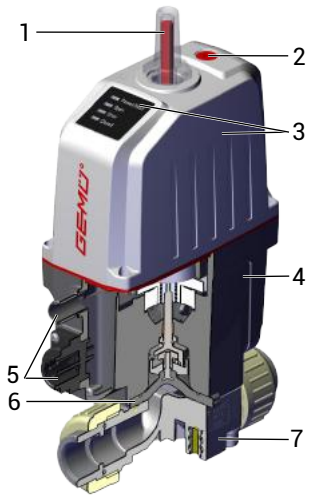
* depending on version and/or operating parameters

FDA

further information
webcode: GW-R639

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, FKM, EPDM, PTFE/ EPDM
7	Valve body	PVC-U (grey), PP, PVDF, PP-H (natural)

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 [1]			
		7		33	78
		Material code [2]			
		5, 20, N5	1	1	5, 20, N5
10	DN 15	X	X	X	X
20	DN 15	-	X	X	-
	DN 20	-	X	X	-
	DN 25	-	X	X	-
25	DN 32	-	X	X	-

MG = diaphragm size, X = standard

1) **Connection type**
Code 7: Union end with insert (socket) - DIN
Code 33: Union end with inch insert - BS (socket)
Code 78: Union end with insert (for IR butt welding) - DIN

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

Spigot

MG	DN	Connection type code 28 [1]
		Material code 20 [2]
10	DN 15	X

MG = diaphragm size

1) **Connection type**
Code 28: Spigot for IR butt welding, BCF

2) **Valve body material**
Code 20: PVDF

Flare

MG	DN	Connection type code 75 [1]
		Material code N5 [2]
10	DN 15	X
	DN 20	X

MG = diaphragm size

1) **Connection type**
Code 75: Flare connection with PVDF union nut

2) **Valve body material**
Code N5: PP-H, natural

Threaded socket

MG	DN	Connection type code 1 [1]
		Material code 1, 5, 20 [2]
10	DN 12	X

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

MG	DN	Connection type code 2 [1]
		Material code 1 [2]
10	DN 12	X

MG = diaphragm size

1) **Connection type**
Code 2: Solvent cement socket DIN

2) **Valve body material**
Code 1: PVC-U, grey

Availability of mounting plate

MG	DN	Material code [1]
10	DN 12	X
	DN 15	X
	DN 20	X

Dimensions in mm, MG = diaphragm size

1) **Valve body material**
Code 20: PVDF
Code N5: PP-H, natural

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, motorized, eSyStep	R639

2 DN	Code
DN 12	12
DN 15	15
DN 20	20
DN 25	25
DN 32	32

3 Body configuration	Code
2/2-way body	D

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

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
EPDM	29
PTFE/EPDM one-piece	54

7 Voltage/Frequency	Code
24 V DC	C1

8 Control module	Code
OPEN/CLOSE control, additional end position indicators	AE
Open/Close control, additional end position indicators, configured for emergency power supply module (NC)	A5

8 Continuation of Control module	Code
Open/Close control, additional end position indicators, configured for emergency power supply module (NO)	A6
Positioner	S0
Positioner, configured for emergency power supply module (NC)	S5
Positioner, configured for emergency power supply module (NO)	S6

9 Actuator version	Code
Actuator size 0 diaphragm size 10	0C
Actuator size 1	1A

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

Order example

Order option	Code	Description
1 Type	R639	Diaphragm valve, motorized, eSyStep
2 DN	15	DN 15
3 Body configuration	D	2/2-way body
4 Connection type	7	Union end with insert (socket) - DIN
5 Valve body material	1	PVC-U, grey
6 Diaphragm material	29	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 - 6	0 - 6
	15	0 - 6	0 - 6
	20	0 - 6	0 - 6
20	15	0 - 8	0 - 8
	20	0 - 8	0 - 8
	25	0 - 8	0 - 8
25	32	0 - 8	0 - 8

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.

