

## 9.3.1 TECHNICAL DATA

**MAX OPERATING PRESSURE (PS):** 420 bar

**PRESSURE TEST (PT):** 1.43 x PS

**NOMINAL PASSAGE DIAMETER:** 10mm, 20mm, 25mm, 32mm

**WORKING TEMPERATURE:** -40 ÷ +150

**FLUID VISCOSITY RANGE:** 10 ÷ 400 cSt

**RECOMMENDED VISCOSITY:** 36 cSt

**FLUID CONTAMINATION DEGREE:** class 21/19/16 according to ISO 4406/99

**SHUT-OFF VALVE:** ball type

**SAFETY VALVE:** with DBDS 10 cartridge

**DISCHARGE VALVE:** manual and electric

**MOUNTING POSITION:** every position

**BODY MATERIAL:** - phosphated or galvanized carbon steel in compliance with Directive 2002/95/EC (RoHS) to resist to corrosion.  
 - nickel coating 25 - 40 µ  
 - stainless steel AISI 430 (only for BS25)

**VALVES MATERIAL:** - phosphated or galvanized carbon steel in compliance with Directive 2002/95/EC (RoHS) to resist to corrosion  
 - stainless steel

**SEALS MATERIAL:**

- P = Nitrile rubber (NBR)
- F = Low temp. nitrile rubber
- K = Hydrogenated nitrile (HNBR)
- E = Ethylene-propylene (EPDM)
- V = Fluorocarbon (FPM)

See Table 9.3B and/or section 1.5

**ACCUMULATOR SIDE CONNECTION:**

- 3/4" BSP with O-Ring for chamfer
- 1"1/4 BSP with O-Ring for chamfer
- 2" BSP with O-Ring for chamfer

**FLUID PORT CONNECTION:** see Chapter 9.3.8

**FLOW RATE:** see Chapter 9.3.10

**POWER SUPPLY:** 24 VDC, 105 VDC, 110 VDC, 220 VDC, P=26W, 100%ED, IP65 in compliance with DIN 40050, connector in compliance with DIN 43650 type A 2 poles + earthing with AC voltage; the internal connector has a bridge rectifier

**WEIGHT:** see Chapter 9.3.8



9.3a

## 9.3.2 HYDRAULIC SYMBOL

See section 9.3.8

## 9.3.3 DESCRIPTION

The EPE range of safety blocks BS is available in sizes NG10, NG20, NG25 and NG32. The safety blocks BS combine all the features to protect, isolate and discharge a hydraulic accumulator. The shut-off valve rotates of 90 degrees to instantly isolate the accumulator from the hydraulic system in emergency conditions or for maintenance. Once isolated, the accumulator can be discharged into a tank through a discharging valve with manual or electric controls. In version BS10 and BS20 when switching over the ball valve, the pump flow rate is stopped and simultaneously the accumulator discharged to the tank. During switching all three ports (P, A and T) are momentarily interconnected (negative switching overlap). Ball valves are not designed to be used as flow control valves; therefore they should always be either fully open or fully closed, to avoid damaging the sealing cups. The system security is ensured by a pressure PED an anti-tempering pressure valve certified CE/PED. The safety blocks BS allow easy and secure connection of an accumulator to a hydraulic system. Suitable for use with all types of bladder, piston and diaphragm accumulators, the compact and multifunction design allows saving space and reducing the wiring. By reducing the times required by the procedures of installation and maintenance, the security blocks BS help maximizing the productivity and profitability, minimizing the downtime of the system. For easy installation, we offer a full range of adapters, suitable for all standard fittings of any size and type. For diagnostic purposes and for continuous monitoring of pressure, all the security blocks BS are provided with a manometer connection of 1/4" BSP. The European Directive on pressure equipment 97/23/EC states that all accumulators must be provided with a safety device that intercepts, limit and discharge the pressure as well as allows carrying out the measurements. BS range satisfies all these requirements with a single and compact device. The safety block should always be mounted as close as possible to the accumulator.

### 9.3.4 PRESSURE RELIEF VALVE

The function of the pressure relief valve is to protect the accumulator during its operation. If the pressure exceeds the valve setting, this opens and discharges the fluid into the tank and allows the pressure in the system returning to a safe level. Thanks to its cartridge design, the pressure relief valve can be recalibrated to another pressure setting. This change requires a new approval according to PED 97/23 EC. The vessels discharge pressure expressed in bar, is stamped on the nameplate. The pressure relief valve is controlled and carefully sealed after approval in accordance with the rules of pressurized vessels. On their body there are stamped the CE mark, the certification ID and the serial number. All valves are supplied with a certificate attesting the calibration pressure. The documents provided with the pressure relief valve must be kept as they may be necessary in the event of repetition of the tests.

#### Manual and electric discharge valve

The discharge valve allows the discharge of the accumulator fluid in the

tank. All models of the safety block BS have a manually operated valve. In addition to the manual valve on request, could be installed a discharging electrically-controlled valve.

### 9.3.5 SAFETY BLOCK ADVANTAGES

- dirt tolerant
- light weight
- compact
- simple construction
- quick response
- works well on water, low lubricity fluids
- quick, easy installation
- low cost

### 9.3.6 SEALS-TEMPERATURE-LIQUID COMPATIBILITY

When selecting the additional seal variant, pay attention to the following non-binding notes with regard to hydraulic fluid, seals material and the permissive temperature range. (see Section 1.5)

Code letter	Polymer	ISO	Temperature range (°C)	Some of the liquids compatible with the polymer
P	Standard nitrile (Perburan)	NBR	-20 ÷ +80	Aliphatic hydrocarbons (propane, butane, gasoline, oils, mineral greases, diesel fuel, fuel oil, kerosene), mineral greases and oils, HFA - HFB - HFC fluids, many dilute acids, alkalis, saline solutions, water, water glycol
F	Low temperature nitrile	NBR	-40 ÷ +70	The same as with standard nitrile + a number of different types of Freon. (This contains less acrylonitrile than the standard and is therefore more suitable for low temperatures, but its chemical resistance is slightly lower).
K	Hydrogenated nitrile	HNBR	-30 ÷ +130	The same as with standard nitrile but with excellent performance at high and low temperatures.
E	Ethylene-Propylene	EPDM	30 ÷ +100	Hot water up to 100°C, glycol-based brake fluids, many organic and inorganic acids, detergents, solutions of sodium and potassium, phosphate ester-based hydraulic fluids, (HFD-R), silicone oils and greases, many polar solvents (alcohol, ketones, esters), Skydrol 500 and 7000, resistance to ozone, aging and weathering.
V	Fluorocarbon	FPM	-10 ÷ +150	Mineral oils and greases, non-flammable fluids of HFD group, silicone oils and greases, animal and vegetable oils and greases, aliphatic hydrocarbons (gasoline, butane, propane, natural gas), aromatics hydrocarbons (benzene, toluene), chlorinated hydrocarbons (Tetrachloroethylene, carbon tetrachloride), fuel (regular, super and containing methanol), excellent resistance to ozone, weathering and aging.

9.3b

For other hydraulic fluid and/or temperatures, please consult us.

