

## GESTRA Steam Systems

## Product Range B

### Rapid-Action Intermittent Blowdown Valves

**PA 46 / PA 46-ASME, PN 40/CL 150/300, DN 20-DN 50**

**PA 47 / PA 47-ASME, PN 63/CL 600, DN 25, 40, 50**

**MPA 46 / MPA 46-ASME, PN 40/CL 150/300, DN 20-DN 50**

**MPA 47 / MPA 47-ASME, PN 63/CL 600, DN 25, 40, 50**

**PA 46 / PA 46-ASME**

**PA 47 / PA 47-ASME**

**MPA 46 / MPA 46-ASME**

**MPA 47 / MPA 47-ASME**

### Description

Intermittent valves for manual or automatic and programme-controlled removing of boiler sludge from land or marine installations, particularly if these installations are operated without constant supervision in accordance with TRD 604. Sludge sediments, which are accumulated precipitates from boiler water that settle at the bottom of the boiler, will be removed from the steam boiler with the aid of valves PA and MPA. These valves give the boiler a short blow at regular intervals, thereby discharging accumulated sludge and sediments.

- **PA 46 and PA 47** are designed for manual operation (diaphragm actuator can be retrofitted).
- **MPA 46 and MPA 47** feature a diaphragm actuator for compressed air or pressurized water.

### Function

The intermittent valves for removing boiler sludge PA 46 and PA 47 are opened by means of a hand lever. A pressure pin forces the spring-loaded valve plug out of the valve seat. The large cross-sectional area of the orifice creates a suction effect, giving a short-term high water flow which will discharge the precipitated sludge and sediments and – if installed – move them to a mixing cooler (= blowdown receiver). The intermittent valve for removing boiler sludge must be completely opened for about 2 seconds with the aid of the hand lever in order to give the boiler a short and highly effective blow.

The intermittent valves for removing boiler sludge MPA 46 and MPA 47 are opened by the diaphragm actuator. The guide pin of the diaphragm actuator acts upon the pressure pin, which in turn forces the spring-loaded valve plug out of the orifice creates a suction effect, giving a short-term high water flow which will discharge the precipitated sludge and sediments and – if installed – move them to a mixing cooler (= blowdown receiver). Compressed air (at room temperature) or pressurized water (at room temperature) can be used as control fluid for the diaphragm actuator in accordance with the specified pressure and temperature ratings.

The duration of the bottom blowdown, i. e. the time when the valve is open, should be approx. 2 seconds. The time period when the valve remains closed and hence the frequency of the bottom blowdown must be established as a function of the size and capacity of the steam boiler.

The duration and frequency of the bottom blowdown must be established individually by the user as a function of the size and capacity of the steam boiler, the boiler water quality and the corresponding load.

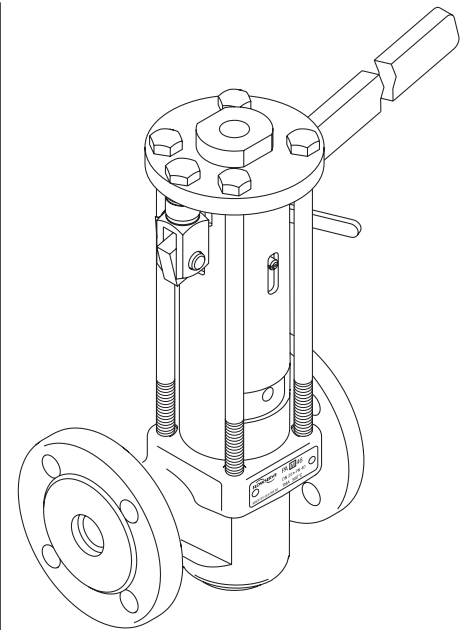
### Intermittent boiler blowdown

Simple water treatment processes cannot prevent small amounts of alkaline earths from getting into the boiler water, thereby causing residual hardness. As a consequence chemical treatment for removal of hardness in the steam boiler is necessary. The controlled addition of moderate amounts of excess phosphate ions ('phosphate treatment') leads to the precipitation of calcium phosphates and magnesium phosphates. Both substances form fine sludge deposits which settle out on heating surfaces and the bottom of the boiler. These sludge deposits can form an adherent insulating coating on heating surfaces, resulting in an effect similar to that of hard scale. These insulating layers formed in zones of high heat transfer retard the flow of heat and cause overheating, which may result in deformation and ultimately failure of the affected boiler parts. It is therefore essential to remove sludge deposits at regular intervals. Although the use of polyacrylates as complexing agents for removing residual hardness has a dispersing effect, the free-flowing boiler sludge must also be removed by blowdown.

