Company name : BAREZ	**WPS No. : TS-404-03**	**Sheet: 2 Of: 2**
Supporting PQR No.(s): -	**Project : KURDISTAN**	**Date: 2025**
Standard: ASME IX :2015		**Revision No.: 00**

PREHEAT (QW_406)	**POSTHEAT (QW_407)**
Min preheat temp: 10 °c	**Temp range: N.A**
Max interpass temp: 250 °c	**Time range: N.A**
Preheat maintenance: N.A	**Other: N.A**

ELECTRICAL CHARACTERISTICS (QW_409)	
Current AC or DC: DC	**Polarity: EP**
Ampere range: 50 - 110	**Voltage range: 22-33**
Tungsten electrode size and type: N.A	
Mode of metal transfer for GMAW: N.A	
Electrode wire feed speed range: N.A	
Other: N.A	

TECHNIQUE (QW_410)	
String or Weave bead: Both	**Multi or Single Pass: Multi Pass**
Initial and inter pass cleaning: **Brushing & Grinding**	**Back gouging: NA**
Orifice or gas cap size: N.A	**Travel speed: --**
Contact tube to work distance: N.A	**Oscillation: 2-3 X Filler Size**
Multiple or single electrodes: Single	**Other: N.A**

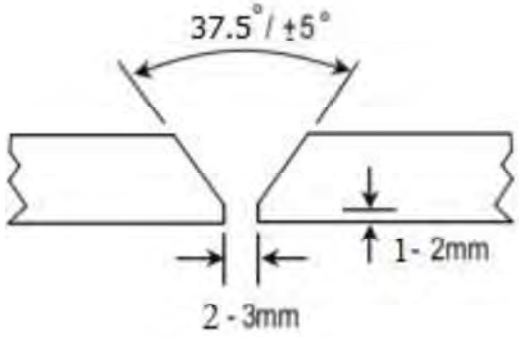
WELD PARAMETERS

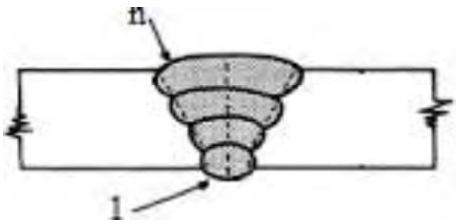
Pass No.	Process	Position	Filler Metal		Current		Volt Rang	Travel Speed m / min
			Class	Dia.	Pol.	Amp.		
1	SMAW	5G	E6010	2.5	DCEP	130-150	10	8
2	SMAW	5G	E7018	2.5	DCEP	05-130	10~20	12
3	SMAW	5G	E7018	2.5	DCEP	80-110	22	12

Company name : BAREZ	**WPS No. : TS-404-04**	**Sheet: 1 Of: 2**
Supporting PQR No.(s): -	**Project : KURDISTAN**	**Date: 2025**
Standard: ASME IX :2015		**Revision No.: 00**

Welding Process (es): SMAW	**Type(s): Manual**

JOINT DESIGN (QW_ 402)





Backing : No

BASE METAL (QW_ 403)

P-No: 1 Group No.: 1	**To P-No.: 1 Group No.: 1**
Specification grade: ASTM-A53,A106 & API-5L	
Thickness range:4.85mm ~8.18mm	**Pipe Dia. Range :5" TO 8"**
Maximum pass thickness ≤ 13 mm (Yes) __X__ (No) _____	

FILLER METALS (QW_404)

Specification No.: E6010 and E7018	**AWS No.: SFA5.1**
F- No.: 3	**A- No.: 1**
Size of filler metals: 2.5	**Flux type: N.A**
Weld metal thickness rang: 2.5 mm for E6010 and 3.2 mm for E7018	
Other: Baking E7018: 2 hr at 300-350°c then using at 100°c	

GAS (QW_408)	POSITION (QW_405)
Shielding gas: N.A	**Position: 5G**
Percent composition: N.A	**Welding progression: Up hill**
Flow rate: N.A	**Position of fillet: N.A**
Other: --	**Other: --**

Company name : BAREZ	WPS No. : TS-404-04	Sheet: 2 Of: 2
Supporting PQR No.(s): -	Project : KURDISTAN	Date: 2025
Standard: ASME IX :2015		Revision No.: 00

PREHEAT (QW_406)	POSTHEAT (QW_407)
Min preheat temp: 10 °c	Temp range: N.A
Max interpass temp: 250 °c	Time range: N.A
Preheat maintenance: N.A	Other: N.A

ELECTRICAL CHARACTERISTICS (QW_409)	
Current AC or DC: DC	Polarity: EP
Ampere range: 50 - 110	Voltage range: 22-33
Tungsten electrode size and type: N.A	
Mode of metal transfer for GMAW: N.A	
Electrode wire feed speed range: N.A	
Other: N.A	

TECHNIQUE (QW_410)	
String or Weave bead: Both	Multi or Single Pass: Multi Pass
Initial and inter pass cleaning: Brushing & Grinding	Back gouging: NA
Orifice or gas cap size: N.A	Travel speed: --
Contact tube to work distance: N.A	Oscillation: 2-3 X Filler Size
Multiple or single electrodes: Single	Other: N.A

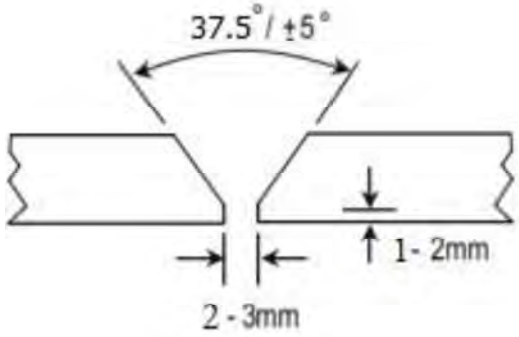
WELD PARAMETERS

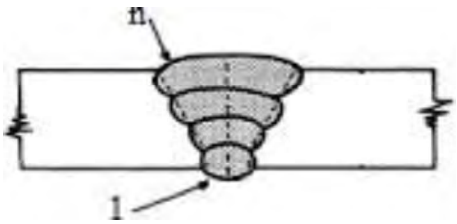
Pass No.	Process	Position	Filler Metal		Current		Volt Rang	Travel Speed m / min
			Class	Dia.	Pol.	Amp.		
1	SMAW	5G	E6010	2.5	DCEP	130-150	10	8
2	SMAW	5G	E7018	3.2	DCEP	05-130	10~20	12
3	SMAW	5G	E7018	3.2	DCEP	80-110	22	12

Company name : BAREZ	**WPS No. : TS-404-05**	**Sheet: 1 Of: 2**
Supporting PQR No.(s): -	**Project : KURDISTAN**	**Date: 2025**
Standard: ASME IX :2015		**Revision No.: 00**

Welding Process (es): SMAW	**Type(s): Manual**

JOINT DESIGN (QW_ 402)





Backing : No

BASE METAL (QW_ 403)

P-No: 1 Group No.: 1	**To P-No.: 1 Group No.: 1**
Specification grade: ASTM-A53,A106 & API-5L	
Thickness range:7.10mm ~10.31mm	**Pipe Dia. Range :10"&12"**
Maximum pass thickness ≤ 13 mm (Yes) __X__ (No) _____	

FILLER METALS (QW_404)

Specification No.: E6010 and E7018	**AWS No.: SFA5.1**
F- No.: 4	**A- No.: 1**
Size of filler metals: 2.5~4	**Flux type: N.A**
Weld metal thickness rang: 2.5 mm for E6010 and 3.25&4 mm for E7018	
Other: Baking E7018: 2 hr at 300-350°c then using at 100°c	

GAS (QW_408)	POSITION (QW_405)
Shielding gas: N.A	**Position: 5G**
Percent composition: N.A	**Welding progression: Up hill**
Flow rate: N.A	**Position of fillet: N.A**
Other: --	**Other: --**

Company name : BAREZ	WPS No. : TS-404-05	Sheet: 2 Of: 2
Supporting PQR No.(s): -	Project : KURDISTAN	Date: 2025
Standard: ASME IX :2015		Revision No.: 00

PREHEAT (QW_406)	POSTHEAT (QW_407)
Min preheat temp: 10 °c	Temp range: N.A
Max interpass temp: 250 °c	Time range: N.A
Preheat maintenance: N.A	Other: N.A

ELECTRICAL CHARACTERISTICS (QW_409)	
Current AC or DC: DC	Polarity: EP
Ampere range: 50 - 110	Voltage range: 22-33
Tungsten electrode size and type: N.A	
Mode of metal transfer for GMAW: N.A	
Electrode wire feed speed range: N.A	
Other: N.A	

TECHNIQUE (QW_410)	
String or Weave bead: Both	Multi or Single Pass: Multi Pass
Initial and inter pass cleaning: Brushing & Grinding	Back gouging: NA
Orifice or gas cap size: N.A	Travel speed: --
Contact tube to work distance: N.A	Oscillation: 2-3 X Filler Size
Multiple or single electrodes: Single	Other: N.A

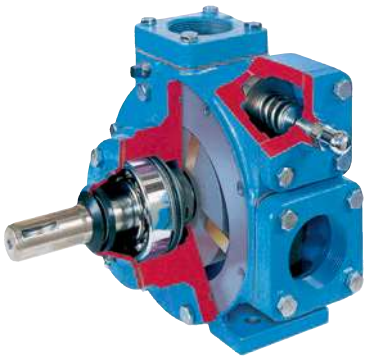
WELD PARAMETERS

Pass No.	Process	Position	Filler Metal		Current		Volt Rang	Travel Speed m / min
			Class	Dia.	Pol.	Amp.		
1	SMAW	5G	E6010	2.5	DCEP	130-150	10	8
2	SMAW	5G	E7018	3.2	DCEP	05-130	10~20	12
3	SMAW	5G	E7018	3.2	DCEP	80-110	22	12
4	SMAW	5G	E7018	4.0	DCEP	80-110	22	12

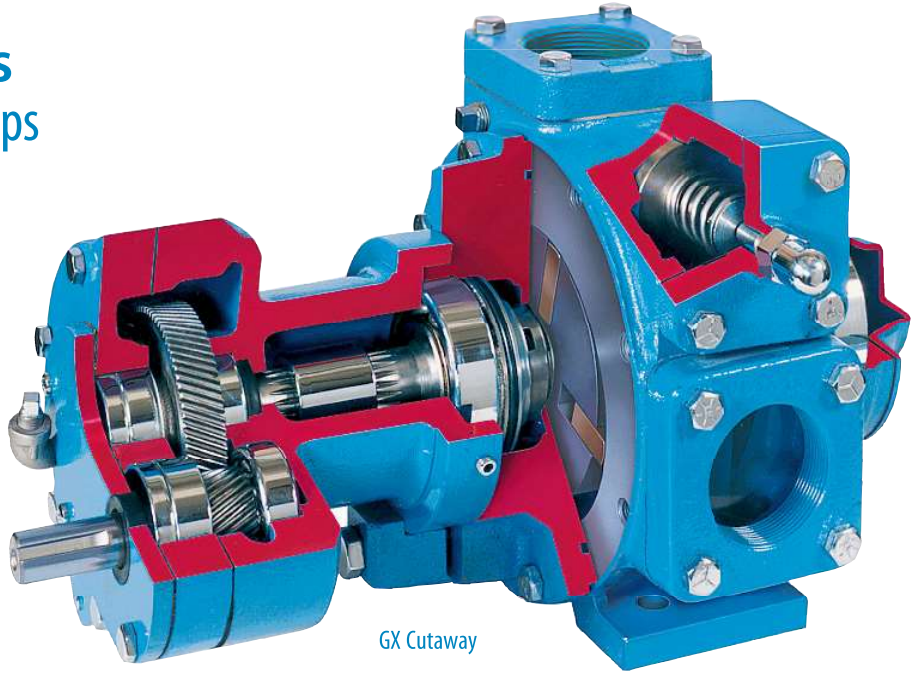
Spec Sheet 101-003

Section: 101
Effective: January 2012
Replaces: November 2009

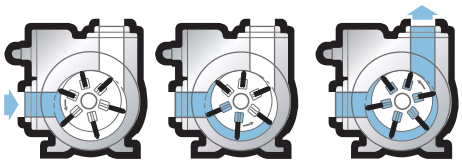
GX & X Series
General Duty Pumps



X2 cutaway

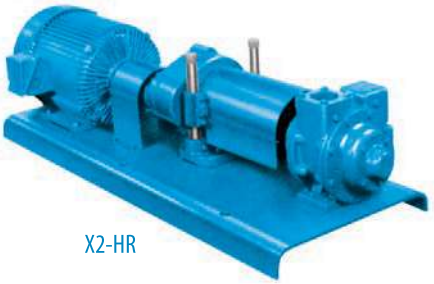


GX Cutaway



How Blackmer's sliding vane action works

GX3



X2-HR

Design

Blackmer's GX and X series models are available in 2, 2.5, 3 and 4-inch flanged port sizes with capacities from 30 to 520 U.S. gpm (114-1,855 L/min). Cast iron construction is standard on all models except the X4 model which is ductile iron construction. All models have external ball bearings isolated from the pumpage by mechanical seals.

The GX type pumps feature an integral head-mounted gear reduction drive with oil lubricated, hardened helical gears that provide quiet trouble-free operation. Gear shafts are supported at both ends by ball bearings for smooth operation and long life.

A splined shaft simplifies alignment of the pump and reducer, and the reducer can be rotated on the pump head to accommodate a variety of motor sizes without shimming.

Application

Blackmer's GX and X type pumps are designed to handle a wide range of non-corrosive, non-abrasive industrial liquids and petroleum products. Typical applications include fuel oils, lube oils, jet fuels, gasoline, edible oils and a variety of solvents and thinners such as esters, ketones, naphthas, ethers, amines, aromatics, alcohols, terpenes, glycols and many other similar liquids.

Benefit

Blackmer's positive displacement rotary pumps utilizing their unique sliding vane design offers the best combined characteristics of sustained high level performance, energy efficiency, trouble-free operation and low maintenance cost. Also, the high suction lift capability of these pumps makes them especially suitable for pumping from underground tanks, bulk plant service and aircraft refueling.

Performance Data*

Pump Model	GX2, X2				GX2.5, X2.5				GX3, X3				GX4, X4				
Rated Pump Speed (rpm)	640	520	420	350	640	520	420	350	640	520	420	350	500	400	300	230	190
U.S. gpm	70	55	44	36	121	96	76	63	270	220	177	146	507	404	299	225	190
L/min	264	210	165	135	461	363	288	237	1023	835	671	544	1919	1532	1135	855	695
hp	3.2	2.6	2.0	1.7	4.7	3.7	2.9	2.4	11.2	8.5	6.5	5.2	20.8	15.9	11.5	8.6	7.0

* Approximate capacities and horsepower (HP) are based on a 100 ssu (22 cSt) fluid at a 50 psi (3.45 bar) differential pressure.
Refer to Characteristic Curves for capacities and horsepower at other pressures and viscosities.
Centipoise (cP) = Centistokes (cSt) at fluid specific gravity of 1.0

Maximum Operating Limits

Pump Model	Maximum Pump Speed			Minimum Pump Speed			Maximum Differential Pressure	Maximum Working Pressure	Maximum Operating Temperature
	Speed	Flow[2]	Viscosity[3]	Speed	Flow[2]	Viscosity[3]			
	rmp	gpm (L/min)	ssu (cSt)[4]	rpm	gpm (L/min)	ssu (cSt)[4]	psi (bar)	psi (bar)	°F (°C)
GX2[1]	780	87 (329)	100 (22)	190	20 (76)	20,000 (4,250)	125 (8.6)	175 (12.1)	300 (149)
X2	780	87 (329)	100 (22)	68	7 (26)	20,000 (4,250)	125 (8.6)	175 (12.1)	300 (149)
GX2.5	780	155 (587)	100 (22)	190	33 (125)	20,000 (4,250)	125 (8.6)	175 (12.1)	300 (149)
X2.5	780	155 (587)	100 (22)	68	12 (45)	20,000 (4,250)	125 (8.6)	175 (12.1)	300 (149)
GX3[1]	640	270 (1,022)	100 (22)	125	46 (174)	20,000 (4,250)	125 (8.6)	175 (12.1)	300 (149)
X3	640	270 (1,022)	100 (22)	68	28 (106)	20,000 (4,250)	125 (8.6)	175 (12.1)	300 (149)
GX4[1]	520	528 (1,999)	100 (22)	100	90 (341)	20,000 (4,250)	125 (8.6)	175 (12.1)	300 (149)
X4	520	528 (1,999)	100 (22)	68	66 (250)	20,000 (4,250)	125 (8.6)	175 (12.1)	300 (149)

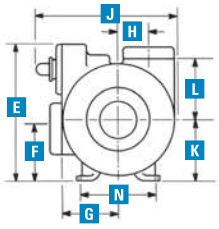
[1] GX pump models are limited by gear reducer capability (pressure / rpm / viscosity dependent).
[2] Flow is normal at 50 psi (3.45 bar) differential pressure.
[3] Viscosity listed is maximum. Blackmer GX and X pump models are also well suited for viscosities less than 31 ssu (1 cSt).
[4] Centipoise (cP) = Centistokes (cSt) at fluid specific gravity of 1.0
Note: Optional materials of construction may be required to meet specific application requirements – refer to Blackmer Material of Construction Sheet 101-095.

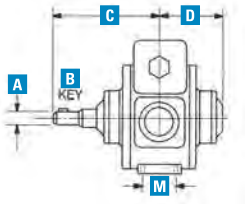
Pipe Companion Flanges

Pump Model	Standard	Optional
GX2[1], X2	2" NPT	2" Blackmer Weld
		2" ANSI**
GX2.5, X2.5	2.5" NPT	2.5" Blackmer Weld
		3" ANSI**
GX3, X3	3" NPT	3" Blackmer Weld
		3" ANSI**
GX4, X4	4" NPT	4" Blackmer Weld
		4" ANSI**

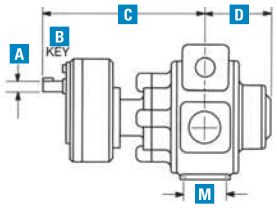
** ANSI Compatible flanges are Raised Flat Faced.