## 9.3.7 ORDER CODE

1	2	3	4	5	6	7	8	9	10	11	12	
<b>BS</b>	<b>10</b>	<b>M</b>	<b>P</b>	<b>360</b>	<b>A</b>	<b>5</b>	<b>G</b>	<b>4</b>	<b>-</b>	<b>C</b>	<b>P</b>	<b>K</b>

<b>1 Series</b>	Safety block = <b>BS</b>
<b>2 Internal nominal diameter</b>	10mm = <b>10</b> 20mm = <b>20</b> 25mm = <b>25</b> 32mm = <b>32</b>
<b>3 Discharge</b>	Only manual = <b>M</b> Electric and manual = <b>E</b> Manual plus drilling for solenoid valve = <b>F</b>
<b>4 Relief valve</b>	Without valve, with plastic plug = <b>A</b> Valve type DBDS... (CE certified) = <b>P</b> Without valve (with plug B 2375) = <b>T</b> Valve type VS224TX = <b>G</b> Valve type DBDS (Gost certified) = <b>U</b>
<b>5 Valve setting (bar)</b>	Valves type DBDS or VS224 calibrated and certificate = <b>5 ÷ 400</b>
<b>6 Accumulator side connection</b>	BSP ISO 228 with chamfer for OR (std) = <b>A</b> For BS25 and BS32: Holes for flange SAE 3000 Psi = <b>L</b> Without adapter = <b>W</b>
<b>7 Dimension of the accumulator side connection</b>	For connection A: 3/4" BSP = <b>5</b> 1" 1/4 BSP = <b>7</b> 2" BSP = <b>9</b> For connection L: 2" = <b>9</b> Without adapter = <b>0</b>
<b>8 Type of installation side connection</b>	For BS25 and BS32: holes for flange CETOP -400, metric threads with flange FC = <b>C</b> For BS32: holes for flange SAE 3000 Psi, metric threads = <b>L</b> For BS25 e BS32: holes for flange SAE 6000 Psi, metric threads = <b>H</b> Thread BSP ISO 228 = <b>G</b>

<b>12 Other variants</b>
For type BS...E Sol. valve power supply 24VDC normally closed = <b>24D-C</b> Sol. valve power supply 110VDC normally closed = <b>110D-C</b> Sol. valve power supply 220VDC normally closed = <b>220D-C</b> Sol. valve power supply 24VAC normally closed = <b>24A-C</b> Sol. valve power supply 110VAC normally closed = <b>110A-C</b> Sol. valve power supply 220VAC normally closed = <b>220A-C</b> Sol. valve power supply 24VDC normally open = <b>24D-O</b> Sol. valve power supply 110VDC normally open = <b>110D-O</b> Sol. valve power supply 220VDC normally open = <b>220D-O</b> Sol. valve power supply 24VAC normally open = <b>24A-O</b> Sol. valve power supply 110VAC normally open = <b>110A-O</b> Sol. valve power supply 220VAC normally open = <b>220A-O</b>
Handle of the padlocked ball valve = <b>K</b> Micro-switch on the ball handle = <b>S</b> Two connections for manometer = <b>M2</b> Discharge connection in installation side only for BS 25/32 = <b>1</b> Special variants on request

<b>11 Seal material</b>
Nitrile rubber (NBR) = <b>P</b> Nitrile for low temp. = <b>F</b> Hydrogenated nitrile (HNBR) = <b>K</b> Ethylene-propylene (EPDM) = <b>E</b> Fluorocarbon (FPM) = <b>V</b>

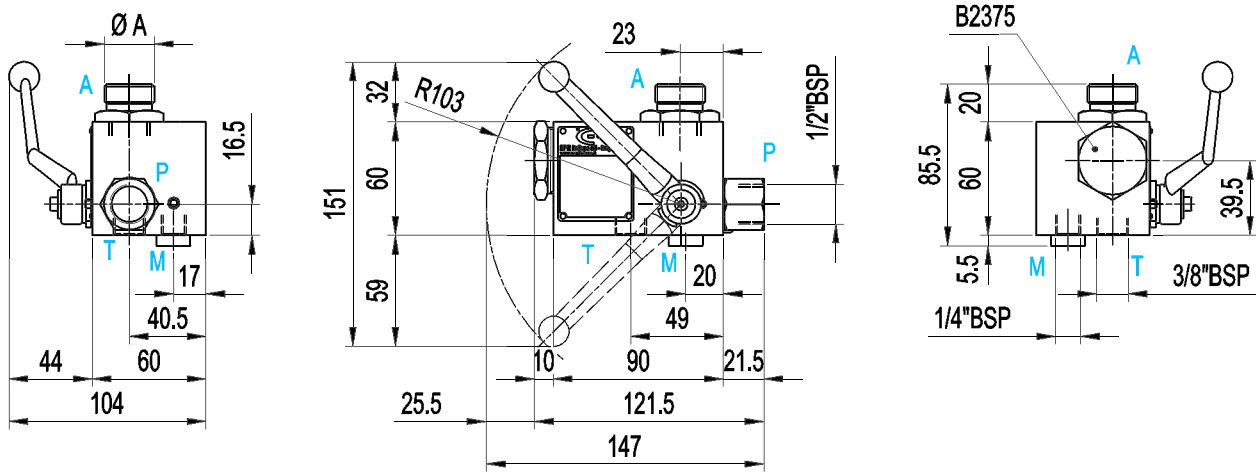
<b>10 Block material</b>
Carbon steel = <b>C</b> Nickel coated steel 25 μ. = <b>N</b> Nickel coated carbon steel 40 μ = <b>M</b> Stainless steel AISI 430 L (only for BS25) = <b>X</b> (only for DBDS in stainless steel) = <b>CX</b>

<b>9 Dimension of the installation side connection</b>
For BS10 1/2" BSP = <b>4</b> For BS20 3/4" BSP = <b>5</b> For BS25 G 1" = <b>6</b> H 1" 1/4 = <b>7</b> C 1" 1/4 = <b>7</b> For BS32 G 1" 1/2 = <b>8</b> L 1" 1/2 = <b>8</b> L 2" = <b>9</b> H 1" 1/4 = <b>7</b> H 1" 1/2 = <b>8</b> C 1" 1/4 = <b>7</b> C 1" 1/2 = <b>8</b>