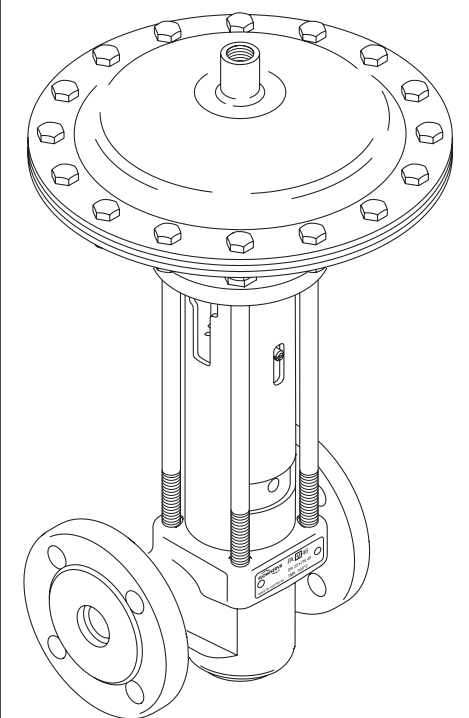
Hardness salts and other impurities are kept in suspension by polyacrylates but will eventually over time settle down on the boiler bottom in the form of finely divided sludge particles. These sludge deposits impair boiler safety and should be removed by intermittent boiler blowdown.

### Please note

- The torsional and flexural torques in the pipeline are a function of the max. admissible pressure ( $p_{max}$ ) and the position of the PA 46 / PA 47 handlever set crosswise or lengthwise to the pipe. The max. actuating forces are indicated in the table **Actuating force / Control pressure**.
- If pressurized water is used as control fluid for the diaphragm actuator make sure that the control line to the diaphragm actuator is made from corrosion-resistant material.
- To avoid waterhammer lay the pipe downstream of the intermittent valve in such a way that it has a slight fall, or evacuate the pipe before carrying out the boiler blowdown.
- The length of the pipe between the steam boiler and the intermittent valve for removing boiler sludge **must not exceed two metres!**



PA 46, PA 47



MPA 46, MPA 47

## Pressure & temperature ratings / Connections

PA 46, MPA 46, Flanged PN 40, EN 1092-1 (2001), 1.0460*)			
$p_{max}$ (max. pressure)	[bar]g	29	
$t_s$ (boiling temperature)	[°C]	234	

Calculated according to DIN EN 12516-2 \*) Material in accordance with AD bulletin

PA 46, MPA 46, Flanged PN 40, EN 1092-1 (2001), A 105			
$p_{max}$ (max. pressure)	[bar]g	36	
$t_s$ (boiling temperature)	[°C]	246	

Calculated according to DIN EN 12516-2

PA 47, MPA 47, Flanged PN 63 / PN 100, EN 1092-1 (2001), 1.0460*)			
$p_{max}$ (max. pressure)	[bar]g	44	
$t_s$ (boiling temperature)	[°C]	257	

Calculated according to DIN EN 12516-2 \*) Material in accordance with AD bulletin

PA 47, MPA 47, Flanged PN 63 / PN 100, EN 1092-1 (2001), A 105			
$p_{max}$ (max. pressure)	[bar]g	55	
$t_s$ (boiling temperature)	[°C]	271	

Calculated according to DIN EN 12516-2

PA 4..., MPA 4...-ASME, Flanged B16.5 Class 150, Butt-weld ends B16.25, Socket-weld ends B16.11, Class 3000			
$p_{max}$ (max. pressure)	[bar]g	14	
$t_s$ (boiling temperature)	[°C]	198	
$p_{max}$ (max. pressure)	[psi]g	203	
$t_s$ (boiling temperature)	[°F]	388	

