

## **+GF+ Type 546 Ball Valve**

**Setting a new standard in piping systems**



**Product range in PVC and CPVC, ASTM**

**Technical Data**

**GEORGE FISCHER +GF+**

## List of Abbreviations

*Technical data is not binding and is not an expressly warranted characteristic of the goods. It is subject to change. Please consult our General Conditions of Supply.*

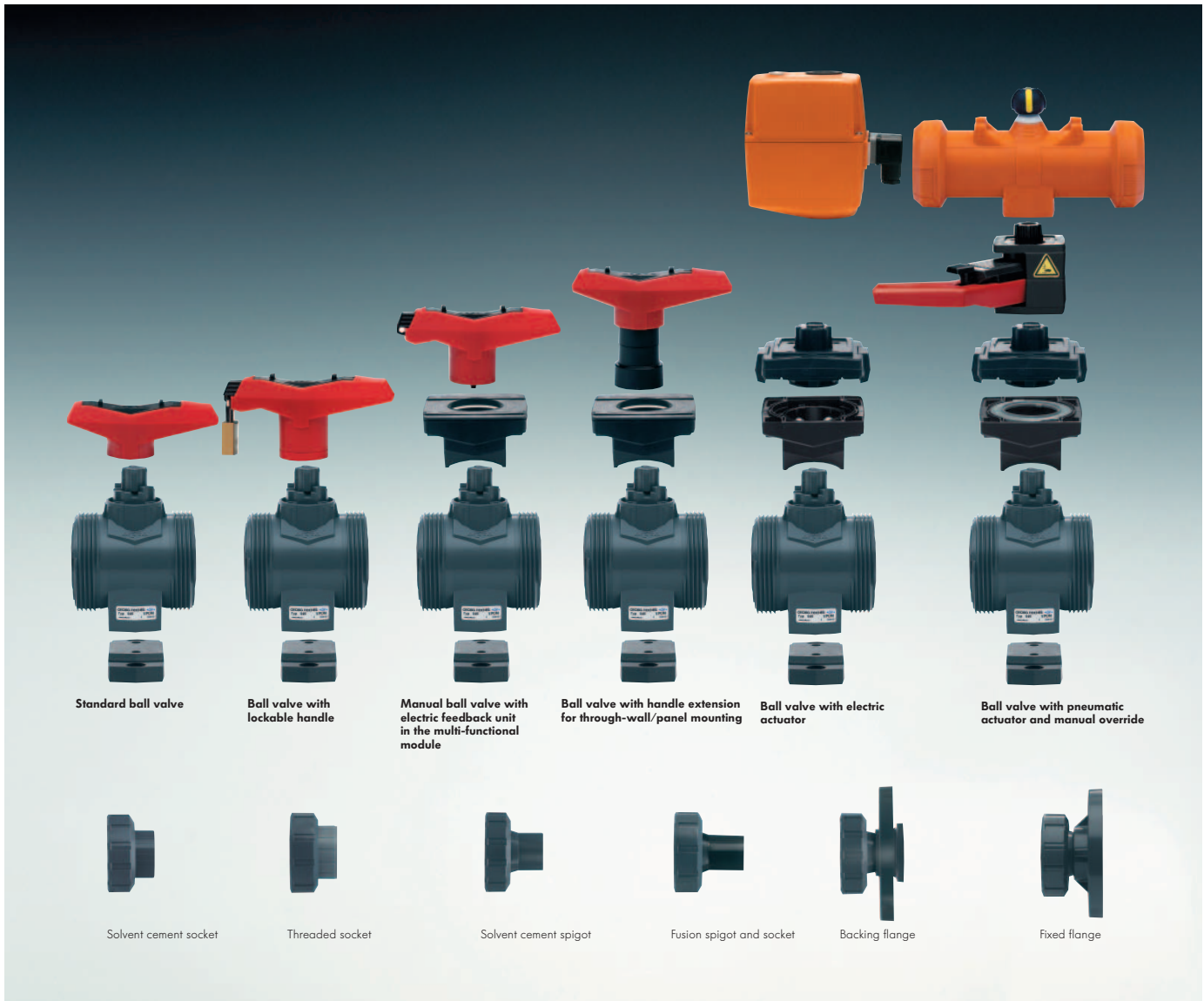
ANSI	American National Standards Institute	PVDF	Polyvinylidene fluoride
ASTM	American Society for Testing and Materials	EPDM	Ethylene-Propylene-Rubber
DIN	Deutsche Industrie-Normen	FPM	Fluororubber, e.g. Viton®
ISO	International Standardization Organization	PTFE	Polytetrafluoroethylene, e.g. Teflon®
PVC	Polyvinyl chloride, unplasticized	d	Pipe outer diameter
CPVC	Polyvinyl chloride, post-chlorinated	DN	Nominal diameter (mm)
PP	Polypropylene, heat stabilized	PN	Nominal pressure at 20°C, water
		NPT	Female thread, tapered, pressure tight in the thread per ANSI B1.20.1

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# +GF+ Type 546 Ball Valve

## The system at a glance



Standard ball valve

Ball valve with lockable handle

Manual ball valve with electric feedback unit in the multi-functional module

Ball valve with handle extension for through-wall/panel mounting

Ball valve with electric actuator

Ball valve with pneumatic actuator and manual override

Solvent cement socket

Threaded socket

Solvent cement spigot

Fusion spigot and socket

Backing flange

Fixed flange

### Availability

**2nd Quarter 2003**  
PVC

**3rd Quarter 2003**  
CPVC

**1st Quarter 2004**  
PP-H, PVDF

### A complete model range with many configurations:

- from the manual valve to the electrically actuated valve with LED display
- Modular design and expandable
- Sizes from 3/8" to 2", up to 232 psi
- Available in cementable (PVC, CPVC) and fusible (PP-H, PVDF) materials
- Connections in all the major standards (DIN, EN, ISO, BS, ANSI, JIS)

This broad range of products enables you to find the right solution for your application.

### The new +GF+ Type 546 ball valve conforms to the following international standards:

**prEN ISO 16135 (pending)**  
Industrial valves—ball valves of thermoplastic material (ISO/DIS 16135:2001)

**ISO 9393**  
Thermoplastic valves—pressure test methods and requirements

**EN 558**  
Flanged valves dimensions are in accordance with EN 558

**Approvals**  
DIBt approval pending

# +GF+ Type 546 Ball Valve We have the answer.



**“What’s the  
black box for?”**

**“Connections!”**

## **The multifunction module**

What is the current status of the valves in the system? Which ones are open, which are closed?

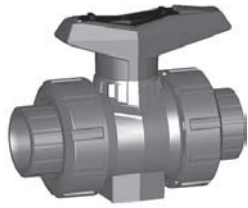
Knowing the answer to these questions at all times ensures reliable system operation and improves plant safety.

With the multifunction module, we have a tested and proven base on which to add many accessories. Position feedback can be accomplished through a selection of five different limit switches and connected to the valve via the multifunction module.

## **More possibilities**

Thanks to its robust construction and the secure fastening on the ball valve, the multifunction module can be used as a mounting bracket. Through wall/panel mounting has never been so easy.

The module is also equipped with a DIN EN ISO 5211 actuator mounting interface for direct connection of the new George Fischer actuators.



## Ball Valve Type 546, PVC with solvent cement socket, Inch ASTM and threaded valve ends, NPT

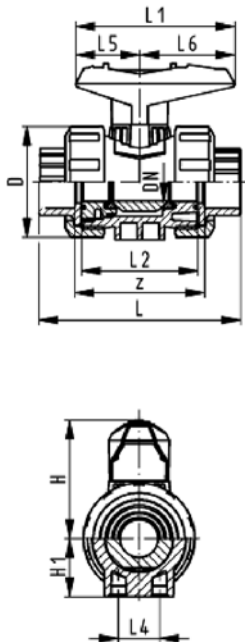
### Features:

- Union ball valve for easy installation and removal (z-dimension, valve end and valve nut **are not compatible** with Type 346)
- Ball seals in PTFE
- Integrated stainless steel mounting inserts

### Options:

- Individual configuration of the valve (see price sheets)
- Multifunction module with integrated limit switches
- Pneumatic or electric actuators from **+GF+**

All data are valid for models with solvent cement sockets



inch	DN	psi	Cv value ( $\Delta p = 1 \text{ psi}$ )	EPDM Seals		FPM Seals	
3/8	10	232	4.97	161 546 341		161 546 351	
1/2	15	232	12.95	161 546 342		161 546 352	
3/4	20	232	24.50	161 546 343		161 546 353	
1	25	232	49.01	161 546 344		161 546 354	
1 1/4	32	232	70.02	161 546 345		161 546 355	
1 1/2	40	232	112.04	161 546 346		161 546 356	
2	50	232	217.08	161 546 347		161 546 357	

inch	DN	D	H	H1	L	L1	L2	L4	L5	L6	z	lbs
3/8	10	1.97	2.24	1.04	4.13	3.03	2.20	0.98	1.26	1.77	2.64	0.40
1/2	15	1.97	2.24	1.04	4.13	3.03	2.20	0.98	1.26	1.77	2.40	0.42
3/4	20	2.28	2.64	1.18	4.76	3.82	2.56	0.98	1.54	2.28	2.76	0.64
1	25	2.68	2.87	1.40	5.24	3.82	2.80	0.98	1.54	2.28	2.99	0.94
1 1/4	32	3.31	3.54	1.73	6.06	5.04	3.35	1.77	2.13	2.91	3.54	1.61
1 1/2	40	3.82	3.82	1.99	6.46	5.04	3.50	1.77	2.13	2.91	3.70	2.18
2	50	4.88	4.57	2.52	7.20	5.98	3.98	1.77	2.58	3.41	4.21	3.91



## Ball Valve Type 546, PVC with lockable handle, solvent cement socket, Inch ASTM and threaded valve ends, NPT

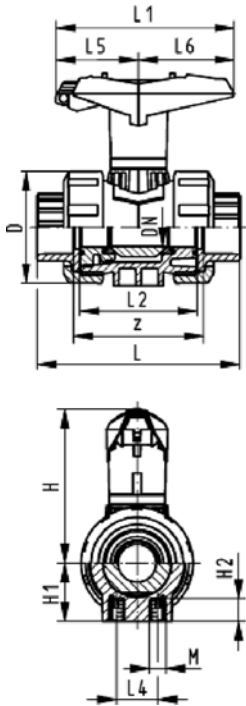
### Features:

- True union ball valve for easy installation and removal (z-dimension, valve end and valve nut **are not compatible** with Type 346)
- Ball seals in PTFE
- Integrated stainless steel mounting inserts
- Lockable hand lever with ratchet settings

### Options:

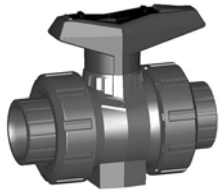
- Individual configuration of the valve (see price sheets)
- Multifunction module with integrated limit switches
- Pneumatic or electric actuators from **+GF+**

All data are valid for models with solvent cement sockets



inch	DN	psi	Cv value ( $\Delta p = 1 \text{ psi}$ )	EPDM Seals	FPM Seals
3/8	10	232	4.97	161 546 361	161 546 371
1/2	15	232	12.95	161 546 362	161 546 372
3/4	20	232	24.50	161 546 363	161 546 373
1	25	232	49.01	161 546 364	161 546 374
1 1/4	32	232	70.02	161 546 365	161 546 375
1 1/2	40	232	112.04	161 546 366	161 546 376
2	50	232	217.08	161 546 367	161 546 377

inch	DN	D	H	H1	H2	L	L1	L2	L4	L5	L6	z	M	lbs
3/8	10	1.97	3.11	1.04	0.47	4.13	3.43	2.20	0.98	1.65	1.77	2.64	M6	0.43
1/2	15	1.97	3.11	1.04	0.47	4.13	3.43	2.20	0.98	1.65	1.77	2.40	M6	0.45
3/4	20	2.28	3.46	1.18	0.47	4.76	4.25	2.56	0.98	1.97	2.28	2.76	M6	0.69
1	25	2.68	3.70	1.40	0.47	5.24	4.25	2.80	0.98	1.97	2.28	2.99	M6	0.99
1 1/4	32	3.31	4.45	1.73	0.59	6.06	5.51	3.35	1.77	2.58	2.91	3.54	M8	1.69
1 1/2	40	3.82	4.69	1.99	0.59	6.46	5.51	3.50	1.77	2.58	2.91	3.70	M8	2.27
2	50	4.88	5.55	2.52	0.59	7.20	6.50	3.98	1.77	3.07	3.41	4.21	M8	4.00



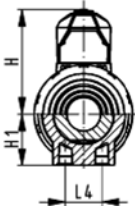
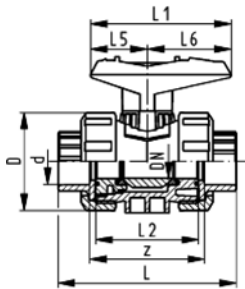
## Ball Valve Type 546, PVC SF solvent cement sockets, Inch ASTM

### Features:

- Paint-compatible / silicone-free
- Ball seals in PTFE
- True union ball valve for easy installation and removal  
(z-dimension, valve end and valve nut **are not compatible** with Type 346)
- Standard without mounting inserts

### Options:

- Individual configuration of the valve (see price sheets)
- Multifunction module with integrated limit switches

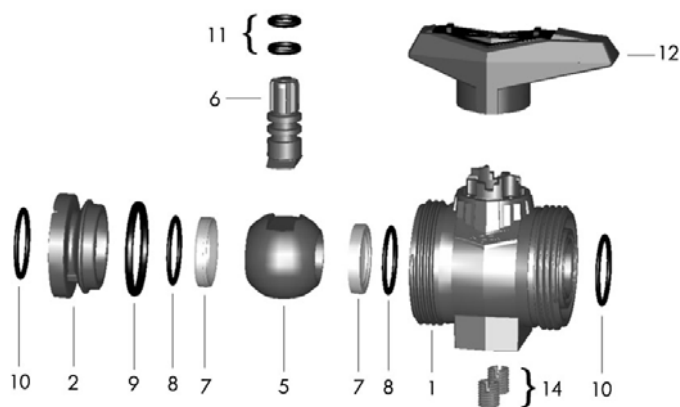


inch	DN	psi	Cv value ( $\Delta p = 1 \text{ psi}$ )	EPDM Seals		FPM Seals	
3/8	10	232	4.97	161 546 681		161 546 691	
1/2	15	232	12.95	161 546 682		161 546 692	
3/4	20	232	24.50	161 546 683		161 546 693	
1	25	232	49.01	161 546 684		161 546 694	
1 1/4	32	232	70.02	161 546 685		161 546 695	
1 1/2	40	232	112.04	161 546 686		161 546 696	
2	50	232	217.08	161 546 687		161 546 697	