Dimensions





GX and X Pump Models



GX Pump Models

Pump Model		A	B	C	D	E	F	G	H	J	K	L	M	N	Approx. Wt. with Std. Flanges
GX2	in.	3/4	3/16	11 9/16	5 3/8	8 11/16	3 1/2	4	1 1/2	9 3/4	4	4 1/8	1 5/8	5	110 lbs.
	mm	–	–	294	137	221	89	102	38	248	102	105	41	127	50 kg
GX2.5	in.	3/4	3/16	12 5/16	6	9 5/8	3 3/4	4 5/16	1 3/4	10 11/16	4	5 1/16	3	5 1/2	130 lbs.
	mm	–	–	313	152	244	95	110	44	271	102	129	76	140	59 kg
GX3	in.	1	1/4	14 1/2	6 1/2	12 3/16	4 5/8	5	2 1/2	13 3/8	5 3/8	5 1/4	2 1/2	6	230 lbs.
	mm	–	–	368	165	310	117	127	64	340	137	133	64	152	104 kg
GX4	in.	1 1/8	1/4	18 5/8	8 1/8	15 1/2	5	7 3/8	2 1/2	16 7/8	6 3/8	8	4 1/2	8	430 lbs.
	mm	–	–	473	206	394	127	187	64	429	162	203	114	203	195 kg

Pump Model		A	B	C	D	E	F	G	H	J	K	L	M	N	Approx. Wt. with Std. Flanges
X2	in.	1 1/8	1/4	8	5 3/8	8 11/16	3 1/2	4	1 1/2	9 3/4	4	4 1/8	1 5/8	5	110 lbs.
	mm	–	–	203	137	221	89	102	38	248	102	105	41	127	50 kg
X2.5	in.	1 1/8	1/4	8 3/4	6	9 5/8	3 3/4	4 15/16	1 3/4	10 11/16	4	5 1/16	3	5 1/2	130 lbs.
	mm	–	–	222	152	244	95	110	44	271	102	129	76	140	59 kg
X3	in.	1 1/8	1/4	9 5/8	6 1/2	12 3/16	4 5/8	5	2 1/2	13 3/8	5 3/8	5 1/4	2 1/2	6	230 lbs.
	mm	–	–	244	165	310	117	127	64	340	137	133	64	152	104 kg
X4	in.	1 1/2	3/8	11	8 1/8	15 1/2	5	7 3/8	2 1/2	16 7/8	6 3/8	8	4 1/2	8	430 lbs.
	mm	–	–	280	206	394	127	187	64	429	162	203	114	203	195 kg

ILTA

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ISO 9001

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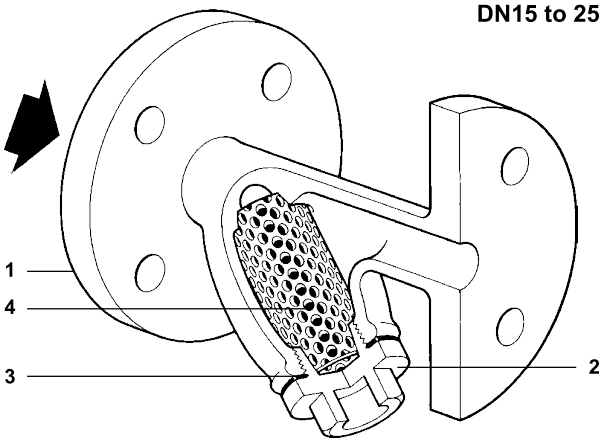
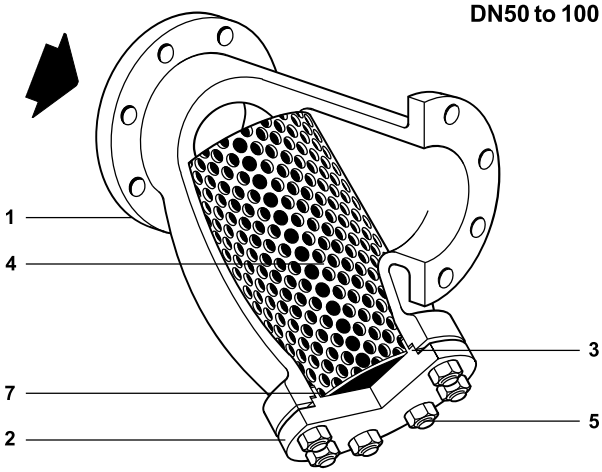
Fig 3 Bronze Strainer

TI-P021-01
ST Issue 6

DN15 to 25



DN50 to 100



Description

The Fig 3 is a bronze integrally flanged Y-type strainer. The standard stainless steel screen in the DN15 to 80 size range has 0.8 mm perforations, the DN100 has 1.6 mm perforations. Optional mesh and perforation sizes are available as well as monel screens. The strainer cap can be drilled and tapped for blowdown and drain valves if required.

Standards
This product fully complies with the requirements of the European Pressure Equipment Directive 97/23/EC and carries the CE mark when so required.

Certification
This product is available with certification to EN 10204 2.2. **Note:** All certification/inspection requirements must be stated at the time of order placement.

Sizes and pipe connections

DN15, 20, 25, 32, 40, 50, 65, 80 and 100.
Standard flanges:- BS 4504/DIN PN25 and ANSI 150.

Optional extras

Strainer screens

Stainless steel screen	Perforations	1.6 mm (DN15 to 80)
		3.0 mm (DN15 to 100)
	Mesh	40, 100, 200
Monel screen	Perforations	0.8 mm (DN15 to 80)
		3.0 mm (DN15 to 100)
	Mesh	100

Blowdown or drain valve connections
The cap can be drilled to the following sizes to enable a blowdown or drain valve to be fitted at extra cost.

Strainer size	Blowdown valve	Drain valve
DN15 and 20	½"	½"
DN25	¾"	¾"
DN32 and 40	1"	¾"
DN50	1¼"	¾"
DN65 and 80	1½"	¾"
DN100	2"	¾"

Materials

No.	Part		Material	
1	Body		Bronze	EN 1982 CC491K
2	Cap	DN15 to 25	Brass	EN 12165 CW617N
		DN32 to 100	Bronze	EN 1982 CC491K
3	Cap gasket		Reinforced exfoliated graphite	
4	Strainer screen		Stainless steel	316L
5	Cap bolts	DN32	Carbon steel	BS 4439 Gr. 8.8
		DN40	Carbon steel	BS 1768 Gr. S
6	Cap studs	DN50 to 100	Carbon steel	BS 2693 - R
	Cap nuts	DN50 to 100	Carbon steel	BS 1768 - 1
7	Screen rods	DN100	Brass	BS 2874 CZ 121

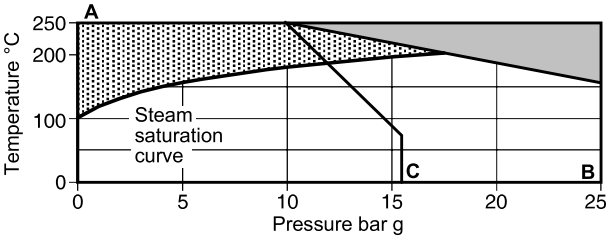
Limiting conditions (ISO 6552)

Body design conditions	PN25
PMA - Maximum allowable pressure	25 bar g
TMA - Maximum allowable temperature	250°C
Minimum operating temperature	0°C

Designed for a maximum cold hydraulic test pressure of 38 bar g

Special testing to allow lower temperature operation can be provided at extra cost. Consult Spirax Sarco.

Operating range



This product must not be used in this region.

For use in this region the castings may be resin impregnated to MIL/276 and DEF 03 - 1/2 standards.

A - B Flanged BS 4504/DIN PN25 **A - C** Flanged ANSI 150

Local regulations may restrict the use of this product to below the conditions quoted.
In the interests of development and improvement of the product, we reserve the right to change the specification.

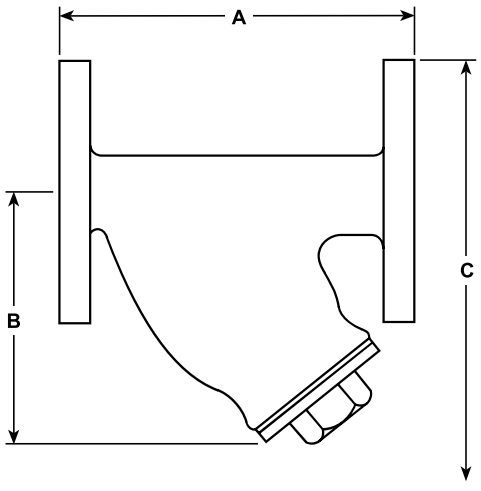
Kv values

For conversion: C_V (UK) = K_V x 0.963 C_V (US) = K_V x 1.156

Size	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100
Perforations 0.8, 1.6 and 3 mm	6.0	11	19	27	41	64	103	165	268
Mesh 40 and 100	6.0	11	19	27	41	64	103	165	268
Mesh 200	5.5	9	16	23	37	52	77	124	196

Dimensions / weights (approximate) in mm and kg

Size	A	B	C	Screening area	Weight
DN15	130	75	127	43 cm²	3.2
DN20	146	86	150	73 cm²	3.6
DN25	165	117	175	135 cm²	5.0
DN32	186	133	200	164 cm²	7.3
DN40	192	150	229	194 cm²	8.6
DN50	222	172	305	310 cm²	13.6
DN65	251	204	343	406 cm²	21.0
DN80	267	227	386	503 cm²	28.5
DN100	362	260	448	826 cm²	42.6



Safety information, installation and maintenance

For full details see the Installation and Maintenance Instructions (IM-S60-18) supplied with the product.

Installation note:
Suitable isolation valves must be installed to allow for safe maintenance and trap replacement.

Maintenance note:
Maintenance can be completed with the strainer in the pipeline once the safety procedures have been observed. It is recommended that a new gasket is used whenever maintenance is undertaken.

Disposal

The product is recyclable. No ecological hazard is anticipated with disposal of this product, providing due care is taken.

How to order

Example: 1 off Spirax Sarco DN25 Fig 3 bronze strainer, flanged to BS 4504/DIN PN25 with a stainless steel screen having 0.8 mm perforations.

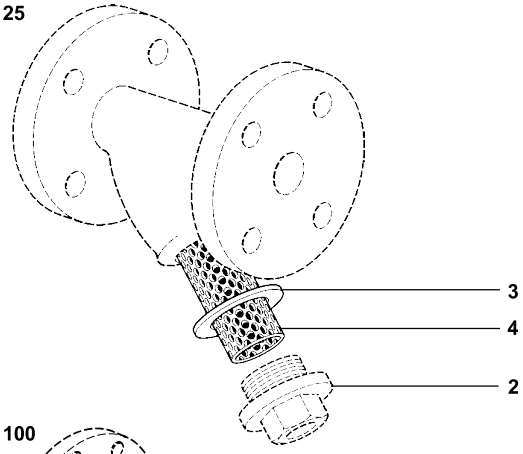
Spare parts

The spare parts available are shown in solid outline. Parts drawn in broken line are not supplied as spares.

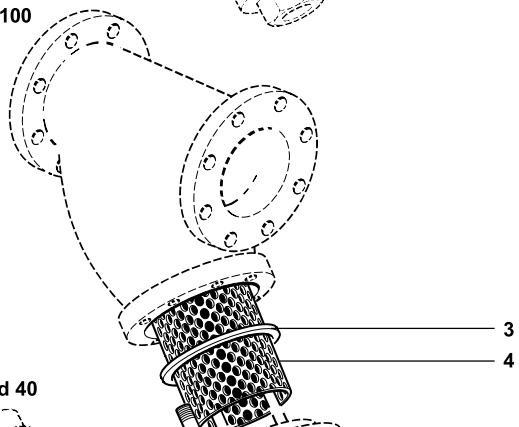
Available spares	
Strainer screen (state material, size of perforation or mesh and size of strainer)	**4**
Cap gasket (packet of 3)	**3**

How to order spares
Always order spares by using the description given in the column headed 'Available spares' and state the size and type of strainer and perforations or mesh required.
Example: 1 - Stainless steel strainer screen, having 0.8 mm perforations for a DN65 Spirax Sarco Fig 3 strainer having BS 4504/DIN PN25 connections.

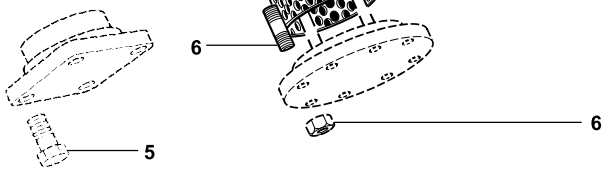
DN15 to 25



DN50 to 100



DN32 and 40



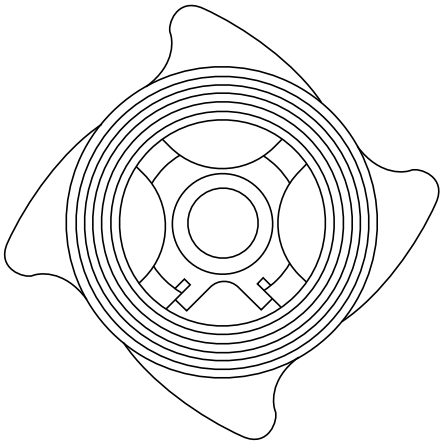
Recommended tightening torques

Item	Qty	Size	or mm	N m
2	1	DN15	26 A/F 1" BSP x 29/64"	42 - 48
	1	DN20	26 A/F 1¼" BSP x 37/64"	70 - 80
	1	DN25	32 A/F 1¾" BSP x 41/64"	124 - 144
5, 6	4	DN32 and 40	3/8" UNF x ¾"	20 - 24
	4	DN50 and 65	3/8" UNF x 1¼"	20 - 24
	6	DN80	7/16" UNF x 1½"	50 - 55
	12	DN100	½" UNF x 2"	50 - 55

1340050/5

IM-P134-07
ST Issue 5

DCV1, DCV2 and DCV3
Disc Check Valves
Installation and Maintenance Instructions



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1. General safety information

Safe operation of the unit can only be guaranteed if it is properly installed, commissioned and maintained by a qualified person (see Section 11 of the attached Supplementary Safety Information) in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.

Isolation

Consider whether closing isolating valves will put any other part of the system or personnel at risk. Dangers might include; isolation of vents and protective devices or alarms. Ensure isolation valves are turned off in a gradual way to avoid system shocks.

Pressure

Before attempting any maintenance consider what is or may have been in the pipeline. Ensure that any pressure is isolated and safely vented to atmospheric pressure before attempting to maintain the product, this is easily achieved by fitting Spirax Sarco depressurisation valves type DV (see separate literature for details). Do not assume that the system is depressurised even when a pressure gauge indicates zero.

Temperature

Allow time for temperature to normalise after isolation to avoid the danger of burns and consider whether protective clothing (including safety glasses) is required.

Viton seat:

If the Viton seat has been subjected to a temperature approaching 315°C (599°F) or higher it may have decomposed and formed hydrofluoric acid. Avoid skin contact and inhalation of any fumes as the acid will cause deep skin burns and damage the respiratory system.

Disposal

These products are recyclable. No ecological hazard is anticipated with the disposal of these products providing due care is taken, EXCEPT:

Viton seat:

- **Waste parts can be landfilled, when in compliance with National and Local regulations.**
- **Parts can be incinerated, but a scrubber must be used to remove Hydrogen Fluoride, which is evolved from the product and with compliance to National and Local regulations.**
- **Parts are insoluble in aquatic media.**

2. General product information

2.1 General description

The DCV1, DCV2 and DCV3 disc check valves are of the wafer pattern designed to be sandwiched between flanges. They are suitable for use on a wide range of fluids for applications in process lines, hot water systems, steam and condensate systems etc. Face-to-face dimensions conform to EN 558 part 1, series 49.
As standard the valves have a metal-to-metal seat. See Section 2.5 for other options which are available on request.
Note: For additional information see Technical Information Sheets; TI-P134-05 for the DCV1 or TI-P134-50 for the DCV2 and DCV3.

2.2 Sizes and pipe connections

DN15, 20, 25, 32, 40, 50, 65, 80 and 100
Suitable for installation between BS 10 Tables 'E' and 'H'.
BS 4504/(DIN) PN6, 10, 16, 25, 40;
JIS 5, 10, 16 and 20 flanges with the following exceptions:-
DN40, 50, 80 and 100 - will not fit between JIS 5 flanges
DN65 and 80 - will not fit between BS 10 'E' flanges.

2.3 Optional extras

Heavy duty springs (700 mbar [10 psi] opening pressure up to DN65) for boiler feed applications.
Viton soft seats for oil, gas and steam applications.
EPDM soft seats for water applications.

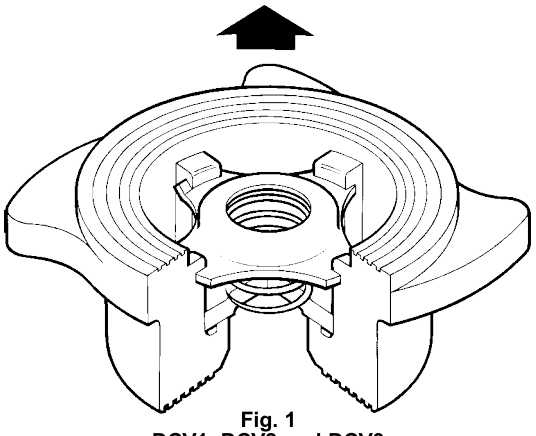


Fig. 1
DCV1, DCV2 and DCV3

2.4 Materials

Part		Material
Body	DCV1	Bronze
	DCV2	Ferritic stainless steel
	DCV3	Austenitic stainless steel
Disc		Austenitic stainless steel
Spring retainer		Austenitic stainless steel
Standard spring		Austenitic stainless steel
Heavy duty spring		Austenitic stainless steel
High temperature spring		Nickel alloy

2.5 Seating options

The valves are stamped to identify the internals fitted:

'N'	- High temperature spring	- Metal disc seat
'H'	- Heavy duty spring	- Metal disc seat
'W'	- Without spring	- Metal disc seat
'V'	- Standard spring	- Viton disc seat
'E'	- Standard spring	- EPDM disc seat
'WV'	- Without spring	- Viton disc seat
'WE'	- Without spring	- EPDM disc seat
'HV'	- Heavy duty spring	- Viton disc seat
'HE'	- Heavy duty spring	- EPDM disc seat
'T'	- Valves tested to DIN 3230 part 3, B03	

No identification indicates a standard spring with a metal disc.