Calculated according to ASME B16.34

PA 4..., MPA 4...-ASME, Flanged B16.5 Class 300, Butt-weld ends B16.25, Socket-weld ends B16.11, Class 3000			
$p_{max}$ (max. pressure)	[bar]g	42	
$t_s$ (boiling temperature)	[°C]	254	
$p_{max}$ (max. pressure)	[psi]g	609	
$t_s$ (boiling temperature)	[°F]	489	

Calculated according to ASME B16.34

PA 4..., MPA 4...-ASME, Flanged B16.5 Class 600, Butt-weld ends B16.25, Socket-weld ends B16.11, Class 3000			
$p_{max}$ (max. pressure)	[bar]g	55	
$t_s$ (boiling temperature)	[°C]	271	
$p_{max}$ (max. pressure)	[psi]g	800	
$t_s$ (boiling temperature)	[°F]	520	

Calculated according to ASME B16.34

## Materials

Type	PA... / MPA...	PA... / MPA...	PA... ASME / MPA... ASME
Designation	DIN / EN	DIN	ASTM
Body	P250GH (1.0460)	C 22.8 (1.0460)	A 105
Stuffing box union	P250GH (1.0460)	C 22.8 (1.0460)	A 105
Sealing plug	42CrMo4		A 193 B7
Gasket	X5CrNi18-10 (1.4301)	X 5 CrNi 18 10 (1.4301)	
Seat, hardened	X46Cr13 (1.4034)	X 46Cr 13 (1.4034)	
Valve cone, hardened	X39CrMo17-1 (1.4122)	X 35 CrMo 17 (1.4122)	
Disk springs	51CrV4 (1.8159)	50 CrV 4 (1.8159)	
Compression springs	DIN EN 10270-1-SH	DIN 17223-C	
Diaphragm actuator		STW 23 (1.0334)	
Packing		PTFE-silk	
Control membrane		EPDM	

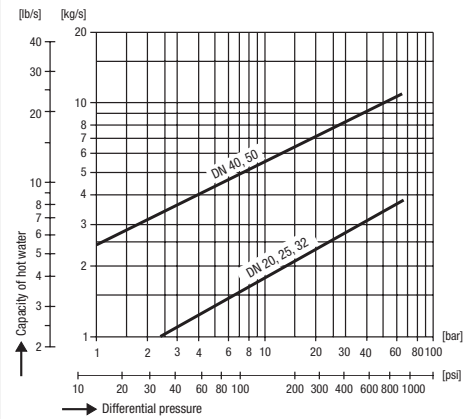
## Flow Characteristics

PA 46, PA 47, MPA 46, MPA 47 – DN 20, 25, 32	Position	$K_{VS}$ value [m³/h]
Handlever	completely open	5.1

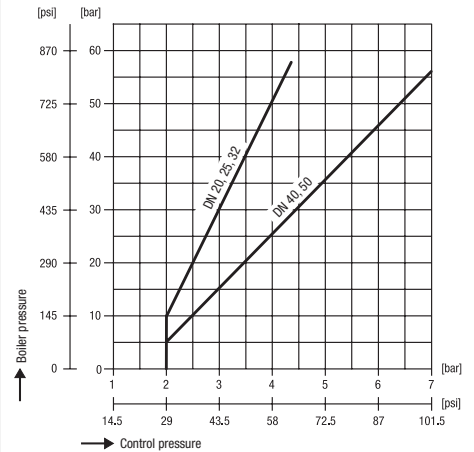
PA 46, PA 47, MPA 46, MPA 47 – DN 40, 50	Position	$K_{VS}$ value [m³/h]
Handlever	completely open	16.5

The  $K_V$  value is the measured flowrate of water (5 to 30 °C) in [m³/h] at a pressure drop of 1 bar and the corresponding opening angle of the control lever. The  $K_{VS}$  value is the  $K_V$  value when the handlever is completely open.