Leakage rate: Leakage rate A to P11/P12 EN 12266-1

Kv values:

MG	DN	Kv values
10	**12**	2.8
	15	3.5
	20	3.5
20	**15**	6.0
	20	10.0
	25	12.0
25	**32**	20.0

MG = diaphragm size, Kv values in m³/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.

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.
The Kv value curve (Kv value dependent on valve stroke) can vary depending on the diaphragm material and duration of use.

Product compliance

Pressure Equipment Directive: 2014/68/EU

Machinery Directive: 2006/42/EU
FDA*
USP* Class VI
* depending on version and/or operating parameters

EMC Directive: 2014/30/EU

Interference resistance: DIN EN 61000-6-2
DIN EN 61326-1 (industrial processes)

Interference emission: DIN EN 61000-6-4 (Sep. 2011)
Interference emission class: Class A
Interference emission group: Group 1

Materials

Materials:

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

Mechanical data

Protection class: IP 65 acc. to EN 60529

Actuating speed: Max. 3 mm/s

Weight:

Actuator

Actuator size 0 (code 0C) 0.95 kg
Actuator size 1 (code 1A) 1.88 kg

Valve body

MG	DN	Threaded socket	Solvent cement socket	Union end			Spigot	Flare
		Connection types code						
		1	2	7	33	78	28	75
10	12	0.08	0.06	-	-	-	-	-
	15	-	-	0.18	0.13	0.20	0.13	0.08
	20	-	-	-	-	-	-	0.125
20	15	-	-	0.17	0.26	0.27	-	-
	20	-	-	0.21	0.30	0.36	-	-
	25	-	-	0.26	0.38	0.37	-	-
25	32	-	-	0.40	0.73	0.63	-	-

MG = diaphragm size, weight in kg

Mechanical environmental conditions: Class 4M8 acc. to EN 60721-3-4:1998

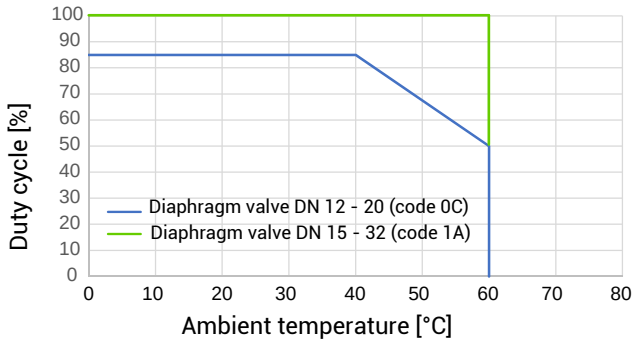
Vibration: 5g acc. to IEC 60068-2-6 Test Fc

Shock: 25g acc. to 60068-2-27 Test Ea

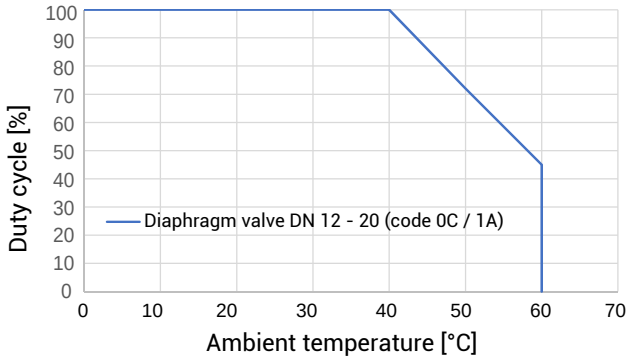
Duty cycle and service life

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.



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



The specified curves and values apply to the factory setting.

With reduced forces, higher duty cycles and/or higher ambient temperatures are possible. At higher force settings the duty cycle and/or ambient temperature is reduced (for IO-Link parameters see operating instructions).