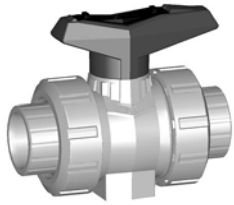
inch	DN	D	H	H1	L	L1	L2	L4	L5	L6	z	lbs		
3/8	10	1.97	2.24	1.04	4.13	3.03	2.20	0.98	1.26	1.77	2.64	0.34		
1/2	15	1.97	2.24	1.04	4.13	3.03	2.20	0.98	1.26	1.77	2.40	0.34		
3/4	20	2.28	2.64	1.18	4.76	3.82	2.56	0.98	1.54	2.28	2.76	0.53		
1	25	2.68	2.87	1.40	5.24	3.82	2.80	0.98	1.54	2.28	2.99	0.75		
1 1/4	32	3.31	3.54	1.73	6.06	5.04	3.35	1.77	2.13	2.91	3.54	1.33		
1 1/2	40	3.82	3.82	1.99	6.46	5.04	3.50	1.77	2.13	2.91	3.70	1.77		
2	50	4.88	4.57	2.52	7.20	5.98	3.98	1.77	2.58	3.41	4.21	3.21		



## Spare Parts for Ball Valve Type 546, PVC



No.	Article/ Material	Pieces	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
	<b>Central Part (EPDM)</b>		<b>161 486 151</b>	<b>161 486 151</b>	<b>161 486 152</b>	<b>161 486 153</b>	<b>161 486 154</b>	<b>161 486 155</b>	<b>161 486 156</b>
1	Body PVC	1							
2	Union bushing PVC	1							
5	Ball PVC	1							
6	Stem PVC	1							
7	Ball seals PTFE	2							
8	Backing seals EPDM	2							
9	Body seals EPDM	1							
10	Face seal EPDM	2							
11	Stem seals EPDM	2							
12	Lever PP red	1							
14	Threaded bushing Stainless steel	2							
	<b>Central Part (FPM)</b>		<b>161 486 163</b>	<b>161 486 163</b>	<b>161 486 164</b>	<b>161 486 165</b>	<b>161 486 166</b>	<b>161 486 167</b>	<b>161 486 168</b>
1	Body PVC	1							
2	Union bushing PVC	1							
5	Ball PVC	1							
6	Stem PVC	1							
7	Ball seals PTFE	2							
8	Backing seals FPM	2							
9	Body seals FPM	1							
10	Face seal FPM	2							
11	Stem seals FPM	2							
12	Lever PP red	1							
14	Threaded bushing Stainless steel	2							
	<b>Ball set (EPDM)</b>		<b>161 486 375</b>	<b>161 486 375</b>	<b>161 486 376</b>	<b>161 486 377</b>	<b>161 486 378</b>	<b>161 486 379</b>	<b>161 486 380</b>
5	Ball PVC	1							
6	Stem PVC	1							
7	Ball seals PTFE	2							
8	Backing seals EPDM	2							
9	Body seal EPDM	1							
11	Stem seals EPDM	2							
	<b>Ball set (FPM)</b>		<b>161 486 385</b>	<b>161 486 385</b>	<b>161 486 386</b>	<b>161 486 387</b>	<b>161 486 388</b>	<b>161 486 389</b>	<b>161 486 390</b>
5	Ball PVC	1							
6	Stem PVC	1							
7	Ball seals PTFE	2							
8	Backing seals FPM	2							
9	Body seal FPM	1							
11	Stem seals FPM	2							
	<b>Seal Set (EPDM)</b>		<b>161 486 400</b>	<b>161 486 400</b>	<b>161 486 401</b>	<b>161 486 402</b>	<b>161 486 403</b>	<b>161 486 404</b>	<b>161 486 405</b>
8	Backing seals EPDM	2							
9	Body seals EPDM	1							
10	Face seal EPDM	2							
11	Stem seals EPDM	2							
	<b>Seal Set (FPM)</b>		<b>161 486 410</b>	<b>161 486 410</b>	<b>161 486 411</b>	<b>161 486 412</b>	<b>161 486 413</b>	<b>161 486 414</b>	<b>161 486 415</b>
8	Backing seals FPM	2							
9	Body seals FPM	1							
10	Face seal FPM	2							
11	Stem seals FPM	2							



## Ball Valve Type 546, CPVC with solvent cement sockets, Inch ASTM and 2 threaded union ends, NPT

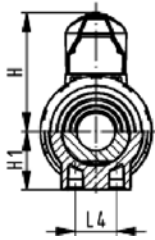
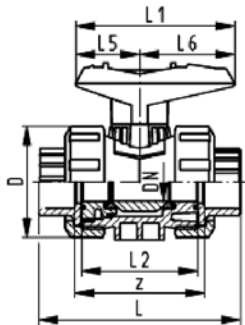
### Features:

- True union ball valve for easy installation and removal (z-dimension, valve end and valve nut **are not compatible** with Type 346)
- Ball seals PTFE
- Integrated stainless steel mounting inserts

### Options:

- Individual configuration of the valve (see price sheets)
- Multifunction module with integrated limit switches
- Pneumatic or electric actuators from **+GF+**

All data are valid for model with solvent cement sockets



inch	DN	psi	Cv value ( $\Delta p = 1 \text{ psi}$ )	EPDM Seals	FPM Seals
3/8	10	232	4.97	163 546 341	163 546 351
1/2	15	232	12.95	163 546 342	163 546 352
3/4	20	232	24.50	163 546 343	163 546 353
1	25	232	49.01	163 546 344	163 546 354
1 1/4	32	232	70.02	163 546 345	163 546 355
1 1/2	40	232	112.04	163 546 346	163 546 356
2	50	232	217.08	163 546 347	163 546 357

inch	DN	D	H	H1	L	L1	L2	L4	L5	L6	z	lbs
3/8	10	1.97	2.24	1.04	4.13	3.03	2.20	0.98	1.26	1.77	2.64	0.42
1/2	15	1.97	2.24	1.04	4.13	3.03	2.20	0.98	1.26	1.77	2.40	0.44
3/4	20	2.28	2.64	1.18	4.76	3.82	2.56	0.98	1.54	2.28	2.76	0.66
1	25	2.68	2.87	1.40	5.24	3.82	2.80	0.98	1.54	2.28	2.99	1.01
1 1/4	32	3.31	3.54	1.73	6.06	5.04	3.35	1.77	2.13	2.91	3.54	1.76
1 1/2	40	3.82	3.82	1.99	6.46	5.04	3.50	1.77	2.13	2.91	3.70	2.41
2	50	4.88	4.57	2.52	7.20	5.98	3.98	1.77	2.58	3.41	4.21	4.39



## Ball Valve Type 546, CPVC with lockable handle with solvent cement sockets, Inch ASTM and 2 threaded union ends, NPT

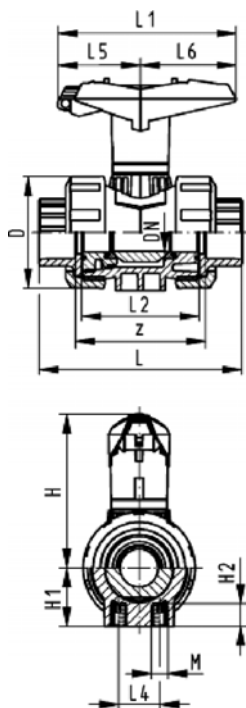
### Features:

- True union ball valve for easy installation and removal (z-dimension, valve end and valve nut **are not compatible** with Type 346)
- Ball seals PTFE
- Integrated stainless steel mounting inserts
- Lockable hand lever with ratchet settings

### Options:

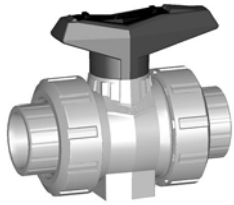
- Individual configuration of the valve (see price sheets)
- Multifunction module with integrated limit switches
- Pneumatic or electric actuators from **+GF+**

All data are valid for model with solvent cement sockets



inch	DN	psi	Cv value ( $\Delta p = 1 \text{ psi}$ )	EPDM Code	FPM Code
3/8	10	232	4.97	163 546 361	163 546 371
1/2	15	232	12.95	163 546 362	163 546 372
3/4	20	232	24.50	163 546 363	163 546 373
1	25	232	49.01	163 546 364	163 546 374
1 1/4	32	232	70.02	163 546 365	163 546 375
1 1/2	40	232	112.04	163 546 366	163 546 376
2	50	232	217.08	163 546 367	163 546 377

inch	DN	D	H	H1	H2	L	L1	L2	L4	L5	L6	z	M	lbs
3/8	10	1.97	3.11	1.04	0.47	4.13	3.43	2.20	0.98	1.65	1.77	2.64	M6	0.45
1/2	15	1.97	3.11	1.04	0.47	4.13	3.43	2.20	0.98	1.65	1.77	2.40	M6	0.47
3/4	20	2.28	3.46	1.18	0.47	4.76	4.25	2.56	0.98	1.97	2.28	2.76	M6	0.72
1	25	2.68	3.70	1.40	0.47	5.24	4.25	2.80	0.98	1.97	2.28	2.99	M6	1.07
1 1/4	32	3.31	4.45	1.73	0.59	6.06	5.51	3.35	1.77	2.58	2.91	3.54	M8	1.85
1 1/2	40	3.82	4.69	1.99	0.59	6.46	5.51	3.50	1.77	2.58	2.91	3.70	M8	2.50
2	50	4.88	5.55	2.52	0.59	7.20	6.50	3.98	1.77	3.07	3.41	4.21	M8	4.48



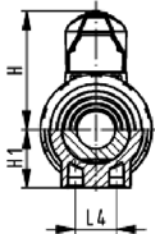
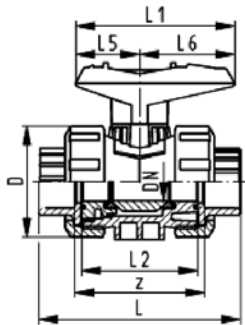
## Ball Valve Type 546, CPVC SF with solvent cement sockets, Inch ASTM

### Features:

- Paint-compatible / silicone-free
- True union ball valve for easy installation and removal (z-dimension, valve end and valve nut **are not compatible** with Type 346)
- Ball seals PTFE
- Standard without mounting inserts

### Options:

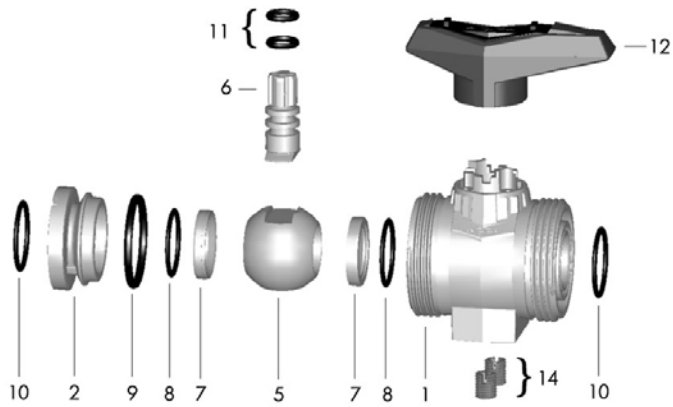
- Individual configuration of the valve (see price sheets)
- Multifunction module with integrated limit switches



inch	DN	psi	Cv value ( $\Delta p = 1 \text{ psi}$ )	FPM Seals
1/2	15	232	12.95	163 546 692
3/4	20	232	24.50	163 546 693
1	25	232	49.01	163 546 694
1 1/4	32	232	70.02	163 546 695
1 1/2	40	232	112.04	163 546 696
2	50	232	217.08	163 546 697

inch	DN	D	H	H1	L	L1	L2	L4	L5	L6	z	lbs
1/2	15	1.97	2.24	1.04	4.13	3.03	2.20	0.98	1.26	1.77	2.40	0.35
3/4	20	2.28	2.64	1.18	4.76	3.82	2.56	0.98	1.54	2.28	2.76	0.54
1	25	2.68	2.87	1.40	5.24	3.82	2.80	0.98	1.54	2.28	2.99	0.80
1 1/4	32	3.31	3.54	1.73	6.06	5.04	3.35	1.77	2.13	2.91	3.54	1.45
1 1/2	40	3.82	3.82	1.99	6.46	5.04	3.50	1.77	2.13	2.91	3.70	1.96
2	50	4.88	4.57	2.52	7.20	5.98	3.98	1.77	2.58	3.41	4.21	3.63

## Spare Parts for Ball Valve Type 546, CPVC

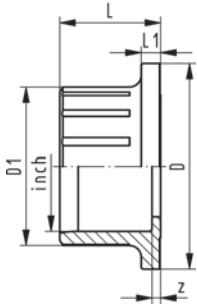


No.	Article/ Material	Pieces	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
<b>Central Part (EPDM)</b>			<b>163 481 251</b>	<b>163 481 251</b>	<b>163 481 252</b>	<b>163 481 253</b>	<b>163 481 254</b>	<b>163 481 255</b>	<b>163 481 256</b>
1	Body CPVC	1							
2	Union bushing CPVC	1							
5	Ball CPVC	1							
6	Stem CPVC	1							
7	Ball seals PTFE	2							
8	Backing seals EPDM	2							
9	Body seals EPDM	1							
10	Face seal EPDM	2							
11	Stem seals EPDM	2							
12	Lever PP red	1							
14	Threaded bushing Stainless steel	2							
<b>Central Part (FPM)</b>			<b>163 481 263</b>	<b>163 481 263</b>	<b>163 481 264</b>	<b>163 481 265</b>	<b>163 481 266</b>	<b>163 481 267</b>	<b>163 481 268</b>
1	Body CPVC	1							
2	Union bushing CPVC	1							
5	Ball CPVC	1							
6	Stem CPVC	1							
7	Ball seals PTFE	2							
8	Backing seals FPM	2							
9	Body seals FPM	1							
10	Face seal FPM	2							
11	Stem seals FPM	2							
12	Lever PP red	1							
14	Threaded bushing Stainless steel	2							
<b>Ball set (EPDM)</b>			<b>163 481 375</b>	<b>163 481 375</b>	<b>163 481 376</b>	<b>163 481 377</b>	<b>163 481 378</b>	<b>163 481 379</b>	<b>163 481 380</b>
5	Ball CPVC	1							
6	Stem CPVC	1							
7	Ball seals PTFE	2							
8	Backing seals EPDM	2							
9	Body seal EPDM	1							
11	Stem seals EPDM	2							
<b>Ball set (FPM)</b>			<b>163 481 385</b>	<b>163 481 385</b>	<b>163 481 386</b>	<b>163 481 387</b>	<b>163 481 388</b>	<b>163 481 389</b>	<b>163 481 390</b>
5	Ball CPVC	1							
6	Stem CPVC	1							
7	Ball seals PTFE	2							
8	Backing seals FPM	2							
9	Body seal FPM	1							
11	Stem seals FPM	2							
<b>Seal Set (EPDM)</b>			<b>161 486 400</b>	<b>161 486 400</b>	<b>161 486 401</b>	<b>161 486 402</b>	<b>161 486 403</b>	<b>161 486 404</b>	<b>161 486 405</b>
8	Backing seals EPDM	2							
9	Body seals EPDM	1							
10	Face seal EPDM	2							
11	Stem seals EPDM	2							
<b>Seal Set (FPM)</b>			<b>161 486 410</b>	<b>161 486 410</b>	<b>161 486 411</b>	<b>161 486 412</b>	<b>161 486 413</b>	<b>161 486 414</b>	<b>161 486 415</b>
8	Backing seals FPM	2							
9	Body seals FPM	1							
10	Face seal FPM	2							
11	Stem seals FPM	2							