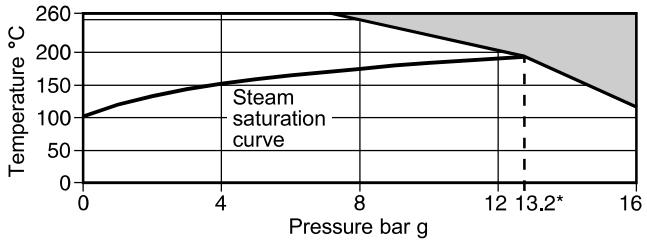
2.6 Limiting conditions and operating ranges

Note: Special testing to allow lower temperature operation can be provided at extra cost. Consult Spirax Sarco.

DCV1

Body design conditions			PN16
PMO - Maximum operating pressure		16 bar g	(232 psi g)
TMO - Maximum operating temperature		260°C	(500°F)
Minimum operating temperature		-198°C	(-324°F)
Temperature limits	Viton seat	-15°C to +250°C	(5°F to 482°F)
	EPDM seat	-50°C to +150°C	(-58°F to 302°F)
Designed for a maximum cold hydraulic test pressure of:		24 bar g	(348 psi g)

DCV1



The product must not be used in this region.

* PMO Maximum operating pressure when used for steam service.

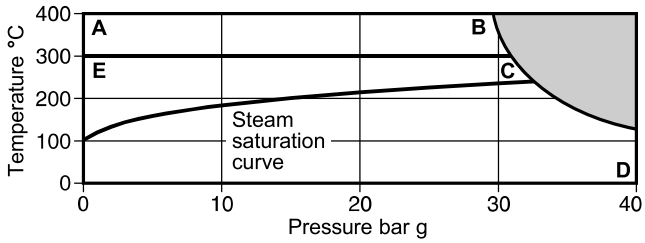
DCV2

Body design conditions			PN40
PMO - Maximum operating pressure		40 bar g	(580 psi g)
TMO - Maximum operating temperature	Standard spring	300°C	(572°F)
	Heavy duty spring	300°C	(572°F)
	High temperature spring	-	-
	Without spring	300°C	(572°F)
Minimum operating temperature (standard disc)		-60°C	(-76°F)
Temperature limits	Viton seat	-15°C to +250°C	(5°F to 482°F)
	EPDM seat	-50°C to +150°C	(-58°F to 302°F)
Designed for a maximum cold hydraulic test pressure of:		60 bar g	(870 psi g)

DCV3

Body design conditions			PN40
PMO - Maximum operating pressure		40 bar g	(580 psi g)
TMO - Maximum operating temperature	Standard spring	300°C	(572°F)
	Heavy duty spring	300°C	(572°F)
	High temperature spring	400°C	(752°F)
	Without spring	400°C	(752°F)
Minimum operating temperature (standard disc)		-10°C	(14°F)
Temperature limits	Viton seat	-10°C to +250°C	(14°F to 482°F)
	EPDM seat	-10°C to +150°C	(14°F to 302°F)
Designed for a maximum cold hydraulic test pressure of:		60 bar g	(870 psi g)

DCV2 and DCV3



The product must not be used in this region.

E-C-D DCV2 and DCV3 with standard spring.

A-B-D DCV3 High temperature spring and without spring.

3. Installation

Note: Before actioning any installation observe the 'Safety information' in Section 1.

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended installation:

3.1 Check materials, pressure and temperature and their maximum values. If the maximum operating limit of the product is lower than that of the system in which it is being fitted, ensure that a safety device is included in the system to prevent overpressurisation.

3.2 Determine the correct installation situation and the direction of fluid flow.

3.3 Remove protective covers from all connections.

3.4 Valves must only be installed where 'weld neck' flanges are used. Other flange types may restrict operation.

3.5 Disc check valves simply fit between two pipe flanges (see Fig. 2). Standard gaskets are used either side of the valve together with longer bolts or studs. **Note:** flanges, bolts (or studs), nuts and joint gaskets to be provided by the installer. Normal sensible flange bolting practice should be followed eg. torque tightening the bolts in opposite sequence.

3.6 The DCV1, DCV2 and DCV3 can be installed in any plane with the exception of DCV's supplied without an internal spring. These must be fitted in a vertical flow line with the flow from bottom-to-top i.e. upward flow (see Fig. 2b). Disc check valves must be fitted in accordance with the direction of the flow arrow on the body, indicating correct fluid flow direction.

Note: Disc check valves are not suitable for use where heavily pulsating flow exists, such as close to a compressor.

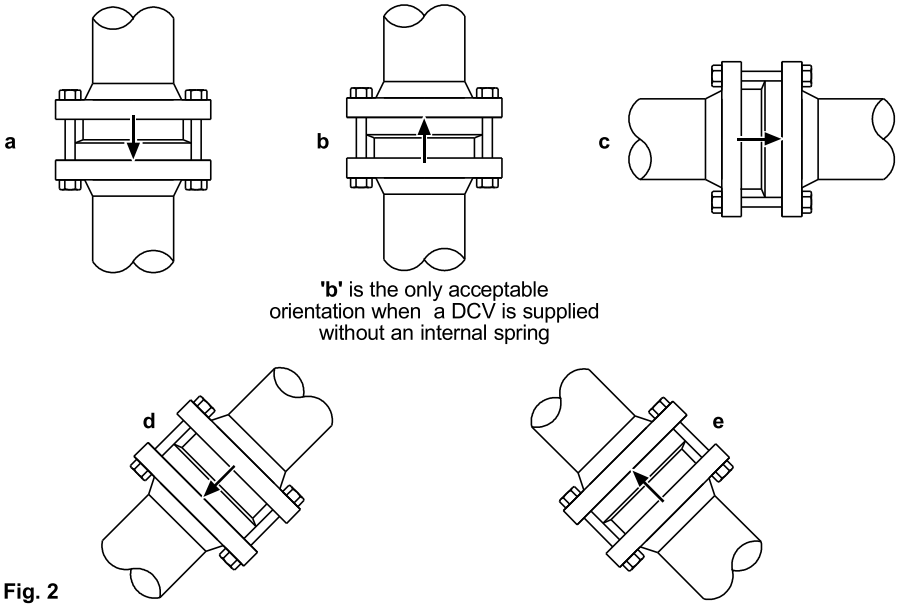


Fig. 2

4. Commissioning

After installation or maintenance ensure that the system is fully functional. Carry out tests on any alarms or protective devices.

5. Operation

Disc check valves are opened by the pressure of the fluid and closed by the spring as soon as the flow ceases and before the reverse flow occurs.

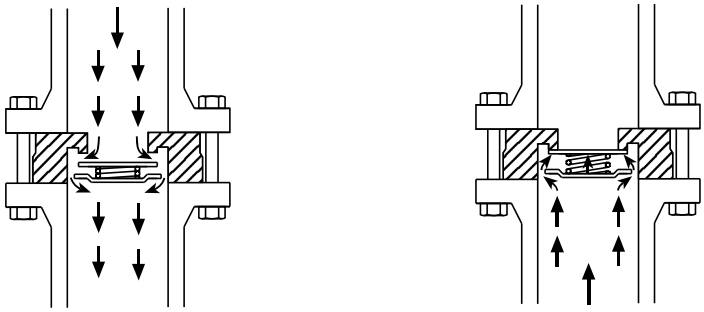


Fig. 3 **Open** **Closed**

K_V values

Size	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100
K_V	4.4	6.8	10.8	17	26	43	60	80	113

For conversion C_V (UK) = K_V x 0.97 C_V (US) = K_V x 1.17

Opening pressures in mbar

Differential pressures with zero flow for standard and high temperature springs.

→ Flow direction

Direction	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100
↑	25	25	25	27	28	29	30	31	33
→	22.5	22.5	22.5	23.5	24.5	24.5	25	25.5	26.5
↓	20	20	20	20	20	20	20	20	20

Where lowest opening pressures are required, valves without springs can be installed in vertical pipes with bottom-to-top flow.

Without spring									
↑	2.5	2.5	2.5	3.5	4.0	4.5	5.0	5.5	6.5

Heavy duty springs approximately 700 mbar

6. Maintenance

Note: Before actioning any maintenance programme observe the 'Safety information' in Section 1.

This product is non-maintainable.

Note: Great care must be taken if a DCV with a heavy duty spring is taken apart since the strength of the spring can cause the retainer to spring out of the body.

7. Spare parts

There are no spare parts available for this product.

How to order a new product

Example:
1 off Spirax Sarco DN25, DCV2 ferritic stainless steel disc check valve for fitting between DN25, PN40 flanges.

Cert. No. LRQ 0963008

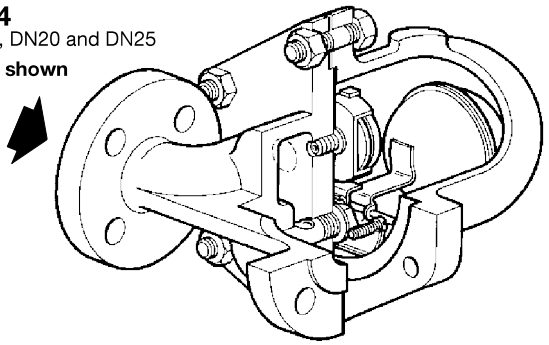
ISO 9001

spirax sarco

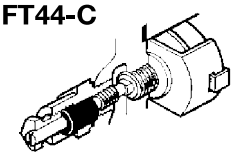
TI-S02-14
ST Issue 11

FT44
Carbon Steel
Ball Float Steam Traps (DN15 to DN50)

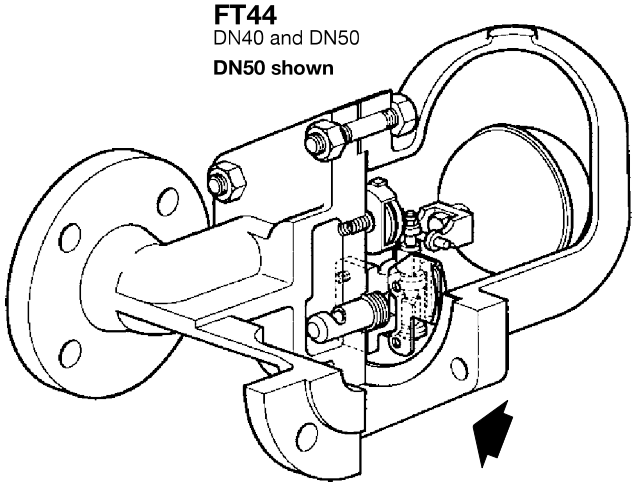
FT44
DN15, DN20 and DN25
DN15 shown



FT44-C



FT44
DN40 and DN50
DN50 shown



Description

The FT44 is a carbon steel bodied ball float steam trap having stainless steel working internals and automatic air venting facility. The body and cover castings are produced by a TÜV approved foundry. The trap is supplied with integrally flanged connections and can be maintained without disturbing the pipework. Vertical flanged connections, designated FT44V, are available for all sizes. Flow direction for the horizontal trap is clearly illustrated above. For vertically orientated traps the flow is downwards only.

Available options: **FT44** – Horizontal flow **FT44V** – Vertical flow

Capsule
The BP99/32 capsule which is used in the FT44 is suitable for use on 150°C superheat @ 0 bar g and 50°C superheat @ 32 bar g.

Optional extras

A **manually adjustable needle valve** (designated 'C' on the nomenclature i.e. **FT44-C**) can be fitted to the **FT44 horizontal version only.** This option provides a **steam lock release (SLR)** feature in addition to the standard air vent. For further information please consult Spirax Sarco.

The **top of the cover can be drilled and tapped ⅜" BSP or NPT** for the purpose of fitting a balance line if requested at the point of order.

The **bottom of the cover can be drilled and tapped ⅜" BSP or NPT** for the purpose of fitting a drain cock if requested at the point of order.

Standards
This product fully complies with the requirements of the European Pressure Equipment Directive 97/23/EC and carries the CE mark when so required.

Certification
This product is available with certification to EN 10204 3.1. **Note:** All certification/inspection requirements must be stated at the time of order placement.

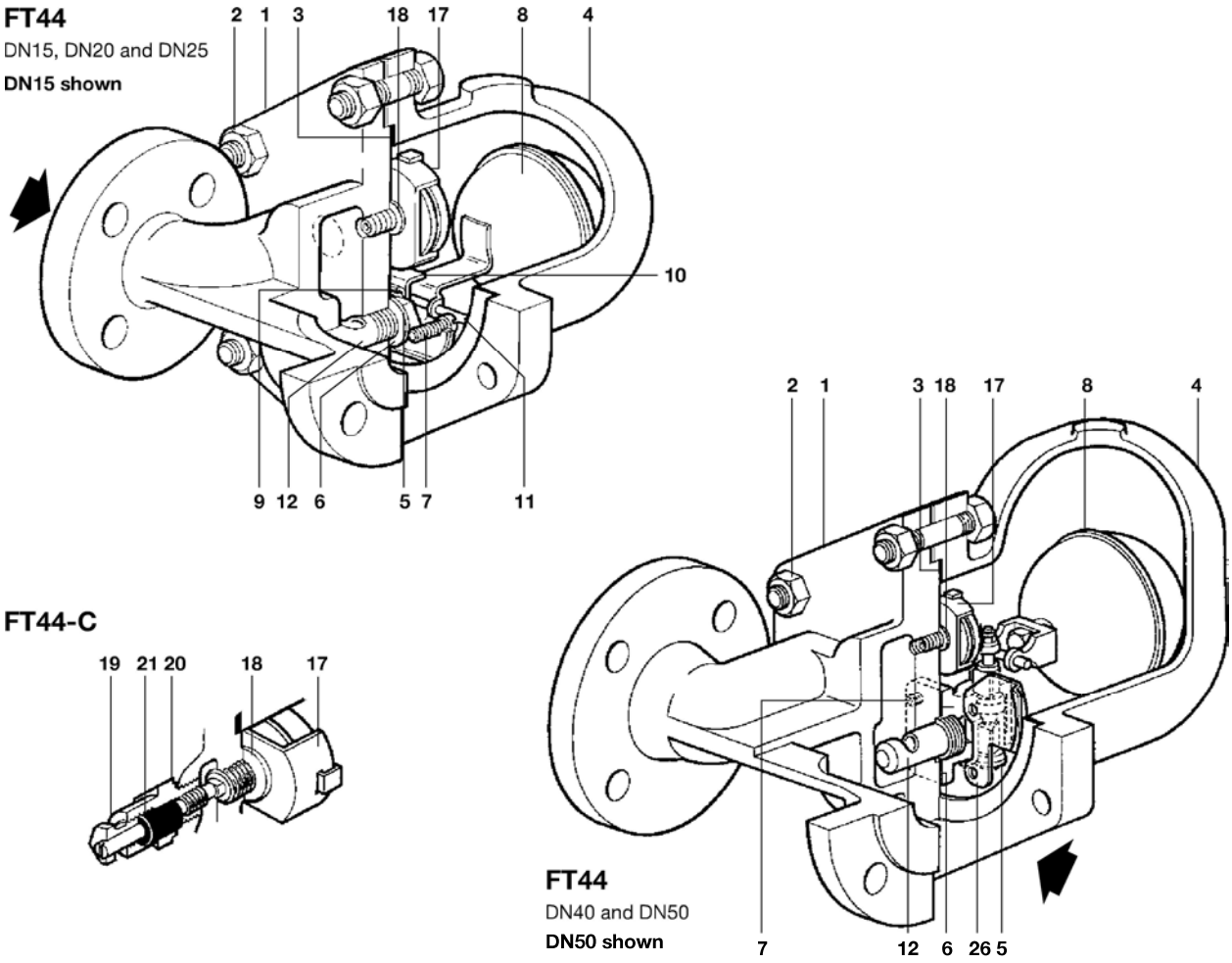
Sizes and pipe connections

DN15, DN20, DN25, DN40 and DN50.

Horizontal traps: Note the flow direction when facing the body: - DN15 to DN25 is left to right. - DN40 and DN50 is right to left. Standard flanges are EN 1092 PN40 with face-to-face dimensions in accordance with EN 26554 (Series 1), ASME (ANSI) B 16.5 Class 150, ASME (ANSI) B 16.5 Class 300 and JIS/KS 20 flanges are also available with extended face-to-face dimensions.

Vertical traps: Note that the flow direction is vertically downwards only.
Standard flanges are EN 1092 PN40 with face-to-face dimensions in accordance with EN 26554 (Series 1). ASME (ANSI) B 16.5 Class 150, ASME (ANSI) B 16.5 Class 300 and JIS/KS 20 are also available with face-to-face dimensions in accordance with EN 26554 (Series 1). ASME (ANSI) / JIS / KS flanges are supplied with tapped holes to receive flange bolts. ASME (ANSI) flanges have UNC threads and JIS/KS have metric threads.

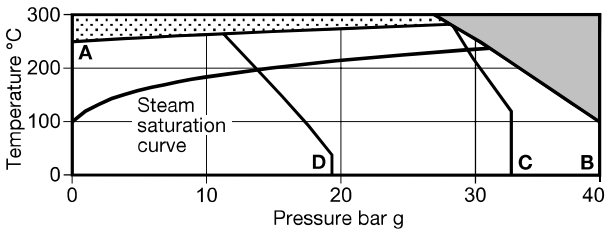
Local regulations may restrict the use of this product to below the conditions quoted.
In the interests of development and improvement of the product, we reserve the right to change the specification without notice.



Materials

No.	Part			Material	
1	Body			Carbon steel	1.0619+N / WCB
2	Cover studs			Steel	BS 4882 B7M
	Cover nuts			Steel	BS 3692 Gr. 8
3	Cover gasket			Reinforced exfoliated graphite	
4	Cover			Carbon steel	1.0619+N / WCB
5	Valve seat		DN15, DN20 and DN25	Stainless steel	BS 970 431 S29
	Main valve assembly with erosion deflector		DN40 and DN50	Stainless steel	BS 3146 Pt2 ANC2 BS 970 416 S37
6	Valve seat gasket		DN15, DN20 and DN25	Stainless steel	BS 1449 304 S11
	Main valve assembly gasket		DN40 and DN50	Reinforced exfoliated graphite	
7	Pivot frame assembly screws		DN15, DN20 and DN25	Stainless steel	BS 4183 18/8
	Main valve assembly	Bolts	DN40	Stainless steel	BS 970 302 S25
		Studs and nuts	DN50	Stainless steel	BS 970 431 S29
8	Ball float and lever			Stainless steel	BS 1449 304 S16
9	Support frame		DN15, DN20 and DN25	Stainless steel	BS 1449 304 S16
10	Pivot frame		DN15, DN20 and DN25	Stainless steel	BS 1449 304 S16
11	Pivot pin		DN15, DN20 and DN25	Stainless steel	
12	Erosion deflector			Stainless steel	BS 970 431 S29
17	Air vent assembly			Stainless steel	
18	Air vent seat gasket			Stainless steel	BS 1449 409 S19
19	SLR assembly			Stainless steel	BS 970 303 S31
20	SLR gasket			Steel	BS 1449 CS4
21	SLR seal			Graphite	
26	Inlet plate		DN40 and DN50 only	Stainless steel	BS 1449 304 S16

Pressure / temperature limits



This product **must not** be used in this region.