Electrical data

Supply voltage Uv: 24 V DC ± 10%

Rating:

Actuator size 0 (code 0A)	20 W
Actuator size 1 (code 1A)	60 W

Operation: Step motor, self-locking

Reverse battery protection: Yes

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

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

Communication

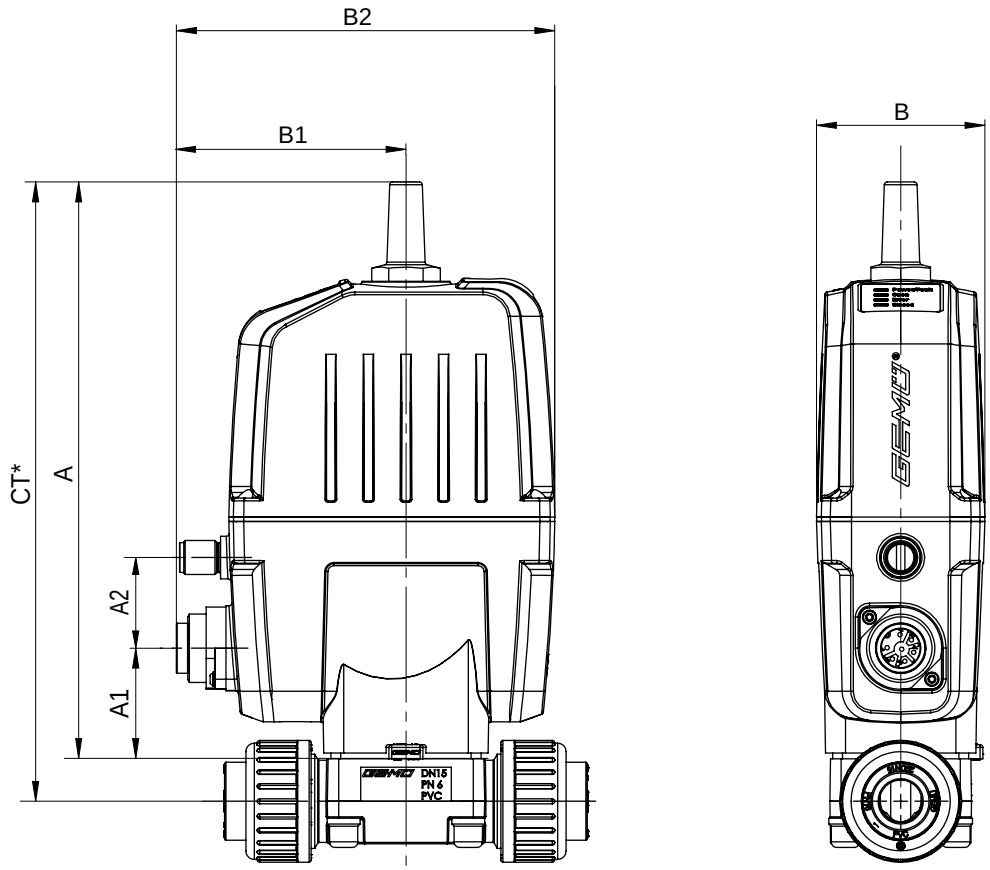
Interface:	IO-Link
Function:	Parameterization/process data
Transmission rate:	38400 baud
Frame type in Operate:	2.5 (eSyStep ON/OFF, code AE) 2.V (eSyStep positioner, code S0), PDout 3Byte; PDin 3 Byte; OnRequestData 2 Byte
Min. cycle time:	2.3 ms (eSyStep ON/OFF, code AE) 20 ms (eSyStep positioner, code S0)
Vendor-ID:	401
Device-ID:	1906701 (eSyStep ON/OFF, code AE) 1906801 (eSyStep positioner, code S0),
Product-ID:	eSyStep On/Off (code AE) eSyStep Positioner (code S0)
ISDU support:	Yes
SIO operation:	Yes
IO-Link specification:	V1.1

IODD files can be downloaded via https://ioddfinder.io-link.com/ or www.gemu-group.com.