## Valve end PVC (G03) Solvent cement socket, Inch ASTM

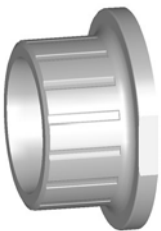
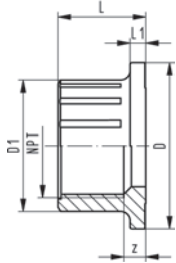
inch	psi	Code	D	D1	L	L1	z	lbs
3/8	232	<b>161 490 712</b>	1.49	0.96	0.97	0.16	0.22	0.03
1/2	232	<b>161 490 713</b>	1.49	1.16	0.97	0.16	0.09	0.03
3/4	232	<b>161 490 714</b>	1.73	1.39	1.10	0.18	0.10	0.04
1	232	<b>161 490 715</b>	2.09	1.70	1.23	0.20	0.10	0.07
1 1/4	232	<b>161 490 716</b>	2.55	2.08	1.35	0.18	0.10	0.10
1 1/2	232	<b>161 490 717</b>	3.03	2.35	1.48	0.22	0.10	0.15
2	232	<b>161 490 718</b>	3.88	2.86	1.61	0.26	0.11	0.26



## Valve end PVC (G09) Threaded socket, NPT

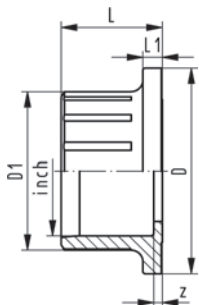
- Connection to plastic thread only
- Do not use thread sealing pastes that are harmful to PVC

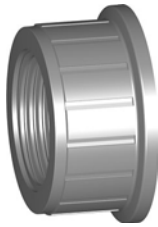
NPT	psi	Code	D	D1	L	L1	z	lbs
3/8	150	<b>161 490 723</b>	1.49	1.03	0.83	0.16	0.29	0.03
1/2	150	<b>161 490 724</b>	1.49	1.31	0.84	0.16	0.16	0.04
3/4	150	<b>161 490 725</b>	1.73	1.53	0.90	0.18	0.21	0.06
1	150	<b>161 490 726</b>	2.09	1.85	1.09	0.20	0.24	0.09
1 1/4	150	<b>161 490 727</b>	2.55	2.24	1.20	0.18	0.29	0.14
1 1/2	150	<b>161 490 728</b>	3.03	2.55	1.34	0.22	0.43	0.20
2	150	<b>161 490 729</b>	3.88	3.05	1.61	0.26	0.65	0.35



## Valve end CPVC (G13) Solvent cement socket, Inch ASTM

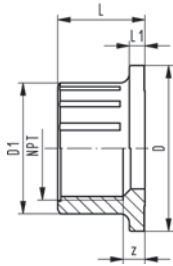
inch	psi	Code	D	D1	L	L1	z	lbs
3/8	232	<b>163 481 311</b>	1.49	0.96	0.97	0.16	0.22	0.03
1/2	232	<b>163 481 312</b>	1.49	1.16	0.97	0.16	0.09	0.03
3/4	232	<b>163 481 313</b>	1.73	1.39	1.10	0.18	0.10	0.04
1	232	<b>163 481 314</b>	2.09	1.70	1.23	0.20	0.10	0.07
1 1/4	232	<b>163 481 315</b>	2.55	2.08	1.35	0.18	0.10	0.10
1 1/2	232	<b>163 481 316</b>	3.03	2.35	1.48	0.22	0.10	0.15
2	232	<b>163 481 317</b>	3.88	2.86	1.61	0.26	0.11	0.26





## Valve end CPVC (G17) Threaded socket, NPT

- Connection to plastic thread only
- Do not use thread sealing pastes that are harmful to CPVC



NPT	psi	Code	D	D1	L	L1	z	lbs
3/8	150	<b>163 481 322</b>	1.49	1.03	0.83	0.16	0.29	0.03
1/2	150	<b>163 481 323</b>	1.49	1.31	0.84	0.16	0.16	0.04
3/4	150	<b>163 481 324</b>	1.73	1.53	0.90	0.18	0.21	0.06
1	150	<b>163 481 325</b>	2.09	1.85	1.09	0.20	0.24	0.09
1 1/4	150	<b>163 481 326</b>	2.55	2.24	1.20	0.18	0.29	0.14
1 1/2	150	<b>163 481 327</b>	3.03	2.55	1.34	0.22	0.43	0.20
2	150	<b>163 481 328</b>	3.88	3.05	1.61	0.26	0.65	0.35



## Valve end blank (G80)

- Flat joining face

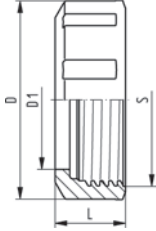


inch	d	DN	psi	Code	D	D1	L	L1	lbs
3/8	16	10	232	<b>161 490 837</b>	1.50	0.91	0.31	0.16	0.02
1/2	20	15	232	<b>161 490 837</b>	1.50	0.91	0.31	0.16	0.02
3/4	25	20	232	<b>161 490 838</b>	1.73	1.30	0.39	0.20	0.03
1	32	25	232	<b>161 490 839</b>	2.09	1.61	0.43	0.20	0.05
1 1/4	40	32	232	<b>161 490 840</b>	2.56	2.01	0.43	0.20	0.07
1 1/2	50	40	232	<b>161 490 841</b>	3.03	2.44	0.55	0.24	0.13
2	63	50	232	<b>161 490 842</b>	3.90	3.03	0.67	0.28	0.25



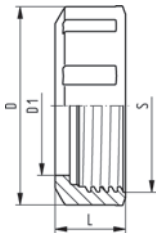
## Union nut PVC

inch	d	DN	Code	D	D1	L	S	lbs
3/8	15	10	<b>161 490 538</b>	1.97	1.33	0.76	1.65 x 0.09	0.04
1/2	20	15	<b>161 490 538</b>	1.97	1.33	0.76	1.65 x 0.09	0.04
3/4	25	20	<b>161 490 539</b>	2.27	1.55	0.80	1.89 x 0.09	0.06
1	32	25	<b>161 490 540</b>	2.68	1.87	0.94	2.28 x 0.12	0.09
1 1/4	40	32	<b>161 490 541</b>	3.31	2.26	1.06	2.80 x 0.12	0.17
1 1/2	50	40	<b>161 490 542</b>	1.97	1.33	0.76	3.32 x 0.15	0.24
2	60	50	<b>161 490 543</b>	4.88	3.11	1.42	4.17 x 0.15	0.42

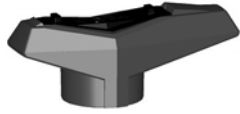


## Union nut CPVC

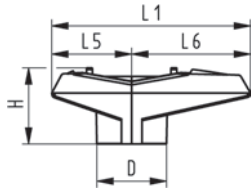
inch	d	DN	Code	D	D1	L	S	lbs
3/8	15	10	<b>163 481 226</b>	1.97	1.33	0.76	1.65 x 0.09	0.03
1/2	20	15	<b>163 481 226</b>	1.97	1.33	0.76	1.65 x 0.09	0.03
3/4	25	20	<b>163 481 227</b>	2.27	1.55	0.80	1.89 x 0.09	0.04
1	32	25	<b>163 481 228</b>	2.68	1.87	0.94	2.28 x 0.12	0.06
1 1/4	40	32	<b>163 481 229</b>	3.31	2.26	1.06	2.80 x 0.12	0.12
1 1/2	50	40	<b>163 481 230</b>	1.97	1.33	0.76	3.32 x 0.15	0.16
2	60	50	<b>163 481 231</b>	4.88	3.11	1.42	4.17 x 0.15	0.50



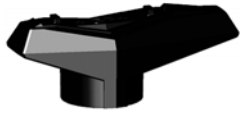




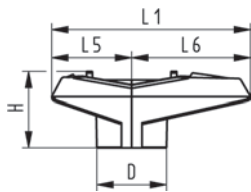
## Standard handle red (K01)



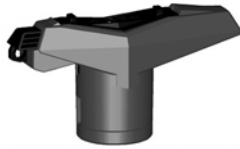
inch	d	DN	Code	L1	L5	L6	H	D	lbs
3/8, 1/2	16/20	10/15	<b>167 484 088</b>	3.03	1.26	1.77	1.22	1.02	0.03
3/4	25	20	<b>167 484 089</b>	3.82	1.54	2.28	1.46	1.34	0.05
1	32	25	<b>167 484 090</b>	3.82	1.54	2.28	1.46	1.34	0.05
1 1/4	40	32	<b>167 484 091</b>	5.04	2.13	2.91	1.81	1.57	0.09
1 1/2	50	40	<b>167 484 092</b>	5.04	2.13	2.91	1.81	1.57	0.09
2	63	50	<b>167 484 093</b>	5.98	2.58	3.43	2.13	1.73	0.13



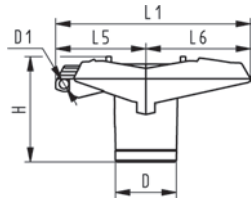
## Standard handle black (K02)



inch	d	DN	Code	L1	L5	L6	H	D	lbs
3/8, 1/2	16/20	10/15	<b>167 484 076</b>	3.03	1.26	1.77	1.22	1.02	0.03
3/4	25	20	<b>167 484 077</b>	3.82	1.54	2.28	1.46	1.34	0.05
1	32	25	<b>167 484 078</b>	3.82	1.54	2.28	1.46	1.34	0.05
1 1/4	40	32	<b>167 484 079</b>	5.04	2.13	2.91	1.81	1.57	0.09
1 1/2	50	40	<b>167 484 080</b>	5.04	2.13	2.91	1.81	1.57	0.09
2	63	50	<b>167 484 081</b>	5.98	2.58	3.43	2.13	1.73	0.13

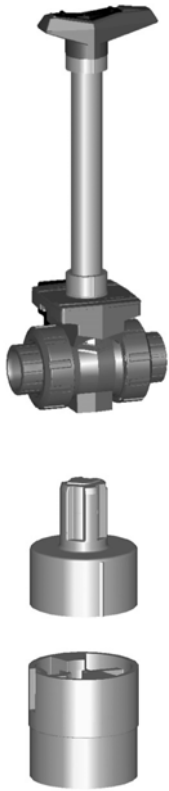


## Multifunction handle red (K11) with ratchet settings, lockable

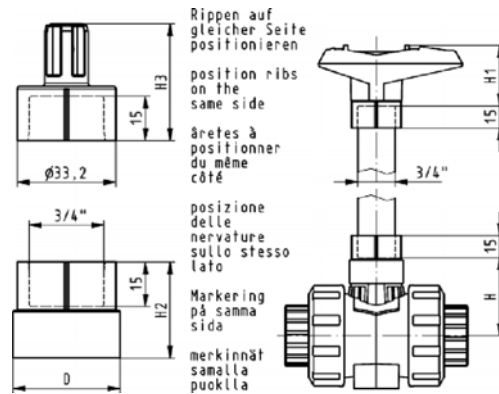


inch	d	DN	Code	D	D1	H	L1	L5	L6	lbs
3/8, 1/2	16/20	10/15	<b>167 484 100</b>	1.02	0.21	2.09	3.43	1.65	1.77	0.06
3/4	25	20	<b>167 484 101</b>	1.34	0.21	2.32	4.25	1.97	2.28	0.10
1	32	25	<b>167 484 102</b>	1.34	0.21	2.32	4.25	1.97	2.28	0.10
1 1/4	40	32	<b>167 484 103</b>	1.57	0.21	2.72	5.51	2.60	2.95	0.18
1 1/2	50	40	<b>167 484 104</b>	1.57	0.21	2.72	5.51	2.60	2.95	0.18
2	63	50	<b>167 484 105</b>	1.73	0.21	3.15	6.50	3.07	3.43	0.23

## Handle extension 546 PVC, inch BS/ASTM



inch	DN	Code	H	H1	H2	H3	D	lbs
3/8, 1/2	10/15	<b>161 486 443</b>	1.61	2.05	1.14	1.42	1.02	0.07
3/4, 1	20/25	<b>161 486 444</b>	1.97	2.44	1.26	1.54	1.42	0.08
1 1/4, 1 1/2	32/40	<b>161 486 445</b>	2.56	2.99	1.34	1.73	1.57	0.10
2	63	<b>161 486 446</b>	3.31	3.43	1.46	1.89	1.73	0.13

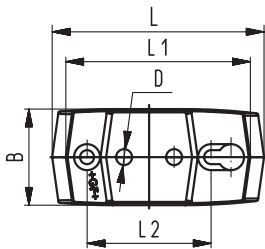
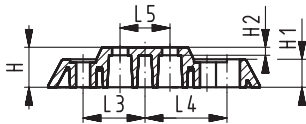