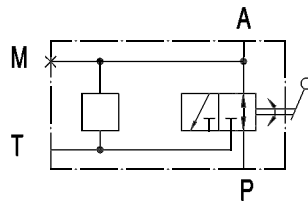
**Special variants on request**

**9.3.8 DIMENSIONS**

**BS10MT..A.G.. - ...**

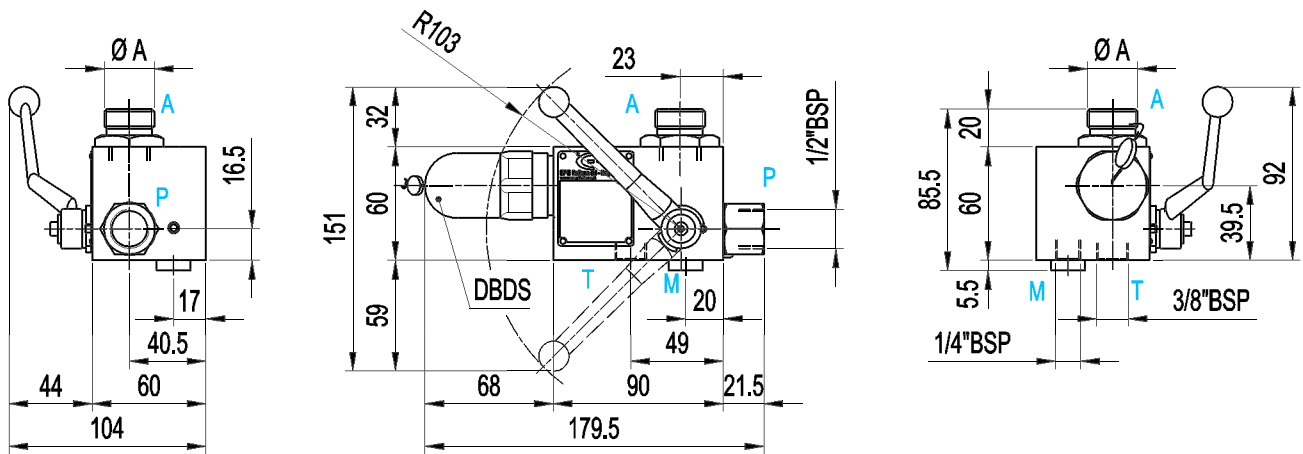


Order code	ØA	Weight
BS10MT...A5...	3/4" BSP	2.7
BS10MT...A7...	1" 1/4 BSP	2.9
BS10MT...A9...	2" BSP	3

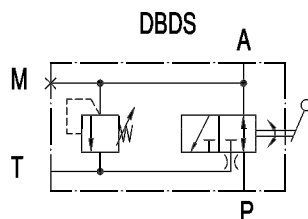


9.3ca

**BS10MP..A.G.. - ...**

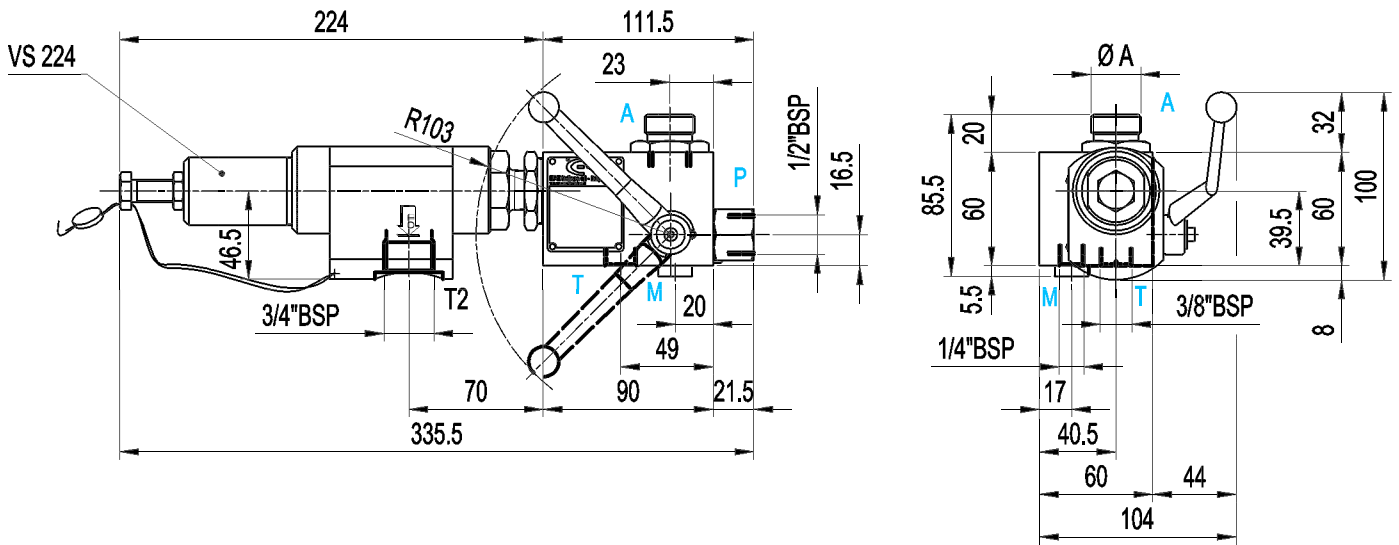


Order code	ØA	Weight
BS10MP...A5...	3/4" BSP	3.2
BS10MP...A7...	1" 1/4 BSP	3.4
BS10MP...A9...	2" BSP	3.5