Dimensions

Installation and actuator dimensions

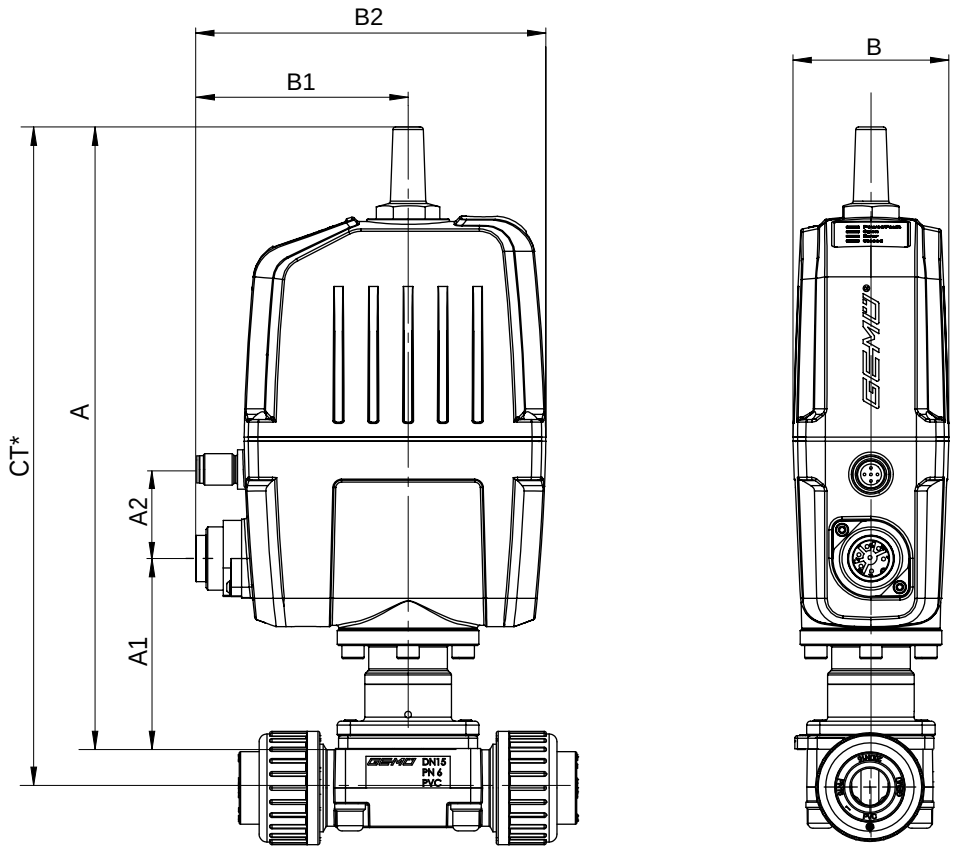
Actuator version code 0C



MG	DN	Actuator version	A	A1	A2	B	B1	B2
10	12	0C	203.5	39.0	33.2	59.4	81.0	133.5
	15	0C	203.5	39.0	33.2	59.4	81.0	133.5
	20	0C	203.5	39.0	33.2	59.4	81.0	133.5

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

Actuator version code 1A

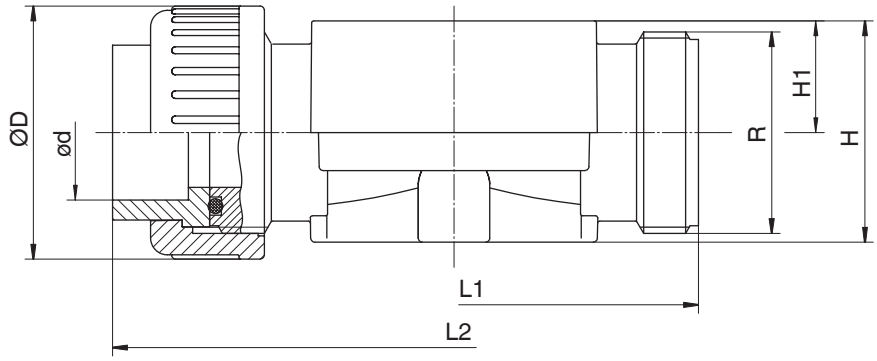


MG	DN	Actuator version	A	A1	A2	B	B1	B2
20	15	1A	298.0	116.0	32.5	70.0	82.0	150.0
	20	1A	298.0	116.0	32.5	70.0	82.0	150.0
	25	1A	298.0	116.0	32.5	70.0	82.0	150.0
25	32	1A	306.0	124.0	32.5	70.0	82.0	150.0