## Mounting plate (L02) PP-GF

- Includes 2 mounting screws



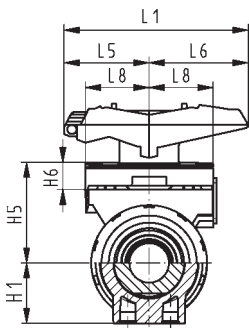
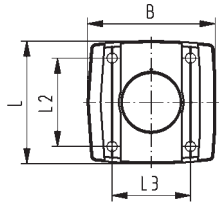
inch	d	DN	Code
3/8	16	10	<b>167 484 110</b>
1/2	20	15	<b>167 484 110</b>
3/4	25	20	<b>167 484 110</b>
1	32	25	<b>167 484 110</b>
1 1/4	40	32	<b>167 484 111</b>
1 1/2	50	40	<b>167 484 111</b>
2	63	50	<b>167 484 111</b>



inch	d	B	D	H	H1	H2	L	L1	L2	L3	L4	L5	lbs
3/8	16	1.89	0.31	0.79	0.55	0.16	4.17	3.62	2.44	1.22	1.61	0.98	0.12
1/2	20	1.89	0.31	0.79	0.55	0.16	4.17	3.62	2.44	1.22	1.61	0.98	0.12
3/4	25	1.89	0.31	0.79	0.55	0.16	4.17	3.62	2.44	1.22	1.61	0.98	0.12
1	32	1.89	0.31	0.79	0.55	0.16	4.17	3.62	2.44	1.22	1.61	0.98	0.12
1 1/4	40	2.13	0.33	0.79	0.55	0.16	5.87	5.28	4.09	2.05	2.44	1.77	0.19
1 1/2	50	2.13	0.33	0.79	0.55	0.16	5.87	5.28	4.09	2.05	2.44	1.77	0.19
2	63	2.13	0.33	0.79	0.55	0.16	5.87	5.28	4.09	2.05	2.44	1.77	0.19

# Multifunction modules

## Multifunction module (I02) PP-GF Empty module

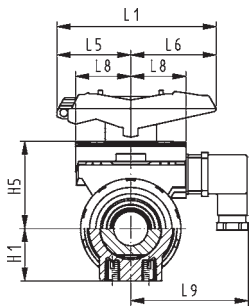
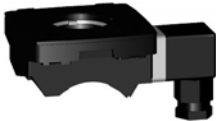


- Accessory to Type 546 Ball Valve
- Multifunction module acts as an intermediate element for actuators (requires additional adapter/coupling)

inch	d	DN	Code
3/8	16	10	<b>167 482 680</b>
1/2	20	15	<b>167 482 680</b>
3/4	25	20	<b>167 482 681</b>
1	32	25	<b>167 482 681</b>
1 1/4	40	32	<b>167 482 682</b>
1 1/2	50	40	<b>167 482 682</b>
2	63	50	<b>167 482 683</b>

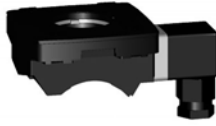
inch	B	H1	H5	H6	L	L1	L2	L3	L5	L6	L8	lbs
3/8	2.64	1.04	1.97	0.66	2.83	3.43	2.13	1.57	1.65	1.77	1.34	0.12
1/2	2.64	1.04	1.97	0.66	2.83	3.43	2.13	1.57	1.65	1.77	1.34	0.12
3/4	2.95	1.18	2.09	0.63	2.83	4.25	2.05	1.81	1.97	2.28	1.50	0.15
1	2.95	1.40	2.32	0.63	2.83	4.25	2.05	1.81	1.97	2.28	1.50	0.15
1 1/4	3.19	1.73	2.83	0.64	3.15	5.51	2.36	1.97	2.60	2.95	1.61	0.18
1 1/2	3.19	1.99	3.07	0.64	3.15	5.51	2.36	1.97	2.60	2.95	1.61	0.18
2	3.58	2.52	3.70	0.76	3.66	6.50	2.68	2.56	3.07	3.43	1.81	0.26

## Multifunction module (I03) PP-GF with mechanical limit switches, Ag, Ni



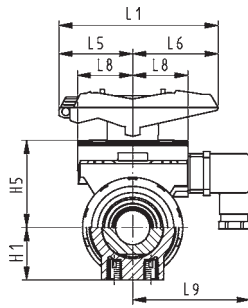
- Accessory to Type 546 Ball Valve
- Multifunction module acts as an intermediate element for actuators
- Includes Plug 3P+E / Protection: IP65

inch	d	DN	Code	H1	H5	L1	L5	L6	L8	L9	lbs
3/8	16	10	<b>167 482 626</b>	1.04	1.97	3.43	1.65	1.77	1.34	2.87	0.24
1/2	20	15	<b>167 482 626</b>	1.04	1.97	3.43	1.65	1.77	1.34	2.87	0.24
3/4	25	20	<b>167 482 627</b>	1.18	2.09	4.25	1.97	2.28	1.50	3.03	0.26
1	32	25	<b>167 482 627</b>	1.40	2.32	4.25	1.97	2.28	1.50	3.03	0.26
1 1/4	40	32	<b>167 482 628</b>	1.73	2.83	5.51	2.60	2.95	1.61	3.15	0.30
1 1/2	50	40	<b>167 482 628</b>	1.99	3.07	5.51	2.60	2.95	1.61	3.15	0.30
2	63	50	<b>167 482 629</b>	2.52	3.70	6.50	3.07	3.43	1.81	3.35	0.39

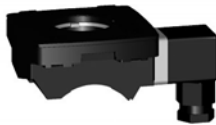


## Multifunction module (I04) PP-GF with mechanical limit switches, Au

- Accessory to Type 546 Ball Valve
- Multifunction module acts as an intermediate element for actuators
- Includes Plug 3P+E / Protection: IP65

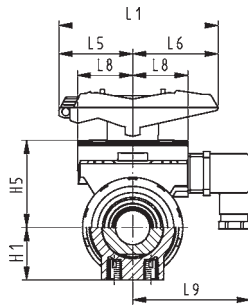


inch	d	DN	Code	H1	H5	L1	L5	L6	L8	L9	lbs
3/8	16	10	<b>167 482 635</b>	1.04	1.97	3.43	1.65	1.77	1.34	2.87	0.24
1/2	20	15	<b>167 482 635</b>	1.04	1.97	3.43	1.65	1.77	1.34	2.87	0.24
3/4	25	20	<b>167 482 636</b>	1.18	2.09	4.25	1.97	2.28	1.50	3.03	0.26
1	32	25	<b>167 482 636</b>	1.40	2.32	4.25	1.97	2.28	1.50	3.03	0.26
1 1/4	40	32	<b>167 482 637</b>	1.73	2.83	5.51	2.60	2.95	1.61	3.15	0.30
1 1/2	50	40	<b>167 482 637</b>	1.99	3.07	5.51	2.60	2.95	1.61	3.15	0.30
2	63	50	<b>167 482 638</b>	2.52	3.70	6.50	3.07	3.43	1.81	3.35	0.39

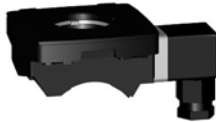


## Multifunction module (I06) PP-GF with inductive limit switches, PNP

- Accessory to Type 546 Ball Valve
- Multifunction module acts as an intermediate element for actuators
- Includes Plug 3P+E / Protection: IP65

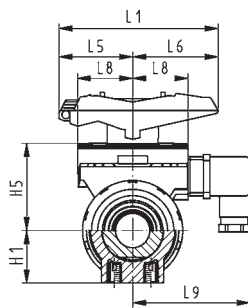


inch	d	DN	Code	H1	H5	L1	L5	L6	L8	L9	lbs
3/8	16	10	<b>167 482 662</b>	1.04	1.97	3.43	1.65	1.77	1.34	2.87	0.24
1/2	20	15	<b>167 482 662</b>	1.04	1.97	3.43	1.65	1.77	1.34	2.87	0.24
3/4	25	20	<b>167 482 663</b>	1.18	2.09	4.25	1.97	2.28	1.50	3.03	0.26
1	32	25	<b>167 482 663</b>	1.40	2.32	4.25	1.97	2.28	1.50	3.03	0.26
1 1/4	40	32	<b>167 482 664</b>	1.73	2.83	5.51	2.60	2.95	1.61	3.15	0.30
1 1/2	50	40	<b>167 482 664</b>	1.99	3.07	5.51	2.60	2.95	1.61	3.15	0.30
2	63	50	<b>167 482 665</b>	2.52	3.70	6.50	3.07	3.43	1.81	3.35	0.39



## Multifunction module (I07) PP-GF with inductive limit switches, NPN

- Accessory to Type 546 Ball Valve
- Multifunction module acts as an intermediate element for actuators
- Includes Plug 3P+E / Protection: IP65

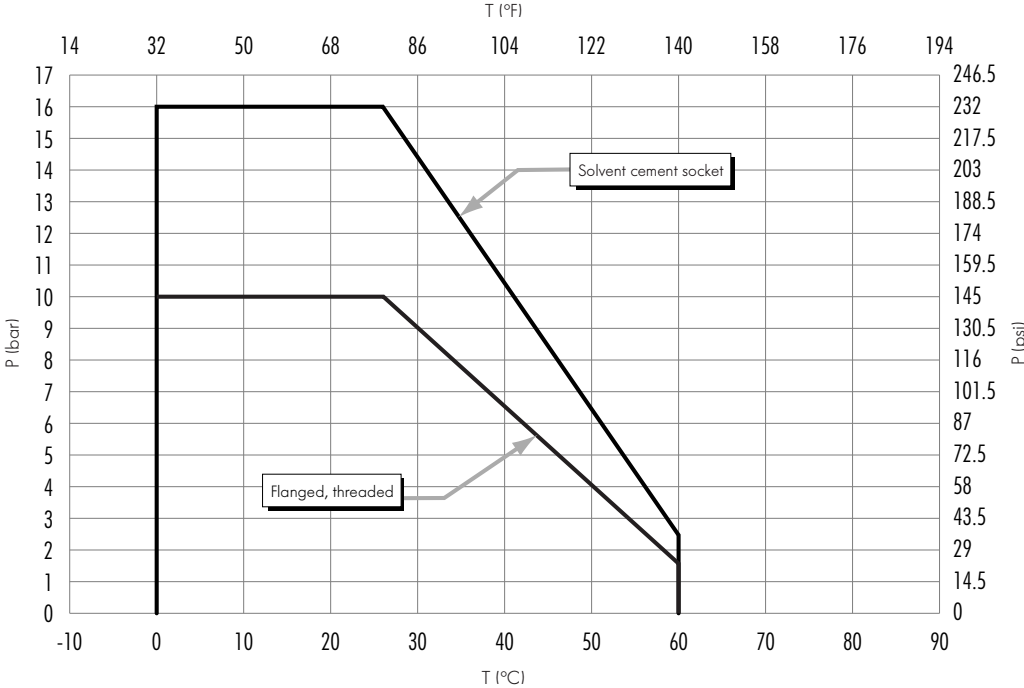


inch	d	DN	Code	H1	H5	L1	L5	L6	L8	L9	lbs
3/8	16	10	<b>167 482 653</b>	1.04	1.97	3.43	1.65	1.77	1.34	2.87	0.24
1/2	20	15	<b>167 482 653</b>	1.04	1.97	3.43	1.65	1.77	1.34	2.87	0.24
3/4	25	20	<b>167 482 654</b>	1.18	2.09	4.25	1.97	2.28	1.50	3.03	0.26
1	32	25	<b>167 482 654</b>	1.40	2.32	4.25	1.97	2.28	1.50	3.03	0.26
1 1/4	40	32	<b>167 482 655</b>	1.73	2.83	5.51	2.60	2.95	1.61	3.15	0.30
1 1/2	50	40	<b>167 482 655</b>	1.99	3.07	5.51	2.60	2.95	1.61	3.15	0.30
2	63	50	<b>167 482 656</b>	2.52	3.70	6.50	3.07	3.43	1.81	3.35	0.39

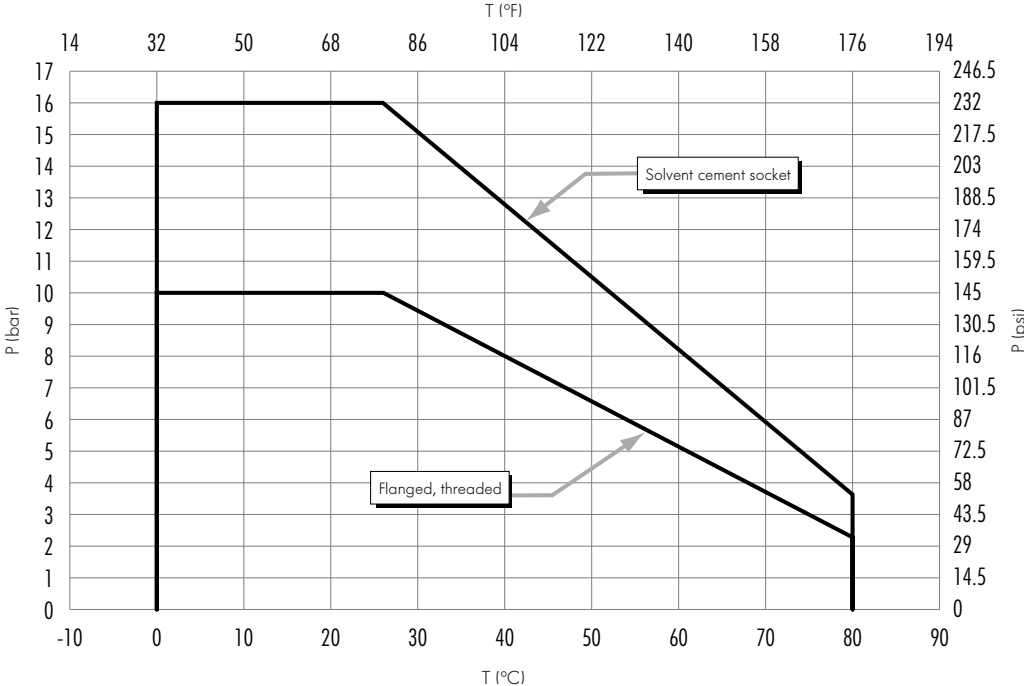
# Technical Data

## Type 546 Ball Valve

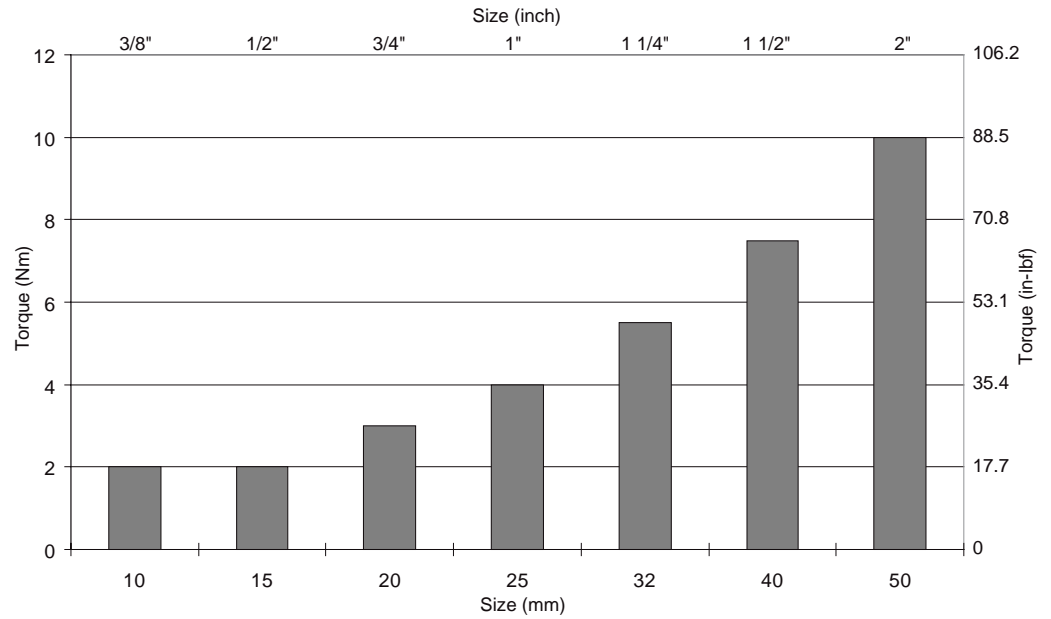
### Pressure-Temperature Diagram (PVC) (service life 25 years in clean water)



