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Астана (7172)727-132
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Волгоград (844)278-03-48
Вологда (8172)26-41-59
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89
Иваново (4932)77-34-06

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Иркутск (395)279-98-46
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Кемерово (3842)65-04-62
Киров (8332)68-02-04
Краснодар (861)203-40-90
Красноярск (391)204-63-61
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Набережные Челны (8552)20-53-41
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Новокузнецк (3843)20-46-81
Новосибирск (383)227-86-73
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Казахстан (772)734-952-31

Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Россия (495)268-04-70
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Саратов (845)249-38-78-78
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Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13

Сургут (3462)77-98-35
Тверь (4822)63-31-35
Томск (3822)98-41-53
Тула (4872)74-02-29
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Уфа (347)229-48-12
Хабаровск (4212)92-98-04
Челябинск (351)202-03-61
Череповец (8202)49-02-64
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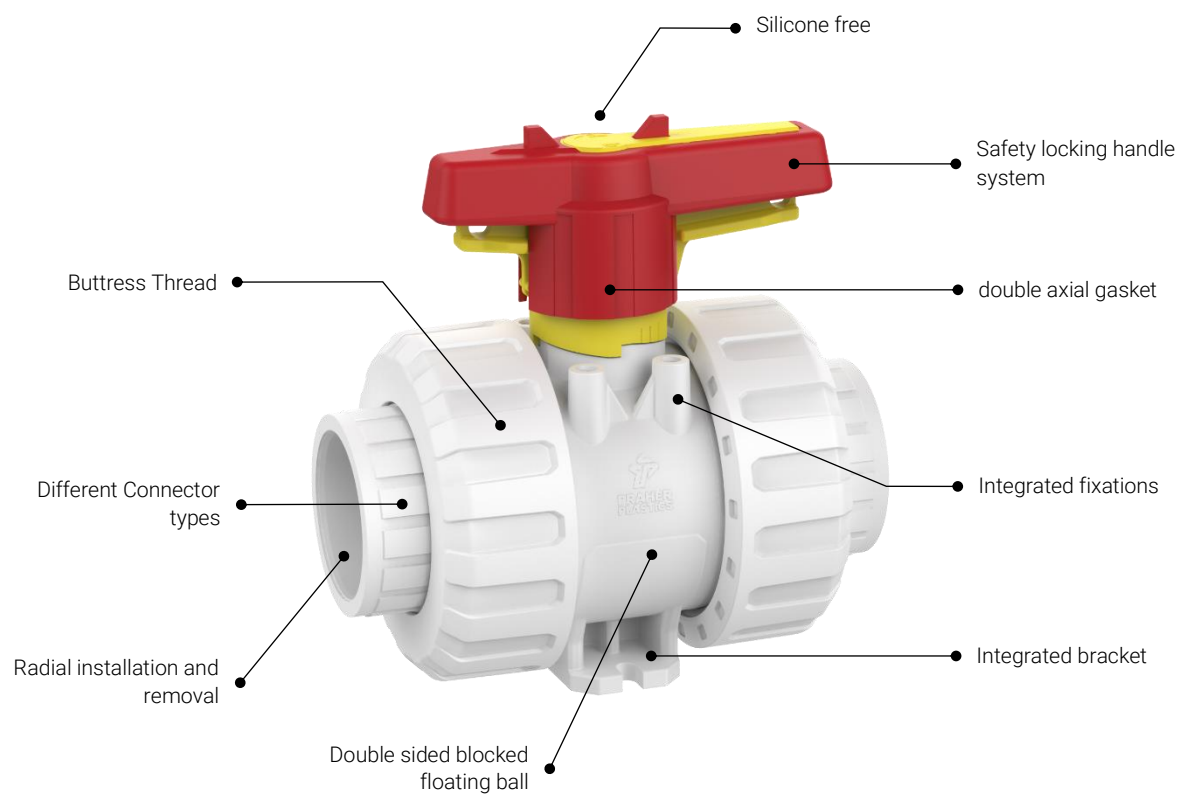
Kugelhahn
Ball Valve

M1

PVDF

DATENBLATT
DATASHEET

2-Wege Kugelhahn M1

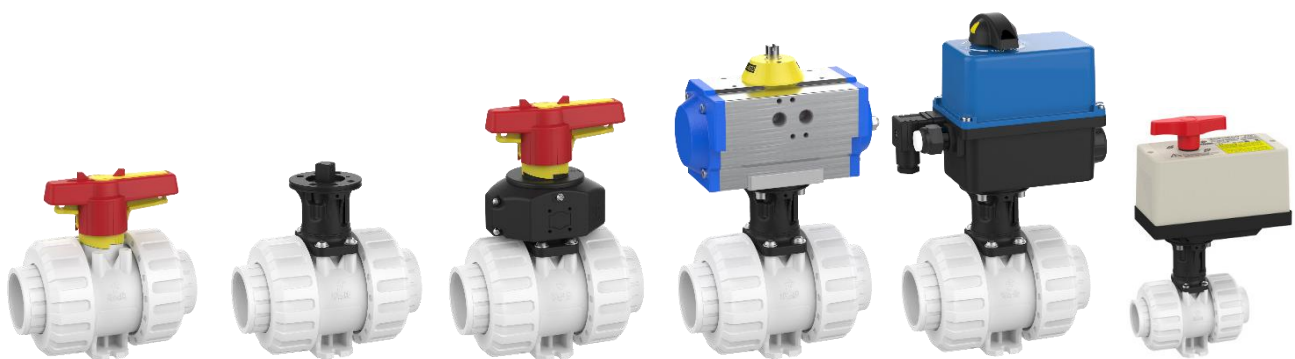


Overview

General

Material	Body material Seal material Ball seating joint	PVDF FPM PTFE
Dimensions	DN10 – DN80 d16 – d110 3/8" – 4"	
Connector types	Fusion socket Fusion spigot Fusion spigot long Threaded socket Backing flange	metric metric metric BSP / NPT DIN / ANSI
Operating pressure	DN10 – DN80 d110	PN16

Range summery



Hand operated

Adapter Set

Position
Feedback

Pneumatic

Elektric

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2W ball valve electric EO ER

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2W ball valve pneumatic

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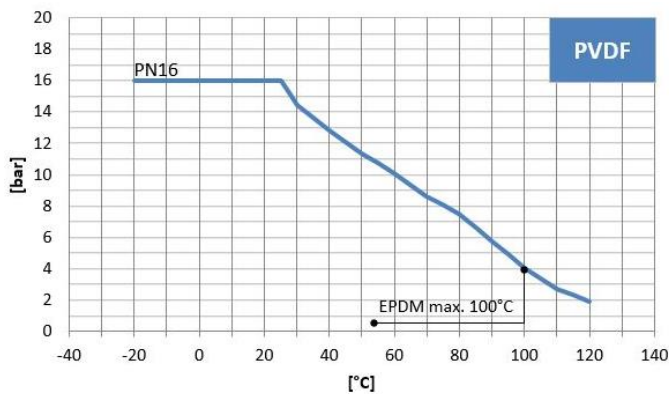


accessories / spare parts

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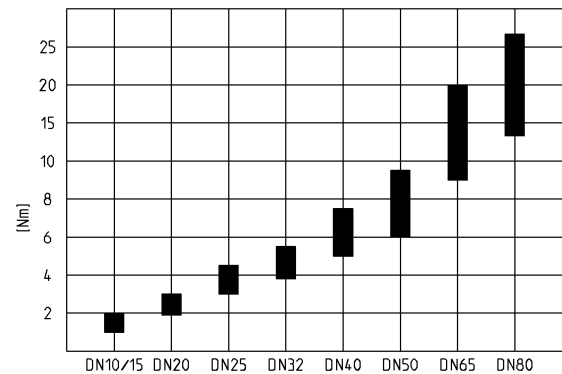
Technical data

Pressure – temperature – diagram

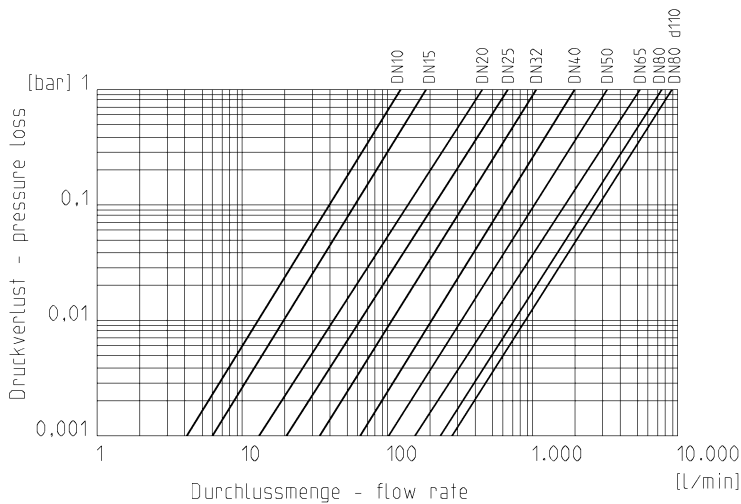


The values of the pressure-temperature-diagram are based on a service life of 25 years at static pressure load and apply to water-like media.

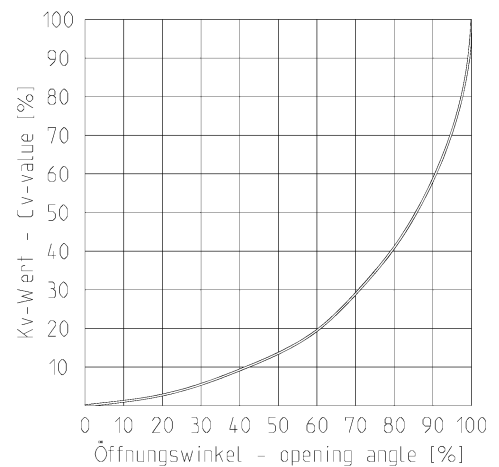
Torque at the shaft



Flow rate – pressure loss



Flow characteristics

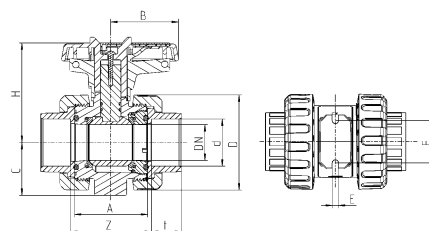


Cv-value-table

pressure loss	DN10 d16	DN15 d20	DN20 d25	DN25 d32	DN32 d40	DN40 d50	DN50 d63	DN65 d75	DN80 d90	DN80 d110
0,001 bar	4,1	6,0	13,9	20,6	34,2	62,6	102,5	164,4	237,1	179,8
1,0 bar	130	190	440	650	1080	1980	3240	5200	7500	8850

Specification in l/min

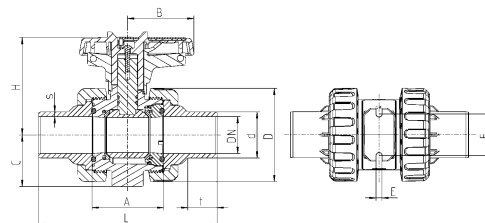
Dimensions hand operated



Connector type

PVDF fusion socket metric (dimensions in mm)

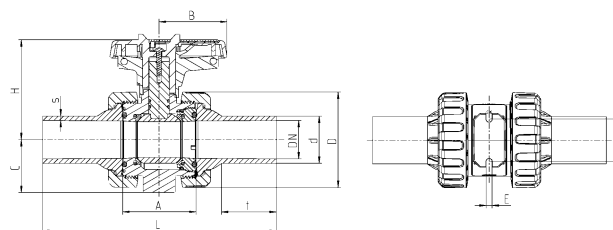
DN	10	15	20	25	32	40	50	65	80	80
d	16	20	25	32	40	50	63	75	90	110
A	61,5	61,5	69	73	83	94	109	131,5	156,5	156,5
B	39,5	39,5	51	51	63,5	72	84	110	132	132
C	33	33	40	43,5	51	56,5	64,5	85	100	100
D	56,5	56,5	67	73,5	90	105,5	124,5	157,5	192,5	192,5
E	5,4	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	34	36	38	40	45	50	65	80	80
H	71,5	71,5	78	80	98,5	106,5	113,5	143	161	161
t	14,5	16	17	19,5	22	25	29	35	38,5	44
Z	69,5	67	78	84	97	113	136	158,5	205	163
PN	16	16	16	16	16	16	16	16	16	16



Connector type

PVDF fusion spigot metric (dimensions in mm)

DN	10	15	20	25	32	40	50	65	80	80
d	16	20	25	32	40	50	63	75	90	110
A	61,5	61,5	69	73	83	94	109	131,5	156,5	156,5
B	39,5	39,5	51	51	63,5	72	84	110	132	132
C	33	33	40	43,5	51	56,5	64,5	85	100	100
D	56,5	56,5	67	73,5	90	105,5	124,5	157,5	192,5	192,5
E	5,4	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	34	36	38	40	45	50	65	80	80
H	71,5	71,5	78	80	98,5	106,5	113,5	143	161	161
L	114	124,5	144,5	155	172	193	223	278	290,5	316,5
s	1,9	1,9	1,9	2,4	2,4	3	3	3,6	4,3	5,3
t	13	13,5	15,5	18,5	20,5	23,5	28,5	32	36	40
PN	16	16	16	16	16	16	16	16	16	16