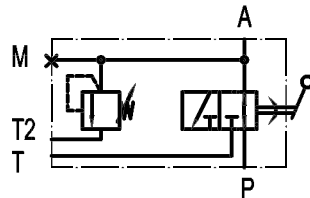


9.3cb

## BS10MG..A.G.. - ...

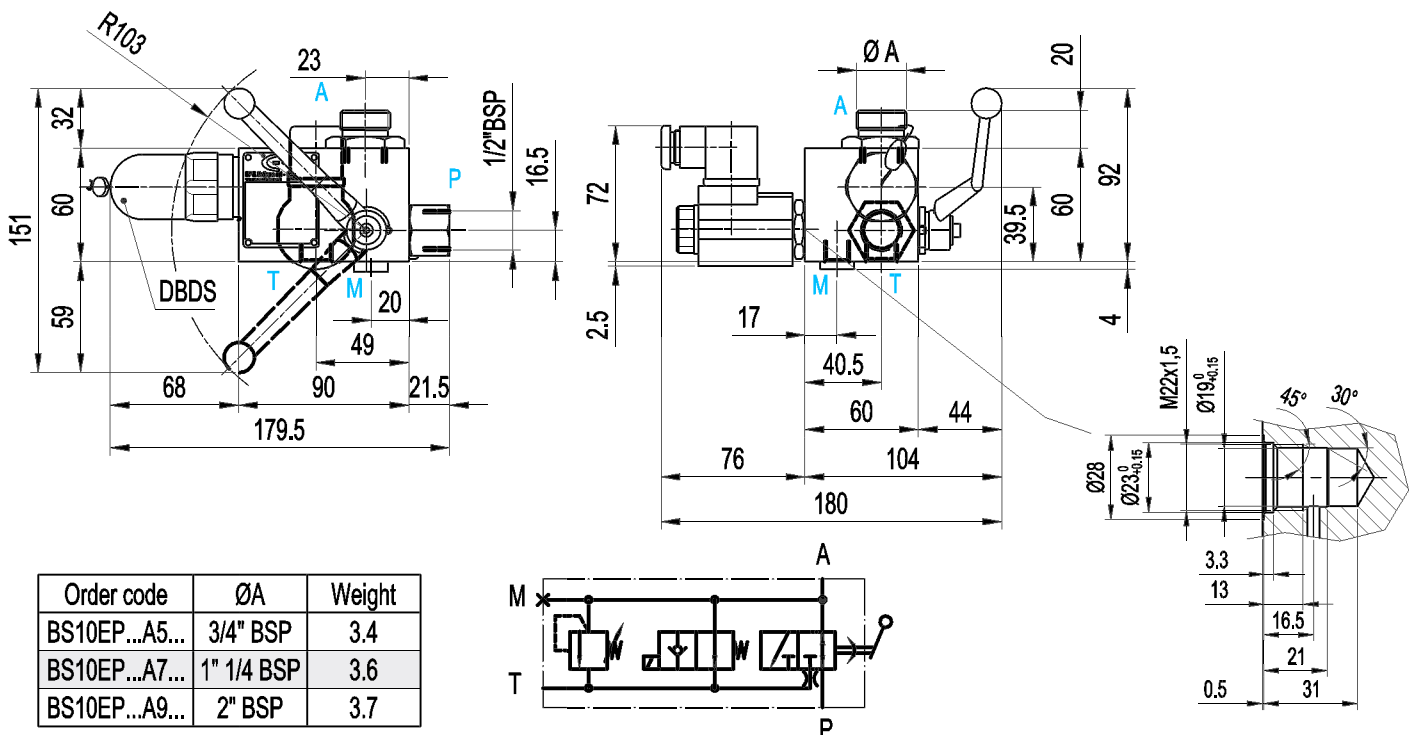


Order code	ØA	Weight
BS10MG...A5...	3/4" BSP	4.9
BS10MG...A7...	1" 1/4 BSP	5.1
BS10MG...A9...	2" BSP	5.2

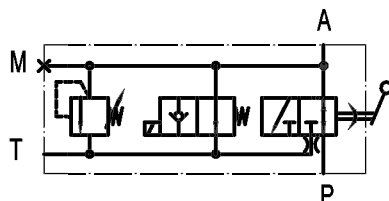


9.3cc

## BS10EP..A.G.. - ...

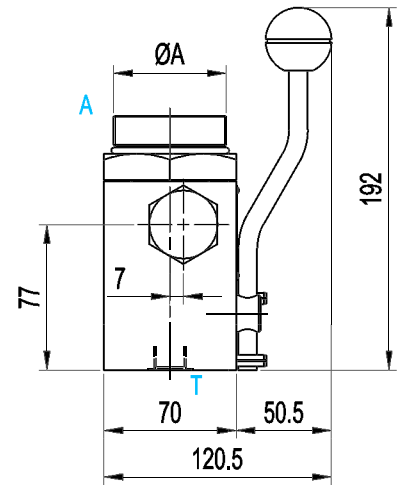
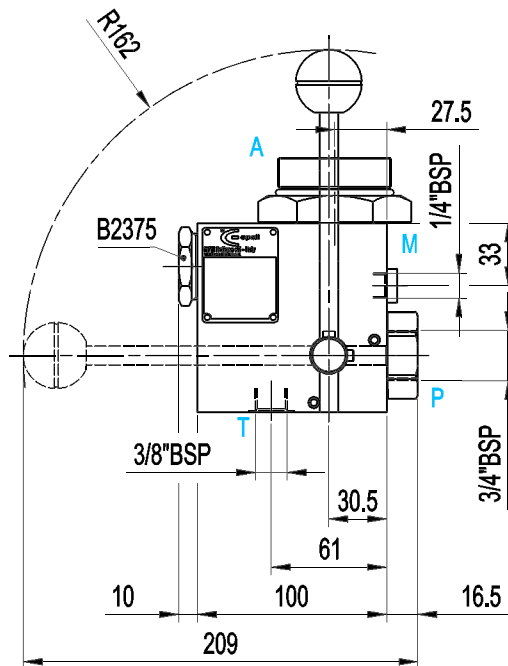
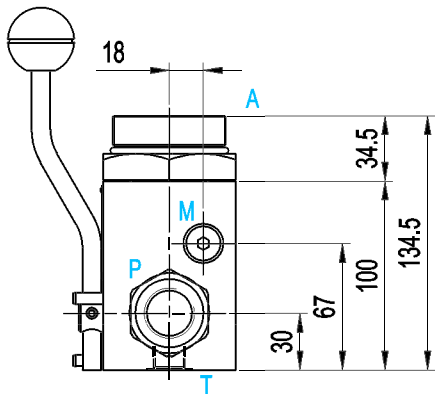


Order code	ØA	Weight
BS10EP...A5...	3/4" BSP	3.4
BS10EP...A7...	1" 1/4 BSP	3.6
BS10EP...A9...	2" BSP	3.7

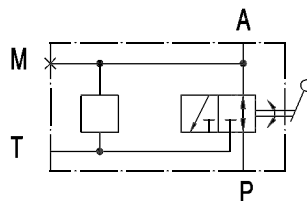


9.3cd

BS20MT..A.G.. - ...

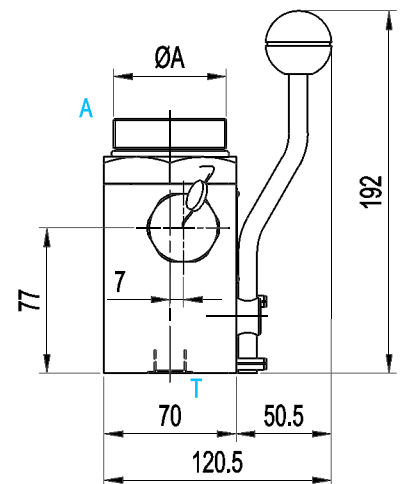
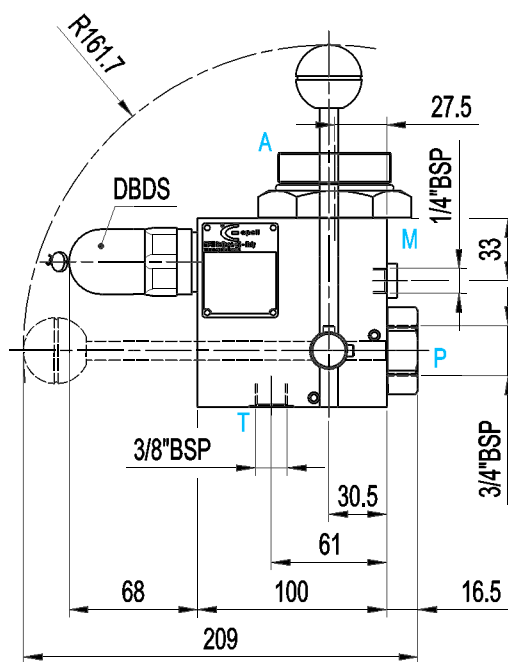
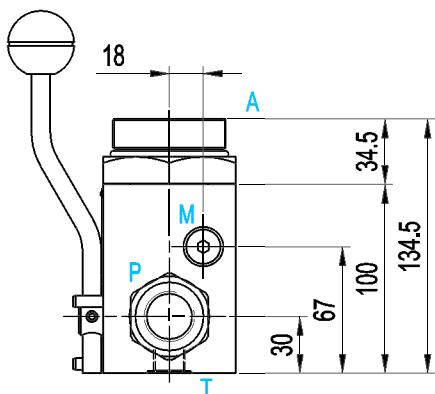


Order code	ØA	Weight
BS20MT...A7...	1" 1/4 BSP	5.6
BS20MT...A9...	2" BSP	6.1

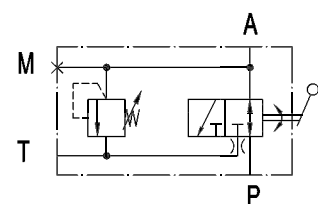


9.3ce

BS20MP..A.G.. - ...