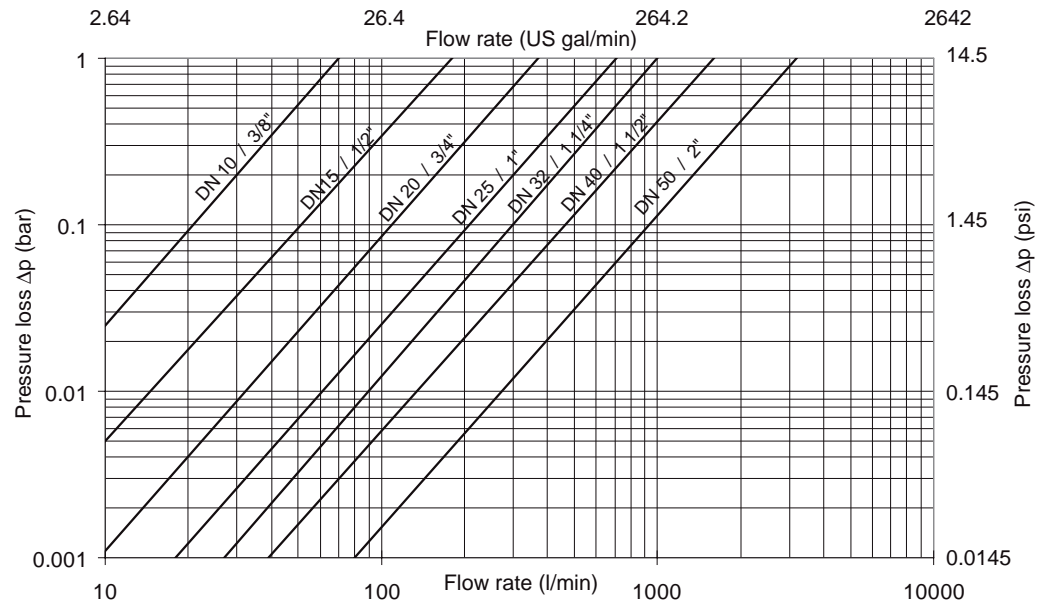
### Pressure-Temperature Diagram (CPVC) (service life 25 years in clean water)



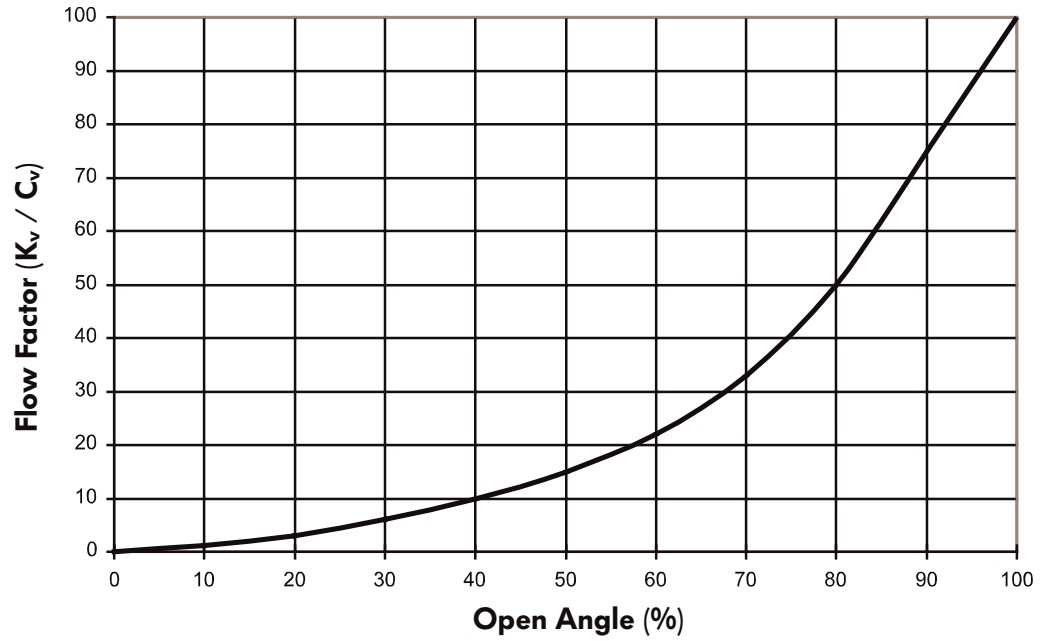
## Average Operating Torque



## Pressure Loss



## Flow Characteristics



$$C_v = \frac{Q}{\sqrt{\Delta p}}$$

$$K_v = 14.28 C_v$$

## C<sub>v</sub> Values

Inch	DN (mm)	d (mm)	C <sub>v</sub>	K <sub>v</sub>
3/8	10	15	4.97	70
1/2	15	20	12.95	85
3/4	20	25	24.50	350
1	25	32	49.01	700
1 1/4	32	40	70.02	1000
1 1/2	40	50	112.04	1600
2	50	63	217.08	3100

## Tightening Torque Values for Flanged Joints

Size inch	Torque (in-lbf) Flat gasket	Torque (in-lbf) Flanged gasket
1/2	133	133
3/4	133	133
1	133	133
1 1/4	177	133
1 1/2	266	133
2	310	177

## Technical Features of the Ball Valve Type 546

a) End connections for the Type 546 are available as:

- Solvent cement/fusion socket (short installation length)
- Solvent cement/fusion spigot (for standard installation length)
- Threaded socket (on request with stainless steel outer reinforcement ring)
- Butt fusion spigot
- Electrofusion spigot
- Fixed flange (for standard installation length)
- Backing flange (for standard installation length)
- Solvent cement and threaded connections for other standards

b) Newly designed valve nuts with buttress thread. These enable fast and secure radial mounting and dismounting of the valve during installation or maintenance work, without tools. **Caution: Tighten valve nuts by hand only!**

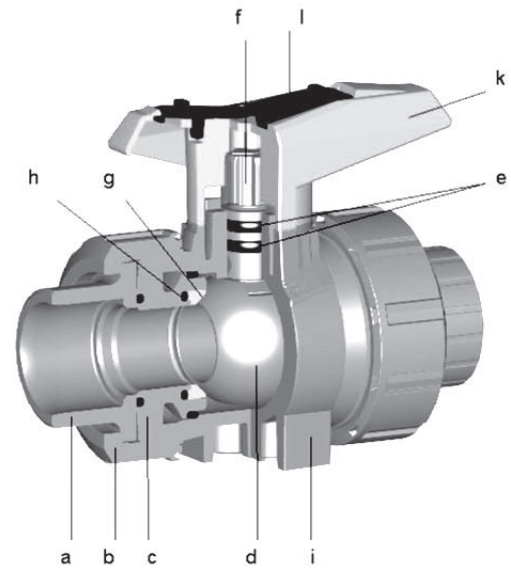
c) Union bushing with fine buttress thread allows for more accurate adjustment of the operating torque. **Caution: Please observe the operating torque guidelines!**

d) Full-port ball for optimal flow characteristics. The floating ball design permits a tight seal.

e) Dual stem seals guarantee a long service life and high reliability.

f) The stem features an intended break point, which is located outside of the housing. In case of damage, the medium cannot leak past the stem.

g) Sturdy PTFE ball seals with high abrasion resistance, low friction, and excellent chemical resistance provide a long working life.



h) The backing seal provides a self-adjusting seal between the ball and seat. The special geometry of the O-ring chamber prevents the O-rings from being flushed out.

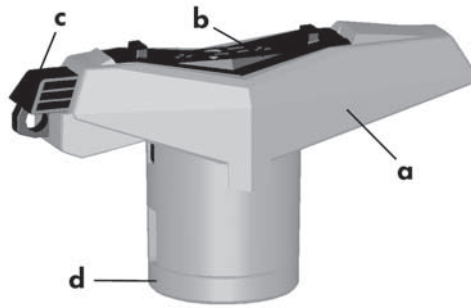
i) Compact design results in shorter overall installation lengths. Threaded inserts can be used for fixed-point mounting. A multifunction module with limit switches, which simultaneously serves as a mounting interface for actuation, can be mounted quickly and simply on the valve body.

k) Ergonomic polypropylene handle with stops at the 0° and 90° positions. Flow direction is clearly indicated on the stem. Optional lockable and ratchet style handles permit safer operation.

l) Integrated seat removal tool permits easy assembly and disassembly of the union bushing. **Caution: the union bushing has left-handed thread.**

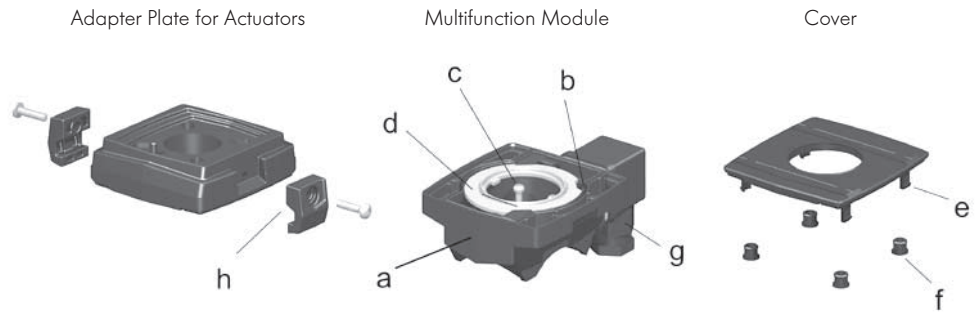


## Technical Features of the Multifunction Handle



- a) Ergonomic handle of polypropylene with stop at the 0° and 90° positions. Flow direction is clearly indicated on the stem. The handle can be locked in place at 0° and 90°. A stainless steel Torx screw is included for secure fastening to the stem.
- b) Integrated seat removal tool permits easy assembly and disassembly of the union bushing.
- c) Locking mechanism constructed of reinforced polypropylene with a stainless steel spring. This mechanism can be secured in place using a standard padlock. The bore diameter for the padlock is 0.2 inches.
- d) Spacer ring acts as an extension when using the locking handle on the standard valve. When using the multifunction handle, the spacer is removed and the handle is installed directly on the multifunction module.

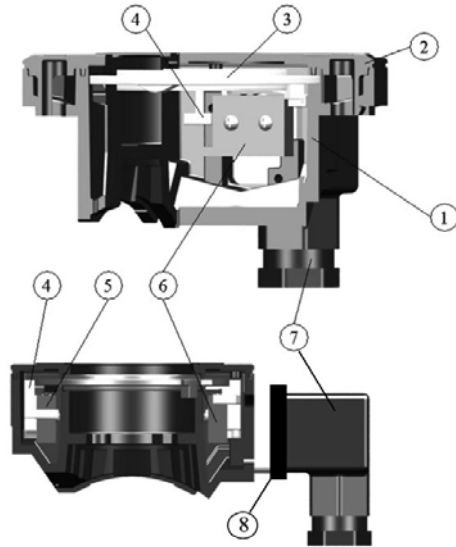
## Technical Features of the Multifunction Module



### Features:

- Interface for mounting actuators
  - Houses position switches for manual and actuated valves
  - Mechanical interface for through wall/panel mounting
- a) The housing is made entirely of polypropylene. It is screwed directly onto the valve, and the module is contoured to fit perfectly on the valve body.
- b) Limit switches can optionally be installed in the multifunction module. Limit switch options are shown on the following pages.
- c) The multifunction module is screwed directly onto the valve body with four stainless steel Torx screws.
- d) The ABS switching disk maintains a precise switching point.
- e) Four tabs lock the cover securely to the multifunction module.
- f) Plugs act as an additional safety device to prevent undesired opening of the cover.
- g) The 3P+E cable connector offers quick disconnect of limit switches, with a protection rating of IP65.
- h) Two clamps securely fasten the adapter plate onto the multifunction module.

## Assembly of multifunction module with switches



- 1 Housing
- 2 Cover
- 3 Switching disk
- 4 Switch holder
- 5 Microswitch (open)
- 6 Microswitch (close)
- 7 Connector plug 3P + E  
per DIN EN 175301-803  
(formerly DIN 43650)
- 8 Seal

## General technical data of multifunction module

Protection rating with DIN unit plug (7): IP 65

Protection rating with cable gland: IP 67

Ambient temperature: -10°C to +50°C

Switch type	Capacity	Code no.	Circuit diagram
Microswitch silver nickel (Ag Ni)	250V ~ 6A*	167 482 626 3/8"-1/2" 167 482 627 3/4"-1" 167 482 628 1 1/4"-1 1/2" 167 482 629 2"	<p>A closed B open C black D blue (short cable) E blue (long cable)</p>
Microswitch with gold contact (Au)	4 - 30V= 1-100mA	167 482 635 3/8"-1/2" 167 482 636 3/4"-1" 167 482 637 1 1/4"-1 1/2" 167 482 638 2"	

\* for ohm resistive load. For inductive loads, provide for protective circuit.