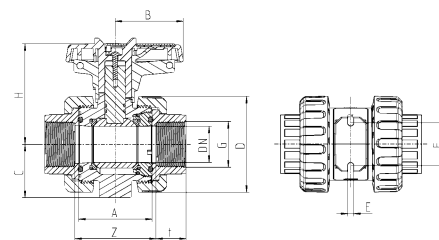


Connector type

PVDF fusion spigot long metric (dimensions in mm)

DN	15	20	25	32	40	50
d	20	25	32	40	50	63
A	61,5	69	73	83	94	109
B	39,5	51	51	63,5	72	84
C	33	40	43,5	51	56,5	64,5
D	56,5	67	73,5	90	105,5	124,5
E	5,4	5,4	6,4	6,4	6,4	6,4
F	34	36	38	40	45	50
H	71,5	78	80	98,5	106,5	113,5
L	192	212	222,5	241	262	292
s	1,9	1,9	2,4	2,4	3	3
t	47,5	49,5	52	55	58	63
PN	16	16	16	16	16	16

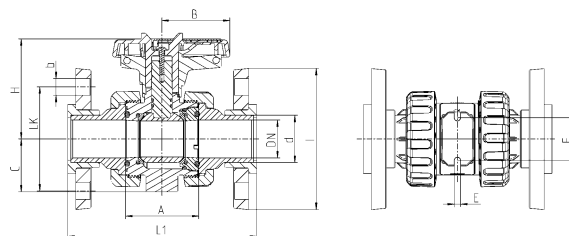
Dimension hand operated



Connector type

PVDF threaded socket BSP / NPT (dimensions in mm)

DN	10	15	20	25	32	40	50
inch	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
A	61,5	61,5	69	73	83	94	109
B	39,5	39,5	51	51	63,5	72	84
C	33	33	40	43,5	51	56,5	64,5
D	56,5	56,5	67	73,5	90	105,5	124,5
E	5,4	5,4	5,4	6,4	6,4	6,4	6,4
F	34	34	36	38	40	45	50
H	71,5	71,5	78	80	98,5	106,5	113,5
t	16	16	19,5	22,5	26	30,5	37
Z	66	67,5	75	80	89	102	120
PN	16	16	16	16	16	16	16



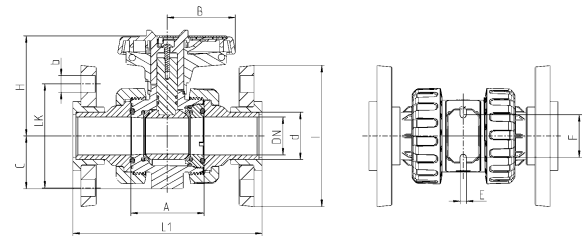
Connector type

PP-GF backing flange DIN with steel insert

(dimensiones in mm)

DN	15	20	25	32	40	50	65	80	80
d	20	25	32	40	50	63	75	90	110
A	61,5	69	73	83	94	109	131,5	156,5	156,5
B	39,5	51	51	63,5	72	84	110	132	132
b	14	14	14	18	18	18	18	18	18
C	33	40	43,5	51	56,5	64,5	85	100	100
E	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	36	38	40	45	50	65	80	80
H	71,5	78	80	98,5	106,5	113,5	143	161	161
I	95	108	115	140	150	165	186	202	220
L1	203	225	236	253	274	308	420	380	437
LK	65	75	85	100	110	125	145	160	180
PN	16	16	16	16	16	16	16	16	16

Dimensions hand operated



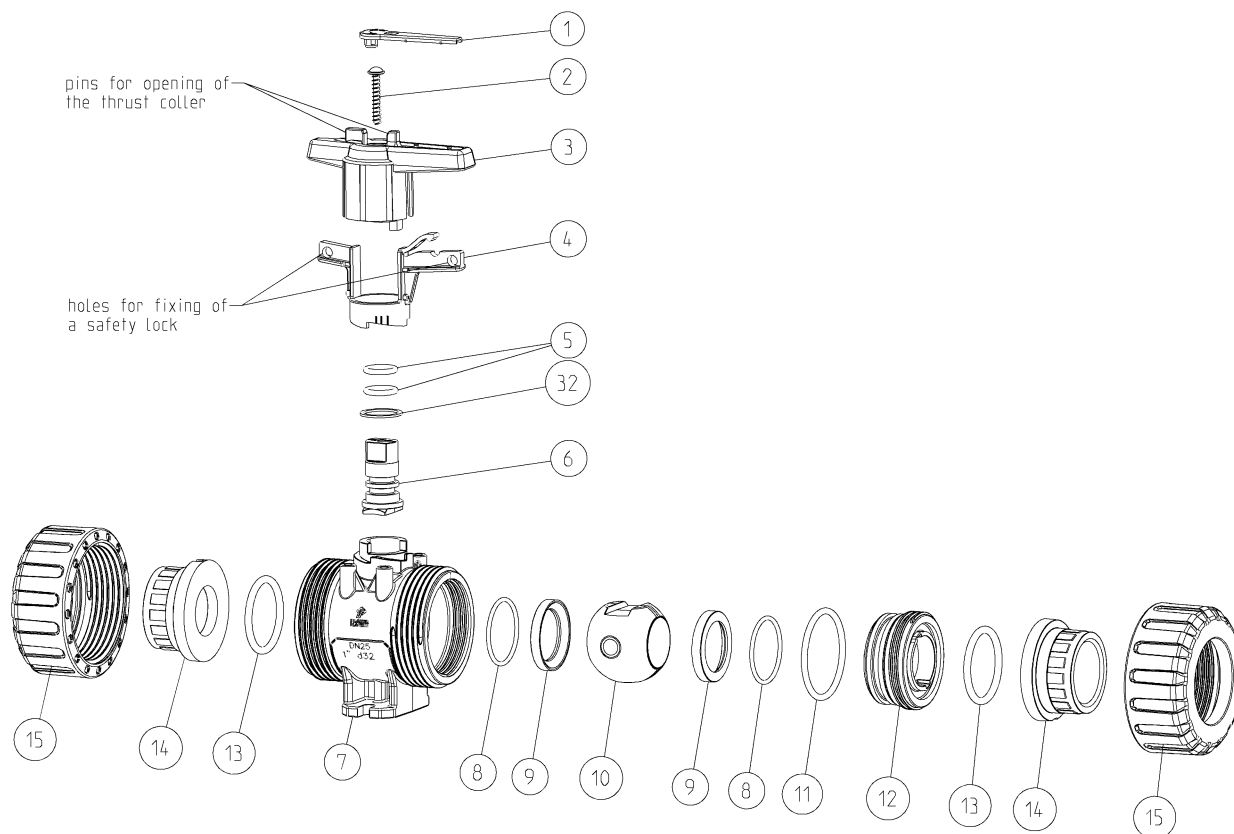
Connector type

PP-GF backing flange ANSI with steel insert

(dimensions in mm)

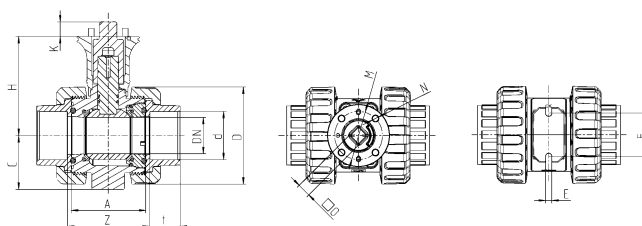
DN	15	20	25	32	40	50	65	80	80
d	20	25	32	40	50	63	75	90	110
inch	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
A	61,5	69	73	83	94	109	131,5	156,5	156,5
B	39,5	51	51	63,5	72	84	110	132	132
b	16	16	16	16	16	20	20	20	20
C	33	40	43,5	51	56,5	64,5	85	100	100
E	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	36	38	40	45	50	65	80	80
H	71,5	78	80	98,5	106,5	113,5	143	161	161
I	95	102	114	130	133	162	184	194	229
L1	203	225	236	253	274	308	420	380	437
LK	60,4	69,8	79,3	89	98,5	120,6	139,7	152,4	190,5
PN	16	16	16	16	16	16	16	16	16

Exploded drawing hand operated



No.	Description	Material
01.	Labeling plate	PBT
02.	Screw	A2
03.	Handle	PP-GF
04.	Spring loaded locking sleeve	PBT
05.	O-ring	FPM
06.	Shaft	PVDF
07.	Body	PVDF
08.	O-ring	FPM
09.	Ball seating joint	PTFE
10.	Ball	PVDF
11.	O-ring	FPM
12.	Thrust collar	PVDF
13.	O-ring	FPM
14.	Connector type fusion socket /-spigot threaded socket Flange	PVDF PVDF PP-GF with steel insert
15.	Union nut	PVDF
32.	Washer	PTFE

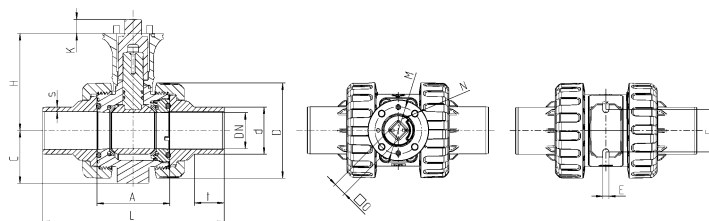
Dimensions adapter set



Connector type

PVDF fusion socket metric (dimensions in mm)

DN	10	15	20	25	32	40	50	65	80	80
d	16	20	25	32	40	50	63	75	90	110
ISO flange	F04	F04	F04	F04	F05	F05	F05	F07	F07	F07
A	61,5	61,5	69	73	83	94	109	131,5	156,5	156,5
C	33	33	40	43,5	51	56,5	64,5	85	100	100
D	56,5	56,5	67	73,5	90	105,5	124,5	157,5	192,5	192,5
E	5,4	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	34	36	38	40	45	50	65	80	80
H	81	81	86,5	89,5	97	104,5	111,5	138,5	168	168
K	11	11	11	11	15	15	15	18	18	18
M	42	42	42	42	50	50	50	70	70	70
N	5,5	5,5	5,5	5,5	6,5	6,5	6,5	8,5	8,5	8,5
O	11	11	11	11	14	14	14	17	17	17
t	14,5	16	17	19,5	22	25	29	35	38,5	44
Z	69,5	67	78	84	97	113	136	158,5	205	163
PN	16	16	16	16	16	16	16	16	16	16



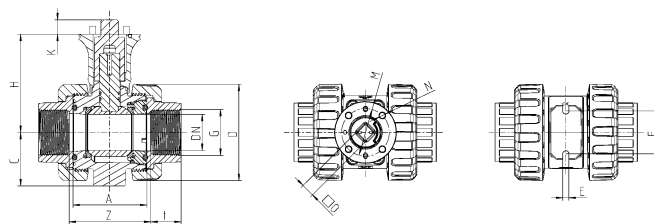
Connector type

PVDF fusion spigot metric

(dimensions in mm)

DN	10	15	20	25	32	40	50	65	80	80
d	16	20	25	32	40	50	63	75	90	110
ISO flange	F04	F04	F04	F04	F05	F05	F05	F07	F07	F07
A	61,5	61,5	69	73	83	94	109	131,5	156,5	156,5
C	33	33	40	43,5	51	56,5	64,5	85	100	100
D	56,5	56,5	67	73,5	90	105,5	124,5	157,5	192,5	192,5
E	5,4	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	34	36	38	40	45	50	65	80	80
H	81	81	86,5	89,5	97	104,5	111,5	138,5	168	168
K	11	11	11	11	15	15	15	18	18	18
L	114	124,5	144,5	155	172	193	223	278	290,5	316,5
M	42	42	42	42	50	50	50	70	70	70
N	5,5	5,5	5,5	5,5	6,5	6,5	6,5	8,5	8,5	8,5
O	11	11	11	11	14	14	14	17	17	17
s	1,9	1,9	1,9	2,4	2,4	3	3	3,6	4,3	5,3
t	13	13,5	15,5	18,5	20,5	23,5	28,5	32	36	40
PN	16	16	16	16	16	16	16	16	16	16

Dimensions adapter set

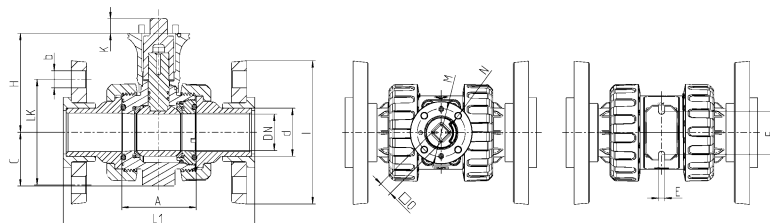


Connector type

PVDF threaded socket BSP / NPT

(dimensions in mm)