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 DIN (code 7 / MG 10)



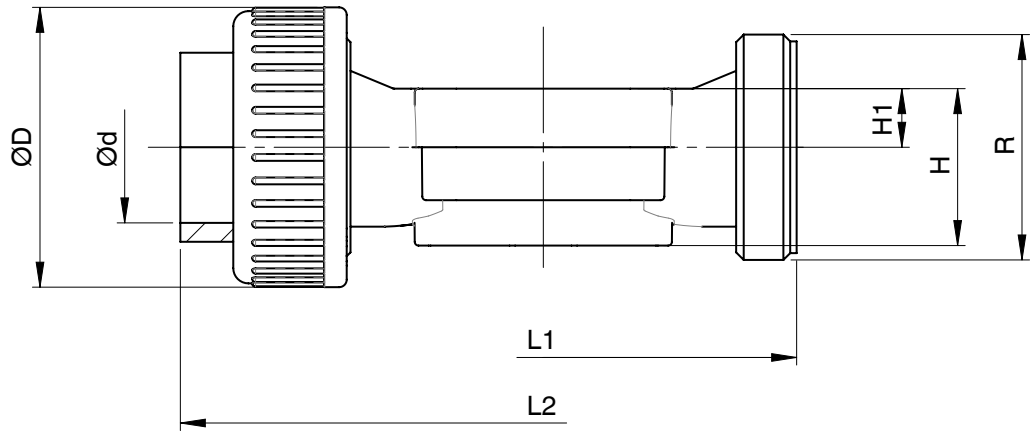
MG	DN	Connection type code 7 [1]									
		Material code [2]									
						1, 20	5, N5	1, 20	5, N5	1, 20	5, N5
		R	øD	ød	L1	L2		H		H1	
10	**15**	G1	43.0	20.0	90.0	128.0	125.0	30.0	41.0	15.0	16.0

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 DIN (code 7 / MG 20 - 25)



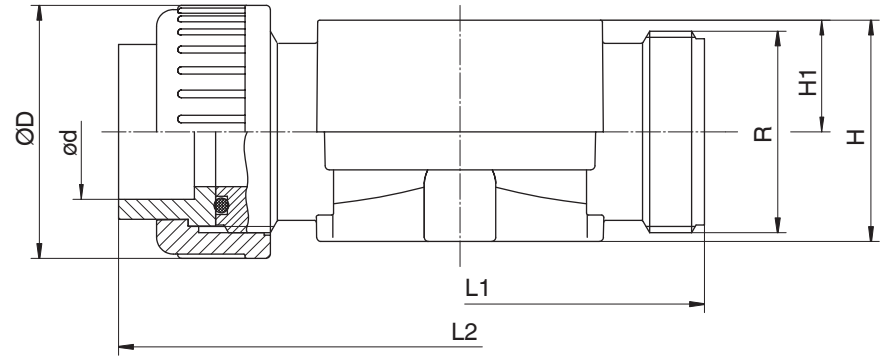
MG	DN	Connection type code 7 [1]							
		Material code 1 [2]							
		R	NPS	øD	L1	H	H1	ød	L2
20	**15**	G 1	1/2"	43.0	108.0	36.0	10.0	20.0	146.0
	20	G 1¼	3/4"	53.0	108.0	38.0	12.0	25.0	152.0
	25	G 1½	1"	60.0	116.0	39.0	13.0	32.0	166.0
25	**32**	G 2	1¼"	74.0	134.0	41.0	15.0	40.0	192.0

Dimensions in mm, MG = diaphragm size

1) **Connection type**
Code 7: Union end with DIN insert (socket)