Switch type	Capacity	Code no.		Circuit diagram
Inductive switch NPN	5-30V= 0.1A	167 482 653	3/8" - 1/2"	
Inductive switch PNP	5-30 V= 0.1 A	167 482 662	3/8" - 1/2"	
		167 482 663	3/4" - 1"	
		167 482 664	1 1/4" - 1 1/2"	
		167 482 665	2"	

Switch type	Capacity	Code no.		Circuit diagram
Inductive switch Namur	8 V=	167 482 671	3/8" - 1/2"	
Approvals: ATEX 2032x, CSA EMC per EN 60947-5-2 Norm conformity EN 60947-5-6		167 482 672	3/4" - 1"	
		167 482 673	1 1/4" - 1 1/2"	
		167 482 674	2"	



## CE label

According to the EC directive 98/37/EC pertaining to machines (formerly 89/392/EWG) these actuators/valves are not considered machines, but may be installed in installations which are considered machines.

**We explicitly specify that operation is prohibited until it has been made certain that the machine (equipment) into which this product has been built corresponds to the regulations of the EC Machine Directive 98/37/EC.**

## Technical Features of the Mounting Plate

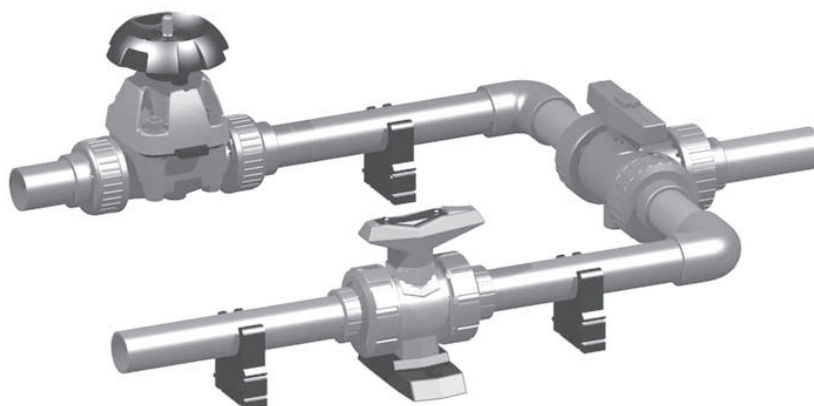
As an alternative to the integrated fastening with the threaded inserts, the Type 546 Ball Valve can also be mounted using an optional mounting plate. Forces that occur under normal operation of the valve (e.g. initial breakaway torque) are absorbed by this mounting plate. By using the mounting plate, no operating forces are transferred to the piping system.



In piping systems which are subject to temperature changes, longitudinal or lateral forces may occur if thermal expansion is restricted. These forces must be absorbed via the respective fixed points before or after the valve, so as not to impair valve operation.

The mounting plate is available in two sizes for the dimension range 3/8 to 2 inches. Two screws are included with the plate for fastening to the valve.

Description	3/8" – 1"	1 1/4" – 2"
	DN 10 – 25	DN 32 – 50
<b>L</b>	4.2	5.9
<b>B</b>	1.9	2.1
<b>H</b>	0.8	0.8
<b>L1</b>	3.6	5.3
<b>L2</b>	2.4	4.1
<b>L3</b>	1.2	2.0
<b>L4</b>	1.6	2.4
<b>L5</b>	1.0	1.8
<b>H1</b>	0.6	0.6
<b>H2</b>	0.2	0.2
<b>D</b>	0.3	0.3
<b>Screw</b>	M6 x 14	M8 x 18



# Operating Instructions for the Type 546 Ball Valve

## General Information

Several hazard notices are used in this manual to warn you of possible injury or damage to property. Please read and observe these warnings at all times!



Imminent danger!  
Failure to comply could result in death or extremely serious injury.



Possible danger!  
Failure to comply could result in serious injury.



Dangerous situation!  
Failure to comply could lead to injury or damage to property

## Abbreviations

Type 546	Type 546 Ball Valve
MF handle	Lockable multifunction handle
MF module	Multifunction module
PN	Nominal pressure

## Safety Information

The same safety guidelines apply for ball valves as for the piping system which they are built into. The Type 546 ball valve is intended exclusively for on/off or controlling the flow of allowed media within the permissible pressure and temperature ranges in the piping system into which it has been installed. The maximum service life is 25 years.



Please note that the maximum working pressure of the whole valve is determined by the maximum permissible nominal pressure of the end connections.

Anyone involved with the mounting, dismantling, operation, handling, and maintenance (inspection, service and repair) of the valve at the plant where it has been installed must have read and understood the complete instruction manual, and in particular this paragraph relating to safety information. We recommend having this confirmed in writing.

Furthermore:

- Use only perfectly functioning valves and always observe these safety guidelines.
- Keep this documentation readily available in the vicinity of the valve

It is the responsibility of the piping engineer/installer and the operator of such systems into which the ball valve has been installed to warrant that:

- The piping system has been installed correctly by professionals and its functionality is checked periodically.
- Only qualified and authorized personnel install, operate, service and repair the ball valve. Employees must be instructed on a regular basis in all aspects of work safety and environmental protection as indicated by the applicable local regulations—especially those pertaining to pressure-bearing piping systems.
- The valve is only used according to the specifications for which it has been intended, as indicated in this paragraph on safety.
- Installation positions and locations in which manipulations can occur unintentionally must be avoided.

## Hazardous Situations



**Do not use ball valves for media containing solids.  
Avoid cavitation in control operation.**

This could lead to leakage due to damage caused by vibration.

### Removing the Type 546 from the pipeline



**If the pressure has not been released completely, the medium can exit uncontrollably, resulting in possible injury.**

Before dismounting, release all pressure from the piping system. For hazardous, flammable, or explosive media, the piping system must be completely emptied and rinsed before the valve may be dismantled. (Caution: there could still be residue)



**Medium needs to be tapped from a Type 546 which is used as an end valve in a pressure-bearing piping system.**

The medium can exit or splash uncontrollably, resulting in possible injury.

**Make certain that the medium is caught safely with the appropriate measures (e.g. connecting a vessel to collect the exiting medium)**



**The Type 546 is to be stored or dismantled after removal from the piping system.**

Residual media can exit uncontrollably, resulting in possible injury.

Open the dismantled Type 546 valve halfway (45° position) and let it drain in a vertical position. Catch the medium in appropriate vessel.

## Transport and Storage

The Type 546 Ball Valve must be handled, transported, and stored with care. Please note the following:

- The Type 546 should be transported and stored in its original, unopened packaging.
- The ball valve must be protected from harmful physical influences such as light, dust, heat, humidity, and UV radiation.
- The connecting parts of the ball valve, in particular, must not be damaged by mechanical or thermal influences.
- The ball valve should be stored with the lever in the open position (as it was supplied).

## Prior to Installation

As a first step in installation, the ball valve should be inspected for transport damage. Damaged valves must not be installed. A function test should then be done by closing the valve manually and opening it again. Ball valves which do not function properly must not be installed.



**The ball valve must always be built into the system in the opened position.**

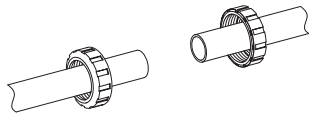
Only ball valves whose pressure rating, end connections and dimensions corresponding to the operating conditions and specifications may be installed. For fusion and cementing connections, only join identical materials with one another.

## Installation of the Type 546

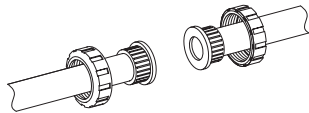


**The installation dimensions, end connections and union nuts of the Type 546 have been modified from the Type 346. The use of components and installation dimensions other than those specified for the Type 546 can cause damage to the piping system. Be sure to compare the installation dimensions and specifications in the technical documentation with those of the actual components at hand.**

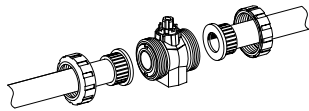
- We recommend only taking the ball valve out of its original packaging just before installation.
- The ball valve and the pipe must be aligned so that the valve is kept free of mechanical stress.
- The specific joining methods for solvent cementing, fusion, or screw connections must be adhered to when installing the valve into a piping system. More information can be found in the operating instructions of the fusion machines or the cementing instructions of the adhesive manufacturer.
- The tightening torque of the flange screws and other useful information can be found in the technical data for the ball valve.



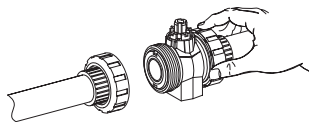
Open the union nuts and slide them onto the pipe ends.



Join the valve ends according to the material and your particular end connections (fusion, cementing, thread, or flange).



Place the ball valve between the connecting parts.



Screw the union nuts onto the connecting thread of the ball valve body and tighten by hand.



**The union nuts of the Type 546 must be hand tightened, without the use of additional tools.**

If other tools such as pliers are used, the material of the union nuts could be damaged. There is also the danger of damaging the thread if they are tightened too strongly.

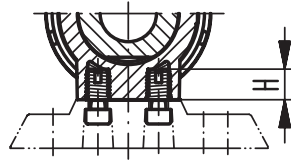
Operation of the valve causes reactive forces in the pipe to which it is connected. It is therefore necessary to mount the ball valve with its integrated/separate fastener (if available) or to reinforce the corresponding piping directly before or after the ball valve with suitable supports.





If you are using the integrated fastening system in the base of the Type 546, please take note of the maximum insertion depth "H" of the screws. Failure to comply can lead to damage of the ball valve housing. The pressure load on a damaged housing can cause breakage.

#### Maximum insertion depth of fastening screws



Inch	3/8"-1/2"	3/4"-1"	1 1/4"-1 1/2"	2"
DN	10/15	20/25	32/40	50
Screw	M6	M6	M8	M8
max. depth H(mm)	12	12	15	15
H (in)	0.47	0.47	0.60	0.60



In piping systems with temperature fluctuations, bending and longitudinal forces can occur if thermal expansion is hindered. These forces must be absorbed by implementing suitable fixed points in front of or behind the valve.

## Pressure Testing

Ball valve pressure testing is subject to the same regulations as apply to the piping system. Detailed information can be found in the George Fischer technical data chapter on Handling and Installation.

Also applicable:

- Check that all valves are in the required open or closed position
- Fill the piping system and deaerate carefully



**The test pressure on a valve must not exceed the value  $1.5 \times PN$  (maximum  $PN + 72.5$  psi).** The components with the lowest PN determine the maximum allowable test pressure in the piping section.

Check the valves and connections for leaks during the pressure test. Record your results.

## Intended use

When the leak test has been completed successfully, the test medium may be removed. The system can now be used as intended.

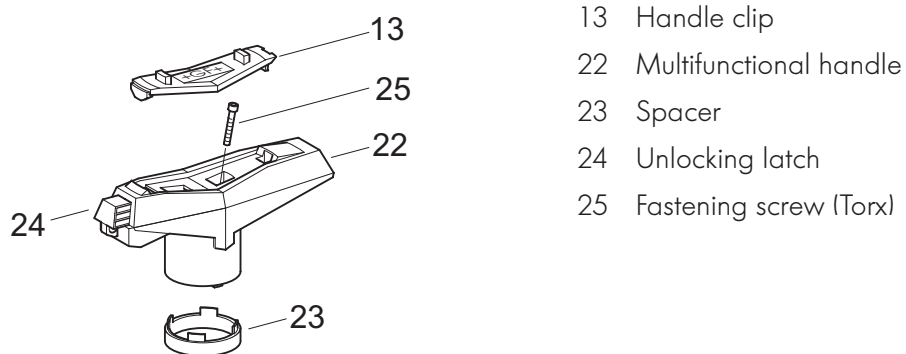
## Service and Maintenance

Ball valves require no maintenance under normal working conditions. Periodic inspection to make sure that no medium is leaking should be sufficient. Should leakage or other malfunctions occur, follow the instructions given under "Safety Information, Hazardous Situations".

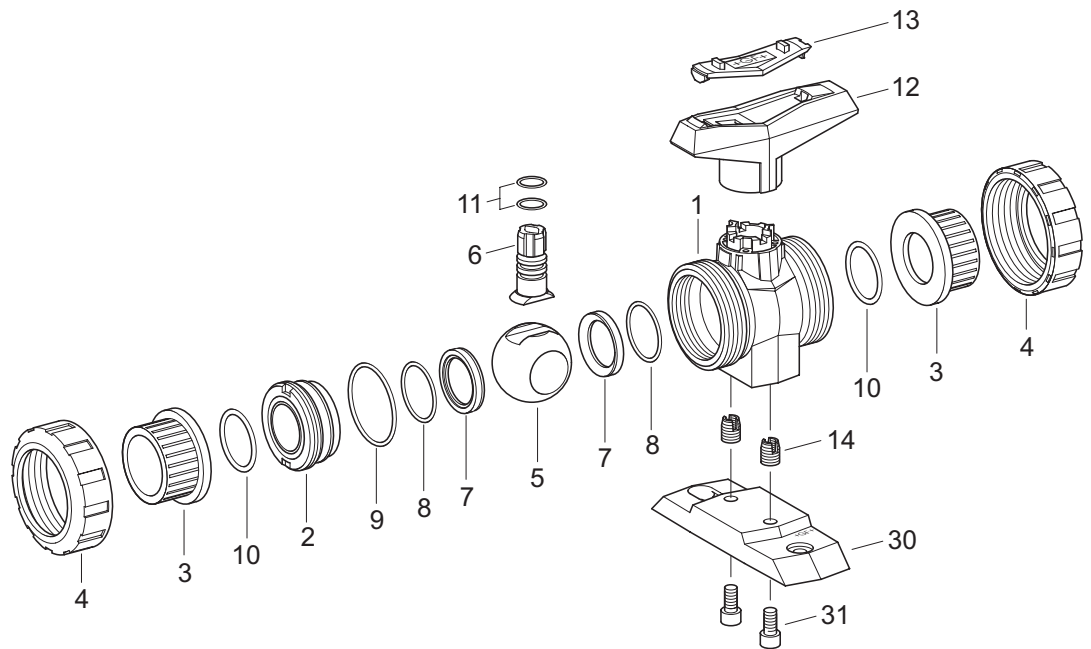
For ball valves which are kept permanently in the same position, we recommend a function test be conducted once or twice per year to check operativeness.

For frequent control operations—e.g. valve automation, or because of chemical attack on the sealing material—it may be necessary to replace parts inside the valve. For this purpose, the valve must be removed from the piping system, while keeping to the instructions given in the "Hazardous Situations" section.