This product should not be used in this region as damage to the internals may occur.

A - B Flanged EN 1092 PN40 and ASME (ANSI) 300.
A - C Flanged JIS/KS 20.
A - D Flanged ASME (ANSI) 150.

Body design conditions			PN40
PMA	Maximum allowable pressure		40 bar g @ 100°C
TMA	Maximum allowable temperature		300°C @ 27.5 bar g
Minimum allowable temperature			-10°C
PMO	Maximum operating pressure for saturated steam service **Note:** The DN40 and DN50 traps are limited to a PMO equal to ΔPMX		32 bar g @ 239°C
TMO	Maximum operating temperature		285°C @ 28.5 bar g
Minimum operating temperature **Note:** For lower operating temperatures consult Spirax Sarco			0°C
ΔPMX	Maximum differential pressure	**Size**	**DN15, DN20, DN25** / **DN40, DN50**
		FT44-4.5	4.5 bar / 4.5 bar
		FT44-10	10 bar / 10 bar
		FT44-14	14 bar / -
		FT44-21	21 bar / 21 bar
		FT44-32	32 bar / 32 bar
Designed for a maximum cold hydraulic test pressure:			60 bar g
Note: With internals fitted, test pressure must not exceed ΔPMX			

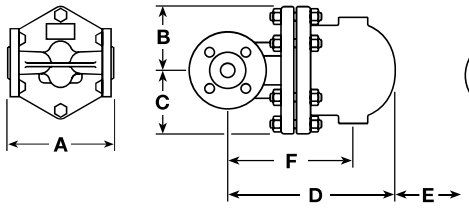
Caution: The trap in its complete operational form must not be subjected to a pressure greater than 48 bar otherwise damage to the internal mechanism may result.

Dimensions / weights (approximate) in mm and kg

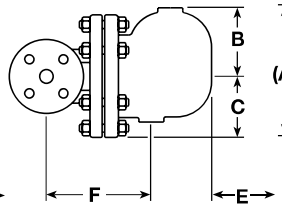
Notes:
1. Dimensions in brackets relate to vertical connections only.
2. PN40 face-to-face dimensions are in accordance with EN 26554 (Series 1).

Size	PN40 A (A)	ASME 300 A (A)	ASME 150 A (A)	JIS/KS 20K A (A)	B	C	D	E	F	Weight
DN15	150 (150)	209 (150)	203 (150)	206 (150)	80	80	215	120	155	10.8
DN20	150 (150)	209 (150)	205 (150)	210 (150)	80	80	225	120	165	10.8
DN25	160 (160)	212 (160)	208 (160)	210 (160)	115	85	282	170	215	15.0
DN40	230 (230)	327 (230)	321 (230)	322 (230)	130	115	337	200	200	33.0
DN50	230 (230)	320 (230)	313 (230)	311 (230)	141	123	347	200	225	34.0

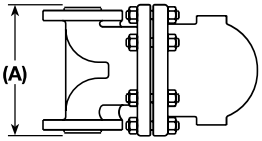
FT44
DN15 and DN20



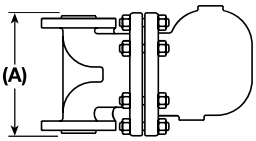
FT44
DN25, DN40 and DN50



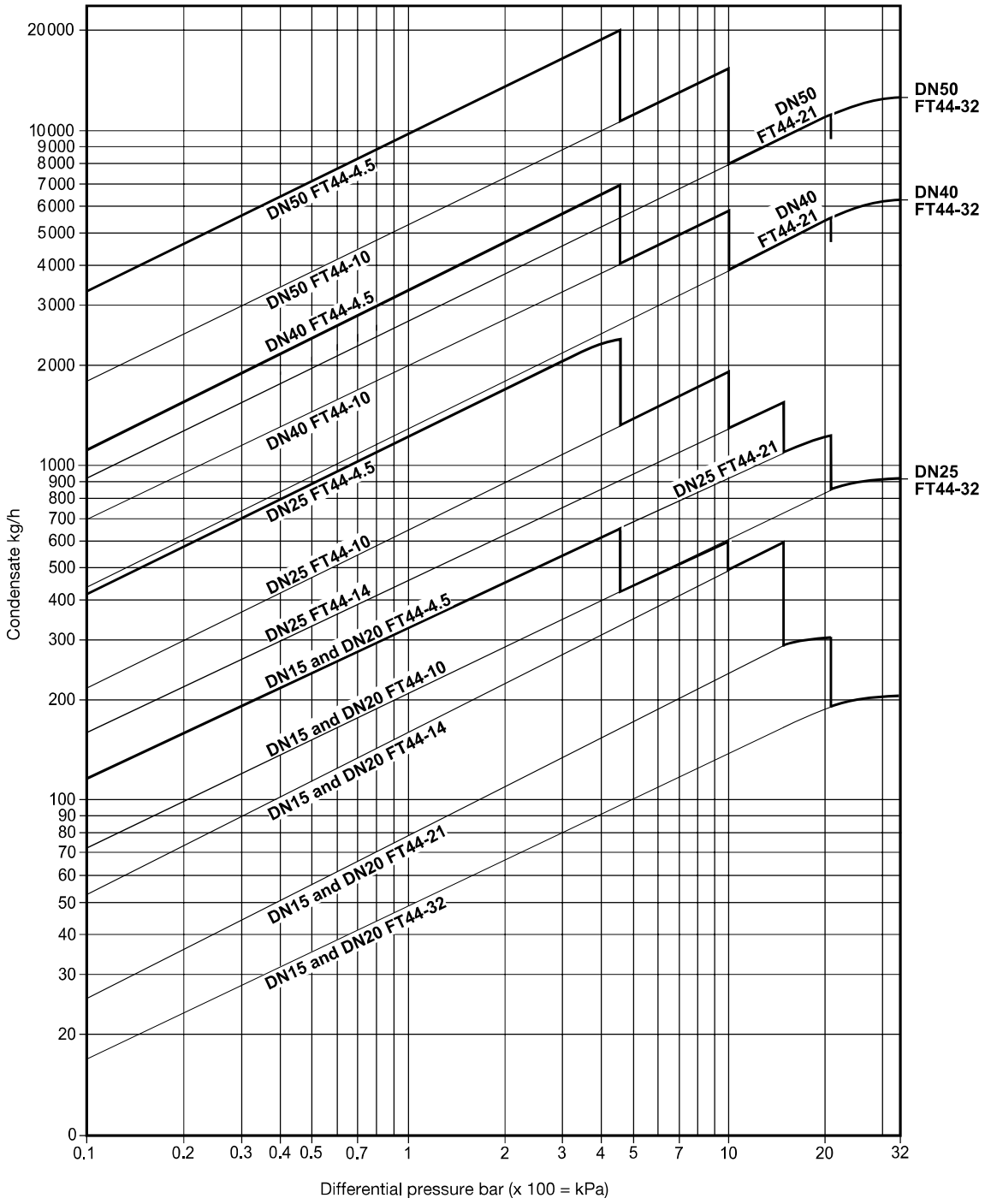
FT44V
DN15 and DN20



FT44V
DN25, DN40 and DN50



Capacities



Additional cold water capacities from the thermostatic air vent under start-up conditions

Capacities shown above are based on condensate at saturation temperature. Under start-up conditions when the condensate is cold the internal thermostatic air vent will be open and provides additional capacity to the main valve. The following table gives the minimum additional cold water capacities from the air vent.

ΔP (bar)		0.5	1	2	3	4.5	7	10	14	21	32
		Minimum additional cold water capacity (kg/h)									
DN15 and DN20	up to 21 bar	450	600	780	1 040	1 140	1 350	1 530	1 750	2 300	-
	32 bar only	170	250	380	520	600	780	860	1 140	1 170	1 200
DN25, DN40 and DN50	up to 21 bar	460	680	900	1 080	1 300	1 600	1 980	2 050	2 600	-
	32 bar only	90	120	350	460	600	850	900	1 020	1 200	1 300

Safety information, installation and maintenance

For full details see the Installation and Maintenance Instructions (IM-S02-30) supplied with the product.

Installation note:
The FT44 must be installed with the direction of flow as indicated on the body, and with the float arm in a horizontal plane so that it rises and falls vertically.

Disposal
This product is recyclable. No ecological hazard is anticipated with the disposal of this product, providing due care is taken.

How to order

Example: 1 off Spirax Sarco DN25 FT44-14 ball float steam trap, flanged to EN 1092 PN40 with carbon steel body and cover and thermostatic air vent.

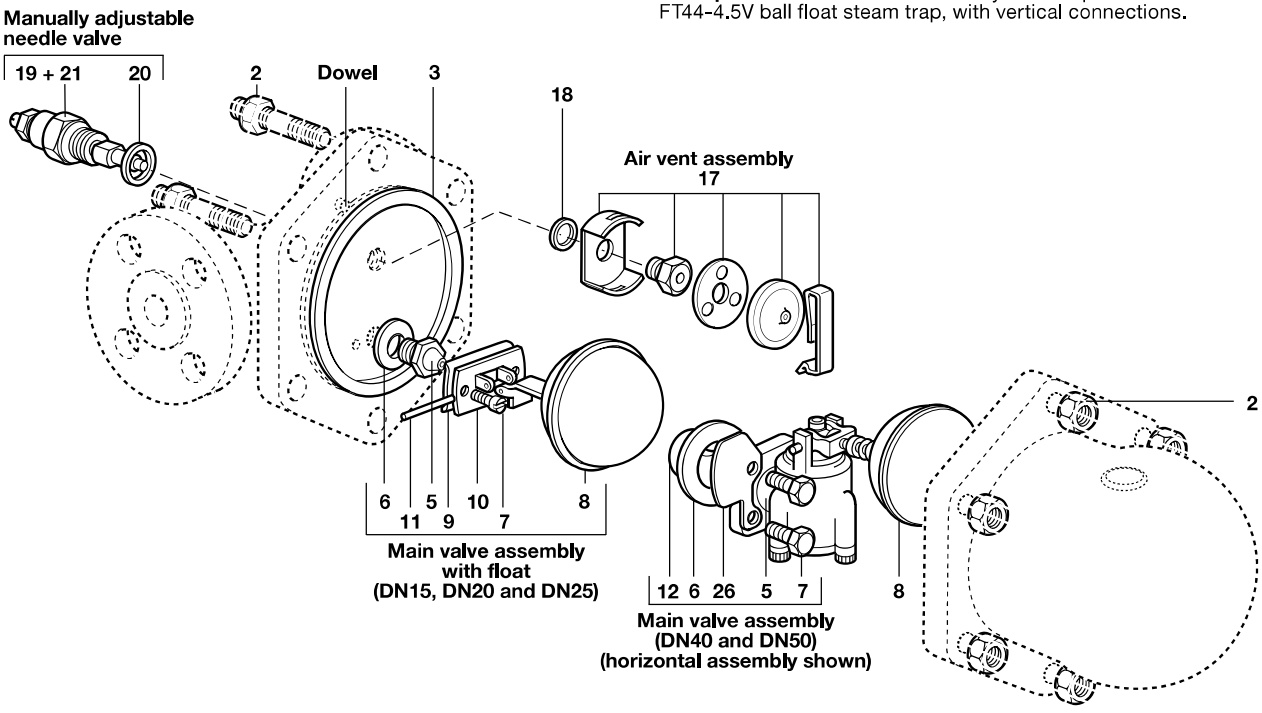
Spare parts

The spare parts available are shown in solid outline. Parts drawn in broken line are not supplied as spares.

Available spares	
Main valve assembly with float (DN15, DN20 and DN25 horizontal traps)*	**5, 6, 7, 8, 9, 10, 11**
Main valve assembly with integral erosion deflector (DN40 and 50) ** (specify horizontal or vertical trap)	**5, 6, 7, 12, 26**
Main valve assembly with float and erosion deflector (DN15 and DN20 vertical traps only)	**5, 6, 7, 8**
Ball float (DN40 and DN50)	**8**
Air vent assembly	**17, 18**
Manually adjustable needle valve (SLR - Steam lock assembly) and air vent assembly (FT44-C)	**17, 18, 19, 20, 21**
Complete set of gaskets (packet of 3 sets)	**3, 6, 18, 20, 21**

* On horizontal traps the erosion deflector on the DN15, DN20 and DN25 is pressed into the body during manufacture and not available as a spare.
** There is no erosion deflector on vertical traps.

How to order spares
Always order spares by using the description given in the column headed 'Available spares' and state the size and type of trap, including pressure range and orientation i.e.: horizontal or vertical connections.
Example: 1 - Main valve assembly for a Spirax Sarco DN40 FT44-4.5V ball float steam trap, with vertical connections.



Recommended tightening torques

Item	Size	or mm		N m
	DN15, DN20 and DN25	17 A/F	M10 x 60	19 - 22
2	DN40	19 A/F	M16 x 85	60 - 66
	DN50	24 A/F	M16 x 85	80 - 88
5	DN15, DN20 and DN25	17 A/F		50 - 55
	DN15, DN20 and DN25		M5 x 20	2.5 - 2.8
7	DN40	10 A/F	M6 x 20	10 - 12
	DN50	13 A/F	M8 x 20	20 - 24
17		17 A/F		50 - 55
19		22 A/F		50 - 55

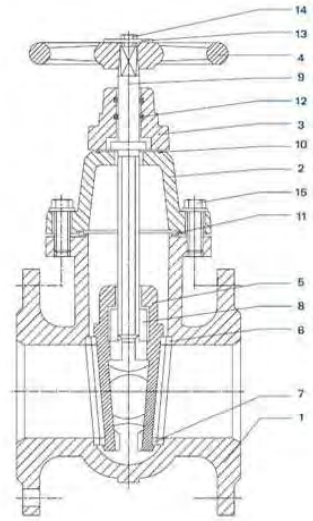
شیر کشویی زبانه فلزی اورینگی

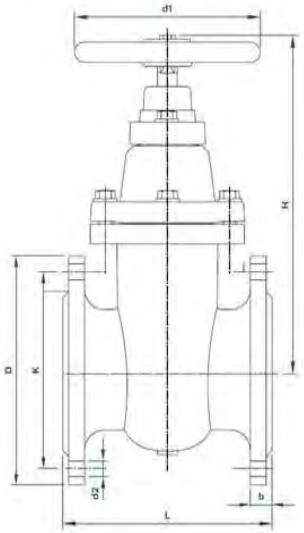
فشار کاری 10 بار
وظیفه:
قطع و وصل جریان
کاربرد:
آب ، فاضلاب و سایر مصارف مشابه صنعتی و ساختمانی

- طراحی: طبق استاندارد DIN 3352-2
- جنس بدنه و دریوش: چدن خاکستری GG25 (EN-JL 1040)
- جنس رینگ آببندی بدنه و زبانه: برنز Rg5 (UNS83600)
- جنس محور: فولاد زنگ نزن X20Cr13 (1.4021)
- محافظت در برابر خوردگی: پوشش اپوکسی پودری داخل و خارج (رنگ: آبی RAL 5005)
- تست و بازرسی نهایی: طبق استاندارد EN12266-1
- فاصله فلنج تا فلنج: طبق استاندارد EN 558-1 (سری 14)

در صورت درخواست:
عملگر برقی
مهره تخلیه

Part	Description	Material	Spare parts
1	Body	Cast Iron EN-JL1040(GG25) DIN 1691	
2	Bonnet		
3	Stuffing box/ Gland		Y
5	Handwheel		Y
6	Gate	DN 50-100: Copper Zinc Alloy (DIN 1705) Rg5	
		DN 125-400 Cast Iron EN-JL1040 (GG25) DIN 1691	
7	Sealing Ring- Body	Copper Zinc Alloy (DIN 1705) Rg5	
8	Sealing Ring- Gate	DN 125-400 Copper Zinc Alloy (DIN 1705) Rg5	
9	Nut	Rg5	Y
10	Stem	X20Cr13 (DIN 17440)	
11	Gland Seal	EPDM/NBR	Y
12	Bonnet Seal		Y
13	O-ring		Y
14	Washer	St37-Galvanized	Y
15	Handwheel Screw	Hex. Head Screw DIN 933/ Galvanized	Y
16	Bonnet Bolt	Hex. Head Screw DIN 933/ Galvanized	Y





DN(mm)	L	H	D1	D2	D	K	B	No Holes	W (kg)
50	150	250	160	19	165	125	20	4	14.5
65	170	258	160	19	185	145	20	4	15.5
80	180	284	160	19	200	160	22	8	18.5
100	190	320	200	19	220	180	24	8	24.5
125	200	375	250	19	250	210	26	8	38.5
150	210	423	250	23	285	240	26	8	47
200	230	515	250	23	340	295	26	8	73
250	250	603	315	23	395	350	28	12	112
300	270	708	315	23	445	400	28	12	174

350	290	830	400	23	505	460	28	16	220
400	310	910	400	28	565	515	32	16	270

spirax sarco

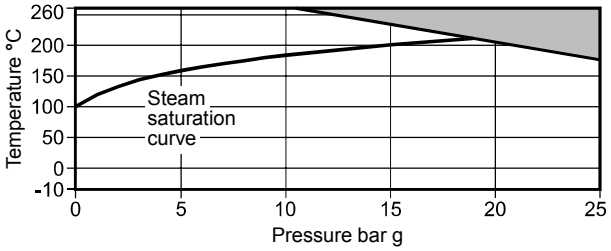
TI-P060-01
ST Issue 7

HV3
Stop Valve

Description
A bronze bodied globe valve for steam, water, oil or air applications.
To BS 5154 Series A.

Sizes and pipe connections
½", ¾", 1", 1¼",1½" and 2" screwed BSP parallel.