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

Union end code 33



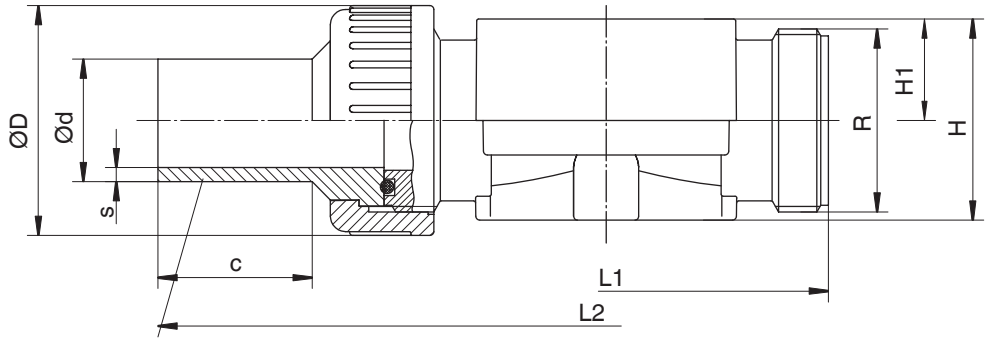
MG	DN	Connection type code 33 [1]						
		Material code 1 [2]						
		L1	L2	H	H1	øD	ød	R
10	**15**	90.0	128.0	30.0	15.0	43.0	21.4	G1

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 code 78



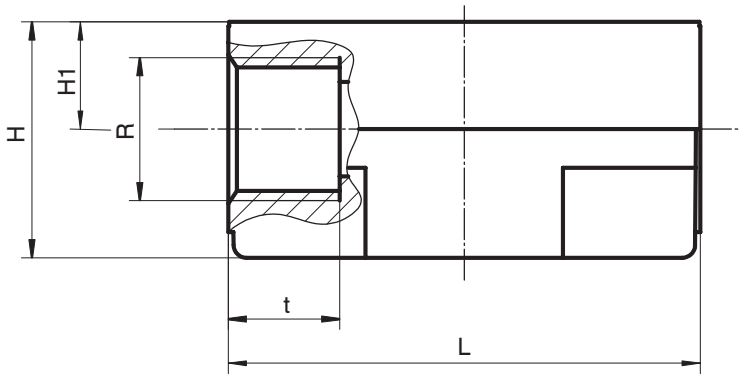
MG	DN	Connection type code 78 [1]										
		Material code [2]										
									5	20, N5	5	20, N5
		R	L1	L2	øD	ød	s	c	H		H1	
10	15	1	90.0	196.0	42.0	20.0	1.9	36.0	30.0	41.0	15.0	16.0

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 code 1



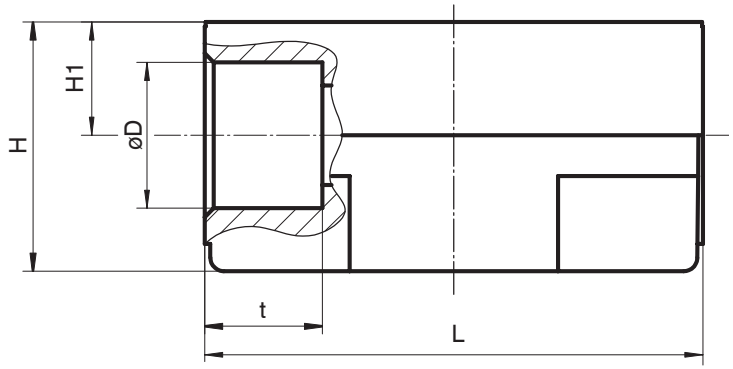
MG	DN	Connection type code 1 [1]						
		Material code [2]						
					1, 5	20	1, 5	20
		L	R	t	H	H	H1	H1
10	12	55.0	G3/8	13.0	27.5	31.5	12.5	12.5