DN	10	15	20	25	32	40	50
inch	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
ISO flange	F04	F04	F04	F04	F05	F05	F05
A	61,5	61,5	69	73	83	94	109
C	33	33	40	43,5	51	56,5	64,5
D	56,5	56,5	67	73,5	90	105,5	124,5
E	5,4	5,4	5,4	6,4	6,4	6,4	6,4
F	34	34	36	38	40	45	50
H	81	81	86,5	89,5	97	104,5	111,5
K	11	11	11	11	15	15	15
M	42	42	42	42	50	50	50
N	5,5	5,5	5,5	5,5	6,5	6,5	6,5
O	11	11	11	11	14	14	14
t	16	16	19,5	22,5	26	30,5	37
Z	66	67,5	75	80	89	102	120
PN	16	16	16	16	16	16	16



Connector type

PP-GF backing flange DIN with steel insert

(dimensions in mm)

DN	15	20	25	32	40	50	65	80	80
d	20	25	32	40	50	63	75	90	110
ISO flange	F04	F04	F04	F05	F05	F05	F07	F07	F07
A	61,5	69	73	83	94	109	131,5	156,5	156,5
b	14	14	14	18	18	18	18	18	18
C	33	40	43,5	51	56,5	64,5	85	100	100
E	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	36	38	40	45	50	65	80	80
H	81	86,5	89,5	97	104,5	111,5	138,5	168	168
I	95	108	115	140	150	165	186	202	220
K	11	11	11	15	15	15	18	18	18
L1	203	225	236	253	274	308	420	380	437
LK	65	75	85	100	110	125	145	160	180
M	42	42	42	50	50	50	70	70	70
N	5,5	5,5	5,5	6,5	6,5	6,5	8,5	8,5	8,5
O	11	11	11	14	14	14	17	17	17
PN	16	16	16	16	16	16	16	16	16

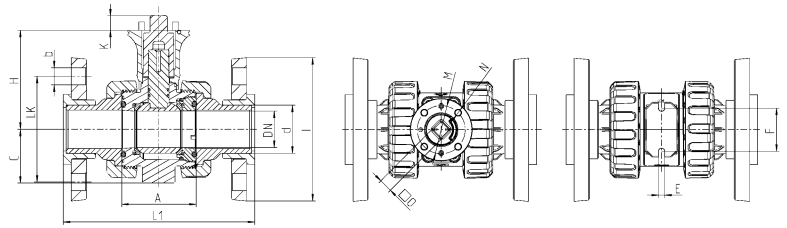
Dimensions adapter set

Connector type

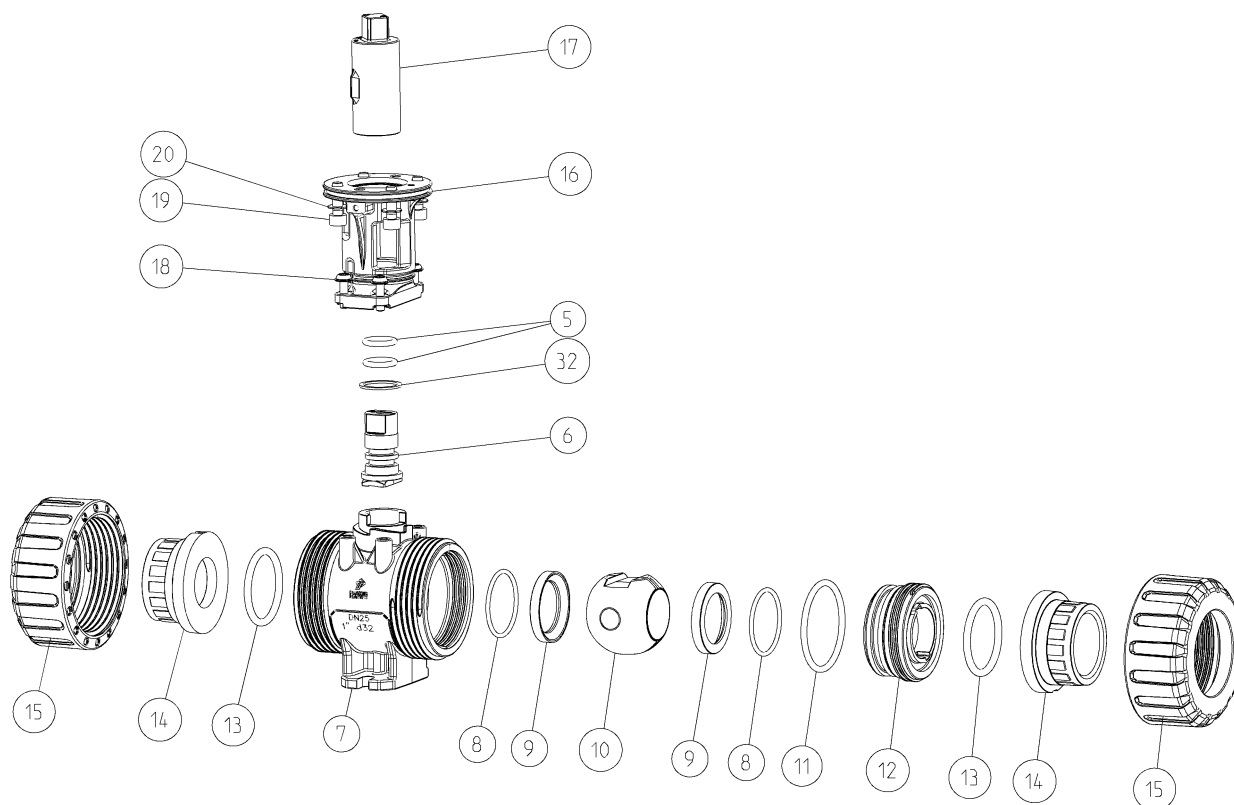
PP-GF backing flange ANSI with steel insert

(dimensions in mm)

DN	15	20	25	32	40	50	65	80	80
d	20	25	32	40	50	63	75	90	110
inch	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
ISO flange	F04	F04	F04	F05	F05	F05	F07	F07	F07
A	61,5	69	73	83	94	109	131,5	156,5	156,5
b	16	16	16	16	16	20	20	20	20
C	33	40	43,5	51	56,5	64,5	85	100	100
E	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	36	38	40	45	50	65	80	80
H	81	86,5	89,5	97	104,5	111,5	138,5	168	168
I	95	102	114	130	133	162	174	194	229
K	11	11	11	11	15	15	15	18	18
L1	203	225	236	253	274	308	420	380	437
LK	60,4	69,8	79,3	89	98,5	120,6	139,7	152,4	190,5
M	42	42	42	50	50	50	70	70	70
N	5,5	5,5	5,5	6,5	6,5	6,5	8,5	8,5	8,5
O	11	11	11	14	14	14	17	17	17
PN	16	16	16	16	16	16	16	16	16



Exploded drawing adapter set



No.	Description	Material
05.	O-ring	FPM
06.	Shaft	PVDF
07.	Body	PVDF
08.	O-ring	FPM
09.	Ball seating joint	PTFE
10.	Ball	PVDF
11.	O-ring	FPM
12.	Thrust collar	PVDF
13.	O-ring	FPM
14.	Connector types fusion socket /-spigot threaded socket Flange	PVDF PVDF PP-GF with steel insert
15.	Union nut	PVDF
16.	Bracket	PA-GF
17.	Coupling shaft	PA-GF
18.	Screw	A2
19.	Screw	A4
20.	Toothed washer	A2 / A4 from DN65
32.	Washer	PTFE

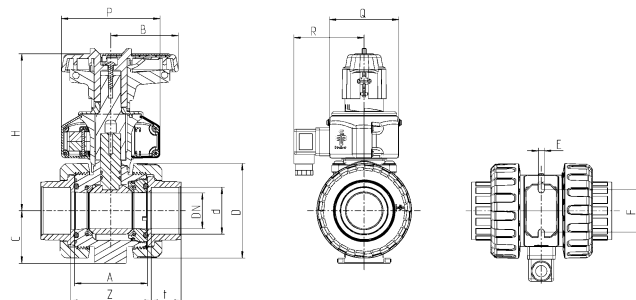
Dimensions position feedback

Connector type

PVDF fusion socket metric

(dimensions in mm)

DN	10	15	20	25	32	40	50	65	80	80
d	16	20	25	32	40	50	63	75	90	110
A	61,5	61,5	69	73	83	94	109	131,5	156,5	156,5
B	39,5	39,5	51	51	63,5	72	84	110	132	132
C	33	33	40	43,5	51	56,5	64,5	85	100	100
D	56,5	56,5	67	73,5	90	105,5	124,5	157,5	192,5	192,5
E	5,4	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	34	36	38	40	45	50	65	80	80
H	127	127	138	141	159,5	168,5	177,5	215	246,5	246,5
P	98	98	102	102	105	105	105	116	116	116
Q	64	64	64	64	74	74	74	99	99	99
R	70	70	70	70	75	75	75	88	88	88
t	14,5	16	17,5	19,5	22	25,5	29	34,5	38,5	42
Z	69,5	67	78	84	97	113	136	158,5	205	163
PN	16	16	16	16	16	16	16	16	16	16

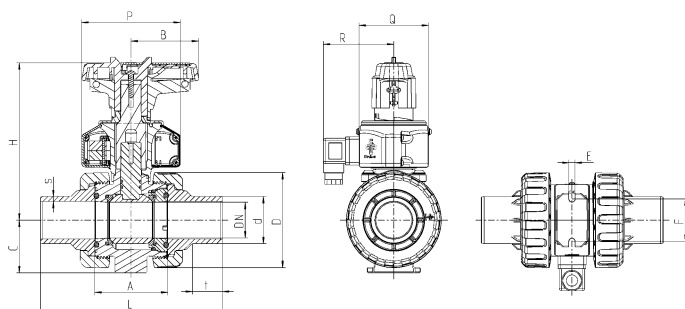


Connector type

PVDF fusion spigot metric

(dimensions in mm)

DN	10	15	20	25	32	40	50	65	80	80
d	16	20	25	32	40	50	63	75	90	110
A	61,5	61,5	69	73	83	94	109	131,5	156,5	156,5
B	39,5	39,5	51	51	63,5	72	84	110	132	132
C	33	33	40	43,5	51	56,5	64,5	85	100	100
D	56,5	56,5	67	73,5	90	105,5	124,5	157,5	192,5	192,5
E	5,4	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	34	36	38	40	45	50	65	80	80
H	127	127	138	141	159,5	168,5	177,5	215	246,5	246,5
L	114	124,5	144,5	155	172	193	223	278	290,5	316,5
P	98	98	102	102	105	105	105	116	116	116
Q	64	64	64	64	74	74	74	99	99	99
R	70	70	70	70	75	75	75	88	88	88
s	1,9	1,9	1,9	2,4	2,4	3	3	3,6	4,3	5,3
t	13	13,5	15,5	18,5	20,5	23,5	28,5	32	36	40
PN	16	16	16	16	16	16	16	16	16	16



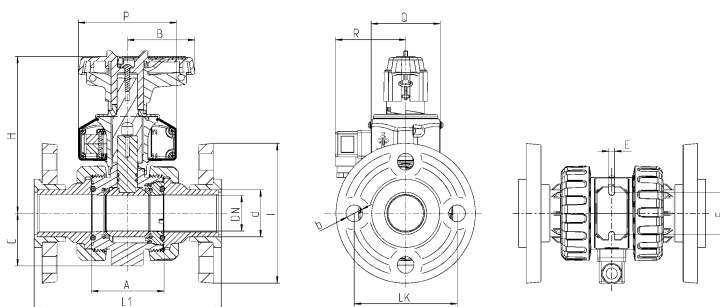
Dimensions position feedback

Connector type

PP-GF backing flange DIN with steel insert

(dimensions in mm)

DN	15	20	25	32	40	50
d	20	25	32	40	50	63
A	61,5	69	73	83	94	109
B	39,5	51	51	63,5	72	84
b	14	14	14	18	18	18
C	33	40	43,5	51	56,5	64,5
E	5,4	5,4	6,4	6,4	6,4	6,4
F	34	36	38	40	45	50
H	127	138	141	159,5	168,5	177,5
I	95	108	115	140	150	165
L1	203	225	236	253	274	308
LK	65	75	85	100	110	125
P	98	102	102	105	105	105
Q	64	64	64	74	74	74
R	70	70	70	75	75	75
PN	16	16	16	16	16	16