## Capacity chart PA 46, PA 47, MPA 46, MPA 47



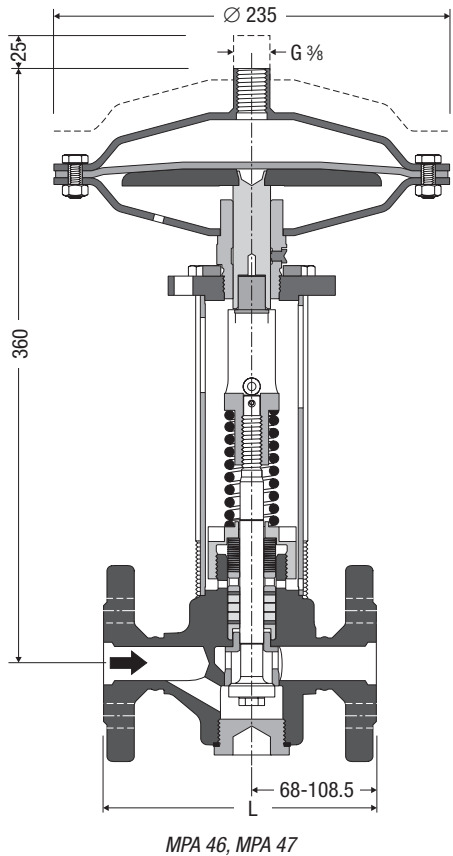
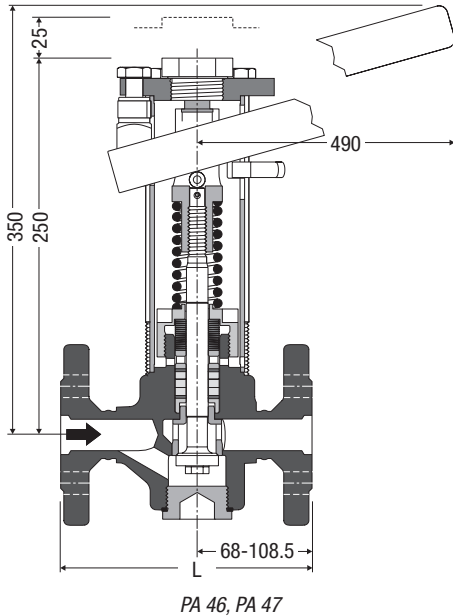
## Control pressure chart MPA 46, MPA 47



## Actuating force / Control pressure

Max. actuating force PA... [N]		Control fluid MPA...	Max. control pressure MPA...
DN 20-32	DN 40, 50		
290	560	Water or compressed air	8 bar
320	530		
230	310		
340	580		
360	620		
410	730		
400	720		

## Dimensions



## End dimensions of flanges (extract)

DN	EN 1092-1 (2001) PN 40						EN 1092-1 (2001) PN 63			
	[inch]	1/2	3/4	1	1 1/4	1 1/2	2	1	1 1/2	2
[mm]	15	20	25	32	40	50	25	40	50	
D		105	115	140	150	165	140	170	180	
b		18	18	18	18	20	24	26	26	
k		75	85	100	110	125	100	125	135	
g		58	68	78	88	102	68	88	102	
l		14	14	18	18	18	18	22	22	
n		4	4	4	4	4	4	4	4	
L		150	160	180	200	230	190	220	250	
[kg] *)		8.8/13.2	9.3/13.7	10.6/15.0	13.8/18.2	15.6/20.0	9.3/13.7	13.8/18.2	15.6/20.0	

\*) Weight PA 4... / Weight MPA 4...

DN	ASME B16.5 Class 150									
	[inch]	1/2	3/4	1	1 1/4	1 1/2	2			
[mm]	15	20	25	32	40	50				
D		98.4	107.9	117.5	127.0	152.4				
b		12.7	14.3	15.9	17.5	19.0				
k		69.8	79.4	88.9	98.4	120.6				
g		42.9	50.8	63.5	73.0	92.1				
l		15.9	15.9	15.9	15.9	19.0				
n		4	4	4	4	4				
L		150	160	180	230	230				
[kg] *)		8.8/13.2	9.3/13.7	10.6/15.0	13.8/18.2	15.6/20.0				

\*) Weight PA 4... / Weight MPA 4...