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 code 2



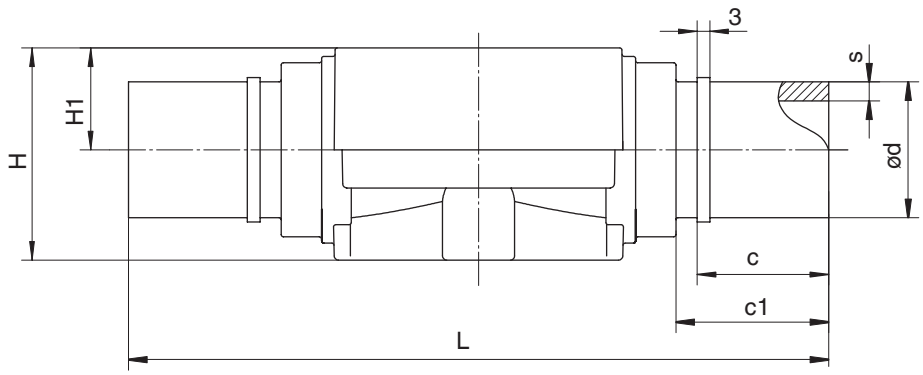
MG	DN	Connection type code [1]				
		Material code [2]				
		ø D	t	H	H1	L
10	12	16.0	13.0	27.5	12.5	55.0

Dimensions in mm, MG = diaphragm size

1) **Connection type**
Code 2: Solvent cement socket DIN

2) **Valve body material**
Code 1: PVC-U, grey

Spigot, connection type code 28



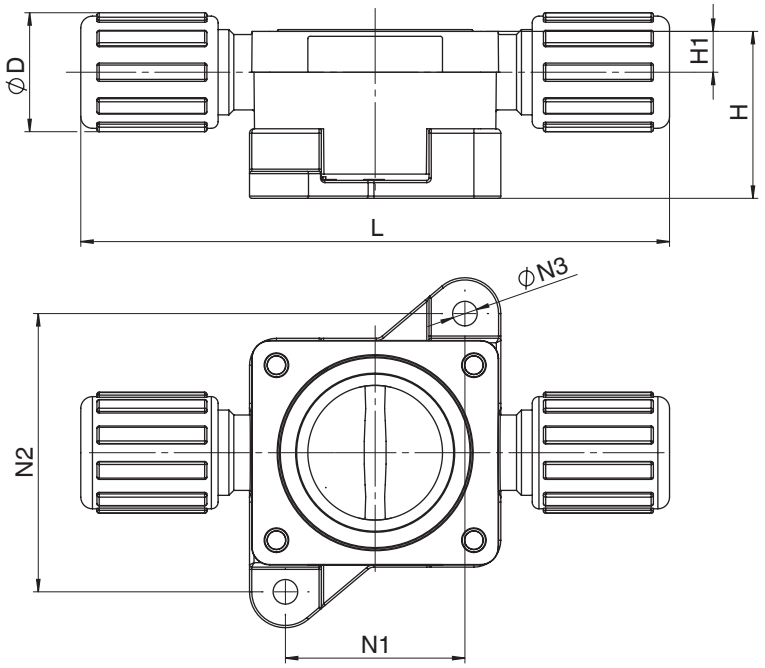
MG	DN	Connection type code 28 [1]						
		Material code 20 [2]						
		L	H	H1	ød	s	c	c1
10	15	134	41	16	20	1.9	31	37

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



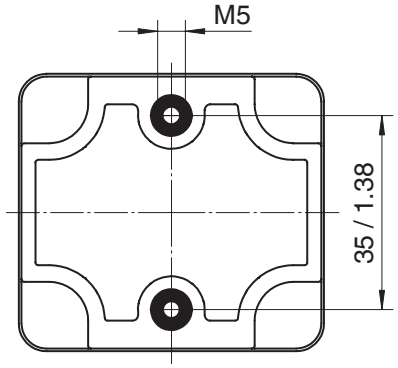
MG	DN	Connection type code 75 [1]						
		Material code N5 [2]						
		L	H	H1	øD	N1	N2	øN3
10	**15**	132.0	38.1	10.0	26.5	40.0	62.0	5.5
	20	134.0	44.5	15.0	26.5	40.0	62.0	5.5