Pressure / temperature limits

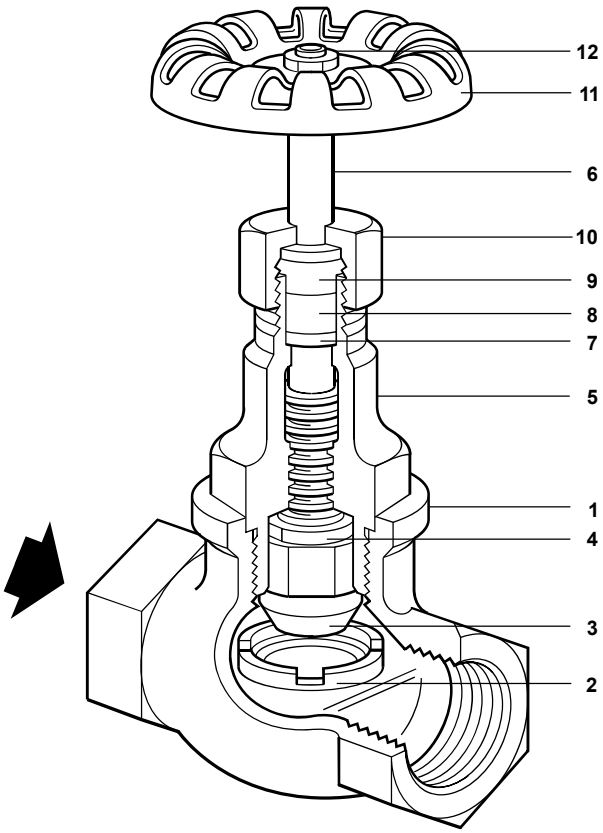


The product **must not** be used in this region.

Maximum body design conditions		PN25
PMA	Maximum allowable pressure	25 bar g @ 170°C
TMA	Maximum allowable temperature	260°C @ 10.5 bar g
Minimum allowable temperature		-10°C
PMO	Maximum operating pressure	25 bar g @ 170°C
TMO	Maximum operating temperature	260°C @ 10.5 bar g
Minimum operating temperature		-10°C
Designed for a maximum cold hydraulic test pressure of 38 bar g		

Materials

No.	Part		Material	
1	Body		Gunmetal	BS 1400 LG2
2	Valve seat		Stainless steel	AISI 431
3	Valve		Stainless steel	AISI 431
4	Lock-nut		Gunmetal	BS 1400 LG2
5	Bonnet		Gunmetal	BS 1400 LG2
6	Stem	½" - 1"	Austenitic stainless steel	BS 970 303 S31
		1¼" - 2"	Gunmetal	BS 1400 LG2
7	Washer		Gunmetal	BS 1400 LG2
8	Gland packing		PTFE	
9	Gland		Gunmetal	BS 1400 LG2
10	Packing nut		Gunmetal	BS 1400 LG2
11	Handwheel		Aluminium	DIN 1725 GK-A1 Si 1
12	Handwheel nut		Brass	DIN 17660 MS63



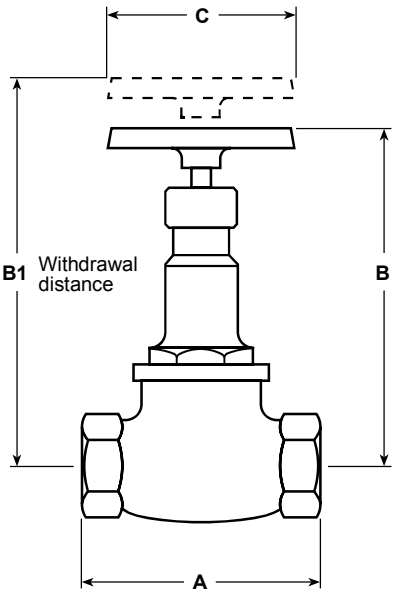
K_V values

Size	½"	¾"	1"	1¼"	1½"	2"
K_V	1.3	1.6	4.2	13.8	19.7	28

For conversion: C_V (UK) = K_V x 0.963 C_V (US) = K_V x 1.156

Dimensions / weights (approximate) in mm and kg

Size	A	B	B1	C	Weight
½"	67	102	110	60	0.60
¾"	80	110	125	60	0.86
1"	95	130	146	80	1.30
1¼"	112	144	160	100	2.08
1½"	132	144	160	100	2.86
2"	160	174	203	120	4.65



Safety information, installation and maintenance

For full details see the Installation and Maintenance Instructions (IM-P060-04) supplied with the product.

Installation note:
Install the valve in the direction of flow given by the arrow on the body. The valve can be installed in any plane but not with the handwheel below the valve body.

Disposal
The product is recyclable. No ecological hazard is anticipated with the disposal of this product, providing due care is taken.

How to order

Example: 1 off Spirax Sarco HV3 stop valve having 1½ BSP parallel connections.

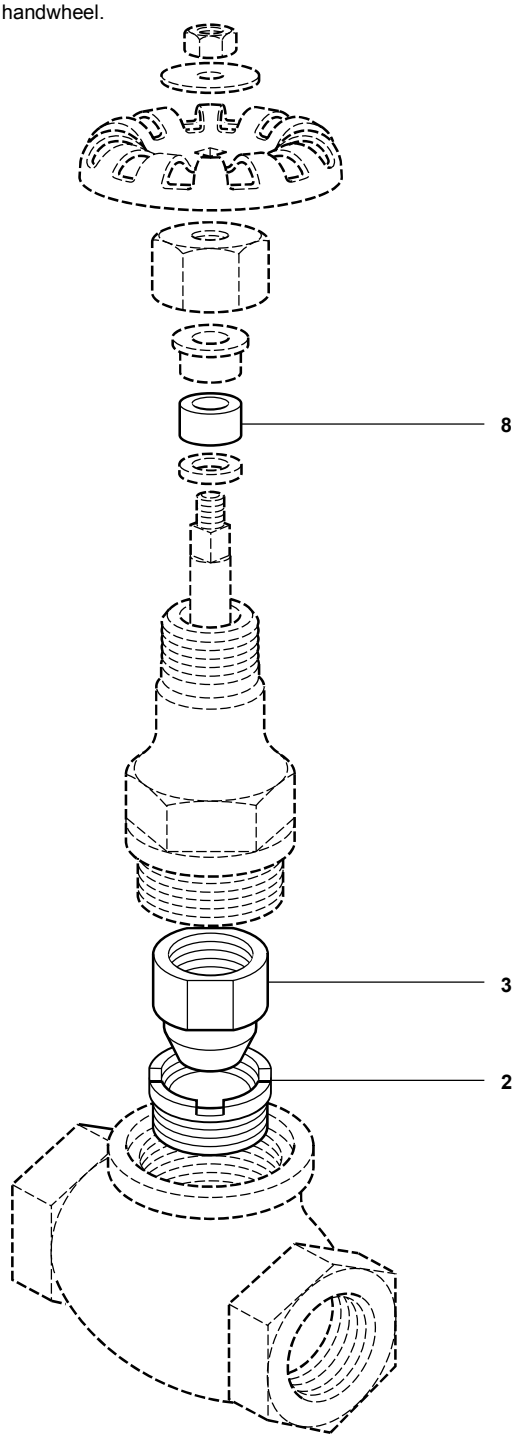
Spare parts

The spare parts available are shown in heavy outline. Parts drawn in broken line are not supplied as spares.

Available spares	
Valve and seat assembly	**2**, **3**
Gland packing (packet of 3)	**8**

How to order spares
Always order spares by using the description given in the column headed 'Available spares' and state the size and type of valve.
Example: 1 - Valve and seat assembly for a 1" Spirax Sarco HV3 stop valve.

Note: The above spares are applicable to the HV3 stop valve only, identified by its blue handwheel.
They are not interchangeable with spares for the HV1 stop valve identified by its green handwheel, or the HV2 stop valve, identified by its red handwheel.



EYVAZ

MLG-33

کنترل کننده و نشان دهنده سطح مایعات

Liquid level control & indicator

مواردااستفاده :

۱ – مخازن آب
۲ – تانکهای سوخت
۳– تانکهای اسید
۴– مخازن شیمیائی
۵– صنایع نفت،گاز،پتروشیمی
۶ – دیگهای آب گرم و بخار

Applications:

1- Water reservoirs
2- Fuel reservoirs
3- Acid tanks
4- Chemical reservoirs
5- Steam and hot water boilers
6- Petrochemical , gas , petroleum industrial

طرز کار :

این دستگاه بر اساس قوانین فیزیکی نیروی فشار مایعات و خاصیت جذب و دفع قطبهای غیر همنام و همنام آهنربا طراحی شده است . بدنه لول گیج ، لوله ای استوانه ای شکل می باشد که از ناحیه نازلهای مربوطه به صورت عمودی برروی مخازن نصب می گردد. مایع درونی مخزن از طریق نازل پایین به داخل لوله استوانه ای هدایت شده و توپی دارای آهنربای دائمی را شناور می سازد. با تغییر سطح مایع، شناور به حرکت درآمده و با روبروی هم قرار گرفتن آهنربای توپی و فلپها و تغییر رنگ فلپها سطح مایع درون مخازن نشان داده می شود. بوسیله سنسورهایی که بر روی این دستگاه نصب می گردند می توان فرمانهای لازم را توسط پانل الکتریکی مربوطه مستقیما به تابلوهای اصلی برق ارسال نمود و بدین طریق با Start و Stop کردن الکترو پمپهای تغذیه مخازن ، سطح مایع را در ارتفاع موردنظر کنترل نمود یا با نصب لول ترانسمیتر برروی این دستگاه می توان با ارسال جریان خروجی (4…20mA) به سیستم های PLC یا مانیتورینگ در محل های جداگانه ای سطح سیال را مشاهده و کنترل نمود .

Operation principles:

This device has been designed on the basis of the laws of physical, fluids pressure, electromagnetic property, attraction and repulsion of poles. The body of the level gauge is a tube which is connected to reservoir vertically from the related flanges. The fluid inside the reservoir is directed to the tube through the bottom nozzle and makes the magnetic ball float . When the level of liquid is changed the level is read as a result of the above said law and change in color of rollers . By the sensors that are mounted on this device , the required commands are simply sent to the main electrical panels through the relevant electrical panel and thus, the liquid level inside reservoirs can be controlled and fixed at the favorable high automatically by start and stop feeder electro pumps or by mounting level transmitter on this device and sending output current (4…20 mA) to PLC or monitoring systems see and control the level of liquid in other area.

متریال قطعات:

Parts Material:

Stainless steel 304/316	Body, lower flanges & Connection flanges	بدنه ، فلنجهای زیرین و فلنجهای اتصال
Stainless steel 304L/316L	Floater	فلوتر
P.T.F.E-PE-PP-PVC	Body ,Floater, Behind flanges and Connection flanges (for corrosive material)	بدنه، فلوتر،فلنجهای زیرین واتصال (برای سیالات خورنده)

MLG-33

Advantages:

1) Because of lack of mechanical and electrical connection between the parts inside and outside the liquid , this device can be installed with more safety.
2) Possibility of seeing the liquid level of reservoirs from distance
3) Possibility of change the sight angle of indicator plate
4) Resistant and leak proof
5) makeable for high temperature and working pressure
6) Makeable for top and side mounting
7) Possibility to send electrical commands (ON-OFF) or transmit (4-20 mA) current
8) Possibility to adjust sensors mounting positions
9) Possibility to use more sensors to increase the safety coefficient device

مزایا:

۱) بدلیل عدم ارتباط مکانیکی و الکتریکی بین قطعات داخل و خارج مایع ، با امنیت بیشتری قابل نصب می باشد.
۲)امکان دیدن سطح مایع درون مخازن از فواصل دور
۳)دارای قابلیت تغییر زاویه دید صفحه نشان دهنده
۴) مقاوم و غیر قابل نشت
۵) قابل ساخت برای حرارت و فشار کاری بالا
۶) قابل ساخت جهت نصب از کنار و بالای مخازن
۷) دارای قابلیت ارسال فرمانهای الکتریکی (ON-OFF) یا خروجی (4…20mA)
۸) قابل تنظیم بودن موقعیت نصب سنسورها
۹) امکان استفاده از سنسورهای بیشتر و افزایش ضریب اطمینان عملکرد دستگاه

Models of installation:

This device is installed on reservoirs and other relevant place vertically from the connecting flanges. To give order manufacture, the position of tank and the distance of first connection flange from foundation (A) should be taken in to account .When to make such distance is not possible , it is necessary to make necessary coordination's with the manufacture. When installation of the device from the side is not possible, the other design of the device to install from above the reservoir can manufactured that is shown in (fig6)

نمونه هایی از موارد نصب:

این دستگاه از محل فلنجهای اتصال بصورت عمودی از جانب و یا دیگر محل های مربوطه بر روی مخازن نصب می گردد. جهت سفارش ساخت، بایستی موقعیت تانک و فاصله محور اولین فلنج اتصال تا سطح زمین (A) مد نظر قرار بگیرد.در مواردی که امکان ایجاد فاصله مذکور در محل نصب وجود نداشته باشد ضروری است با سازنده هماهنگی لازم به عمل آید . درمواردی که امکان نصب دستگاه از کنار مخازن وجود نداشته باشد طرح دیگر این دستگاه جهت نصب از بالای مخازن قابل ساخت می باشد که در (شکل۶) قابل مشاهده است .

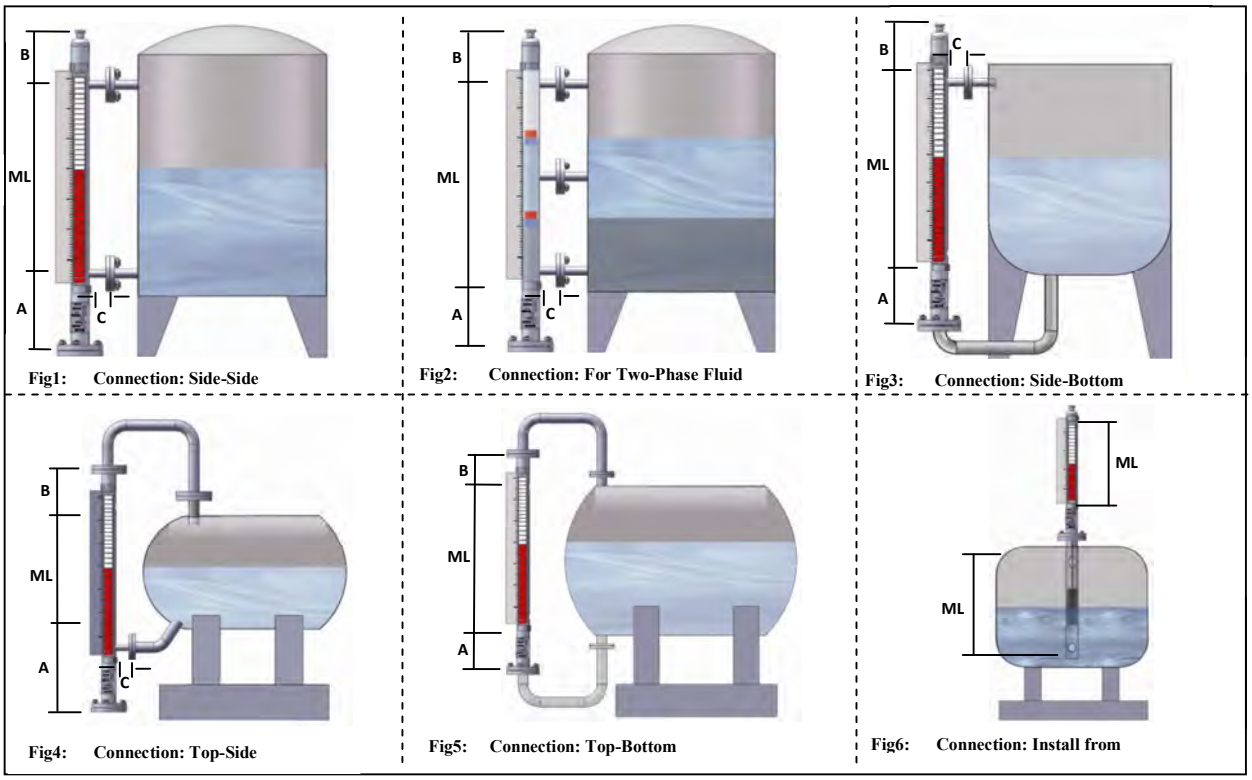


Fig1: Connection: Side-Side

Fig2: Connection: For Two-Phase Fluid

Fig3: Connection: Side-Bottom

Fig4: Connection: Top-Side

Fig5: Connection: Top-Bottom

Fig6: Connection: Install from

MLG-33

Technical data:

مشخصات فنی:

Measurable range		ارتفاع قابل اندازه گیری
0.3…5.7m	Standard	استاندارد
5.7…18m	Custom	سفارشی
±5mm	Accuracy	تلرانس اندازه گیری
0.6 g/cm^3	Min density	مینیمم دانسیته
≤5000 Mpa.s	Max allowable working viscosity	ماکزیمم ویسکوزیته مجاز کاری
Allowable working pressure		فشار کاری مجاز
16/25/40 bar g	Standard	استاندارد
100 bar g	Custom	سفارشی
linear with cm / خطی به cm	Indicator	نشانگر
IP 65	Insulation Protection	محافظت در برابر غبار و رطوبت
Working temperature		دمای کاری
-10/150 ˚c	Standard	استاندارد
300 ˚c	Custom	سفارشی
Connection flanges size		سایز فلنج اتصال
¾"#150	Standard	استاندارد
On request / مطابق درخواست	Custom	سفارشی
Pipe 2"-SCH 10…40	Chamber	بدنه اصلی

Designed sensors & their operation principle:

سنسورهای طراحی شده و نحوه عملکرد آنها:

S11

This sensor is working with (CP22) control panel that made by this company and connected to command circuit with dry contant switch .

این نوع سنسور با پانل الکتریکی (CP22) ساخت این شرکت کار می کند و با دادن سوئیچ خشک الکتریکی به مدار فرمان متصل می شود.

3m	Standard wire length	طول سیم استاندارد
10m	Custom	سفارشی
AL	Cover	پوشش
24VDC,0.5A , 220VAC,1A	Current & Passing voltageFrom CP22 panel	ولتاژ و جریان عبوری از پانل CP22
IP65	protection Dust & wet	محافظت درمقابل گردوغبار و رطوبت

S12 و S13

This kinds of sensors has inductive self perpetuating property made by magnetic field . S12 type has two terminals (bipod) and S13 type has three terminals (tripod)

این نوع سنسورها قابلیت خودنگهداری القایی (bistable) توسط میدان مغناطیسی ایجاد شده را دارند. سنسور S12 دارای دو پایه (bipod) و S13دارای سه پایه (tripod) می باشند.