DN	ASME B16.5 Class 300						ASME B16.5 Class 600			
	[inch]	1/2	3/4	1	1 1/4	1 1/2	2	1	1 1/2	2
[mm]	15	20	25	32	40	50	25	40	50	
D		117.5	123.8	133.3	155.6	165.1	123.8	155.6	165.1	
b		15.9	17.5	19.0	20.6	22.2	17.5	22.2	25.4	
k		82.5	88.9	98.4	114.3	127	88.9	114.3	127	
g		42.9	50.8	63.5	73.0	92.1	50.8	73.0	92.1	
l		19.0	19.0	19.0	22.2	19.0	19.0	22.2	19.0	
n		4	4	4	4	4	4	4	4	
L		150	160	180	230	230	216	216	250	
[kg] *)		8.8/13.2	9.3/13.7	10.6/15.0	13.8/18.2	15.6/20.0	9.3/13.7	13.8/18.2	15.6/20.0	

\*) Weight PA 4... / Weight MPA 4...

Other designs, materials and end connections available on request.

## Dimensions of butt-weld ends (extract)

DN	DIN 3239-1, Series 1 DIN 2559-2						DIN 3239-1, Series 2 DIN 2559-2			
	[inch]	1/2	3/4	1	1 1/4	1 1/2	2	1	1 1/2	2
[mm]	15	20	25	32	40	50	25	40	50	
d <sub>2</sub>		28	34	43	49	61	34	49	61	
d <sub>1</sub>		22	28.5	37	43	54.5	28.5	42.5	54.5	
for pipe		26.9x2.3	33.7x2.6	42.4x2.6	48.3x2.6	60.3x2.9	33.7x2.6	48.3x2.9	60.3x2.9	
L		200	200	200	250	250	200	250	250	
[kg] *)		8.2/12.6	8.2/12.6	8.9/13.3	12.0/16.4	13.3/17.7	8.2/12.6	12.0/16.4	13.3/17.7	

\*) Weight PA 4... / Weight MPA 4...

DN	ASME B16.25, Schedule 40 ASME B36.10						ASME B16.25, Schedule 80 ASME B36.10			
	[inch]	1/2	3/4	1	1 1/4	1 1/2	2	1	1 1/2	2
[mm]	15	20	25	32	40	50	25	40	50	
d <sub>2</sub>		28	34	43	49	61	34	49	61	
d <sub>1</sub>		20.9	26.6	35.1	40.9	52.5	24.3	38.1	49.3	
for pipe		26.7x2.9	33.4x3.4	42.2x3.6	48.3x3.7	60.3x3.9	33.4x4.5	48.3x5.1	60.3x5.5	
L		200	200	200	250	250	200	250	250	
[kg] *)		8.2/12.6	8.2/12.6	8.9/13.3	12.0/16.4	13.3/17.7	8.2/12.6	12.0/16.4	13.3/17.7	

\*) Weight PA 4... / Weight MPA 4...