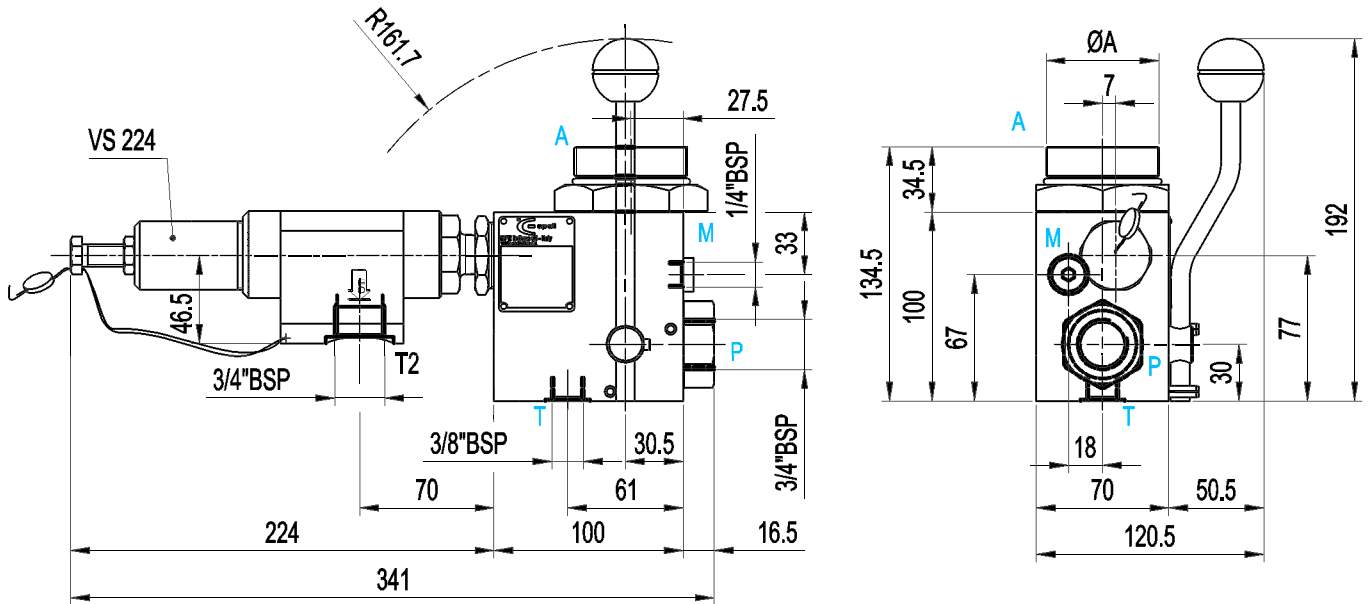


Order code	ØA	Weight
BS20MP...A7...	1" 1/4 BSP	6.1
BS20MP...A9...	2" BSP	6.7

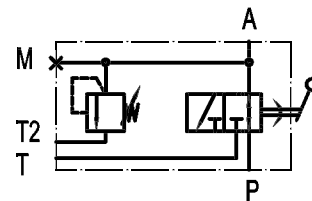


9.3cf

## BS20MG..A..G.. - ...

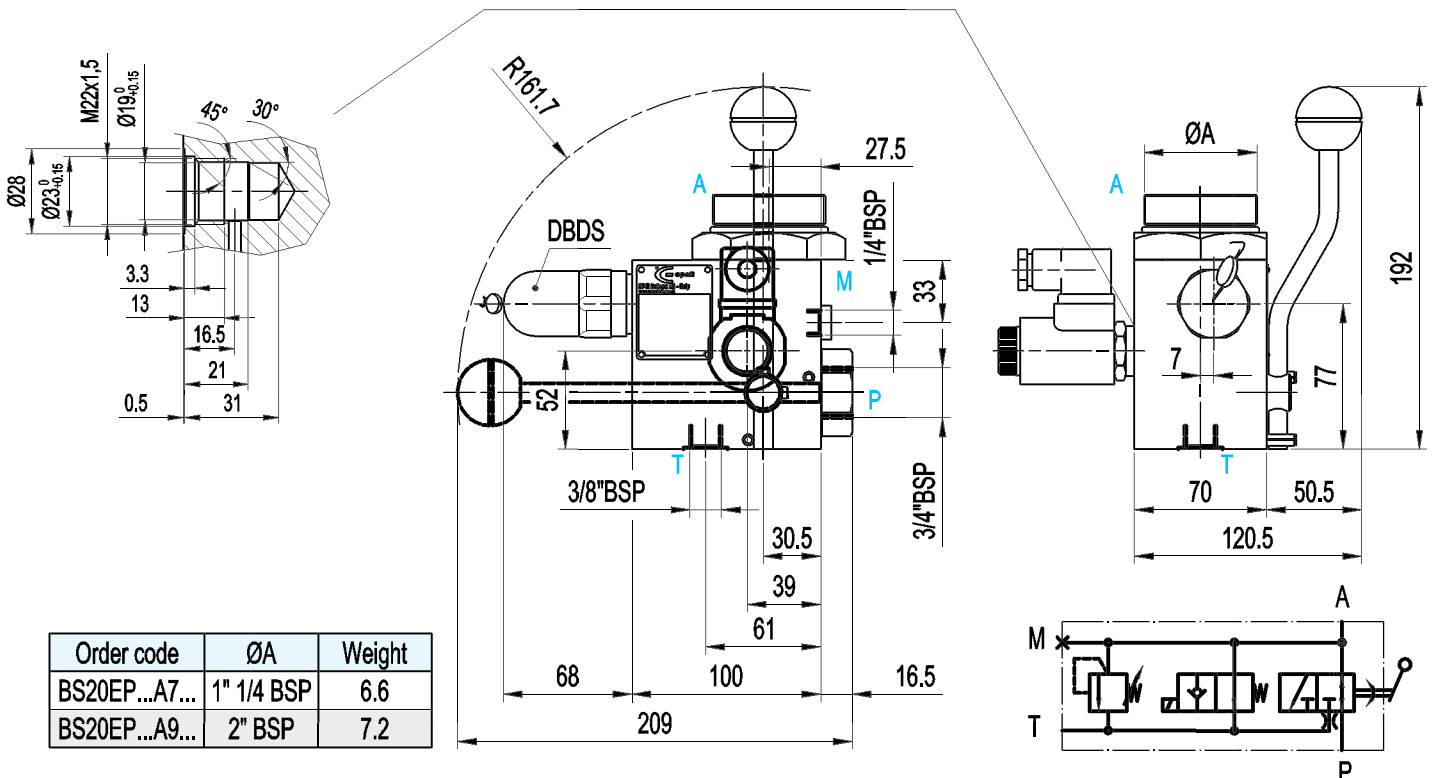


Order code	ØA	Weight
BS20MG...A7...	1" 1/4 BSP	7.8
BS20MG...A9...	2" BSP	8.3



9.3cg

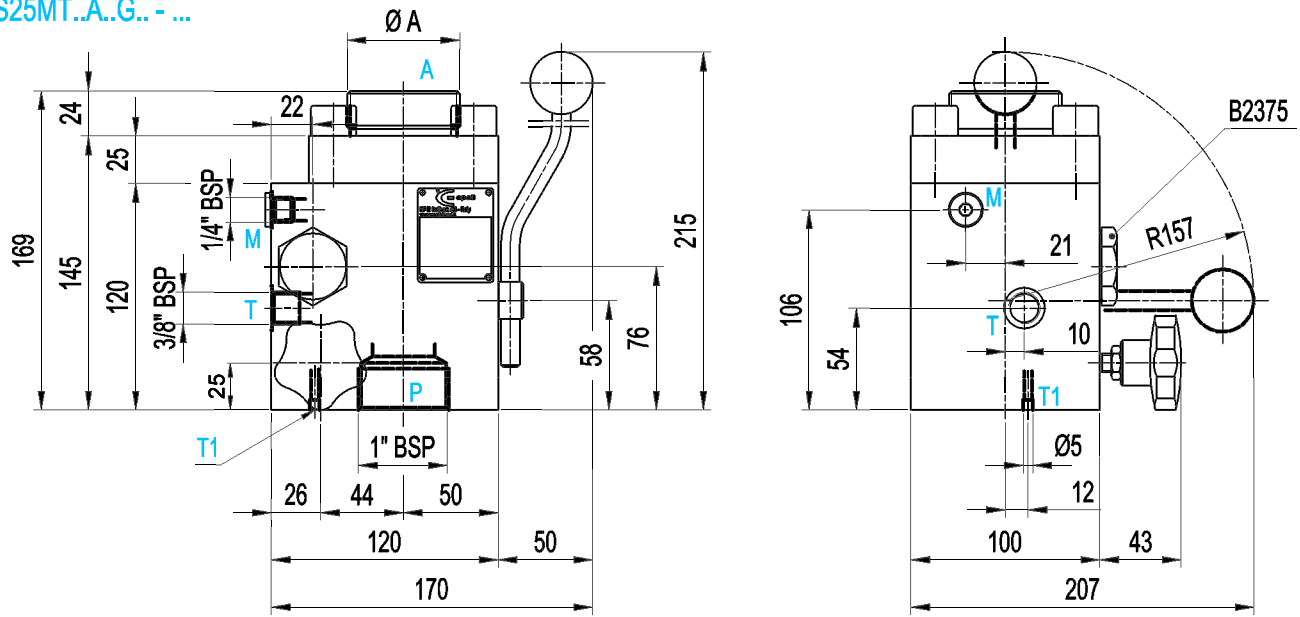
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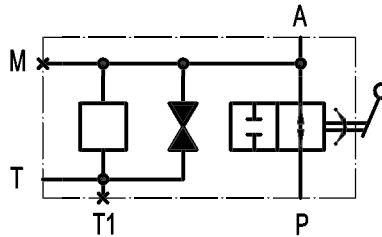
Order code	ØA	Weight
BS20EP...A7...	1" 1/4 BSP	6.6
BS20EP...A9...	2" BSP	7.2