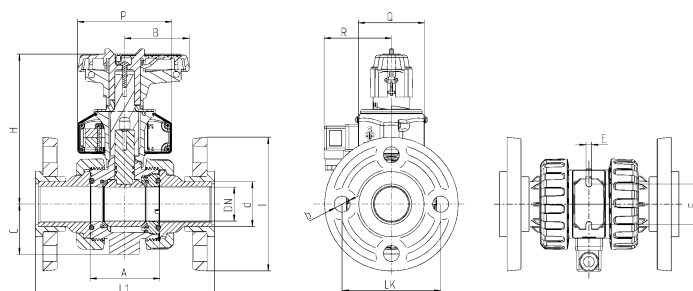


Connector type

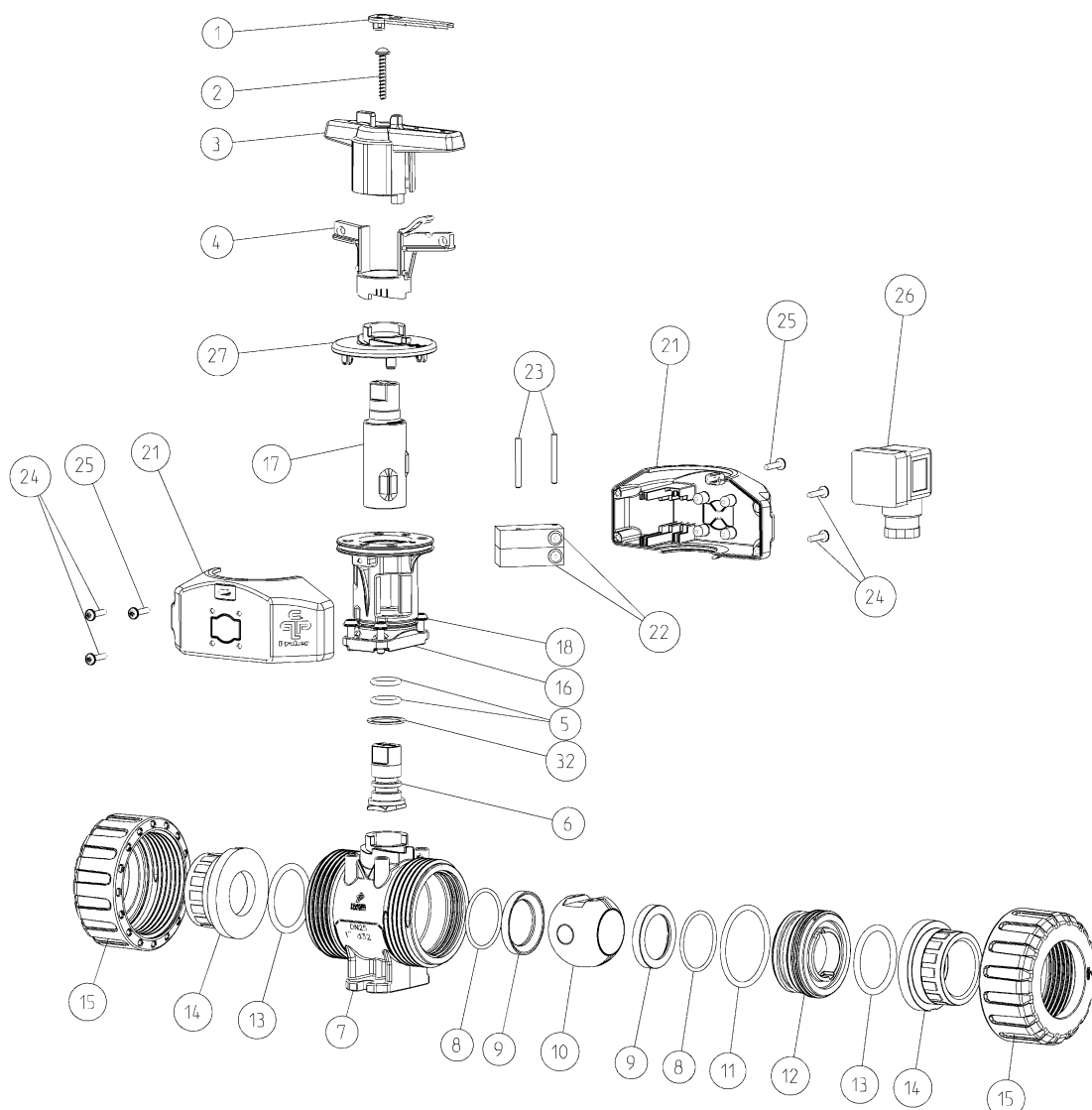
PP-GF backing flange ANSI with steel insert

(dimensions in mm)

DN	15	20	25	32	40	50
d	20	25	32	40	50	63
inch	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
A	61,5	69	73	83	94	109
B	39,5	51	51	63,5	72	84
b	16	16	16	16	16	20
C	33	40	43,5	51	56,5	64,5
E	5,4	5,4	6,4	6,4	6,4	6,4
F	34	36	38	40	45	50
H	127	138	141	159,5	168,5	177,5
I	102	114	130	133	162	184
L1	95	102	114	130	133	162
LK	60,4	69,8	79,3	89	98,5	120,6
P	98	102	102	105	105	105
Q	64	64	64	74	74	74
R	70	70	70	75	75	75
PN	16	16	16	16	16	16

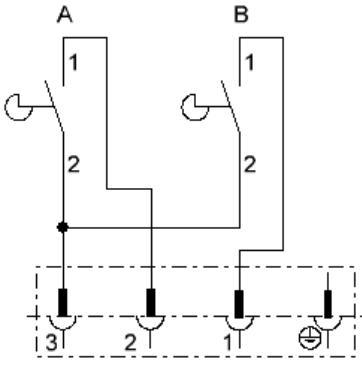
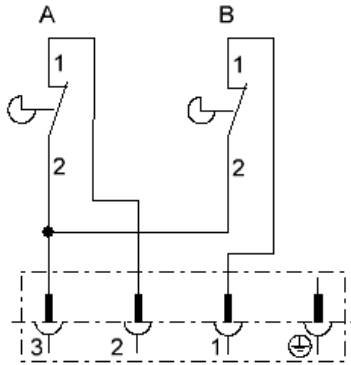


Exploded drawing position feedback

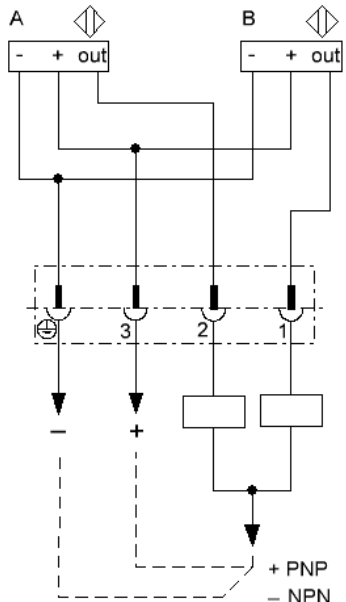
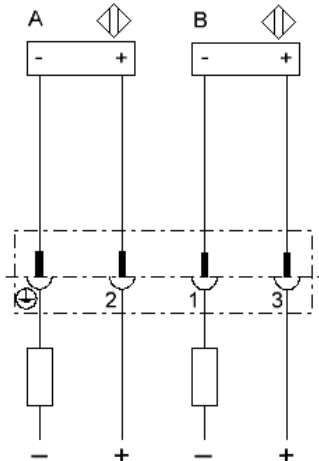


No.	Description	Material	No.	Description	Material
01.	Labeling plate	PBT	15.	Union nut	PVDF
02.	Screw	A2	16.	Bracket	PA-GF
03.	Handle	PP-GF	17.	Coupling shaft	PA-GF
04.	Spring loaded locking sleeve	PBT	18.	Screw	A2
05.	O-ring	FPM	19.	Screw	A2
06.	Shaft	PVDF	20.	Toothed washer	A2
07.	Body	PVDF	21.	Half shells	ABS
08.	O-ring	FPM	22.	Limit switch IP67	-
09.	Ball seating joint	PTFE	23.	Pin	A2
10.	Ball	PVDF	24.	Screw	A2
11.	O-ring	FPM	25.	Locking screw	A2
12.	Thrust collar	PVDF	26.	Device plug IP65	-
13.	O-ring	FPM	27.	Cover	ABS
14.	Connector types		32.	Washer	PTFE
	Fusion socket /-spigot	PVDF			
	Flange	PP-GF with steel insert			

Technical position feedback

Limit switch mechanical		
Type	(Ag-Ni) NO/NC*	(Au) NO*/NC*
Voltage max.	15-250V AC (15-30V DC)	5-250V AC (5-30V DC)
Current max.	100mA-5A	1mA-3A
Protection limit switch	IP67	
Protection DIN-plug	IP65	
Ambient temperature	-10°C bis +50°C	
Electric wiring	NO	NC
A pressed .. open B pressed.. closed		

* on request

Limit switch inductiv		
Type	NPN*/PNP	NAMUR EMV acc. IEC / EN 60947-5-2:2004; NE 21 DIN EN 60947-5-6
Voltage max.	10-30V DC	8V DC
Current max.	0-100mA	NAMUR intrinsically safe
Protection limit switch	IP67	
Protection DIN-plug	IP65	
Ambient temperature	-10°C bis +50°C	
Electric wiring		

* on request

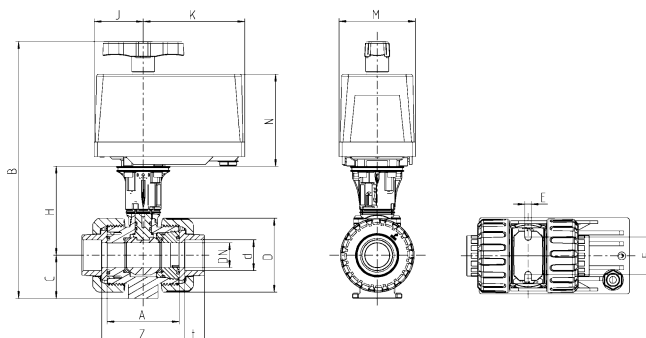
Dimensions electric EO 510

Connector types

PVDF fusion socket metric

(dimensions in mm)

DN	10	15	20	25
d	16	20	25	32
A	61,5	61,5	69	73
C	33	33	40	43,5
D	56,5	56,5	67	73,5
E	5,4	5,4	5,4	6,4
F	34	34	36	38
H	81	81	86,5	89,5
t	14,5	16	17	19,5
Z	69,5	67	78	84
PN	16	16	16	16
actuator	EO510 ECO/IND			
B	239	239	251,5	257
J	49,5	49,5	49,5	49,5
K	102,5	102,5	102,5	102,5
M	77	77	77	77
N	93	93	93	93

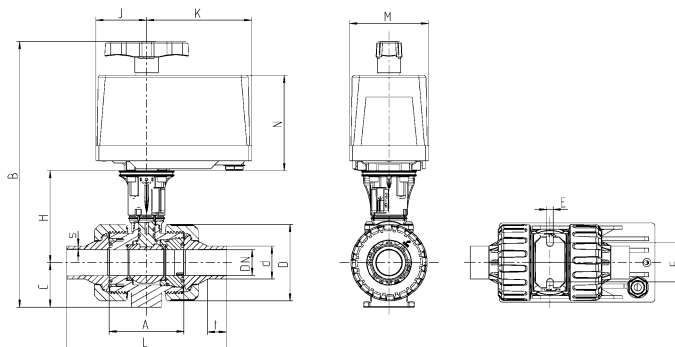


Connector types

PVDF fusion spigot metric

(dimensions in mm)

DN	10	15	20	25
d	16	20	25	32
inch	3/8"	1/2"	3/4"	1"
A	61,5	61,5	69	73
C	33	33	40	43,5
D	56,5	56,5	67	73,5
E	5,4	5,4	5,4	6,4
F	34	34	36	38
H	81	81	86,5	89,5
L	114	124,5	144,5	155
s	1,9	1,9	1,9	2,4
t	13	13,5	15,5	18,5
PN	16	16	16	16
actuator	EO510 ECO/IND			
B	239	239	251,5	257
J	49,5	49,5	49,5	49,5
K	102,5	102,5	102,5	102,5
M	77	77	77	77
N	93	93	93	93



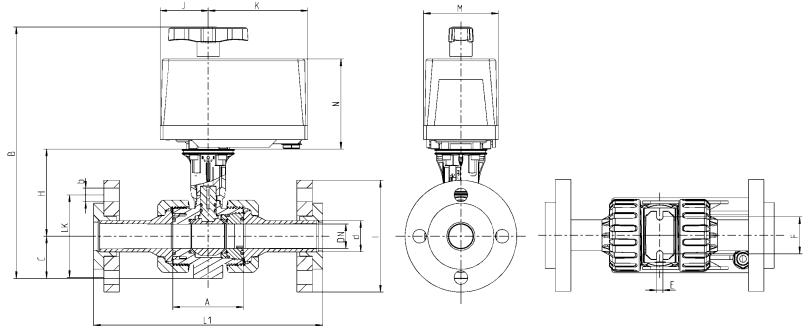
Dimensions electric EO 510

Connector types

PP-GF backing flange DIN with steel insert

(dimensions in mm)

DN	15	20	25
d	20	25	32
A	61,5	69	73
b	14	14	14
C	33	40	43,5
E	5,4	5,4	6,4
F	34	36	38
H	81	86,5	89,5
I	95	108	115
L1	203	225	236
LK	65	75	85
PN	10	10	10
actuator	EO510 ECO/IND		
B	239	251,5	257
J	49,5	49,5	49,5
K	102,5	102,5	102,5
M	77	77	77
N	93	93	93