Pulyester-resin	Cover	پوشش
M20*1.5 Gland size	without wire erminal boxT	ترمینال باکس بدون سیم
0.5A,220VAC	current & Passing voltage	ولتاژ و جریان عبوری
IP65,E EX de II C T6	Dust , wet & explosion Protection	محافظت درمقابل (غبار و رطوبت) و انفجار

S14

This kind of sensor has inductive self perpetuating property made by magnetic field and exist in two types bipod and tripod .

این نوع سنسور قابلیت خودنگهداری القایی توسط میدان مغناطیسی ایجاد شده را داشته و در دو نوع دوپایه و سه پایه موجود می باشد.

3m	Standard wire length	طول سیم استاندارد
10m	Custom	سفارشی
ABS-resin	Cover	پوشش
0.5A,220VAC	Passing voltage & current	ولتاژ و جریان عبوری
IP65	Dust & wet protection	محافظت درمقابل غبار و رطوبت

MLG-33

LT20

This kind of sensor can change the level of liquid to (4…20mA) output current and usable in PLC systems or seeing the level of liquid percentile in indicator of CPG-23 panel.

این نوع سنسور می تواند سطح سیال را بصورت جریان خروجی (4…20mA) تبدیل نموده و جهت استفاده در سیستمهای (PLC) یا رویت درصدی سطح سیال در اندیکاتور پانل CPG-23 کاربرد دارد.

Stainless steel	Body cover	پوشش بدنه
AL	Box	باکس
4…20 mA/24VDC	Output signal	سیگنال خروجی
IP65-EX	Dust & wet protection	محافظت درمقابل غبار و رطوبت و انفجار

پانل CP-22

This panel can used with EC-6 , EC-8 or S11 sensor mounted on MLG33 level gauge . This panel whereas how to it's setpoint connection designed for Start/Stop or send Alarm to circuit command of pump or valves . Meanwhile this panel has input terminal for 4 sensors and has 2 dry contact (Change over) .

این پانل با لول کنترلهای EC-6 , EC-8 و یا سنسور S11 بر روی لول گیج MLG33 استفاده می شود . این پانل با توجه به نحوه اتصال نقاط تنظیم ، جهت Stop/Start و یا دادن Alarm جهت مدار فرمان پمپها و شیر آلات طراحی شده است. ضمنا این پانل دارای ورودی چهار سنسور بوده و دارای دو رله خشک (Change over) می باشد.

220VAC	Power supply	ولتاژ تغذیه
3A-220VAC	Passagable voltage and current	قابلیت ولتاژ و جریان عبوری

پانل CPG-23

This panel can used with LT44 level transmitter or LT20 sensor for view liquid level to graduation (0-100%). it's programmable for set four point to Start/Stop of pumps and alarms .

این پانل را می توان با لول ترانسمیتر LT44 و یا سنسور LT20 جهت دیدن سطح سیال بصورت درصدی(0-100%) استفاده کرد . همچنین این پانل قابلیت برنامه گیری جهت تعیین چهار نقطه Set point برای Stop/Start پمپ ها و آژیرها را دارد.

220VAC	Power supply	ولتاژ تغذیه
220VAC,3A	Passagable voltage and current	قابلیت ولتاژ و جریان عبوری
4…20mA	Input signal	سیگنال ورودی

S11

S12,S13

S14

LT20

CP-22

CPG-23

How to order:

نمونه متن سفارش:

Distance between center to center connection flanges axis (mm)	فاصله مرکز تا مرکز محورهای فلنجهای اتصال (mm)
Max working pressure (Bar)	ماکزیمم فشار کاری (bar)
Max working temperature (°C)	ماکزیمم دمای کاری (°c)
Body material	متریال بدنه
Connection flanges material	متریال فلنجهای اتصال
Size of connecting flanges	سایز فلنج های اتصال
Kind of liquid and its density	نوع مایع و وزن مخصوص آن
Connection type	نحوه نصب
Sensor type & their count (if needed)	تیپ و تعداد سنسورها(در صورت نیاز)

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تلفن:۶۶۸۰۰۳۹۵-۶۶۸۲۴۹۳۵-۶۶۸۲۴۹۷۷ فکس: ۶۶۸۰۵۴۱۷
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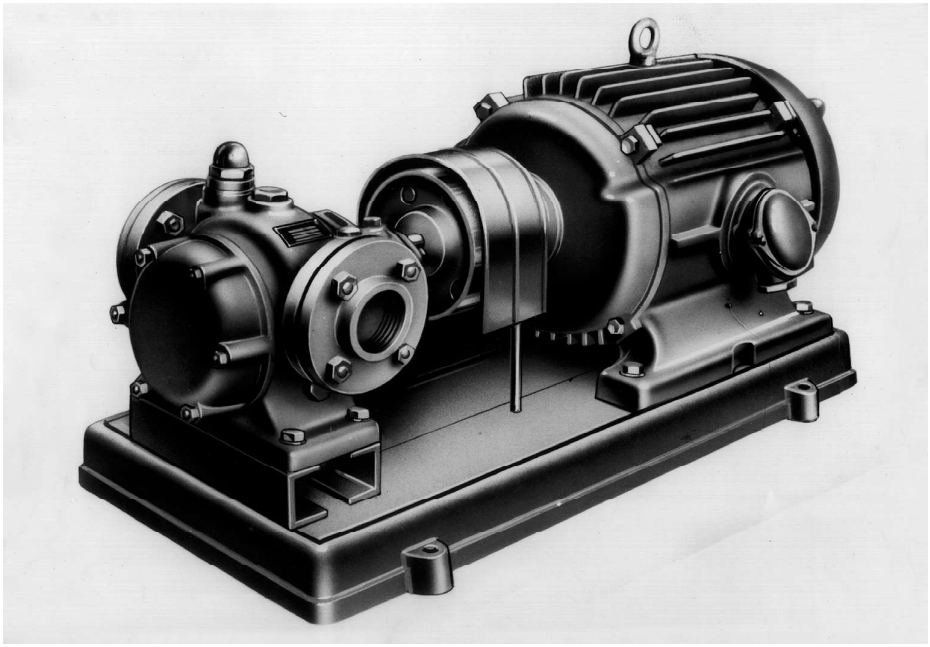
SIGMA PUMPY HRANICE



LOW-PRESSURE GEAR PUMPS

ZPG

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3.99	

Application

In general the low-pressure gear pumps ZPG are intended for delivery of liquids with lubricating capacity without content of mechanical abrasive solids.

Max. temperature of pumped liquid ..... 80 °C
Max. delivery pressure of pump ..... 6 bar

Above all these pumps are available for pumping all kinds of oils, petroleum, diluents, emulsions, suds, molasses, tars, lyes, varnishes, soluble glass, etc.
They are also applicable for lubricating and cooling systems of various machines and aquipments, for low-pressure hydraulic drives, etc.

Design

Gear pumps ZPG are of horizontal foot-mounted type with external gearing.

Gear wheels are fastly gripped on shafts, which are on their other side supported on bearing bushes lubricated by a liquid being delivered. Rotor relieving from radial forces and a stuffing box relieving from a liquid pressure may be gained by realization of interior modifications conformed to working conditions of the pump.

Stuffing box with cord packing prevents penetration of a liquid being pumped around the driving shaft.

Safety devices

Pumps ZPG are provided with a relief valve, that - with exceeding of nominal resp. maximal pressures - should transfer a liquid being delivered back to the suction space through an internal passage provided in the pump casing.

Drive

On principle, it is of a direct type with transfer of torsional moment (T.D.) through a flexible coupling. Pumps are delivered equipped with very usual types of electric motors on common bed plates as the pump-set of a standard type.
With lower speed drives there are reduction gearedmotors used or a special gearbox palced between the motor and the pump.

Sense of rotation

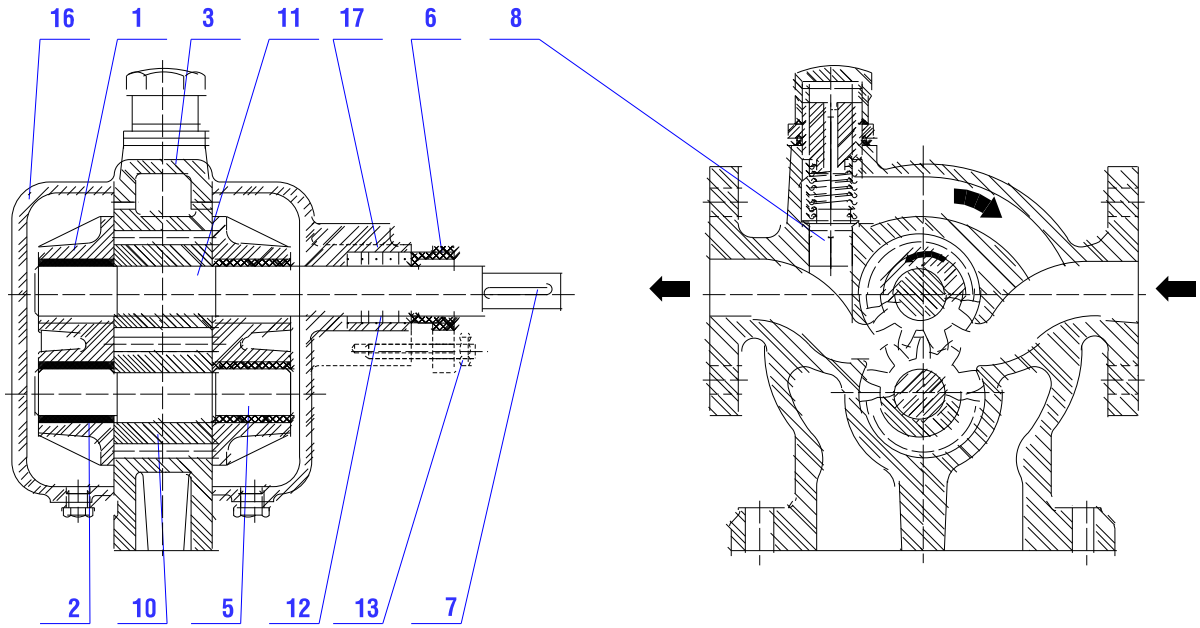
Standard workmanship of pumps is **clockwise**, viewing from the drive side.
On a special application pumps may be supplied as counter-clockwise ones, but with reverse direction of delivered liquid. It is not possible to use same pump in both direction of rotation.

Materials

Material version designated as “LO” may be considered as a standard one, with main parts from following materials:

- pump casing, shields/covers, stuffing box housing are from grey cast iron;
- gear wheels and shafts are from carbon steel;
- bearing bushes are from carbon steel with bronze lining.

Informative Pump Section - with mechanical seal



1. Shield
2. Bearing bush
3. Pump casing
5. Driven shaft
6. Gland
7. Coupling key
8. Realief valve
10. Gear wheel
11. Drive shaft
12. Gland packing
13. Stuffing box screw
16. Cover
17. Stuffing box housing

Types review and main technical data

50 Hz

Pump type	DN of noyyles mm		Max. delliverz pressure	Viscositz of pumped liquid mm².s⁻¹										Speed	Max. speed	Pump weight
				37.4		76		152		380		760				
	suck	discharge	bar	Q l.s⁻¹	P kW	Q l.s⁻¹	P kW	Q l.s⁻¹	P kW	Q l.s⁻¹	P kW	Q l.s⁻¹	P kW	min⁻¹	min⁻¹	kg
ZPG-4	32	32	2					0.466	0.33	0.483	0.40	0.491	0.45	280	1 000	32
			4					0.400	0.45	0.433	0.55	0.450	0.62			
			6					0.333	0.58	0.383	0.70	0.408	0.82			
			2			0.850	0.45	0.866	0.55	0.875	0.70	0.883	0.80	480		
			4			0.791	0.70	0.816	0.85	0.841	0.93	0.858	1.05			
			6			0.733	1.00	0.775	1.10	0.800	1.20	0.833	1.03			
			2	1.233	0.6	1.266	10.70	1.283	0.82	1.300	0.93	1.316	1.07	720		
			4	1.100	0.9	1.166	1.05	1.216	1.15	1.250	1.26	1.266	1.40			
			6	0.950	1.3	1.050	1.40	1.160	1.50	1.183	1.60	1.216	1.70			
			2	1.666	0.85	1.721	1.00	1.733	1.20	1.750	1.4			930		
			4	1.483	1.25	1.566	1.45	1.633	1.60	1.683	1.8					
			6	1.300	1.70	1.433	1.85	1.533	2.05	1.616	2.2					
ZPG-5	40	40	2					0.750	0.5	0.766	0.60	0.783	0.70	280	1 000	37
			4					0.700	0.7	0.733	0.85	0.758	0.95			
			6					0.666	1.0	0.700	1.10	0.733	1.20			
			2			1.283	0.70	1.300	0.80	1.316	1.0	1.333	1.2	480		
			4			1.183	1.05	1.2116	1.15	1.250	1.3	1.283	1.4			
			6			1.083	1.40	1.150	1.50	1.200	1.6	1.233	1.7			
			2	1.866	0.85	1.916	1.05	1.950	1.20	1.966	1.35	1.983	1.50	720		
			4	1.666	1.40	1.750	1.55	1.833	1.70	1.883	1.85	1.916	2.00			
			6	1.500	2.00	1.600	2.10	1.700	2.25	1.783	2.40	1.833	2.55			
			2	2.416	1.1	2.483	1.3	2.533	1.55	2.566	1.75			930		
			4	2.200	1.8	2.333	2.0	2.400	2.20	2.466	2.40					
			6	2.000	2.5	2.160	2.7	2.283	2.90	2.383	3.10					
ZPG-6	50	50	2			1.033	0.60	1.050	0.70	1.058	0.85	1.066	1.10	300	1 000	52
			4			0.933	0.80	0.966	0.90	1.000	1.10	1.016	1.20			
			6			0.833	1.05	0.833	1.15	0.933	1.25	0.966	1.35			
			2	1.716	0.8	1.750	1.00	1.766	1.2	1.800	1.4	1.816	1.7.	500		
			4	1.550	1.2	1.600	1.40	1.650	1.5	1.700	1.7	1.750	1.9			
			6	1.383	1.6	1.466	1.75	1.533	1.9	1.600	2.0	1.66	2.3			
			2	2.500	1.1	2.550	1.35	2.583	1.6	2.600	1.9	2.633	2.2	720		
			4	2.266	1.7	2.360	1.90	2.433	2.1	2.500	2.4	2.550	2.7			
			6	2.033	2.4	2.200	2.50	2.300	2.7	2.400	2.9	2.450	3.2			
			2	3.333	1.7	3.416	2.00	3.500	2.5					960		
			4	3.083	2.5	3.200	1.75	3.333	3.1							
			6	2.833	3.4	3.000	3.60	3.166	3.9							
ZPG-7	65	65	2	1.333	0.65	1.358	0.80	1.383	0.92	1.400	1.10	1.416	1.35	300	1 000	67
			4	1.166	0.90	1.216	1.05	1.266	1.20	1.316	0.85	1.350	1.55			
			6	1.000	1.20	1.083	1.30	1.150	1.40	1.233	1.50	1.283	1.70			
			2	2.250	1.0	2.283	1.25	2.316	1.5	2.350	1.75	2.383	2.1	500		
			4	2.000	1.5	2.100	1.70	2.150	1.9	2.200	2.15	2.283	2.4			
			6	1.750	2.0	1.883	2.20	1.966	2.4	2.066	2.60	2.200	2.8			
			2	3.250	1.4	3.333	1.75	3.366	2.1	3.416	2.4			720		
			4	2.933	2.2	3.083	2.40	3.150	2.7	3.250	3.0					
			6	2.600	2.9	2.833	3.10	2.933	3.3	3.083	3.6					
			2	4.416	1.80	4.466	2.2	4.500	2.75					960*)		
			4	4.000	2.80	4.166	3.2	4.333	3.60							
			6	3.583	3.85	3.833	4.2	4.083	4.50							

Types review and main technical data

50 Hz

Pump type	DN of noyyles mm		Max. delliverz pressure	Viscositz of pumped liquid $mm^2.s^{-1}$										Speed	Max. speed	Pump weight
				37.4		76		152		380		760				
	suck	discharge	bar	Q $l.s^{-1}$	P kW	Q $l.s^{-1}$	P kW	Q $l.s^{-1}$	P kW	Q $l.s^{-1}$	P kW	Q $l.s^{-1}$	P kW	min^{-1}	min^{-1}	kg
ZPG-8	80	80	2	3.166	1.4	3.216	1.7	3.250	2.1	3.300	2.4	3.333	2.9	300	750	88
			4	2.833	2.1	3.000	2.3	3.050	2.6	3.116	2.9	3.166	3.2			
			6	2.583	2.8	2.750	3.0	2.833	3.2	2.933	3.4	3.000	3.6			
			2	5.333	2.4	5.433	2.8	5.500	3.4	5.533	3.8	5.583	4.4	500		
			4	4.833	3.6	5.116	3.9	5.216	4.4	5.333	4.7	5.416	5.2			
			6	4.416	4.8	4.800	5.1	4.950	5.4	5.083	5.7	5.250	6.0			
			2	7.750	3.3	7.833	3.8	7.916	4.7	8.000	5.4			720		
			4	7.250	5.2	7.500	5.6	7.666	6.3	7.750	6.8					
			6	6.800	7.0	7.083	7.3	7.333	7.8	7.500	8.2					
ZPG-9	100	100	2	4.000	1.6	4.033	2.0	4.083	2.5	4.300	2.9	4.160	3.3	300	750	105
			4	3.583	2.5	3.750	2.8	3.833	3.2	3.916	3.5	4.000	3.9			
			6	3.166	3.4	3.416	3.7	3.583	3.9	3.666	4.2	3.750	4.5			
			2	8.833	2.8	6.916	3.3	7.000	4.1	7.066	4.70	7.083	5.3	500		
			4	6.250	4.3	6.500	4.7	6.666	5.4	6.833	5.85	6.916	6.4			
			6	5.666	5.8	6.083	6.2	6.333	6.7	6.583	7.00	6.666	7.4			
			2	9.833	4.0	10.000	4.7	10.166	5.8					720		
			4	9.166	6.3	9.583	6.8	9.833	7.7							
			6	8.500	8.6	9.166	9.0	9.500	9.8							
ZPG-10	100	100	2	7.000	3.4	7.250	4.0	7.333	4.8	7.416	5.5	7.500	6.3	300	750	160
			4	6.250	5.2	6.750	5.7	6.966	6.3	7.166	7.0	7.333	7.7			
			6	5.500	6.9	6.250	7.4	6.583	7.9	6.833	8.6	7.083	9.1			
			2	12.00	5.5	12.25	6.8	12.41	9.1	12.50	11.2			500		
			4	11.00	8.3	11.50	9.4	11.83	10.8	12.08	12.5					
			6	10.08	11.8	10.83	11.8	11.25	12.6	11.66	13.7					
			2	17.50	6.7	17.83	7.7	18.00	11.0					720*)		
			4	16.41	11.0	17.00	11.5	17.50	14.6							
			6	15.41	18.0	16.25	18.0	16.91	18.0							

Q ..... pump capacitz
P ..... pump power required

*) For heavy working conditions there is speed selection limited to max. 720 min^{-1} - type ZPG-7 and to max. 500 min^{-1} - type ZPG-10.