Exploded drawing of multifunctional handle:

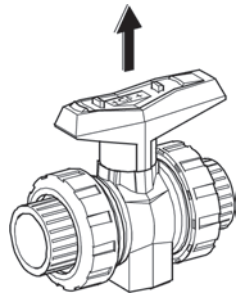


## Exploded view of manual valve:

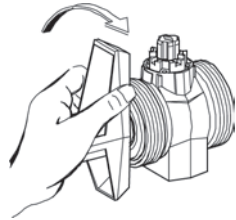


1	Body	10	Union seal
2	Union bushing	11	Stem seals
3	Connecting part / valve end	12	Standard handle
4	Union nut	13	Handle clip
5	Ball	14	Mounting insert
6	Stem	30	Mounting plate
7	Ball seal	31	Fastening screws
8	Backing seal		
9	Body seal		

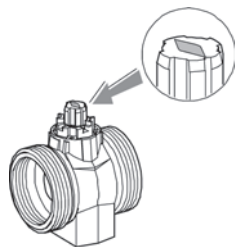
Once the ball valve has been removed from the pipe by loosening the union nut (4) and preparations have been made for drainage, dismantle the valve by following these steps:



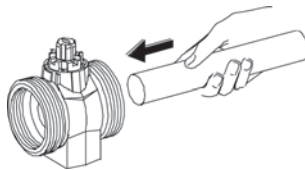
Pull the handle off the stem. The handle can now be used as a tool.



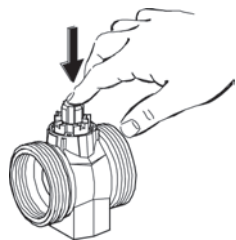
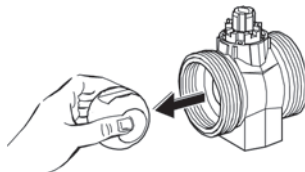
The union bushing (2) can be unscrewed using the handle clip (13). Note: the union bushing has left-handed thread.



The valve must now be in the closed position (with the mark on the spigot at a right angle to the flow direction).



The ball can be pushed out with a rod made of a soft material (plastic or wood).



Push the stem down into the valve body and take it out.



Only original George Fischer spare parts designed specifically for this valve may be used for replacement purposes. Orders for spare parts for the Type 546 valve should include all the details given on the type plate.

## Lubricants



Using the wrong lubricants can damage the material of the ball valve or the seals. Never use petroleum-based greases. For silicone-free valves, please consult the special manufacturer's instructions.

**All the seals must be lubricated with a silicone or polyglycol-based grease.**

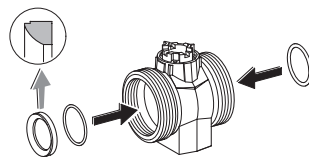
## Seals



All the seals (made of e.g. EPDM, FPM) are organic materials which react to environmental influences. They must therefore be kept in their original packaging and stored in a cool, dry, and dark place. Seals should be checked for damage from aging, such as fissures and hardening, before installation.

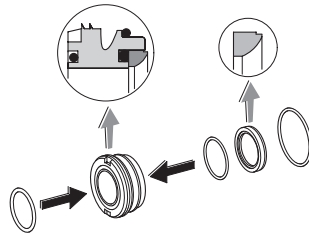
**Do not use defective spare parts.**

To assemble the individual parts, please follow the steps below:

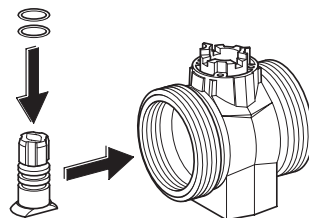


Insert the backing seal (8) and the ball seal (7) in the groove provided for this purpose on the inner side of the stop or the union bushing.

Pull the body seal (9) onto the collar of the union bushing (2).



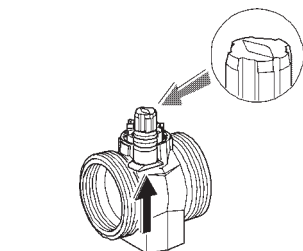
Place the union seals (10) in the groove of the union bushing (2) and the fixed housing stop (1).



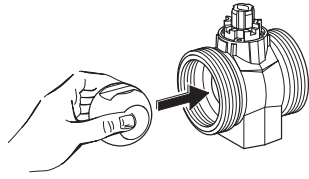
Insert the two lubricated\* stem seals (11) in the grooves of the stem (6).

Slide the prepared stem (6) into the body (1) from the inside. The stem is correctly positioned when it is pushed against the stop from the inside.

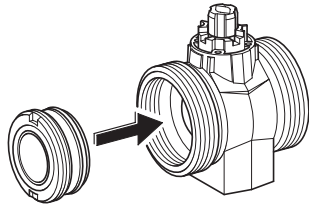
\*see "Lubricants" above



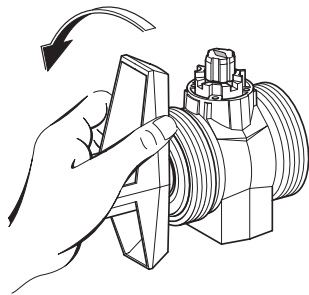
**Note:** The marks on the spigot must now be at a right angle to the flow direction (closed ball position).



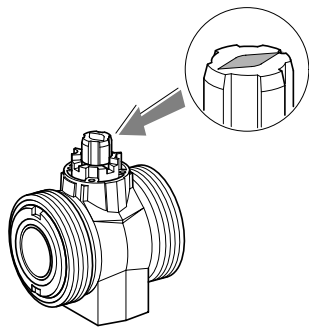
Put the ball (5) through the outlet in the body (1) into the stem guide.



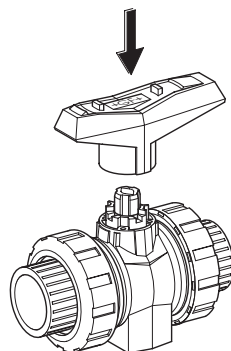
Screw the assembled union bushing (2) into the valve body (1). Note: the union bushing thread is left-handed.



Tighten the union bushing so that the ball is secure. Note that (as in the illustration) the handle can be used as a tool to tighten the bushing.



Note: the marks on the spigot must now be parallel to the flow direction (open ball position).

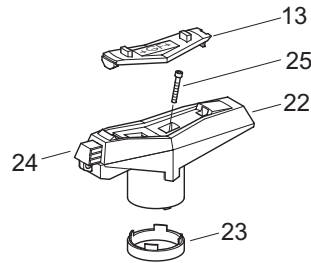


Place the standard handle (12) on the stem (6). The ball valve is now ready for use.

## Mounting and using the Multifunction Handle

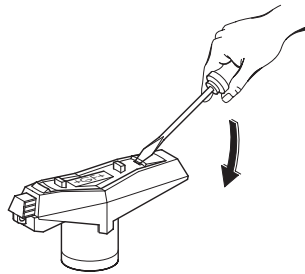
The lockable multifunction handle (MF handle) is available as an alternative to the standard handle on the Type 546 Ball Valve.

### Exploded drawing of the MF handle

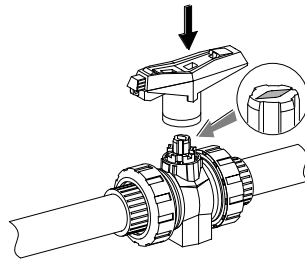


- 13 Handle clip
- 22 Multifunction handle
- 23 Spacer
- 24 Unlocking latch
- 25 Fastening screw (Torx)

To assemble the multifunction handle, please complete the following steps:

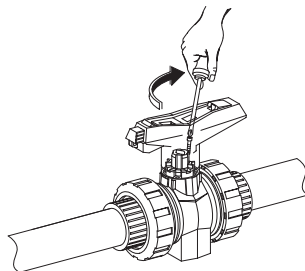


Remove the handle clip (13) with the help of a screwdriver.

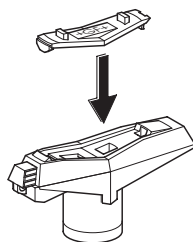


Position the stem according to the illustration. Place the handle on the stem.

At the bottom of the lever shaft there is a spacer (23). Make sure that it is positioned correctly in the shaft (catch).

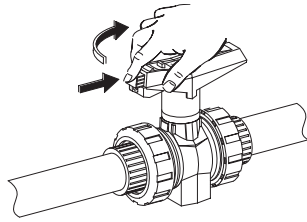


Attach the handle by tightening the pre-assembled screw (25) inside the handle.

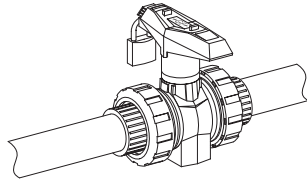


Set the handle clip (13) on the handle again.

## Working with the MF Handle:



Press the unlocking latch (24) into the handle. Hold the latch in this position and the handle can be rotated 90°.



When the latch is released the handle will lock in the respective position and can be secured in this position with a padlock, protecting it from unauthorized access.



# Operating Instructions for the Multifunction Module for the Type 546 Ball Valve

## General Information

Several hazard notices are used in this manual to warn of possible injury or damage to property. Please read and observe these warnings at all times.



Danger! Failure to comply could result in death or extremely serious injury.



Warning! Failure to comply could result in serious injury.



Caution: failure to comply could lead to injury or damage to property.

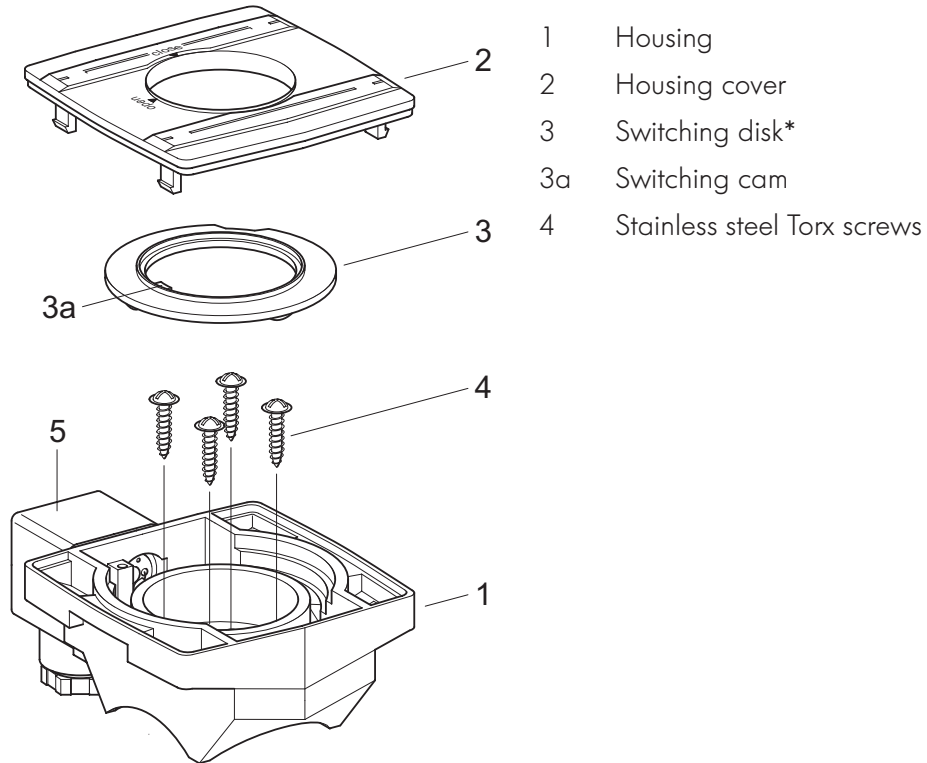
## Abbreviations

Type 546	Ball Valve Type 546
MF Handle	Lockable Multifunction Handle
MF Module	Multifunction module
PN	Nominal pressure

## Mounting the Multifunction Module on the Ball Valve

Examine the MF module before mounting to ensure that it has not been damaged during transport. GF recommend leaving the MF module in its original packaging until just before actual installation. The MF module has been equipped with the respective switches and tested at the factory. It is not necessary to remove the cover when the module is used with hand-operated ball valves.

Assembly of the MF module with built-in switch

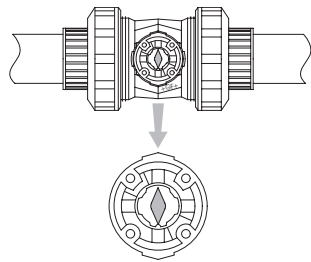


\*for MF module version with preassembled microswitches

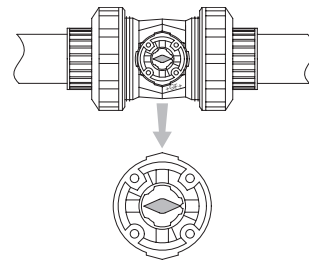
The MF module can be mounted on the Type 546 Ball Valve in either the open or closed position.

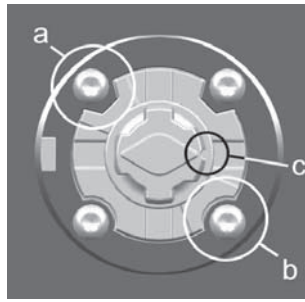
**Caution: The Type 546 valve stem is asymmetrical. Please ensure that the spigot is positioned correctly, according to either of the two illustrations below:**

**A** Stem position for closed ball valve

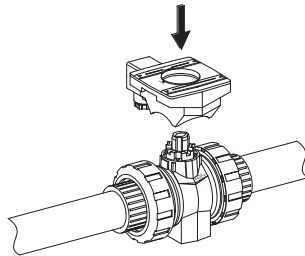


**B** Stem position for open ball valve



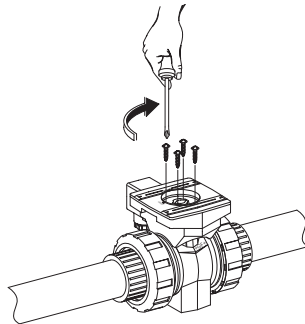


Note the square and round contours ("a" and "b" respectively), as well as the position of the asymmetrical recess of the stem ("c").



Place the MF module on the ball valve.

Make sure the contour of the MF module agrees with that of the ball valve.