Dimensions in mm, MG = diaphragm size

1) **Connection type**
Code 75: Flare connection with PVDF union nut

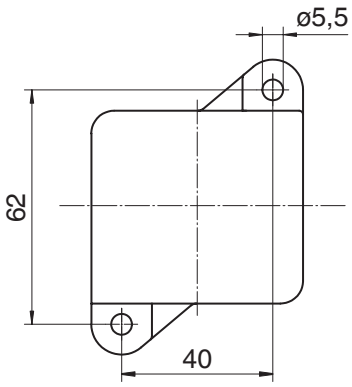
2) **Valve body material**
Code N5: PP-H, natural

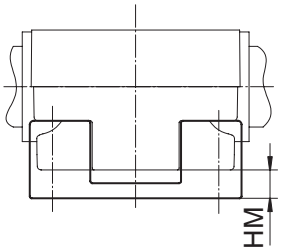
Valve body mounting



Dimensions in mm, MG = diaphragm size

Mounting plate



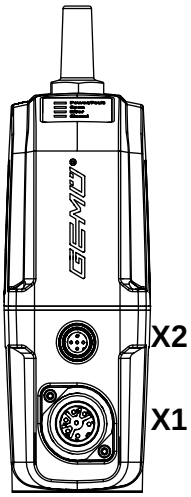


MG	DN	HM
10	**12**	5.0
	15	4.5
	20	4.5

Dimensions in mm, MG = diaphragm size

Electrical connection

Position of the connectors



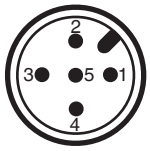
Electrical connection

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

NOTICE

The factory default setting is reset to default settings when a reset is carried out.

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

	Function	Control module S0	Control module S5 + S6
		Default settings	Factory default setting
Digital input 1	Off Open Close Safe/On Initialization	Initialization	Initialization
Digital input 2	Off Open Close Safe/On Initialization	Off	Safe/On
Digital input/output	Open Close Error Error+warning Initialization	Error	Error
Digital output	Open Close Error Error+warning	Close	Close

	Function	Control module S0 Default settings	Control module S5 + S6 Factory default setting
Analogue input	4 – 20 mA 0 – 20 mA 0 – 10 V	4 – 20 mA	4 – 20 mA
Analogue output	4 – 20 mA 0 – 20 mA 0 – 10 V	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			
Connection X1 – supply voltage, relay outputs			
Binder plug	Mating connector 468/ eSy series	Terminal compartment/ screws, 7-pin	88220649
		Terminal compartment/ screws, 7-pin, 90°	88377714 [1]

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 [1]
	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

1) provided in the scope of delivery for control module code S0

GEMÜ 1571

Emergency power supply module

The capacitive emergency power module GEMÜ 1571 is suitable for valves with motorized actuators such as GEMÜ eSyStep and eSyDrive. In the event of a power failure, the product provides an uninterrupted power supply so that the valve can be moved to the safety position. The emergency power module has a capacity of 1700Ws. The input and output voltage is 24 V.

Ordering information

GEMÜ 1571 emergency power supply module			
Input voltage	Output voltage	Capacitance	Item number
24 V	24 V	1700 Ws	88660398

GEMÜ 1573

Switching power supply unit

The switching power supply unit GEMÜ 1573 converts unstabilized input voltages of 100 to 240 V AC into a constant output voltage of 24 V DC. The product can be used as an accessory for valves with motorized actuators such as GEMÜ eSyStep und eSyDrive. Different powers and output currents are available.

Ordering information

GEMÜ 1573 switching power supply unit			
Input voltage	Output voltage	Output current	Item number
100 - 240 V AC	24 V DC	5 A	88660400
		10 A	88660401

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