Speed selection

In general it is true:

- lower speed should be selected for liquids with higher viscosity and lower lubricating capacity and with longer operation of pumps;
- higher speed should be selected for diluted liquids with low visconsity and good lubricating capacity, especially with max. delivery pressure of the pump application.

Speed range for various liquids according to the pump size and pressure is as follows:

max. 1,000 min^{-1} ..... for common lubricating and cooling oils and other diluted self-lubricating liquids with viscosity ranging from 304 to 76 $mm^2.s^{-1}$ - in sequence from the smallest to the greatest pump types;

max. 750 min^{-1} ..... for thicker self-lubricating liquids up to viscosity ranging from 1,140 up to 228 $mm^2.s^{-1}$ - the sequence is the same as with speed 1,000 min^{-1};

max. 500 min^{-1} ..... ror heavy oils, tar, molasses, varnishes and other liquids with higher viscosity - the sequence is the same as with speed 1,000 min^{-1}.

Types review and main technical data

60 Hz

Pump type	DN of noyyles mm		Max. delliverz pressure	Viscositz of pumped liquid mm².s⁻¹										Speed	Max. speed	Pump weight
				37.4		76		152		380		760				
	suck	discharge	bar	Q l.s⁻¹	P kW	Q l.s⁻¹	P kW	Q l.s⁻¹	P kW	Q l.s⁻¹	P kW	Q l.s⁻¹	P kW	min⁻¹	min⁻¹	kg
ZPG-4	32	32	2					0.466	0.33	0.483	0.40	0.491	0.45	280	1 000	32
			4					0.400	0.45	0.433	0.55	0.450	0.62			
			6					0.333	0.58	0.383	0.70	0.408	0.82			
			2			0.850	0.45	0.866	0.55	0.875	0.70	0.883	0.80	480		
			4			0.791	0.70	0.816	0.85	0.841	0.93	0.858	1.05			
			6			0.733	1.00	0.775	1.10	0.800	1.20	0.833	1.03			
			2	1.198	0.58	1.231	0.68	1.248	0.80	1.263	0.90	1.280	1.04	700		
			4	1.070	0.87	1.135	1.02	1.183	1.12	1.215	1.23	1.231	1.36			
			6	0.923	1.26	1.021	1.36	1.085	1.46	1.150	1.56	1.183	1.65			
			2	1.548	0.79	1.580	0.93	1.610	1.11	1.625	1.30			864		
			4	1.378	1.16	1.455	1.35	1.516	1.49	1.563	1.67					
			6	1.208	1.58	1.331	1.72	1.425	1.90	1.501	2.04					
ZPG-5	40	40	2					0.750	0.50	0.766	0.60	0.783	0.70	280	1 000	37
			4					0.700	0.70	0.733	0.85	0.758	0.95			
			6					0.666	1.00	0.700	1.10	0.733	1.20			
			2			1.283	0.70	1.300	0.80	1.316	1.00	1.333	1.20	480		
			4			1.183	1.05	1.216	1.15	1.250	1.30	1.283	1.40			
			6			1.083	1.40	1.150	1.50	1.200	1.60	1.233	1.70			
			2	1.815	0.83	1.863	1.02	1.896	1.17	1.911	1.31	1.928	1.46	700		
			4	1.620	1.36	1.701	1.51	1.781	1.65	1.931	1.80	1.863	1.94			
			6	1.458	1.94	1.555	2.04	1.653	2.19	1.733	2.33	1.781	2.48			
			2	2.245	1.02	2.306	1.21	2.353	1.44	2.385	1.63			864		
			4	2.043	1.67	2.168	1.86	2.230	2.04	2.291	2.23					
			6	1.858	2.32	2.013	2.51	2.121	2.69	2.215	2.88					
ZPG-6	50	50	2			1.033	0.60	1.050	1.70	1.058	0.85	1.066	1.10	300	1 000	52
			4			0.933	0.80	0.966	0.90	1.000	1.10	1.016	1.20			
			6			0.838	1.05	0.883	1.15	0.933	1.25	0.966	1.35			
			2	1.716	0.80	1.750	1.00	1.766	1.20	1.800	1.40	1.816	1.70	500		
			4	1.550	1.20	1.600	1.40	1.650	1.50	1.700	1.70	1.750	1.90			
			6	1.383	1.60	1.466	1.75	1.533	1.90	1.600	2.00	1.666	2.30			
			2	2.430	1.07	2.480	1.31	2.511	1.56	2.528	1.85	2.560	2.14	700		
			4	2.203	1.65	2.301	1.85	2.365	2.04	2.430	2.33	2.480	2.63			
			6	1.976	2.33	2.138	2.43	2.236	2.63	2.333	2.82	2.381	3.11			
			2	3.000	1.53	3.075	1.80	3.150	2.25					864		
			4	2.775	2.25	2.880	2.47	3.000	2.79							
			6	2.550	3.06	2.700	3.24	2.850	3.51							
ZPG-7	65	65	2	1.333	0.65	1.358	0.80	1.383	0.92	1.400	1.10	1.416	1.35	300	1 000	67
			4	1.166	0.90	1.216	1.05	1.266	1.20	1.316	0.85	1.350	1.55			
			6	1.000	1.20	1.083	1.30	1.150	1.40	1.233	1.50	1.283	1.70			
			2	2.250	1.00	2.283	1.25	2.316	1.50	2.350	1.75	2.383	2.10	500		
			4	2.000	1.50	2.100	1.70	2.150	1.90	2.200	2.15	2.283	2.40			
			6	1.783	2.00	1.883	2.20	1.966	2.40	2.066	2.60	2.200	2.80			
			2	3.160	1.36	3.240	1.70	3.273	2.04	3.321	2.33			700		
			4	2.851	2.14	2.998	2.33	3.063	2.63	3.160	2.92					
			6	2.528	2.82	2.755	3.01	2.851	3.21	2.998	3.50					
			2	3.975	1.62	4.020	1.98	4.095	2.47					864*)		
			4	3.600	2.52	3.750	2.88	3.900	3.24							
			6	3.225	3.46	3.450	3.78	3.675	4.05							

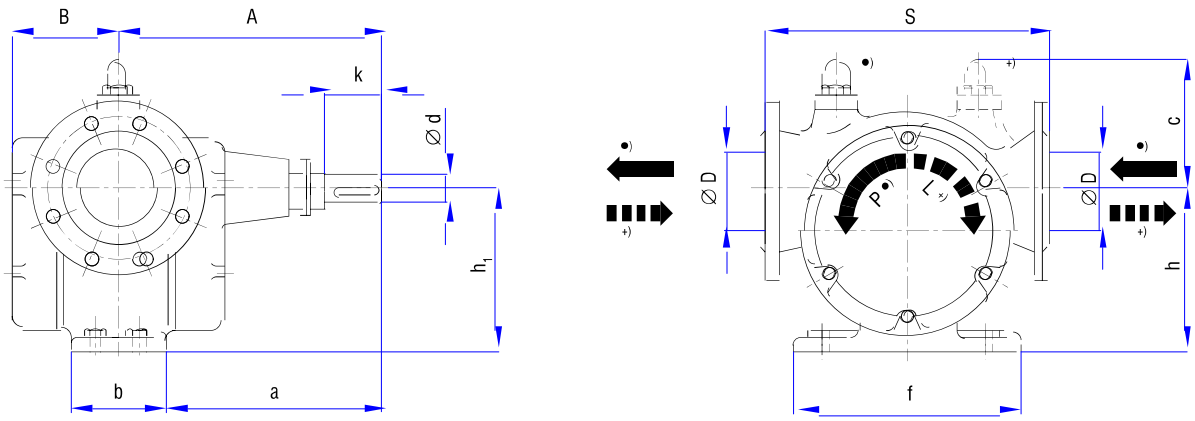
Types review and main technical data

60 Hz

Pump type	DN of noyyles mm		Max. delliverz pressure	Viscositz of pumped liquid $mm^2.s^{-1}$										Speed	Max. speed	Pump weight
				37.4		76		152		380		760				
	suck	discharge	bar	Q $l.s^{-1}$	P kW	Q $l.s^{-1}$	P kW	Q $l.s^{-1}$	P kW	Q $l.s^{-1}$	P kW	Q $l.s^{-1}$	P kW	min^{-1}	min^{-1}	kg
ZPG-8	80	80	2	3.166	1.40	3.216	1.70	3.250	2.10	3.300	2.40	3.333	2.90	300	750	88
			4	2.833	2.10	3.000	2.30	3.050	2.60	3.116	2.90	3.166	3.20			
			6	2.583	2.80	2.750	3.00	2.833	3.20	2.933	3.40	3.000	3.60			
			2	5.333	2.40	5.433	2.80	5.500	3.40	5.533	3.80	5.583	4.40	500		
			4	4.833	3.60	5.116	3.90	5.216	4.40	5.333	4.70	5.416	5.20			
			6	4.416	4.80	4.800	5.10	4.950	5.40	5.083	5.70	5.250	6.00			
			2	7.535	3.21	7.615	3.69	7.696	4.57	7.778	5.25			700		
			4	7.048	5.06	7.291	5.44	7.453	6.13	7.535	6.61					
			6	6.611	6.81	6.886	7.10	7.130	7.58	7.291	7.97					
ZPG-9	100	100	2	4.000	1.60	4.033	2.00	4.083	2.50	4.300	2.90	4.160	3.30	300	750	105
			4	3.583	2.50	3.750	2.80	3.833	3.20	3.916	3.50	4.000	3.90			
			6	3.166	3.40	3.416	3.70	3.583	3.90	3.666	4.20	3.750	4.50			
			2	8.833	2.80	6.916	3.30	7.000	4.10	7.066	4.70	7.083	5.30	500		
			4	6.250	4.30	6.500	4.70	6.666	5.40	6.833	5.85	6.916	6.40			
			6	5.666	5.80	6.083	6.20	6.333	6.70	6.583	7.00	6.666	7.40			
			2	9.560	3.89	9.721	4.57	9.885	5.64					700		
			4	8.911	6.13	9.316	6.61	9.560	7.49							
			6	8.263	8.36	8.911	8.75	9.236	9.53							
ZPG-10	100	100	2	7.000	3.40	7.250	4.00	7.333	4.80	7.416	5.50	7.500	6.30	300	750	160
			4	6.250	5.20	6.750	5.70	6.966	6.30	7.166	7.00	7.333	7.70			
			6	5.500	6.90	6.250	7.40	6.583	7.90	6.833	8.60	7.083	9.10			
			2	12.000	5.50	12.250	6.80	12.416	9.10	12.500	11.20			500		
			4	11.000	8.30	11.500	9.40	11.833	10.80	12.083	12.50					
			6	10.083	11.80	10.833	11.80	11.250	12.60	11.666	13.70					
			2	17.013	6.51	17.338	7.49	17.500	10.69					700*)		
			4	15.960	10.69	16.528	11.18	17.013	14.19							
			6	14.988	17.50	15.798	17.50	16.449	17.50							

Q ..... pump capacity
P ..... pump power required

*) For heavy working conditions there is speed selection limited to max. 700 min^{-1} - type ZPG-7 and to max. 500 min^{-1} - type ZPG-10.



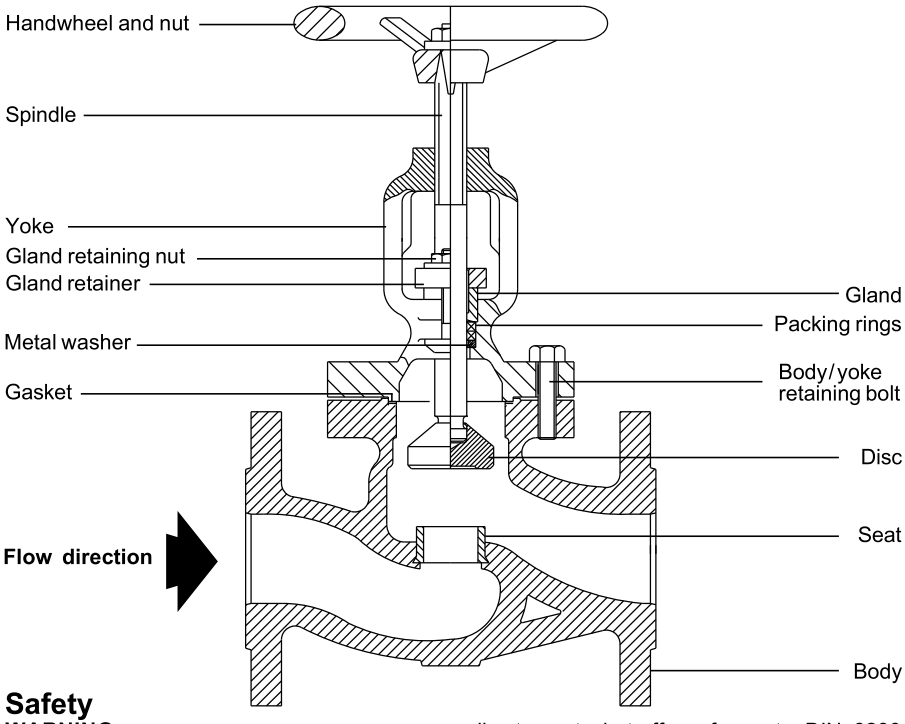
Type of pump	Standard version											
	a	b	c	∅d	f	h	h_1	k	A	B	∅D	S
ZPG-4	170	60	115	22	220	150	150	40	230	85	32	250
ZPG-5	155	90	115	22	220	150	150	40	245	100	40	250
ZPG-6	170	100	145	28	275	175	175	50	275	110	50	300
ZPG-7	155	135	165	28	275	175	175	50	290	130	65	300
ZPG-8	196	115	150	35	275	190	190	60	311	130	80	340
ZPG-9	211	115	150	35	275	190	190	60	326	140	100	340
ZPG-10	248	115	200	50	400	280	280	80	363	145	100	500

P ..... clockwise workmanship
L ..... counterclockwise workmanship - direction of liquid flowing marked *)

Connecting dimensions of flanges of suction and delivery nozzles „D“ are meant for PN 10 with a raised face.

spirax sarco

G3 Gland Sealed Stop Valve
Installation and Maintenance Instructions



Safety

WARNING

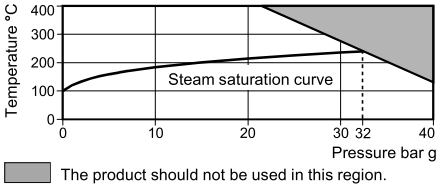
Your attention is drawn to Safety Information leaflet IM-GCM-1.

Before removing a valve from a system, all vessels and pipelines to which it is connected must be adequately isolated, depressurised, and drained. Make sure there is no pressure to the valve body, or any pressure remaining in the body, before loosening or removing the flange bolts.

Description

The Spirax Sarco G3 is a flanged, gland sealed in-line stop valve for general duties. The valve must not be used on any fluids categorised as Group 1 according to the E.C. directive on the classification of dangerous substances (i.e. explosive, flammable, toxic, oxidising substances). Examples of uses include isolating condensate, boiler feedwater, boiler blowdown, hot water, cooling water etc. The G3 valve disc-to-seat shut-off conforms to DIN 3230 leakage BF test method Rate 2 (air under water).

Operating range



The product should not be used in this region.

K_V values

Size	DN15	DN20	DN25	DN32	DN40	DN50
K_V	4.0	7.0	11	19	30	46

For conversion: C_V (UK) = K_V x 0.97
C_V (US) = K_V x 1.17

spirax sarco

Installation

The valve may be installed in any position, but the flow must be in the direction of the arrow on the valve body.

- Fit a suitable strainer before the valve if there is a risk of contamination.
- Ensure easy access to the handwheel.
- Align pipework and flanges so that no load is imposed on the valve in service.
- After the valve has been used for the first time, check the tightness of all nuts and bolts with the valve depressurised and at room temperature.

Maintenance

WARNING

Ensure the valve pipeline is isolated, drained, and vented to atmosphere before attempting any maintenance.

The valve has no special servicing or maintenance requirements. In all applications, periodic operation of the valve is recommended to keep the valve free. Frequency of this check will depend on the operating environment.

Apply a small quantity of graphite or copper based grease to the spindle thread from time to time. We recommend the valve is checked periodically for gland leakage, the gland nuts tightened, and the stem packing and body / yoke gasket replaced if necessary. Gaskets and packing must be renewed every time the valve is dismantled.

Replacing the stem packing and bonnet / yoke gasket

- Ensure the valve pipeline is isolated, drained, cold, and vented to atmosphere.
- Open the valve one or two turns.
- Remove the 4 body / yoke retaining bolts.
- Separate the yoke from the body and remove the gasket.
- Remove the handwheel retaining nut and handwheel.
- Remove the spindle by turning it clockwise until it is free of the yoke thread.
- Loosen packing gland retaining nuts, turn bolts through 90°, and remove gland retainer.
- Remove gland.
- Remove old packing rings and the metal washer below them by pushing the assembly upwards.
- Note quantity of rings removed. Keep the washer.
- Check that the packing ring housing is clear of debris and refit the washer followed by the new seals. Use the same quantity of new seals as were removed.
- Reassemble the valve in the reverse order of dismantling, using a new bonnet / yoke gasket.
- After the valve has been re-used for the first time, check the tightness of all nuts and bolts with the valve depressurised and at room temperature.

Available spares

A packing and gasket set is available for the valve, and consists of 1 off body / yoke gasket and packing rings to suit. Always order spares by using the description and stock number below, and state type and size of valve, and whether it is marked 'Made in Spain' or 'Made in Germany'.

Description
Packing and gasket set consisting of: 1 body / yoke gasket and packing rings to suit.