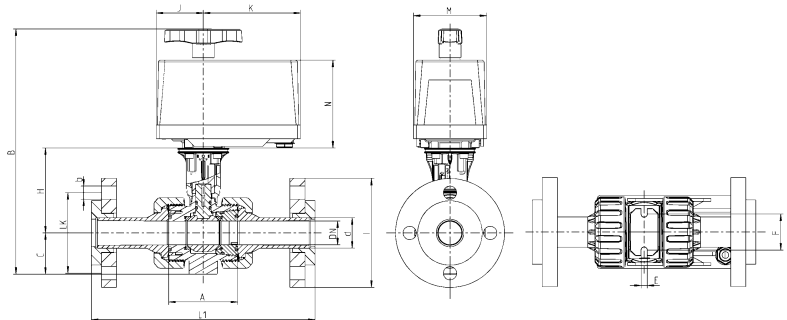


Connector types

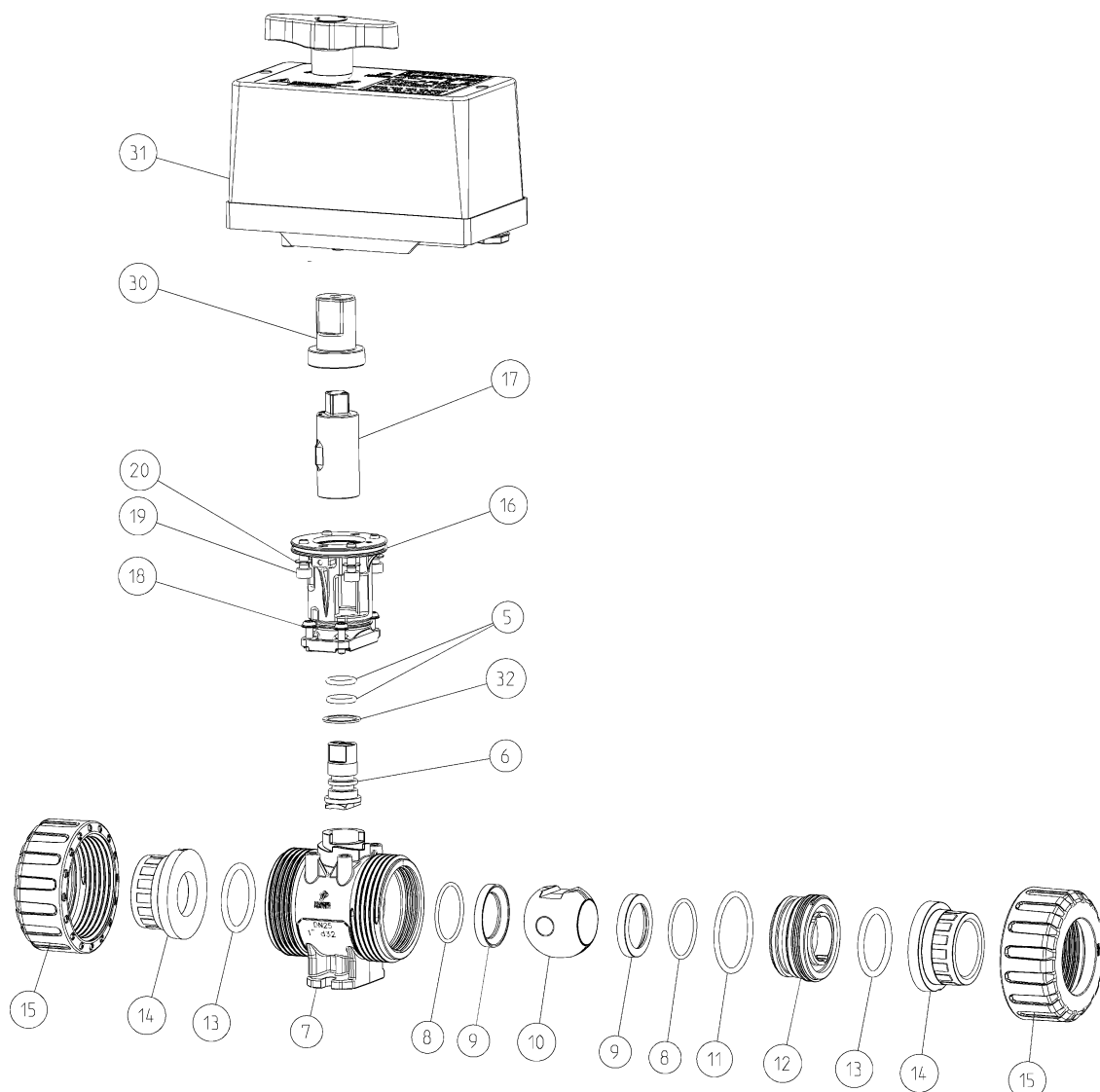
PP-GF backing flange ANSI with steel insert

(dimensions in mm)

DN	15	20	25
d	20	25	32
A	61,5	69	73
b	16	16	16
C	33	40	43,5
E	5,4	5,4	6,4
F	34	36	38
H	81	86,5	89,5
I	95	102	114
L1	203	225	236
LK	60,4	69,8	79,3
PN	10	10	10
actuator	EO510 ECO/IND		
B	239	251,5	257
J	49,5	49,5	49,5
K	102,5	102,5	102,5
M	77	77	77
N	93	93	93



Exploded drawing electric EO 510

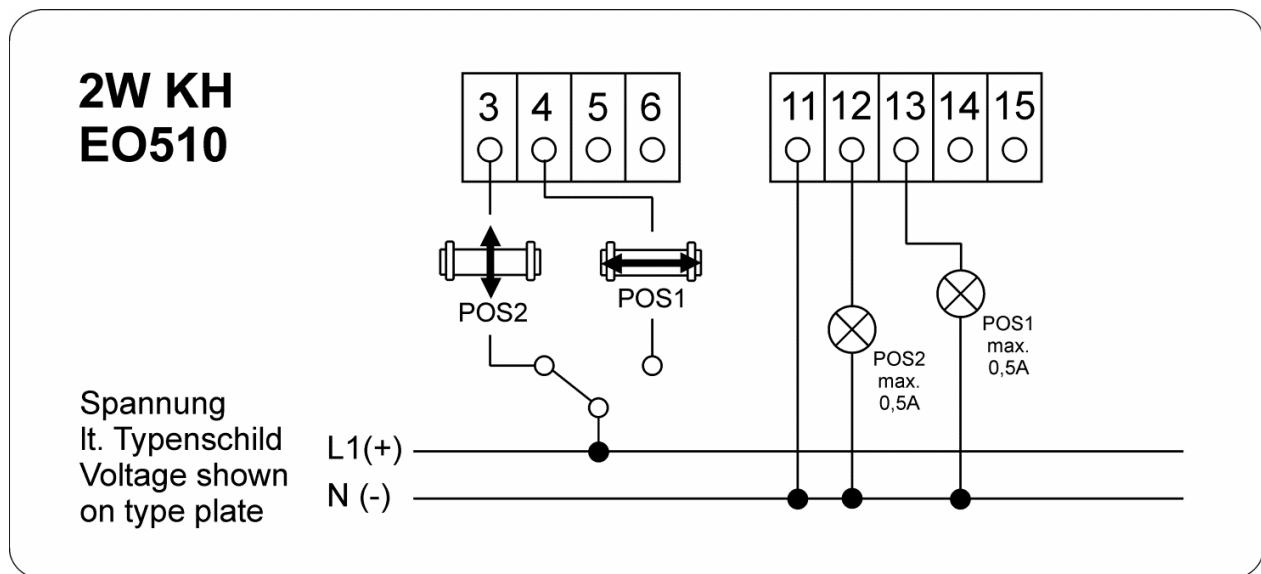


No.	Description	Material	No.	Description	Material
05.	O-ring	FPM	15.	Union nut	PVDF
06.	Shaft	PVDF	16.	Bracket	PA-GF
07.	Body	PVDF	17.	Coupling shaft	PA-GF
08.	O-ring	FPM	18.	Screw	A2
09.	Ball seating joint	PTFE	19.	Screw	A2
10.	Ball	PVDF	20.	Toothed washer	A2
11.	O-ring	FPM	30.	Coupling	PA-GF
12.	Thrust collar	PVDF	31.	actuator EO 510	-
13.	O-ring	FPM	32.	Washer	PTFE
14.	Connector type				
	Fusion socket /-spigot	PVDF			
	Threaded socket	PVDF			
	Flange	PP-GF with steel insert			

Technical data electric EO 510

Electric actuator EO510		
Type	EO510 ECO-230	EO510 IND-24
Nominal torque	7 Nm	
Peak torque	9 Nm	
Voltage	230V AC	12 - 24V DC / 24V AC
Frequency range	50 / 60Hz	DC / 50 / 60HZ
Operating time	22 sec 90°	12 sec 90°
Power consumption	4W	
Rotation angle	360° adjusted to 90°	
Duty cycle	60% / max. 20 min	
Protection	IP65	
Ambient temperature	0°C to + 50°C	
Weight	0,7 kg	
Position indicator	optically (manual override handle)	
Manual override	integrated	

Electric connection:



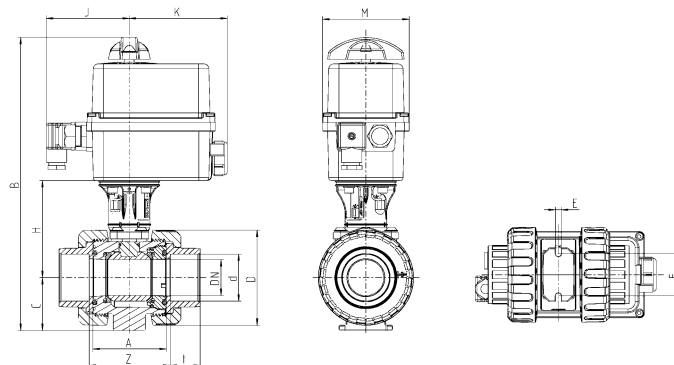
Dimensions electric EO ER

Connector type

PVDF fusion socket metric

(dimensions in mm)

DN	10	15	20	25	32	40	50	65	80	80
d	16	20	25	32	40	50	63	75	90	110
A	61,5	61,5	69	73	83	94	109	131,5	156,5	156,5
C	33	33	40	43,5	51	56,5	64,5	85	100	100
D	56,5	56,5	67	73,5	90	105,5	124,5	157,5	192,5	192,5
E	5,4	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	34	36	38	40	45	50	65	80	80
H	81	81	86,5	89,5	97	104,5	111,5	138,5	168	168
t	14,5	16	17,5	19,5	22	25,5	29	34,5	38,5	42
Z	69,5	97	78	84	97	113	136	158,5	205	163
PN	16	16	16	16	16	16	16	16	16	16
actuator	ER20							ER60		
B	266	266	278,5	285	300	313	328	400	445	445
J	90	90	90	90	90	90	90	98	98	98
K	107	107	107	107	107	107	107	107	107	107
M	92	92	92	92	92	92	92	128	128	128

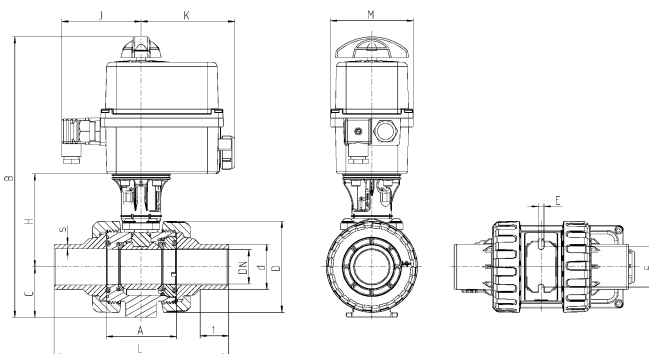


Connector type

PVDF fusion spigot metric

(dimensions in mm)

DN	10	15	20	25	32	40	50	65	80	80
d	16	20	25	32	40	50	63	75	90	110
A	61,5	61,5	69	73	83	94	109	131,5	156,5	156,5
C	33	33	40	43,5	51	56,5	64,5	85	100	100
D	56,5	56,5	67	73,5	90	105,5	124,5	157,5	192,5	192,5
E	5,4	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	34	36	38	40	45	50	65	80	80
H	81	81	86,5	89,5	97	104,5	111,5	138,5	168	168
L	114	124,5	144,5	155	172	193	223	278	290,5	316,5
s	1,9	1,9	1,9	2,4	2,4	3	3	3,6	4,3	5,3
t	13	13,5	15,5	18,5	20,5	23,5	28,5	32	36	40
PN	16	16	16	16	16	16	16	16	16	16
actuator	ER20							ER60		
B	266	266	278,5	285	300	313	328	400	445	445
J	90	90	90	90	90	90	90	98	98	98
K	107	107	107	107	107	107	107	107	107	107
M	92	92	92	92	92	92	92	128	128	128