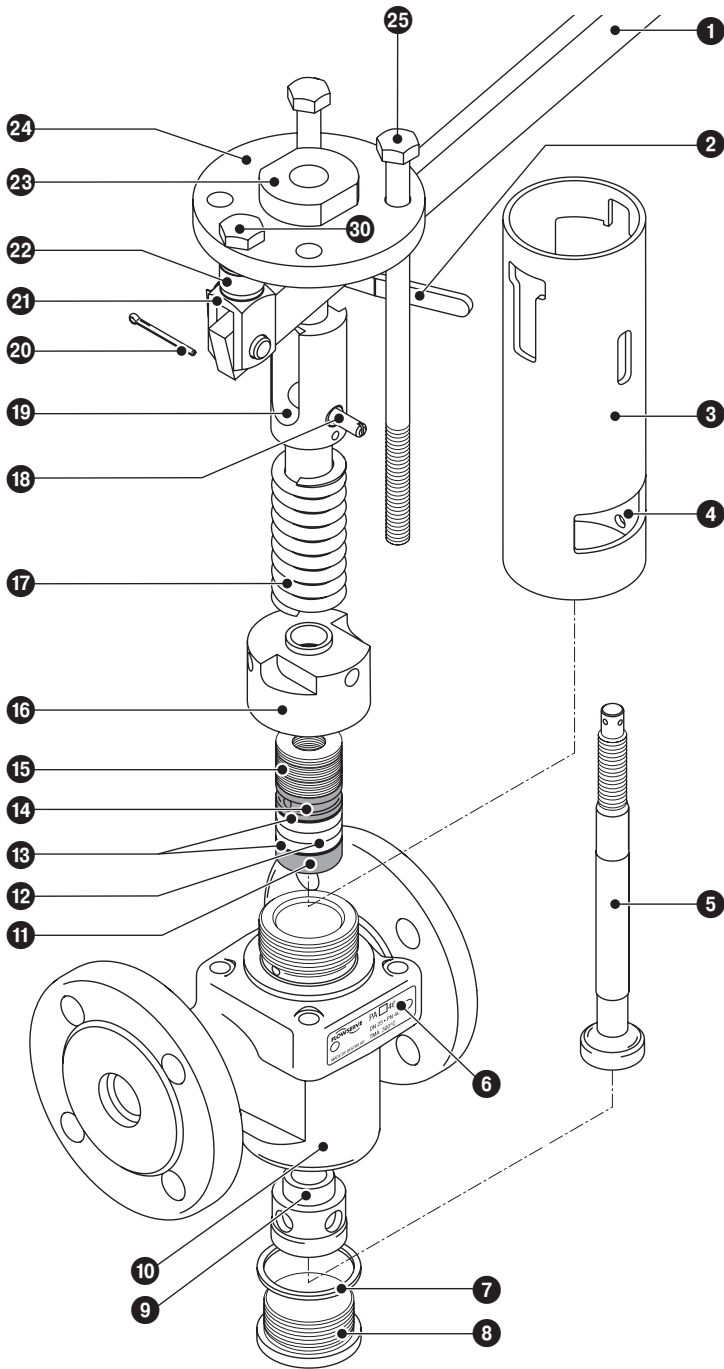
Other designs, materials and end connections available on request.

## Dimensions of socket-weld ends (extract)

DN	DIN EN 12760, ASME B16.11 Class 3000									
	[inch]	1/2	3/4	1	1 1/4	1 1/2	2			
[mm]	15	20	25	32	40	50				
d <sub>2</sub>		40	45	55	62	75				
d <sub>1</sub>		27.3	34.1	42.8	48.8	61.3				
b		13	13	13	13	16				
for pipe		26.9/26.7	33.7/33.4	42.4/42.2	48.3/48.3	60.3/60.3				
L		200	200	200	250	250				
[kg] *)		7.4/11.8	7.7/12.1	8.6/13.0	11.4/15.8	12.6/17.0				