Size		Made in Spain	Made in Germany
DN15 and DN20	Stock numbers	4095081	4095080
DN25 and DN32	Stock numbers	4095281	4095280
DN40	Stock numbers	4095481	4095480
DN50	Stock numbers	4095481	4095580

Cert. No. LRQ 0963008

ISO 9001

spirax sarco

Fig 13 Cast Iron Strainer

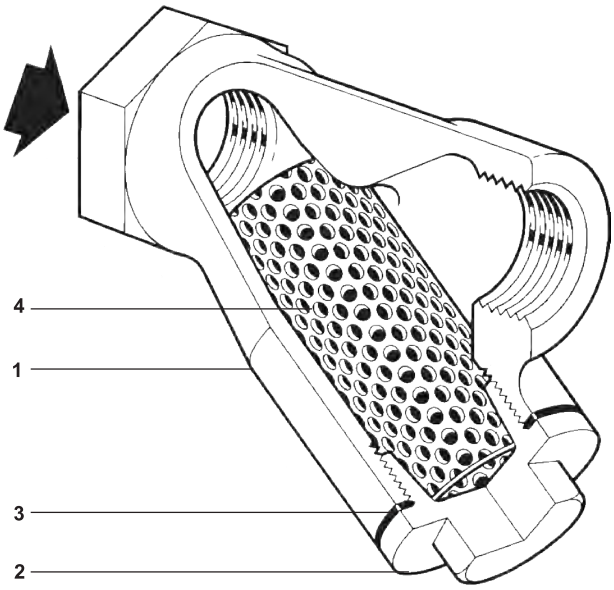
TI-P063-01
ST Issue 3

Description

The Fig 13 is a cast iron screwed Y-type strainer**.** The standard stainless steel screen is 0.8 mm perforations. As options, other perforations and mesh sizes are available as well as monel screens. The strainer cap can be drilled and tapped for blowdown and drain valves if required.

Certification

The product is available with material certification to EN 10204 2.2 for the body and cap as standard.



Sizes and pipe connections

¼" and ⅜" screwed BSP or NPT

Optional extras

Strainer screens

Stainless steel screen	Perforations	1.6 and 3.0 mm
	Mesh	40, 100 and 200
Monel screen	Perforations	0.8 and 3.0 mm
	Mesh	100

Blowdown or drain valve connections.

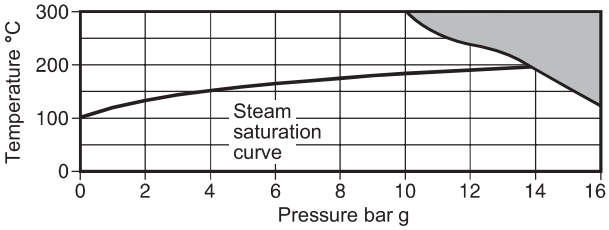
The cap can be drilled to the following sizes to enable a blowdown or drain valve to be fitted.

Strainer size	Blowdown valve	Drain valve
¼" and ⅜"	¼"	¼"

Limiting conditions

Body design conditions	PN16
Maximum design temperature	300°C
Minimum operating temperature	-10°C
Designed for a maximum cold hydraulic test pressure of 24 bar g	

Operating range



The product **must not** be used in this region.

Materials

No.	Part	Material	
1	Body	Cast iron	DIN 1691 GG20
2	Cap	Cast iron	DIN 1691 GG20
3	Cap gasket	Reinforced exfoliated graphite	
4	Strainer screen	Stainless steel	316L

K_V values

Size	¼"	⅜"
Perforations 0.8, 1.6 and 3.0 mm	1	2.5
Mesh 40, 100 and 200	1	2.5

For conversion: C_V (UK) = K_V x 0.963 C_V (US) = K_V x 1.156

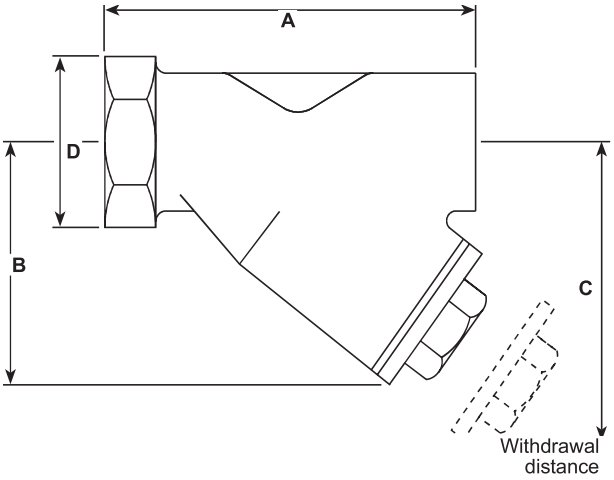
How to order

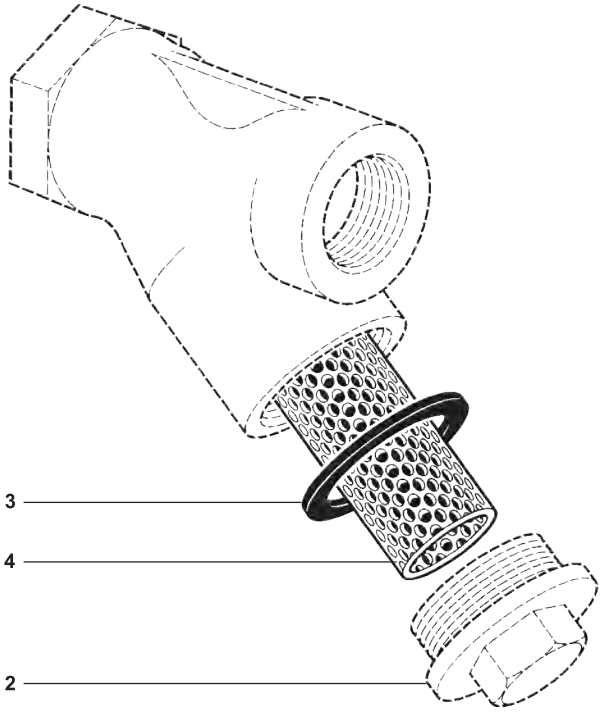
Example: 1 off Spirax Sarco ¼" Fig 13 strainer, screwed BSP with stainless steel screen 0.8 mm perforations.

Local regulations may restrict the use of this product to below the conditions quoted.
In the interests of development and improvement of the product, we reserve the right to change the specification.

Dimensions / weights (approximate) in mm and kg

Size	A	B	C	D	Screening area cm²	Weight
¼"	70	53	80	27	27	0.31
⅜"	70	53	80	30	27	0.40





Installation

The strainer should be installed in the direction of flow as indicated on the body, in a vertically downwards or horizontal pipeline. In a horizontal line on steam and gases the pocket should be in the horizontal plane. On liquid systems the pocket should point vertically downwards.

Maintenance

Pressure

Before attempting any maintenance of the strainer, consider what is or may have been in the pipeline. Ensure that any pressure is isolated and safely vented to atmospheric pressure before attempting to maintain the strainer. This is easily achieved by fitting Spirax Sarco depressurisation valves type DV (see separate literature for details). Do not assume that the system is depressurised even when a pressure gauge indicates zero.

Temperature

Allow time for temperature to normalise after isolation to avoid the danger of burns and consider whether protective clothing (including safety glasses) is required.

Disposal

The product is recyclable. No ecological hazard is anticipated with disposal of this product providing due care is taken.

Spare parts

The spare parts available are shown in heavy outline. Parts drawn in broken line are not supplied as spares.

Available spares

Strainer screen (state material, size of perforation or mesh and size of strainer)	**4**
Cap gasket (packet of 3)	**3**

How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size and type of strainer and perforations or mesh required.
Example: 1 - Strainer screen, stainless steel 0.8 mm perforations for a ⅜" Spirax Sarco Fig 13 strainer.

Recommended tightening torques

Item	Size	or mm	N m
2	¼" and ⅜ "	22	50 - 55

Diaphragm Valve

SISTO-10

PN10
DN 15-300
Maintenance-free
With or without Lining
Flanged Ends

Type Series Booklet

SISTO

Legal information/Copyright

Type Series Booklet SISTO-10

SISTO Armaturen S.A.

Subject to technical modification without prior notice.

Diaphragm Valves

Soft-seated Glandless Diaphragm Valves

SISTO-10

Main applications

- Mining
- Irrigation
- Chemical industry
- Industrial recirculation systems
- Sewage treatment plants
- Air-conditioning systems
- Condensate transport
- Paint shops
- Seawater desalination / reverse osmosis
- Refineries
- Flue gas desulphurisation
- Swimming pools
- Process engineering
- Water treatment
- Water extraction
- Sugar industry

Fluids handled

- Waste water
- Aggressive fluids
- Inorganic fluids
- Brackish water
- Service water
- Distillate
- River, lake and groundwater
- Gas
- Toxic fluids
- Condensate
- Corrosive fluids
- Cooling water
- Volatile fluids
- Solvents
- Seawater
- Fluids containing mineral oils
- Oil
- Organic fluids
- Cleaning agents
- Lubricants
- Dipping paints
- Wash water
- Other fluids on request.

Operating data

Characteristic	Value
Nominal pressure	PN10
Nominal size	DN 15-300
Max. permissible pressure	10 bar.
Max. permissible temperature[1)]	160 °C

Body materials

Overview of available materials

Material	Material number	Temperature limit[1)]
Grey cast iron	JL1040	-10 °C to +160 °C
Nodular cast iron	JS1049	-20 °C to +160 °C
Stainless steel	1.4408	-20 °C to +160 °C

Design details

Design

- Soft-seated shut-off valve in straight-way pattern
- Rising handwheel
- Shut-off and sealing to atmosphere by diaphragm (spiral-supported from DN 65)
- Position indicator with integrated stem protection
- Manufactured and tested to EN 13397
- Marked to DIN/EN 19 (ISO 5209)
- The valves satisfy the safety requirements of Annex I of the European Pressure Equipment Directive 97/23/EC (PED) for fluids in Groups 1 and 2.
- The valves do not have a potential internal source of ignition and can be used in potentially explosive atmospheres, Group II, category 2 (zones 1+21) and category 3 (zones 2+22) to ATEX 94/9/EC.

1) The temperatures indicated are for orientation only; they are not valid for all operating conditions.

Variants

- Body lined with IIR (Butyl); temperature limit: +120 °C
- Body lined with NRH (hard rubber); temperature limit: +100 °C
- Body coated with PA (Rilsan); temperature limit +90 °C
- Body coated with ECTFE (Halar); temperature limit +90 °C
- Diaphragm made of CSM; temperature limit +100 °C
- Diaphragm made of IIR; temperature limit +120 °C
- Diaphragm made of NBR; temperature limit +90 °C
- Two-piece diaphgram made of TFM/EPDM; temperature limit +160 °C
- Electric actuators
- Pneumatic actuators
- Certification to customer specification

Product benefits

- No contamination of fluid handled, as all functional parts are located outside the wetted section
- Closing torques minimised by thrust bearing
- Spiral-supported diaphragm (DN 65 - 300) for increased operating reliability, longer valve life and higher pressure limit
- The valve hydraulics without dead volume offers optimum conditions for high-purity fluids.
- Highly corrosion-resistant due to high-quality linings
- Optimised functional reliability of the diaphragm thanks to balanced diaphragm suspension
- Position indicator with integrated stem protection for increased operating reliability

Related documents

- Operating manual 0570.821
- Type series booklet MAT-P (pneumatic actuators) 9210.1
- Type series booklet SISTOMAT-PC (pneumatic actuators) 8641.1 PC
- SISTOMAT-E, MTAE/LAE (electric actuators) see SISTO price list 0570

On all enquiries/orders please specify

1. Type
2. Nominal pressure
3. Nominal size
4. Operating pressure
5. Differential pressure
6. Operating temperature
7. Fluid handled
8. Pipe connection
9. Variants
10. Number of type series booklet
11. Certificate

Flow characteristics

Flow coefficients

DN	Kvs value [m³/h]	DN	Kvs value [m³/h]
15	5.0	80	126.0
20	7.9	100	216.0
25	12.0	125	311.0
32	19.0	150	414.0
40	30.0	200	1120.0
50	55.0	250	-
65	87.0	300	-

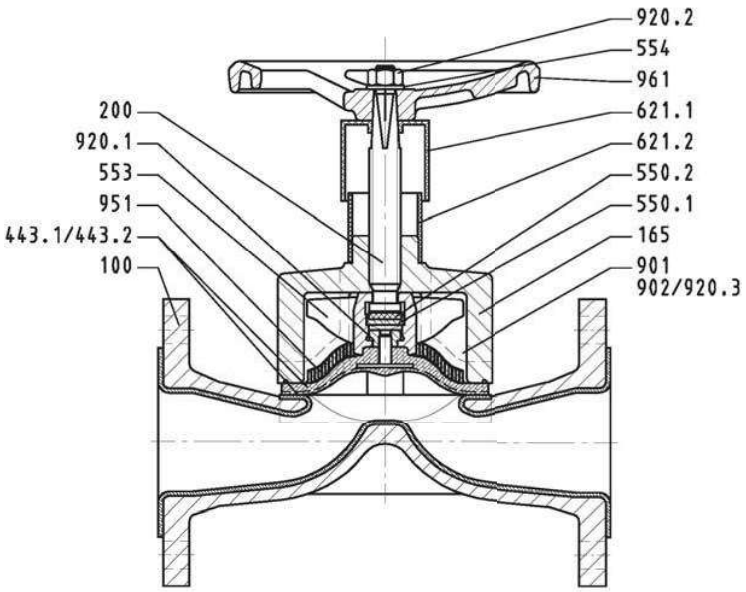
Pressure/temperature ratings

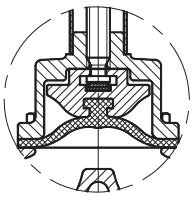
Permissible operating pressures in bar at a temperature of °C (to EN 1092-2/ EN 1092-1)

Nominal pressure	Material	-20	RT[2)]	+50	+100	+120	+150	+160
10	JL1040	10	10	10	10	10	9.0	8.7
	JS1049	10	10	10	10	10	9.7	9.6
	1.4408	9.1	9.1	8.7	7.8	7.48	7.0	6.88

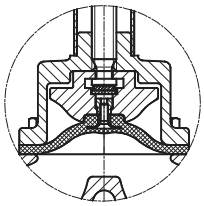
2) RT: room temperature +20°C

Materials

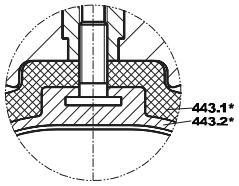




Design DN 15-20



Design DN 25-50



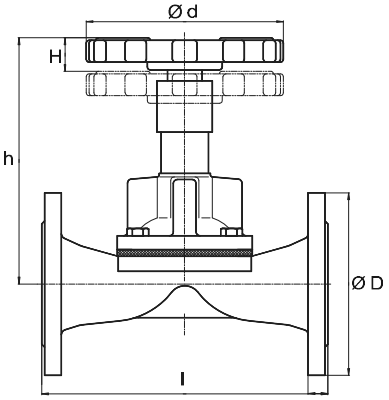
Design with
PTFE diaphragm

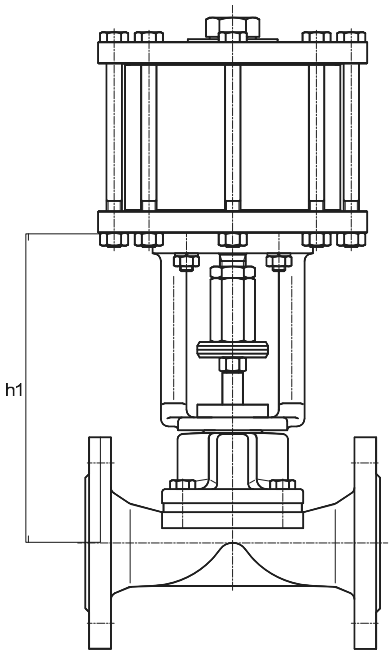
Parts list

Part No.	Description	Material	Note
100	Body	JL1040	Standard, DN 200-300 JS-1025
165	Bonnet	JL1040	Standard
200	Stem	1.4104	
443[3)]	Diaphragm	EPDM	Standard
443.1[3)]	Backing diaphragm	EPDM	
443.2[3)]	Diaphragm	PTFE	
550.1	Bearing disc	9S20	On DN 25-300
550.2	Disc	PTFE/graphite	On DN 25-300
553	Compressor	JL1040	GD-ZnAl4Cu1 for DN 15-20
554	Disc	StA2E	
621.1	Position indicator, upper part	ABS Luran	On DN 25-300
621.2	Position indicator, lower part	ABS Luran	
901	Hexagon head bolt	A2	On DN 15-65
902	Stud	A2	On DN 80-300
920.1	Square nut	9S20K	On DN 25-300
920.2	Hexagon nut	A2	On DN 25-300
920.3	Hexagon nut	A2	On DN 80-300
951	Support spiral	St 2K BK	On DN 65-300
961	Handwheel	JL1030	DN 15-20: ABS Luran

3) Recommended spare parts

Dimensions





Dimensions in mm

					Manually operated valve				Actuated valve	
DN	Diaphragm MD (Ø/AxB)	l	Ø D	H	h[4]	Ø d	Handwheel turns approx.	[kg]	Centre-to-top height h1	Top flange
15[5]	58 x 62	130	95	8	108	63	3	2.5	213	F10
20[5]	58 x 62	150	105	8	108	63	3	3.0	213	F10
25	68 x 72	160	115	11	140	100	4	4.0	217	F10
32	90 x 100	180	140	18	165	100	6	5.5	227	F10
40	90 x 100	200	150	18	165	100	6	8.0	227	F10
50	107 x 124	230	165	26	200	125	7	11.5	242	F10
65	132 x 144	290	185	34	245	200	9	19.0	312	F10
80	157 x 187	310	200	40	265	200	10	25.0	320	F10
100	Ø 226	350	220	56	340	200	11	39.0	363	F10
125	Ø 258	400	250	72	405	250	15	53.0	395	F10
150	Ø 303	480	285	81	450	400	14	78.0	485	F10/F14
200	Ø 415	600	340	115	595	400	20	162.0	550	F10/F14
250	Ø 415	730	395	115	645	400	20	190.0	600	F10/F14
300	Ø 415	850	445	115	645	400	20	210.0	600	F10/F14

Mating dimensions - Standards

Face-to-face length:	EN 558-1 R1 (ISO 5752/1)
Flange dimensions:	DIN EN 1092-2 (BS 4504)
Flange facing:	DIN EN 1092-2, type B

4) Add 5 mm for rubber-lined valves
5) Diaphragm valves in material 1.4408 with dimensions of DN 25 valve