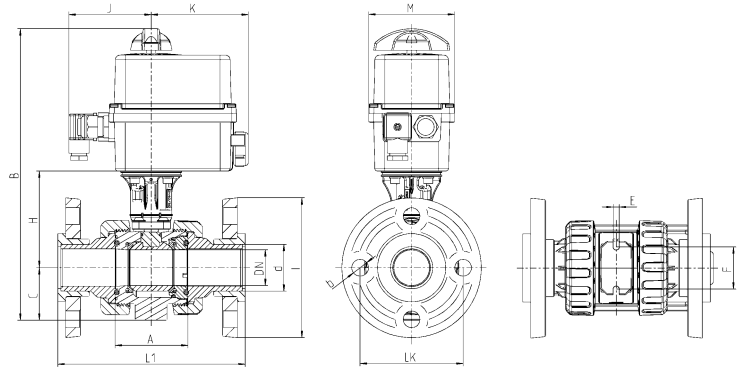
Dimensions electric EO ER

Connector type

PP-GF backing flange DIN with steel insert

(dimensions in mm)

DN	15	20	25	32	40	50	65	80	80
d	20	25	32	40	50	63	75	90	110
A	61,5	69	73	83	94	109	131,5	156,5	156,5
b	14	14	14	18	18	18	18	18	18
C	33	40	43,5	51	56,5	64,5	85	100	100
E	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	36	38	40	45	50	65	80	80
H	81	86,5	89,5	97	104,5	111,5	138,5	168	168
I	95	108	115	140	150	165	186	202	220
L1	203	225	236	253	274	308	420	380	437
LK	65	75	85	100	110	125	145	160	180
PN	16	16	16	16	16	16	16	16	16
actuator	ER20						ER60		
B	266	278,5	285	300	313	328	400	445	445
J	90	90	90	90	90	90	98	98	98
K	107	107	107	107	107	107	107	107	107
M	92	92	92	92	92	92	128	128	128

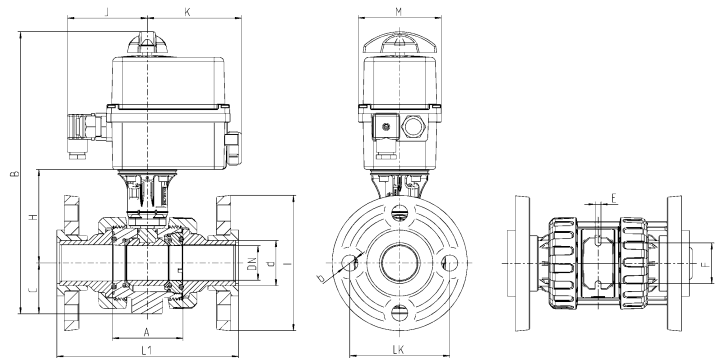


Connector type

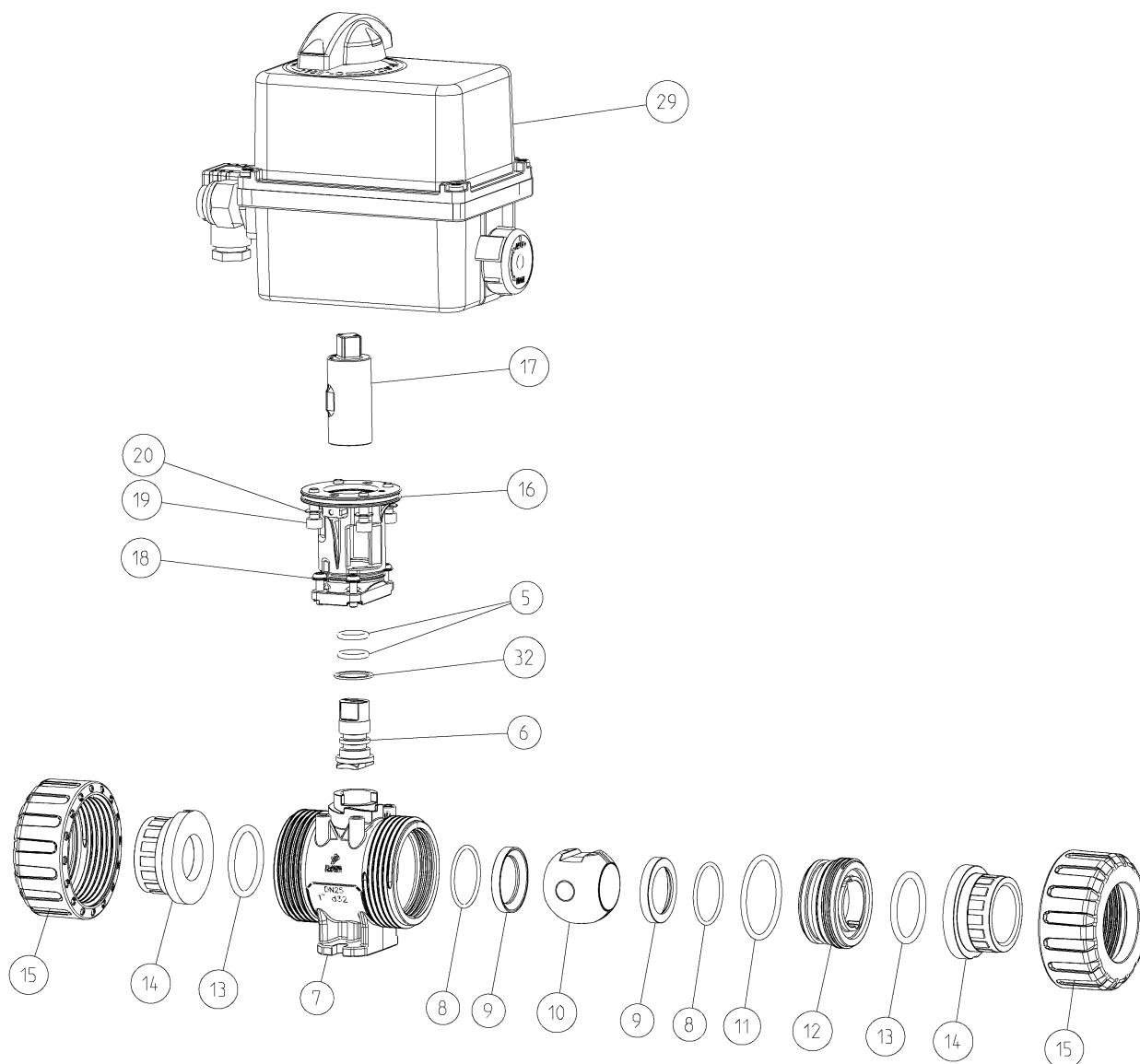
PP-GF backing flange ANSI with steel insert

(dimensions in mm)

DN	15	20	25	32	40	50	65	80	80
d	20	25	32	40	50	63	75	90	110
inch	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
A	61,5	69	73	83	94	109	131,5	156,5	156,5
b	16	16	16	16	16	20	20	20	20
C	33	40	43,5	51	56,5	64,5	85	100	100
E	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	36	38	40	45	50	65	80	80
H	81	86,5	89,5	97	104,5	111,5	138,5	168	168
I	95	102	114	130	133	162	184	194	229
L1	203	225	236	253	274	308	420	380	437
LK	60,4	69,8	79,3	89	98,5	120,6	139,7	152,4	190,5
PN	16	16	16	16	16	16	16	16	16
actuator	ER20						ER60		
B	266	278,5	285	300	313	328	400	445	445
J	90	90	90	90	90	90	98	98	98
K	107	107	107	107	107	107	107	107	107
M	92	92	92	92	92	92	128	128	128



Exploded drawing electric EO ER

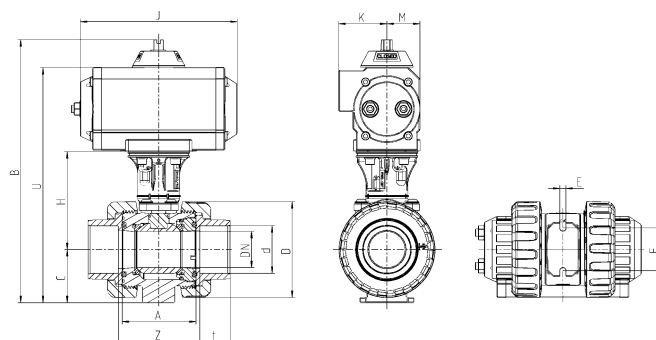


No.	Description	Material	No.	Description	Material
05.	O-ring	FPM	15.	Union nut	PVDF
06.	Shaft	PVDF	16.	Bracket	PA-GF
07.	Body	PVDF	17.	Coupling shaft	PA-GF
08.	O-ring	FPM	18.	Screw	A2
09.	Ball seating joint	PTFE	19.	Screw	A4
10.	Ball	PVDF	20.	Toothed washer	A2 / A4 from DN65
11.	O-ring	FPM	29.	Actuator	-
12.	Thrust collar	PVDF		Premier / Posi / Failsafe	
13.	O-ring	FPM	32.	Washer	PTFE
14.	Connector types				
	Fusion socket /-spigot	PVDF			
	Flange	PP-GF with steel insert			

Technical data electric EO ER

electric actuator		
Type	ER20	ER60
Torque	20 Nm	60 Nm
Voltage	Premier 24V 50/60Hz (24V DC) 100 - 240V 50/60Hz (100 - 350V DC) Posi 15 - 30V AC 50/60 Hz (12V - 48V DC) 100V - 240V AC 50/60 Hz (100 - 230V DC) Failsafe 15 - 30V AC 50/60 Hz (24V - 48V DC) 100V - 240V AC 50/60 Hz (100 - 230V DC)	Premier 24V 50/60Hz (24V DC) 90 - 240V 50/60Hz (90 - 350V DC) Posi 15 - 30V AC 50/60 Hz (12V - 48V DC) 100V - 240V AC 50/60 Hz (100 - 230V DC) Failsafe 15 - 30V AC 50/60 Hz (24V - 48V DC) 100V - 240V AC 50/60 Hz (100 - 230V DC)
Operating time	Premier: 13s Failsafe / Posi: 11s	Premier: 15s Failsafe / Posi: 12s
Power	15W	45W
ISO flange	F03-F04-F05	F05-F07
Star drive nut	14	22
Rotation angle	90°	90°
Duration duty	30%	50%
Protection	Premier: IP65 Failsafe / Posi: IP66	
Ambient temperature	Premier / Posi: -10°C bis +55°C Failsafe: -10°C bis +40°C	
Weight	1 kg	2,1 kg

Dimensions pneumatic



Connector type

PVDF fusion socket metric

(dimensions in mm)

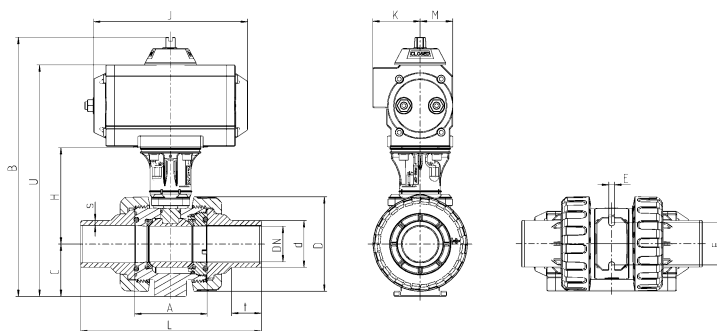
DN	10	15	20	25	32	40	50	65	80	80
d	16	20	25	32	40	50	63	75	90	110
A	61,5	61,5	69	73	83	94	109	131,5	156,5	156,5
C	33	33	40	43,5	51	56,5	64,5	85	100	100
D	56,5	56,5	67	73,5	90	105,5	124,5	157,5	192,5	192,5
E	5,4	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	34	36	38	40	45	50	65	80	80
H	81	81	86,5	89,5	97	104,5	111,5	138,5	168	168
t	14,5	16	17,5	19,5	22	25,5	29	34,5	38,5	42
Z	69,5	67	78	84	97	113	136	158,5	205	163
PN	16	16	16	16	16	16	16	16	16	16
actuator	UT05DA*				UT15DA			UT20DA		
B	214	214	226,5	233	269	282	297	366,5	411	411
J	119	119	119	119	165	165	165	178	178	178
K	40	40	40	40	50	50	50	53	53	53
M	27	27	27	27	35	35	35	43	43	43
U	185	185	197,5	204	239	252	267	336,5	381	381
actuator	UT05SR**				UT15SR		UT17SR	UT30SR	UT35SR	
B	214	214	226,5	233	269	282	297	385,5	463,5	463,5
J	119	119	119	119	165	165	197	230	246	246
K	40	40	40	40	50	50	50	61,5	72,5	72,5
M	27	27	27	27	35	35	35	52	65,5	65,5
U	185	185	197,5	204	239	252	267	355,5	434	434

*DA ... double acting (PO-DA)

**SR ... spring return (PO-NC / PO-NO)

We recommend using a damper and supporting the actuator accordingly when installing the valve in a vertical position
Additional information and dimensions for solenoid valve and position feedback see accessories and spare parts

Dimensions pneumatic



Connector type

PVDF fusion spigot metric

(dimensions in mm)