9.3ch

**BS25MT..A..G.. - ...**

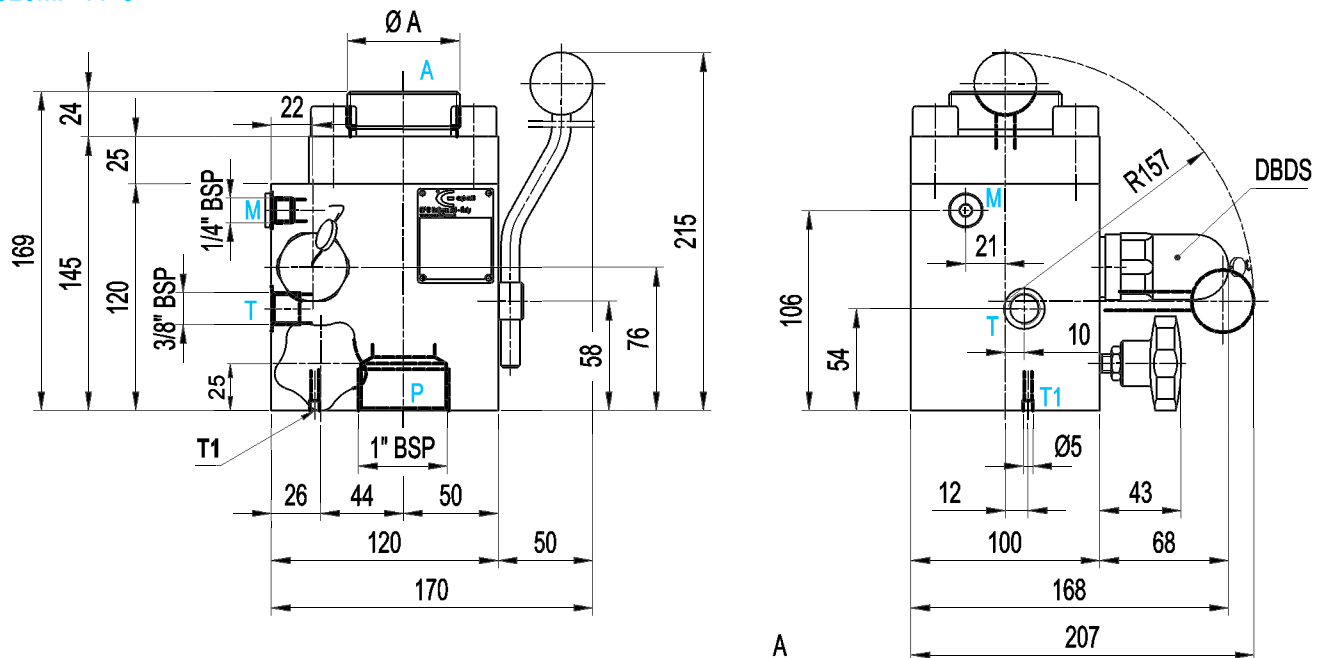


Order code	ØA	Weight
BS25MT...A7...	1" 1/4 BSP	12.4
BS25MT...A9...	2" BSP	12.5

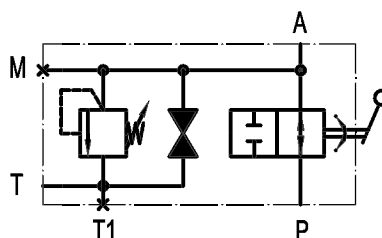


9.3ci

**BS25MP..A..G.. - ...**



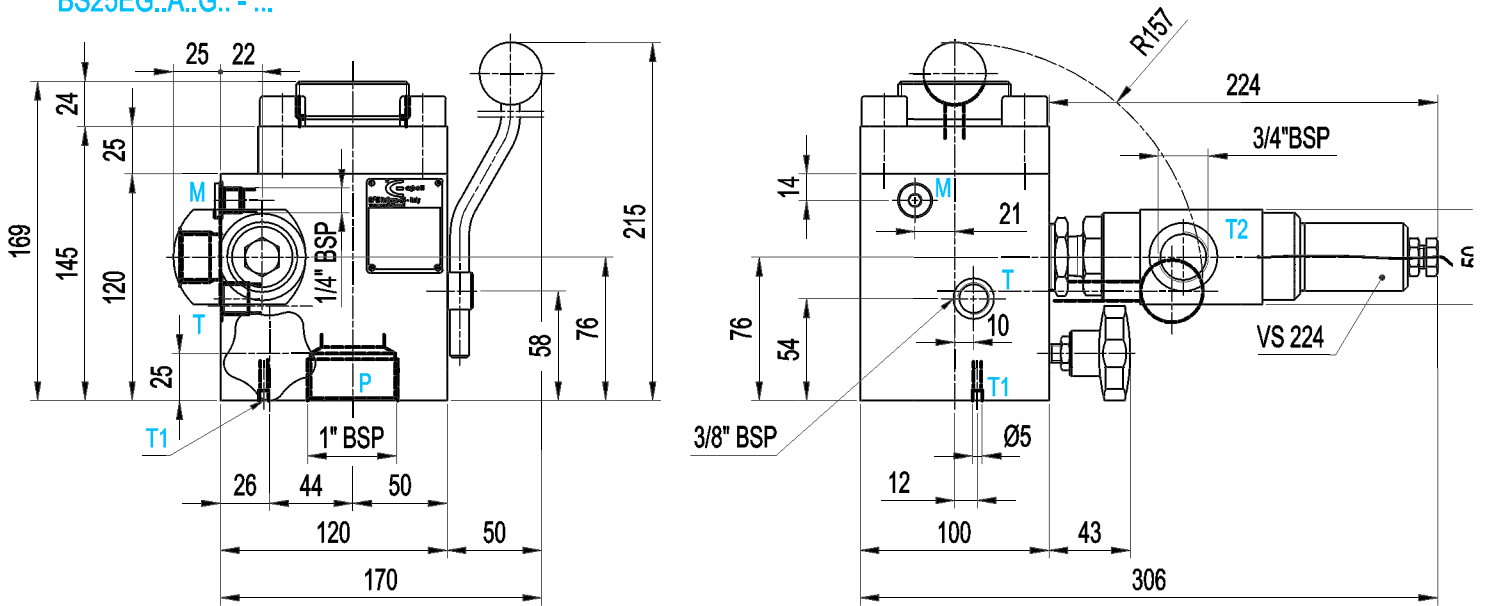
Order code	ØA	Weight
BS25MP...A7...	1" 1/4 BSP	12.7
BS25MP...A9...	2" BSP	12.9