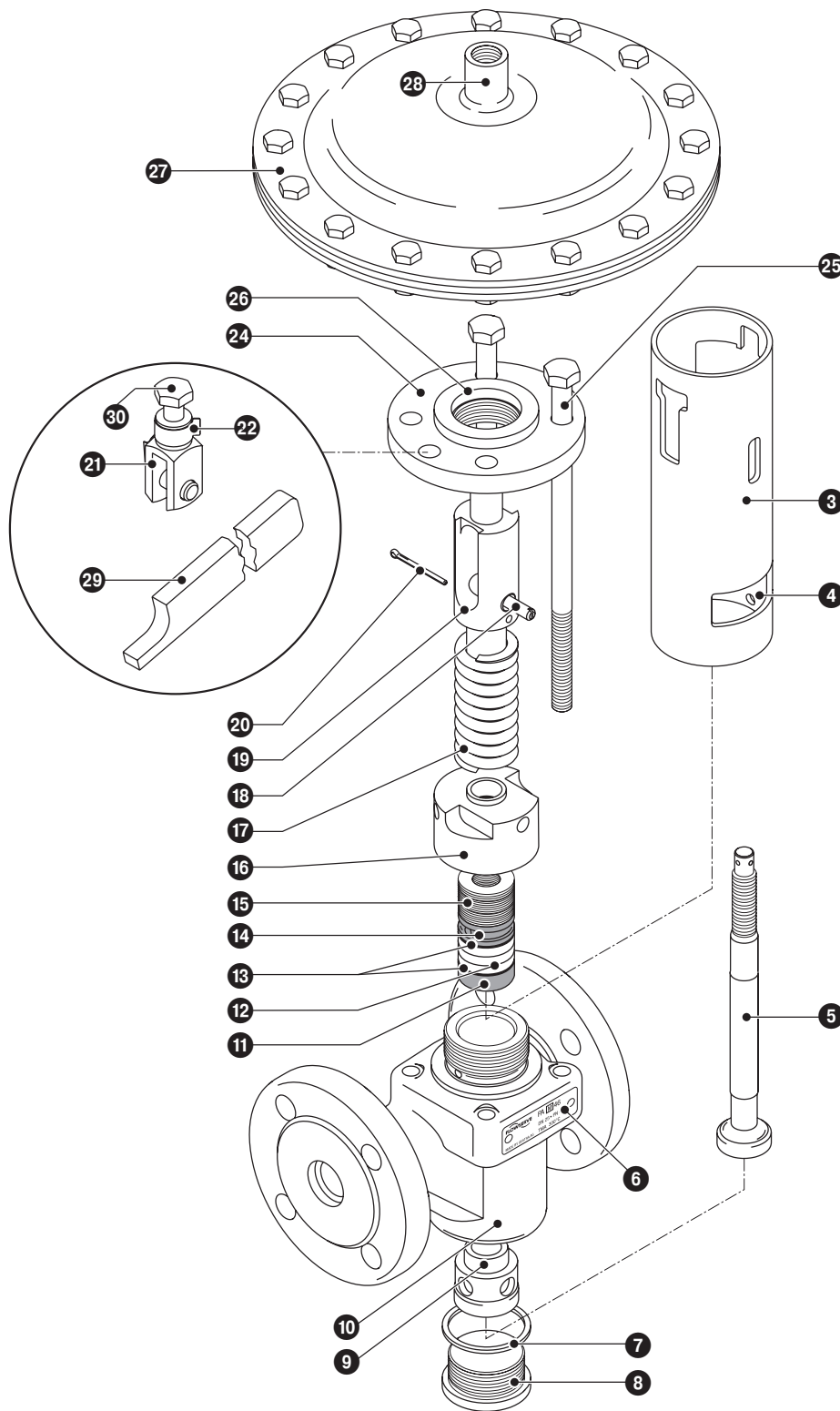
\*) Weight MPA 46 / Weight MPA 47

Other designs, materials and end connections available on request.



**Key**

- 1 Hand lever for PA 46, PA 47
- 2 Locking lever
- 3 Distance sleeve
- 4 Check hole
- 5 Valve plug
- 6 Name plate
- 7 Gasket D 38 x 44 (DN 20-32),  
D 52 x 60 (DN 40-50)
- 8 Sealing plug
- 9 Valve seat
- 10 Valve body
- 11 Base bushing
- 12 Packing ring 14 x 28 x 7
- 13 Wiper ring
- 14 Pressure ring
- 15 Disc springs (15 pcs.)
- 16 Union nut
- 17 Compression spring
- 18 Check pin
- 19 Pressure sleeve
- 20 Split pin 2.5 x 40, ISO 1234
- 21 Forkhead G 10 x 20, DIN 71752
- 22 Retaining piece
- 23 Guide sleeve
- 24 Pressure plate
- 25 Hexagon-head cap screw  
M10 x 200, ISO 4014
- 26 Spacer disc
- 27 GESTRA Diaphragm actuator
- 28 Screwed socket (3/8") for control fluid
- 29 Hand lever for emergency operation  
MPA 46, MPA 47
- 30 Hexagon-head cap screw for forkhead  
M 10 x 25, ISO 4017



Key

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- 7 Gasket D 38 x 44 (DN 20-32),  
D 52 x 60 (DN 40-50)
- 8 Sealing plug
- 9 Valve seat
- 10 Valve body
- 11 Base bushing
- 12 Packing ring 14 x 28 x 8
- 13 Wiper ring
- 14 Pressure ring
- 15 Disc springs (15 pcs.)
- 16 Union nut
- 17 Compression spring
- 18 Check pin
- 19 Pressure sleeve
- 20 Split pin 2.5 x 40, ISO 1234
- 21 Forkhead G 10 x 20, DIN 71752
- 22 Retaining piece
- 23 Guide sleeve
- 24 Pressure plate
- 25 Hexagon-head cap screw  
M10 x 200, ISO 4014
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M 10 x 25, ISO 4017