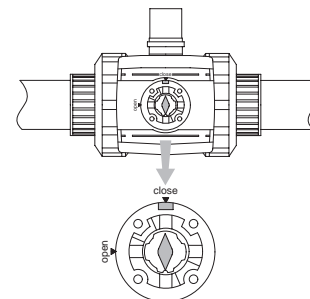
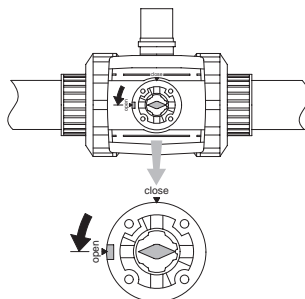


Tighten the four pre-assembled screws. The MF module is now securely positioned on the ball valve.

Put the switching cam (3a) in the respective position:

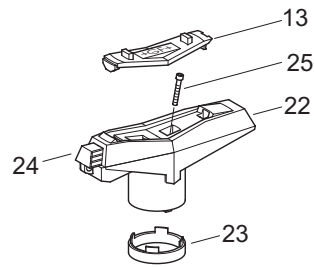
For open ball valve

For closed ball valve

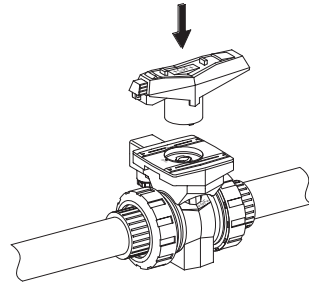


The MF module is now ready to receive the MF Handle.

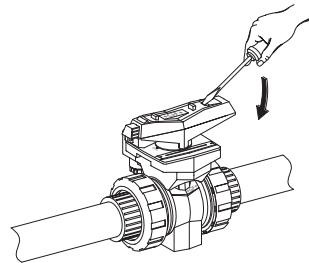
## Mounting the Multifunction Handle



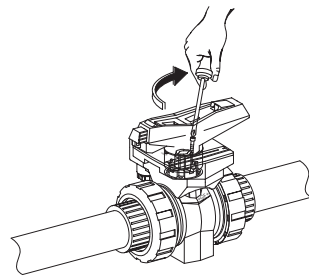
Remove the spacer (23).



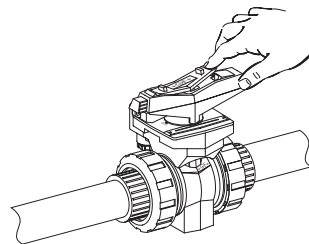
Place the MF handle on the stem.  
(Example: open ball position)



Remove the handle clip (13) with the help  
of a screwdriver.



Attach the handle by tightening the pre-  
assembled screw (25) inside the handle.



Put the handle clip (13) back into the MF  
handle.

## General Technical Data for the Multifunction Module

For general technical data and circuit diagrams, please see the chapter "Technical Features of the Multifunction Module"

## +GF+ Type 546 Ball Valve Configurator

The part number for any combination of ball valve consists of separate match codes that designate the body material, size, seal material, end connections, mounting style and other options. Please refer to the table on this page for the available codes and a sample configuration. **Please note: not all configurations are available. Contact customer service to confirm availability.**

Sample configuration:

**A01 B01 C08 D01 E02 F01 G<sub>left</sub>03 G<sub>right</sub>05 I03 L01 P01**

**This sample configuration corresponds to the following order:** Type 546 PVC ball valve with 1" nominal width, standard PTFE seat, FPM seals, without threaded insert, with PVC solvent cement socket ASTM and PVC solvent cement spigot metric connections, multifunction module with 2 limit switches NiAg, no mounting plate, and the PA1 1/21 pneumatic actuator.



### **A** Ball Valve

01 Type 546

### **B** Material

01 PVC  
02 CPVC

### **C** Nominal width

05 3/8" DN 10  
06 1/2" DN 15  
07 3/4" DN 20  
08 1" DN 25  
09 1 1/4" DN 32  
10 1 1/2" DN 40  
11 2" DN 50

### **D** Version

01 standard, PTFE seat  
02 oil-free, PTFE seat  
03 silicone-free, PTFE seat  
04 silicone-free, PVDF seat

### **E** Seals

01 EPDM seals  
02 FPM seals

### **F** Threaded Insert

01 without threaded insert  
02 with threaded insert

### **G** End Connections

**US**  
03 PVC solvent cement socket, ASTM  
09 PVC threaded socket, NPT  
71 PVC backing flange, ANSI  
13 CPVC solvent cement socket, ASTM  
17 CPVC threaded socket, NPT  
34 PP threaded socket, NPT reinforced

**Metric**  
30 PP fusion socket, metric  
32 PP socket fusion spigot, metric  
33 PP threaded socket, Rp  
72 PP-steel backing flange, metric  
35 PP butt fusion spigot, SDR 11 metric IR-PLUS  
36 PP butt fusion spigot, SDR 17.6 metric  
37 PP butt fusion spigot long, SDR 11 metric  
01 PVC solvent cement socket, metric  
05 PVC solvent cement spigot, metric  
06 PVC threaded socket, Rp  
07 PVC threaded socket, Rp reinforced  
08 PVC threaded socket, Rc  
60 PVC serrated fixed flange, metric  
61 PVC flat fixed flange, metric  
70 PVC backing flange, metric  
11 CPVC solvent cement socket, metric  
14 CPVC solvent cement spigot, metric  
15 CPVC threaded socket, Rp  
16 CPVC threaded socket, Rp reinforced

### **I** Multifunction module

01 no multifunction module  
02 empty module  
03 with 2 limit switches NiAg  
04 with 2 limit switches Au  
05 with 2 inductive switches Namur  
06 with 2 inductive switches PNP  
07 with 2 inductive switches NPN

### **K** Handle

01 standard handle, red  
02 standard handle, black  
11 multi-function handle, red

### **L** Mounting plate

01 without mounting plate  
02 with mounting plate

### **P** Pneumatic actuators PA11/PA21

01 Fail safe to close PA11/PA21  
02 Fail safe to open PA11/PA21  
03 Double-acting PA11/PA21

### **Q** Manual override

01 without manual override  
02 with manual override

### **T** Electric actuators EA11/EA21

01 EA11 24V  
02 EA11 100–230V  
03 EA21 24V  
04 EA21 100–230V

### **U** Accessories for EA11

01 no accessories  
02 2 limit switch Ag, Ni  
03 Heating element  
04 Fail-safe return

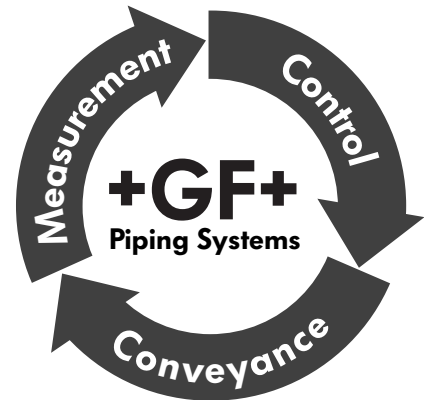
### **W** Accessories for EA21

01 no accessories  
02 Heating element  
03 Cycle time module  
04 Cycle time monitoring  
05 Cycles monitoring  
06 Motor current monitoring  
07 2 limit switches Ag, Ni  
08 2 limit switches Gold  
09 2 limit switches NPN  
10 2 limit switches PNP  
11 Positioner  
12 Electric position indicator  
13 Bus module  
14 Fail-safe return unit

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# GEORGE FISCHER +GF+

## Piping Systems

<b>A</b>	Georg Fischer Rohrleitungssysteme GmbH, Sandgasse 16, 3130 Herzogenburg, Tel. +43(0)2782/856 43-0, Fax +43(0)2782/856 64, e-mail: office@georgefischer.at
<b>AUS</b>	George Fischer Pty Ltd, 186-190 Kingsgrove Road, Kingsgrove NSW 2008, Tel. +61(0)2/95 54 39 77, Fax +61(0)2/95 02 25 61
<b>B/L</b>	Georg Fischer NV/SA, Digue du Canal 109-111 – Vaardijk 109-111, 1070 Bruxelles/Brüssel, Tél. +32(0)2/556 40 20, Fax +32(0)2/524 34 26 e-mail: info.be@be.piping.georgefischer.com
<b>BR</b>	Georg Fischer Ltda, Av. das Nações Unidas 21689, 04795-100 São Paulo, Brasil, Tel. +55(0)11/5687 1311, Fax +55(0)11/5687 6009
<b>CH</b>	Georg Fischer Rohrleitungssysteme (Schweiz) AG, Amsler-Laffon-Strasse 1, Postfach, 8201 Schaffhausen, Tel. +41(0)52 631 30 26, Fax +41(0)52 631 28 97 e-mail: info@rohrleitungssysteme.georgefischer.ch
<b>CHINA</b>	Georg Fischer Piping Systems Ltd Shanghai, No. 218 Kang Qiao Dong Rd., Shanghai 201319, Tel. +86(0)21/58 13 33 33, Fax +86(0)21/58 13 33 66 e-mail: gfsro@public.shanghai.cnbg.com Georg Fischer Piping Systems (Trading) Ltd Shanghai, No. 516 Fute Bei Road, Waigaoqiao Free Trade Zone, 200131 Pudong, Shanghai Tel. +86(0)21/5868 0278, Fax +86(0)21/5868 0264, e-mail: gfttrade@sh.cnbg.com
<b>D</b>	Georg Fischer GmbH, Daimlerstraße 6, 73095 Albershausen, Tel. +49(0)7161/302-0, Fax +49(0)7161/302 111 e-mail: info@georgefischer.de, Internet: <a href="http://www.rls.georgefischer.de">http://www.rls.georgefischer.de</a> Georg Fischer DEKA GmbH, Kreuzstrasse 22, 35232 Dautphetal-Mornshausen, Tel. +49(0)6468/915-0, Fax +49(0)6468/915 221/222 e-mail: info@dekapipe.de, Internet: <a href="http://www.dekapipe.de">http://www.dekapipe.de</a>
<b>DK/IS</b>	Georg Fischer A/S, Røgvænget 30, 2630 Taastrup, Tel. +45 70 22 19 75, Fax +45 70 22 19 76 e-mail: info@dk.piping.georgefischer.com, Internet: <a href="http://www.georgefischer.dk">http://www.georgefischer.dk</a>
<b>E</b>	Georg Fischer S.A., Alcalá, 85, 2º, 28009 Madrid, Tel. +34(0)91/781 98 90, Fax +34(0)91/426 08 23, e-mail: info@georgefischer.es
<b>F</b>	Georg Fischer S.A., 105-113, rue Charles Michels, 93208 Saint-Denis Cedex 1, Tél. +33(0)1/49 22 13 41, Fax +33(0)1/49 22 13 00, e-mail: info@georgefischer.fr
<b>GB</b>	Georg Fischer Sales Limited, Paradise Way, Coventry, CV2 2ST, Tel. +44(0)2476/535 535, Fax +44(0)2476/530 450 e-mail: info@georgefischer.co.uk, Internet: <a href="http://www.georgefischer.co.uk">http://www.georgefischer.co.uk</a>
<b>GR</b>	Georg Fischer S.p.A., Athens Branch, 101, 3rd September Str., 10434 Athen, Tel. +30(0)1/882 0491, Fax +30(0)1/881 0291, e-mail: dderv_piping_gf@oneway.gr
<b>I</b>	Georg Fischer S.p.A., Via Sondrio 1, 20063 Cernusco S/N (MI), Tel. +39(0)2/921 86 1, Fax +39(0)2/921 86 24 7, e-mail: office@piping.georgefischer.it
<b>ID</b>	Georg Fischer Representative Office, c/o Wisma Aria, 3rd Floor, Jl. H.O.S. Cokroaminoto 81, Jakarta 10310, Indonesia, Tel. +62(0)21/391 48 62, Fax +62(0)21/391 48 62
<b>IND</b>	Georg Fischer Piping Systems Ltd, India Branch Office, Solitaire Corporate Park, 532, Building No. 5, 3rd Floor, Chakala, Ghatkopar Link Road, Andheri (E) 400 093 Mumbai, Tel. +91(0)22/820 2362, Fax +91(0)22/820 2462, e-mail: branchoffice@georgefischer.net
<b>J</b>	Georg Fischer Ltd, 2-47, Shikisuhigashi 1-chome, Naniwa-ku, 556-8601 Osaka, Tel. +81(0)6/664 82 59 4, Fax +81(0)6-664 82 56 5, e-mail: info@georgefischer.jp
<b>N</b>	Georg Fischer AS, Rudsletta 97, 1351 Rud, Tel. +47(0)67 18 29 00, Fax +47(0)67 13 92 92, Internet: <a href="http://www.georgefischer.no">http://www.georgefischer.no</a>
<b>NL</b>	Georg Fischer N.V., Postbus 35-8160, 8161 PA Epe, Tel. +31(0)578/678222, Fax +31(0)578/621768 e-mail: info.vgnl@nl.piping.georgefischer.com, Internet: <a href="http://www.georgefischer.nl">http://www.georgefischer.nl</a>
<b>PL</b>	Georg Fischer Sp. z o.o., ul. Radiowa 1A, 01-485 Warszawa, Tel. +48(0)22/638 91 39, Fax +48(0)22/638 00 94
<b>RO</b>	Georg Fischer Rohrleitungssysteme AG, Rep. Office Romania, 11 Barbu Delavrancea, 70000 Bucharest - Sector 1, Tel. +40(0)1/222 91 36, Fax +40(0)1/222 91 77 e-mail: office@georgefischer.ro
<b>RU</b>	Georg Fischer Piping Systems Ltd, Moscow Representative Office, Sheremetievskaya ul., 47, 127521 Moscow, Tel. +7 095/219 9604, Fax +7 095/232 3625 e-mail: lazer@orc.ru
<b>S/FIN</b>	Georg Fischer AB, Box 113, 12523 Älvsjö-Stockholm, Tel. +46(0)8/506 77 500, Fax +46(0)8/749 23 70, e-mail: info@georgefischer.se, Internet: <a href="http://www.georgefischer.se">http://www.georgefischer.se</a>
<b>SGP</b>	Georg Fischer Pte Ltd, 15 Kaki Bukit Road 2, KB Warehouse Complex, 417 845 Singapore, Tel. +65(0)7/47 06 11, Fax +65(0)7/47 05 77, e-mail: info@georgefischer.com.sg
<b>USA</b>	Georg Fischer Inc., 2882 Dow Avenue, Tustin, CA 92780-7258, Tel. +1(714) 731 88 00, Toll Free 800/854 40 90, Fax +1(714) 731 62 01 e-mail: info@us.piping.georgefischer.com, Internet: <a href="http://www.us.piping.georgefischer.com">http://www.us.piping.georgefischer.com</a>
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