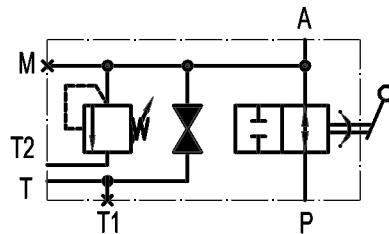
9.3cj



**BS25EG..A.G.. - ...**

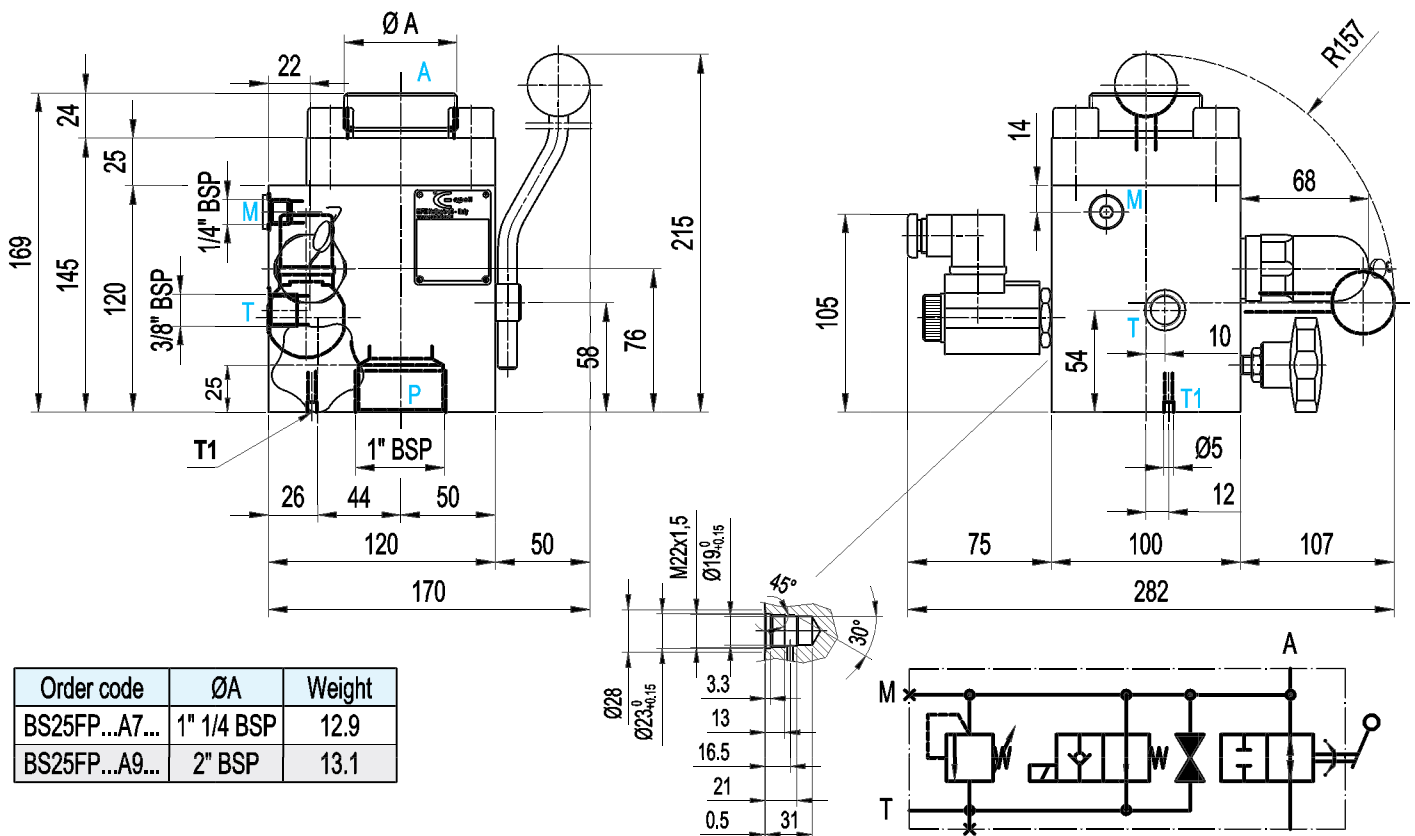


Order code	ØA	Weight
BS25EG...A7...	1" 1/4 BSP	14.5
BS25EG...A9...	2" BSP	14.6

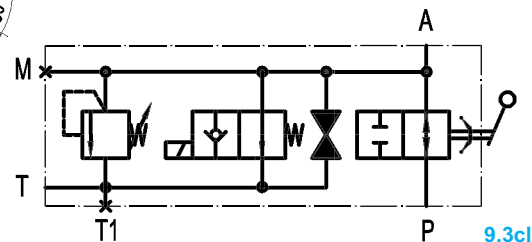


9.3ck

**BS25FP..A.G.. - ...**

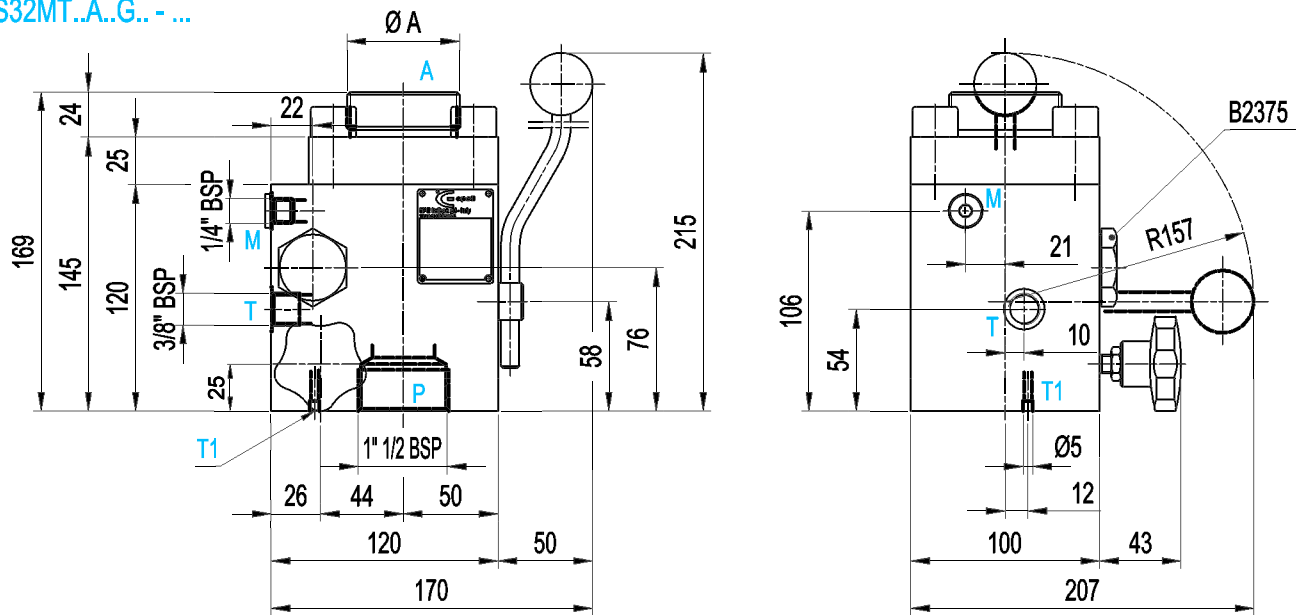


Order code	ØA	Weight