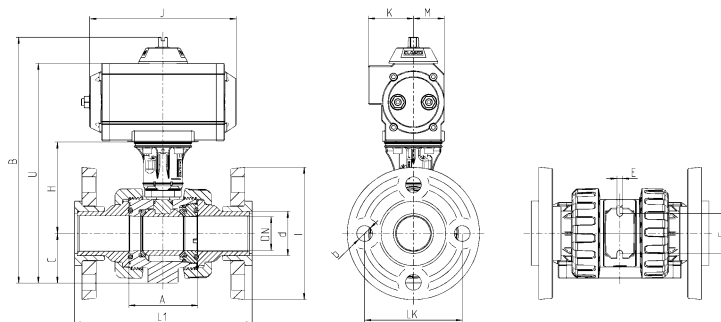
DN	10	15	20	25	32	40	50	65	80	80
d	16	20	25	32	40	50	63	75	90	110
A	61,5	61,5	69	73	83	94	109	131,5	156,5	156,5
C	33	33	40	43,5	51	56,5	64,5	85	100	100
D	56,5	56,5	67	73,5	90	105,5	124,5	157,5	192,5	192,5
E	5,4	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	34	36	38	40	45	50	65	80	80
H	81	81	86,5	89,5	97	104,5	111,5	138,5	168	168
L	114	124,5	144,5	155	172	193	223	278	290,5	316,5
s	1,9	1,9	1,9	2,4	2,4	3	3	3,6	4,3	5,3
t	13	13,5	15,5	18,5	20,5	23,5	28,5	32	36	40
PN	16	16	16	16	16	16	16	16	16	16
actuator	UT05DA				UT15DA					
B	214	214	226,5	233	269	282	297	366,5	411	411
J	119	119	119	119	165	165	165	178	178	178
K	40	40	40	40	50	50	50	53	53	53
M	27	27	27	27	35	35	35	43	43	43
U	185	185	197,5	204	239	252	267	336,5	381	381
actuator	UT05SR				UT15SR		UT17SR			
B	214	214	226,5	233	269	282	297	385,5	463,5	463,5
J	119	119	119	119	165	165	197	230	246	246
K	40	40	40	40	50	50	50	61,5	72,5	72,5
M	27	27	27	27	35	35	35	52	65,5	65,5
U	185	185	197,5	204	239	252	267	355,5	434	434

*DA ... double acting (PO-DA)

**SR ... spring return (PO-NC / PO-NO)

We recommend using a damper and supporting the actuator accordingly when installing the valve in a vertical position
Additional information and dimensions for solenoid valve and position feedback see accessories and spare part

Dimensions pneumatic



Connector types

PP-GF backing flange DIN with steel insert

(dimensions in mm)

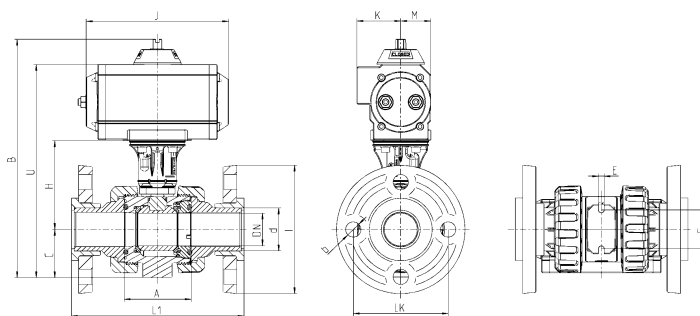
DN	15	20	25	32	40	50	65	80	80
d	20	25	32	40	50	63	75	90	110
A	61,5	69	73	83	94	109	131,5	156,5	156,5
b	14	14	14	18	18	18	18	18	18
C	33	40	43,5	51	56,5	64,5	85	100	100
E	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	36	38	40	45	50	65	80	80
H	81	86,5	89,5	97	104,5	111,5	138,5	168	168
I	95	108	115	140	150	165	186	202	220
L1	203	225	236	253	274	308	420	380	437
LK	65	75	85	100	110	125	145	160	180
PN	16	16	16	16	16	16	16	16	16
actuator	UT05DA			UT15DA			UT20DA		
B	214	226,5	233	269	282	297	366,5	411	411
J	119	119	119	165	165	165	178	178	178
K	40	40	40	50	50	50	53	53	53
M	27	27	27	35	35	35	43	43	43
U	185	197,5	204	239	252	267	336,5	381	381
actuator	UT05SR			UT15SR			UT30SR	UT35SR	
B	214	226,5	233	269	282	297	385,5	463,5	463,5
J	119	119	119	165	165	197	230	246	246
K	40	40	40	50	50	50	61,5	72,5	72,5
M	27	27	27	35	35	35	52	65,5	65,5
U	185	197,5	204	239	252	267	355,5	434	434

*DA ... double acting (PO-DA)

**SR ... spring return (PO-NC / PO-NO)

We recommend using a damper and supporting the actuator accordingly when installing the valve in a vertical position
Additional information and dimensions for solenoid valve and position feedback see accessories and spare parts

Dimensions pneumatic



Connector type

PP-GF backing flange ANSI with steel insert

(dimensions in mm)

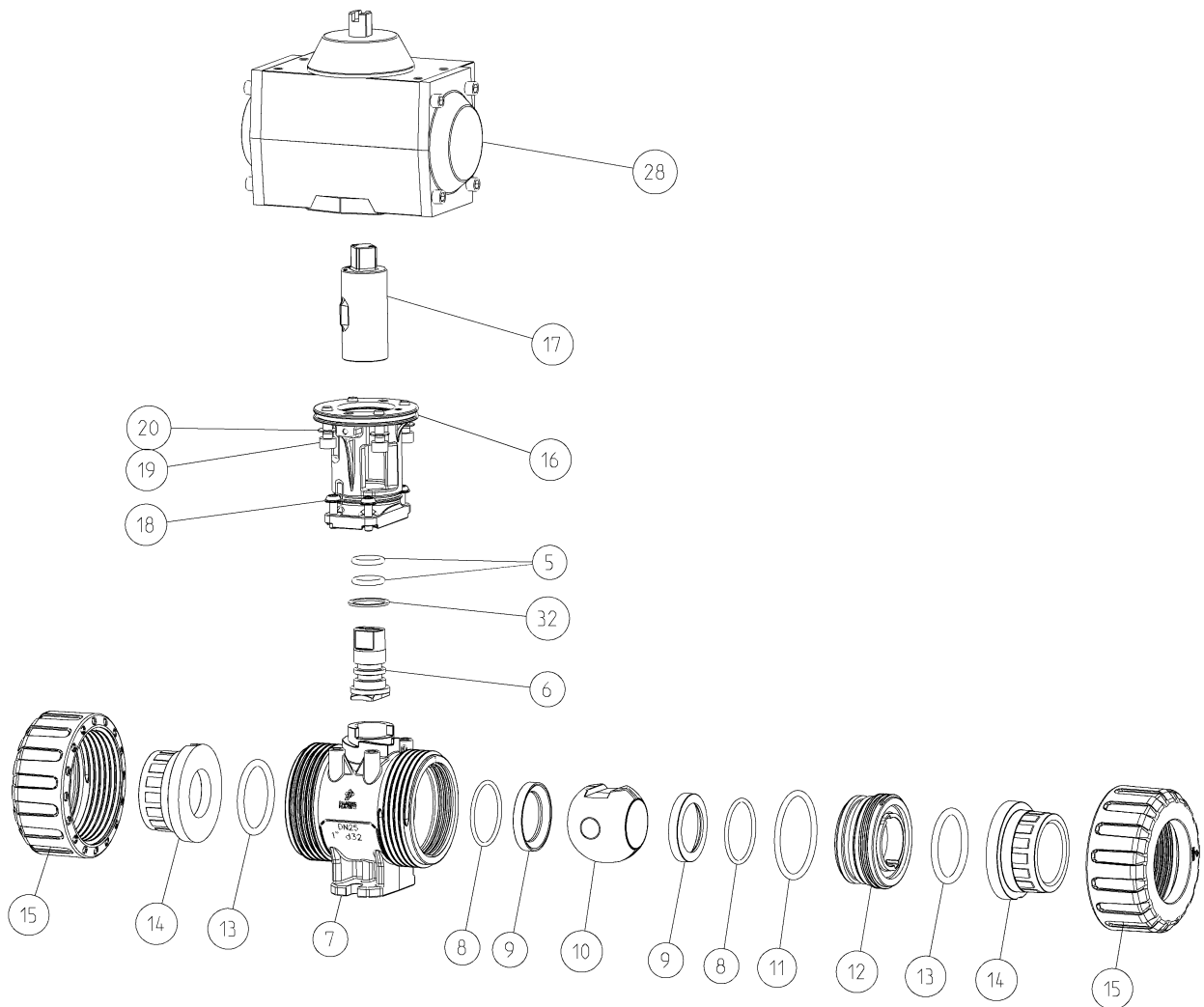
Dimensions in mm									
DN	15	20	25	32	40	50	65	80	80
d	20	25	32	40	50	63	75	90	110
A	61,5	69	73	83	94	109	131,5	156,5	156,5
b	16	16	16	16	16	20	20	20	20
C	33	40	43,5	51	56,5	64,5	85	100	100
E	5,4	5,4	6,4	6,4	6,4	6,4	8,3	10,3	10,3
F	34	36	38	40	45	50	65	80	80
H	81	86,5	89,5	97	104,5	111,5	138,5	168	168
I	95	102	114	130	133	162	184	194	229
L1	203	225	236	253	274	308	420	380	437
LK	60,4	69,8	79,3	89	98,5	120,6	139,7	152,4	190,5
PN	16	16	16	16	16	16	16	16	16
actuator	UT05DA			UT15DA			UT20DA		
B	214	226,5	233	269	282	297	366,5	411	411
J	119	119	119	165	165	165	178	178	178
K	40	40	40	50	50	50	53	53	53
M	27	27	27	35	35	35	43	43	43
U	185	197,5	204	239	252	267	336,5	381	381
actuator	UT05SR			UT15SR		UT17SR	UT30SR	UT35SR	
B	214	226,5	233	269	282	297	385,5	463,5	463,5
J	119	119	119	165	165	197	230	246	246
K	40	40	40	50	50	50	61,5	72,5	72,5
M	27	27	27	35	35	35	52	65,5	65,5
U	185	197,5	204	239	252	267	335,5	434	434

*DA ... double acting (PO-DA)

**SR ... spring return (PO-NC / PO-NO)

We recommend using a damper and supporting the actuator accordingly when installing the valve in a vertical position
Additional information and dimensions for solenoid valve and position feedback see accessories and spare parts

Exploded drawing pneumatic



No.	Description	Material	No.	Description	Material
05.	O-ring	FPM	15.	Union nut	PVDF
06.	Shaft	PVDF	16.	Bracket	PA-GF
07.	Body	PVDF	17.	Coupling shaft	PA-GF
08.	O-ring	FPM	18.	Screw	A2
09.	Ball seating joint	PTFE	19.	Screw	A4
10.	Ball	PVDF	20.	Toohted washer	A2 / A4 from DN65
11.	O-ring	FPM	28.	Actuator	-
12.	Thrust collar	PVDF	32.	Washer	PTFE
13.	O-ring	FPM			
14.	Connector types				
	Fusion socket /-spigot	PVDF			
	Flange	PP-GF with steel insert			

Technical data pneumatic

Technical features of pneumatic actuator

Description actuator:

Piston actuation with two opposed pistons, power transmission with tooth rack, seal elastic

Material actuator:

- o Body: aluminium anodized
- o End caps: aluminium epoxy powder
- o Screw / nuts: stainless steel

Ambient temperature: -20°C to +80°C

Control fluid:

Filtered air according to PNEUROP/ISO class 4 – Thread ¼"

Mounting: in every possible direction

Control function / control pressure:

DA: double acting / max. 10 bar

SR: spring return / max. 8 bar

Rotation angle:

90°; adjustment in both directions from -10° to +10° (UT15 and bigger)

Control function:

- o actuator – valve: ISO 5211
- o actuator – valve: NAMUR (VDI/VDE 3845)
- o actuator – limit switch box: NAMUR (VDI/VDE 3845)

AIR CONSUMPTION (FULL CYCLE)

DA DOUBLE ACTING

Antrieb	UT05 DA	UT15 DA	UT20 DA
N. Lt.	0,22	0,41	0,71

AIR CONSUMPTION (FULL CYCLE)

SR SPRING RETURN

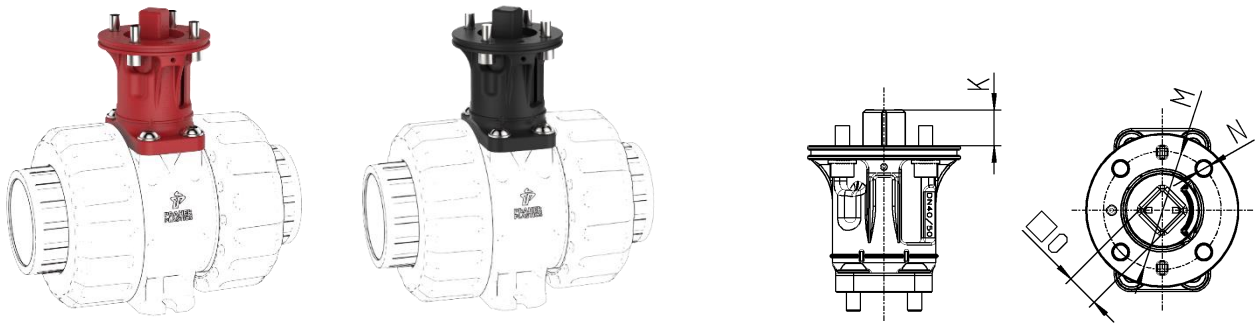
Antrieb	UT05 SR	UT15 SR	UT17 SR	UT30 SR	UT35 SR
N. Lt.	0,13	0,18	0,25	0,65	1,2