Rapid-Action Intermittent  
Blowdown Valves  
**PA 46 / PA 46-ASME,  
PN 40/CL 150/300, DN 20-DN 50  
PA 47 / PA 47-ASME,  
PN 63/CL 600, DN 25, 40, 50  
MPA 46 / MPA 46-ASME,  
PN 40/CL 150/300, DN 20-DN 50  
MPA 47 / MPA 47-ASME,  
PN 63/CL 600, DN 25, 40, 50**

**When ordering please state**

Steam pressure, design, end connection, size, type and place of installation.

The following test certificates can be issued on request, at extra cost:


In accordance with EN 10204-2.1, -2.2, 3.1 and 3.2.

All inspection requirements have to be stated with the order. After supply of the equipment certification cannot be established. Charges and extent of the above mentioned certificates as well as the different tests confirmed therein are listed in our price list "Test and Inspection Charges for Standard Equipment". For other tests and inspections than those listed above, please consult us.

**PED (Pressure Equipment Directive)**

The equipment fulfils the requirements of the Pressure Equipment Directive PED 97/23/EC. For use with fluids of group 2. With CE marking (apart from equipment that is excluded from the scope of the PED as specified in section 3.3).

**ATEX (Atmosphère Explosible)**

The equipment PA 46, PA 47, MPA 46, MPA 47 can be used in potentially explosive areas, provided that the following notes are observed: The service fluid must not generate excessively high operating temperatures. Electrostatic charges that may be produced during operation must be discharged. The tight shut-off of the stuffing box must be ensured. The valve spindle must be able to move smoothly. Applicable in Ex zones 1, 2, 21, 22 (94/9/EG), **CE**  II 2 G/D c X.

**Machinery Directive**

The equipment MPA 46 / MPA 47 constitutes a partly complete machinery (machinery intended to be incorporated into other machinery) according to the Machinery Directive 98/37/EC, article 4, paragraph 2.

In compliance with Annex II, section B of the Directive 98/37/EC a Declaration by the Manufacturer is issued for the equipment.

Supply in accordance with our general terms of business.

**Spare parts list**

Item	Designation	Stock code	Stock code
		PA 46, PA 47	MPA 46, MPA 47
11 12 13 14 15 7	Internal parts of stuffing box, DN 20 to DN 50: Base bushing, wiper ring, Packing ring 14 x 28 x 7, pressure ring, Disk springs (15 pcs.), Gasket D 38 x 44, D 52 x 60	335 064	335 064
5 9 11 12 13 14 15 7	Valve plug, valve seat and internal parts of stuffing box, DN 20, DN 25, DN 32: Base bushing, wiper ring, Packing ring 14 x 28 x 7, pressure ring, Disk springs (15 pcs.), Gasket D 38 x 44	335 063	335 063
5 9 11 12 13 14 15 7	Valve plug, valve seat and internal parts of stuffing box, DN 40, DN 50: Base bushing, wiper ring, Packing ring 14 x 28 x 7, pressure ring, Disk springs (15 pcs.), Gasket D 52 x 60	335 065	335 065
33	Control membrane for diaphragm actuator		335 131
29 22 30 21	Hand lever for emergency operation with forkhead		335 060
35 26	Guide pin with plate, spacer disk		335 130
27 26	Diaphragm actuator with spacer disk		335 093

**List of parts for retrofitting**

Item	Designation	Stock code	Stock code
		PA 46, PA 47	MPA 46, MPA 47
27 26	Diaphragm actuator with spacer disk	335 093	
35 26	Guide sleeve with plate, spacer disk (for retrofitting MPA 26, MPA 27 to MPA 46, MPA 47)		335 130
29 22 30 21	Hand lever for emergency operation with forkhead		335 060
36 37 38 39 40	Proximity switch, including isolation amplifier and L-plug		335140

**GESTRA AG**

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GESTRA