Accessories / spare parts

Adapter set for automation electric or pneumatic

Consist of:

- Bracket for mounting of actuator and position feedback
- Coupling for actuator
- Screws for mounting on ball valve and actuator



dimensions in mm

DN	10	15	20	25	32	40	50	65	80	80
d	16	20	25	32	40	50	63	75	90	110
K	11	11	11	11	15	15	15	18	18	18
M	42	42	42	42	50	50	50	70	70	70
N	5,5	5,5	5,5	5,5	6,5	6,5	6,5	8,5	8,5	8,5
O	11	11	11	11	14	14	14	17	17	17

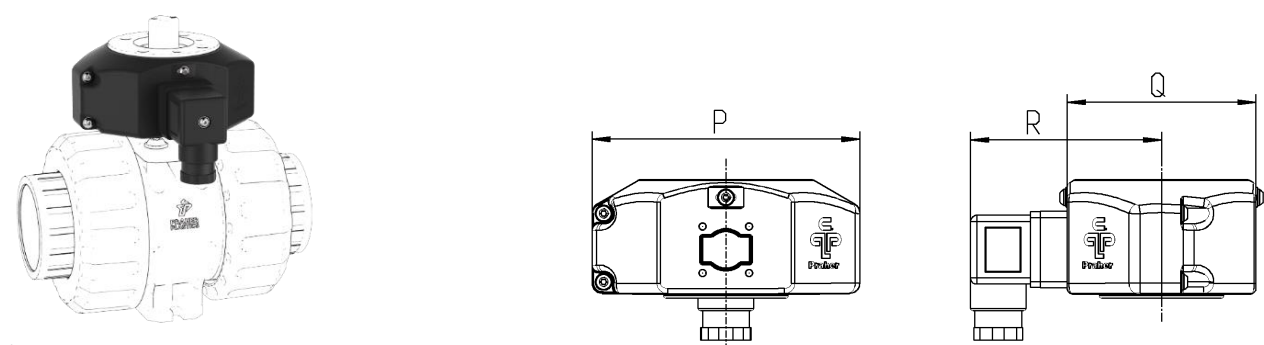
		
Material	PP-GF	PA-GF
Product line	chemical resistance	high durability
Acid resistance	++	0
Tensile modulus of elasticity	+	++
Flexural modulus of elasticity	+	+++
Notch impact strength (23°C)	+	+
Main applications	Electrolysis Acid applications Chrome, Copper, hydrofluoric acid	Water applications Ultrafiltration Semiconductor industry
Recommended installation	Horizontal	Horizontal Vertical (support the actuator)
Recommended maintenance	Short maintenance intervals	Regular inspections
Recommended accessories	Silencer for pneumatic actuator	
M1 Ball Valve	PVC-U / PP-H / PVDF	
ISO 5211	F04 / F05 / F07	

Accessories / spare parts

Half shell set with position feedback for hand operated and automatic ball valves

Consist of:

- Half shells including limit switch mechanical or inductive
- Device plug
- Screws for half shells
- Locking screws for adjusting position feedback



dimensions in mm

DN	10	15	20	25	32	40	50	65	80	80
d	16	20	25	32	40	50	63	75	90	110
P	98	98	102	102	105	105	105	116	116	116
Q	64	64	64	64	74	74	74	99	99	99
R	70	70	70	70	75	75	75	88	88	88

Feedback set for hand operated ball valve DN10 – DN80 d110



Consist of:

- Half shells including limit switch mechanical or inductive
- Cover
- Coupling for handle
- Device plug
- Screws for half shells
- Locking screws for adjusting position feedback
- Screws for mounting on the ball valve

Accessories / spare parts

Feedback set for automatic ball valve DN10 – DN80 d110



Consist of:

- Half shells including limit switch mechanical or inductive
- Coupling for actuator
- Device plug
- Screws for half shells
- Locking screws for adjusting position feedback
- Screws for mounting on the ball valve and actuator

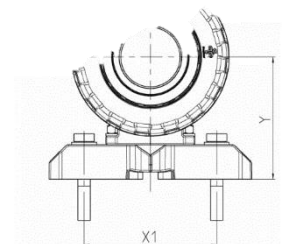
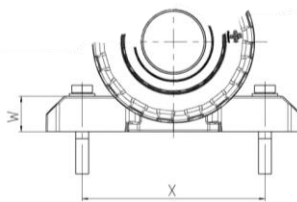
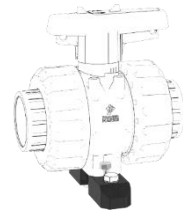
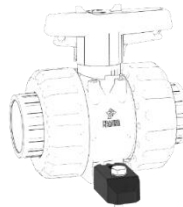
Clamping and spacing element

Use for mounting as a clamping element

- Floor / ceiling / wall
- Plate
- Additional screws necessary

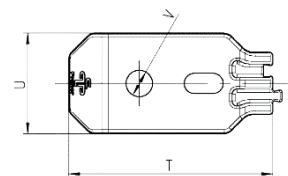
Use for mounting as a spacing element

- for flange connection
- additional screws necessary



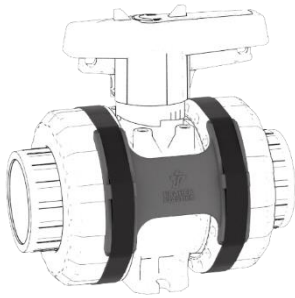
dimensions in mm

DN	10	15	20	25	32	40	50
d	16	20	25	32	40	50	63
T	54	54	54	65	65	65	65
U	25	25	25	32	32	32	32
V	6,5	6,5	6,5	8,5	8,5	8,5	8,5
W	16	16	16	22	22	22	22
X	90	90	94	107	109	114	119
X1	70	70	70	85	85	85	85
Y	49	49	56	65	73	78	86



Accessories / spare parts

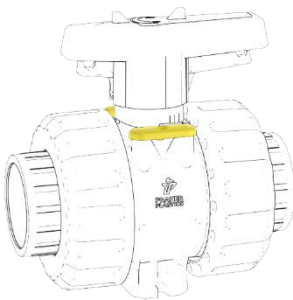
Union nut locking for ball valve DN10 – DN80 d110



Consist of:

- Plate for PVC-U or PP-H / PVDF ball valve
- Velcro straps for fixation

Cover for ball valve DN10 – DN80 d110

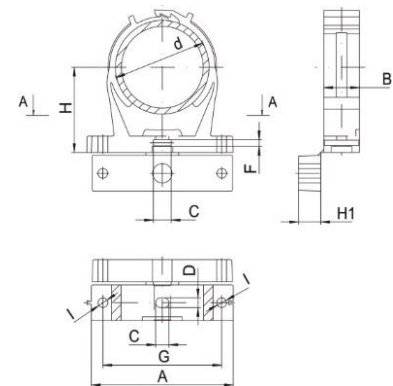


Consist of:

- Cover for PVC-U, PP-H and PVDF ball valve
- Pack unit 50 pieces
- Including eyelet for marking



Pipe clip type B



dimensions in mm

d	20 - 23 1/2"	25 - 28 3/4"	31 - 35 1"	39 - 43 1 1/4"	47 - 51 1 1/2"	60 - 65 2"	72 - 80 2 1/2"	87 - 95 3"
A	56	61	67	80	84,5	96,5	126	137
B	14	16	16	17,5	20	24	26	26
C	9	9	9	9	9	9	12	12
D	6,5	6,5	6,5	6,5	6,5	6,5	8,5	8,5
F	3,5	3,5	3,5	3,5	3,5	3,5	4,3	4,3
G	41	47	52	64	70	80	106	117
H	27	30	31,5	37	41	49	70	80
H1	6	10	11,5	14	15	15	15	20
I	6,5	6,5	6,5	6,5	6,5	6,5	8,5	8,5

Accessories / spare parts

PLS – Praher Labeling System

Features

- Clear and durable label
- Convenient marking by touch-up pen or laser engraving
- Standard version in yellow, blue, green and red
- Simple and easy to change
- Corrosion-resistant
- No effect on the function of the handle



Limit switch box for pneumatic actuator

General

- Limit switch box with two mechanical switches
- Protection IP65
- Cable gland M20*1,5

Material

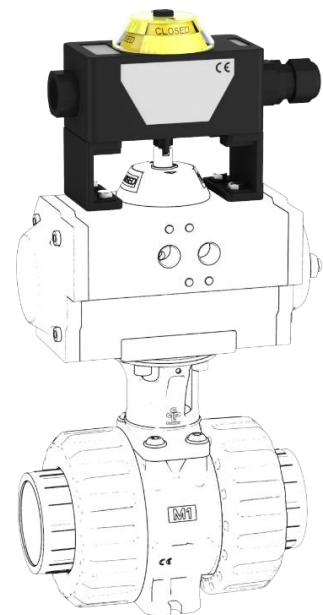
- Body: polycarbonat black
- Cover: polycarbonat clear
- Mounting bracket and screws: stainless steel
- Seals: EPDM

Voltage

- 1 – 250V

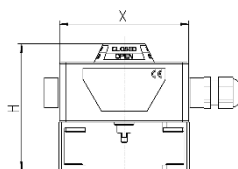
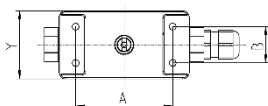
Current

- 16 A (250V AC)
- 2,5 A (24 DC)



dimensions in mm

A	B	H	X	Y
80	30	110	107	56



Accessories / spare parts

Solenoid valve

General

- Solenoid valve NAMUR with combined 5/2- and 3/2- ways function and standard coil
- Easy switch from 5/2- to 3/2- ways by turning the sealing plate
- Manual override as standard
- Protection IP65

Material

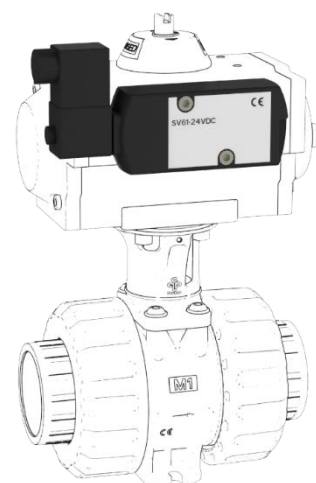
- Body: aluminium anodized
- Piston: aluminium
- Seals: NBR
- Screws and spring: stainless steel

Voltage

- 24 V DC (3W)
- 230 V AC (5VA)

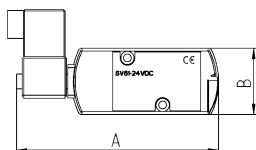
Accessories

- Flow control silencer
- Silencer



dimensions in mm

A	B	C
139	45	33



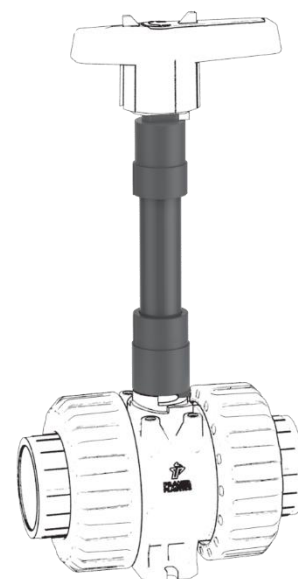
Accessories / spare parts

Handle elongation

Material: PVC-U
Dimensions: DN10 – DN80 d110
Standard pipe length: 200 mm
Max. pipe length possible: 1 m

Features

- Simple assembly by gluing the handle- and shaft-coupling with a metric pipe
- Marking on handle- and shaft-coupling for alignment to the ball valve
- Subsequent installation in existing installation possible
- Direction arrows on the handle coupling show the flow direction of the ball valve when handle is removed



Further details see data sheet for handle extension 2W and 3W ball valve

Архангельск (8182)63-90-72
Астана (7172)727-132
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Волгоград (844)278-03-48
Вологда (8172)26-41-59
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89
Иваново (4932)77-34-06

Ижевск (3412)26-03-58
Иркутск (395)279-98-46
Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Липецк (4742)52-20-81
Киргизия (996)312-96-26-47

Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Новосибирск (383)227-86-73
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Казахстан (772)734-952-31

Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Россия (495)268-04-70
Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78-78
Севастополь (8692)22-31-93
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13

Сургут (3462)77-98-35
Тверь (4822)63-31-35
Томск (3822)98-41-53
Тула (4872)74-02-29
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Уфа (347)229-48-12
Хабаровск (4212)92-98-04
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Ярославль (4852)69-52-93

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