BS25FP...A7...	1" 1/4 BSP	12.9
BS25FP...A9...	2" BSP	13.1

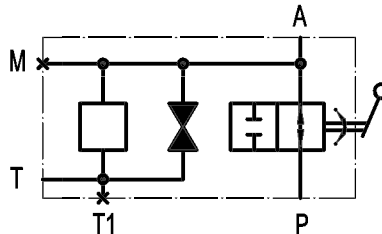


9.3cl

**BS32MT..A..G.. - ...**

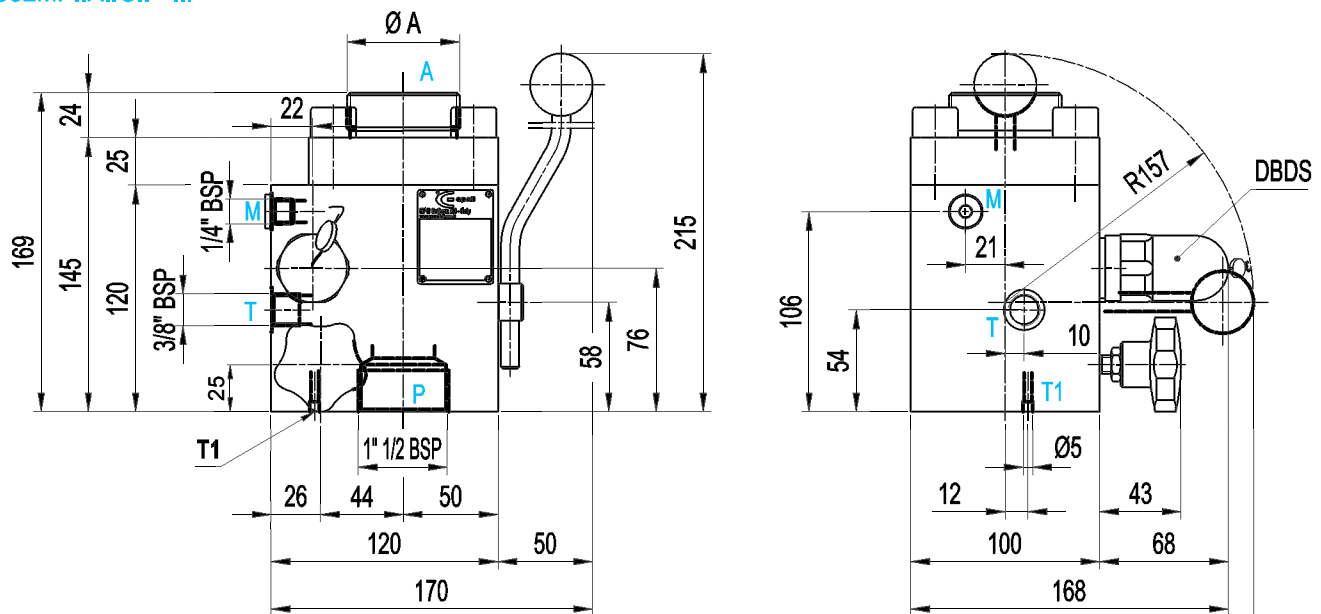


Order code	ØA	Weight
BS32MT...A7...	1" 1/4 BSP	12.4
BS32MT...A9...	2" BSP	12.5

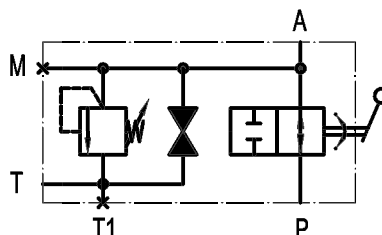


9.3cm

**BS32MP..A..G.. - ...**

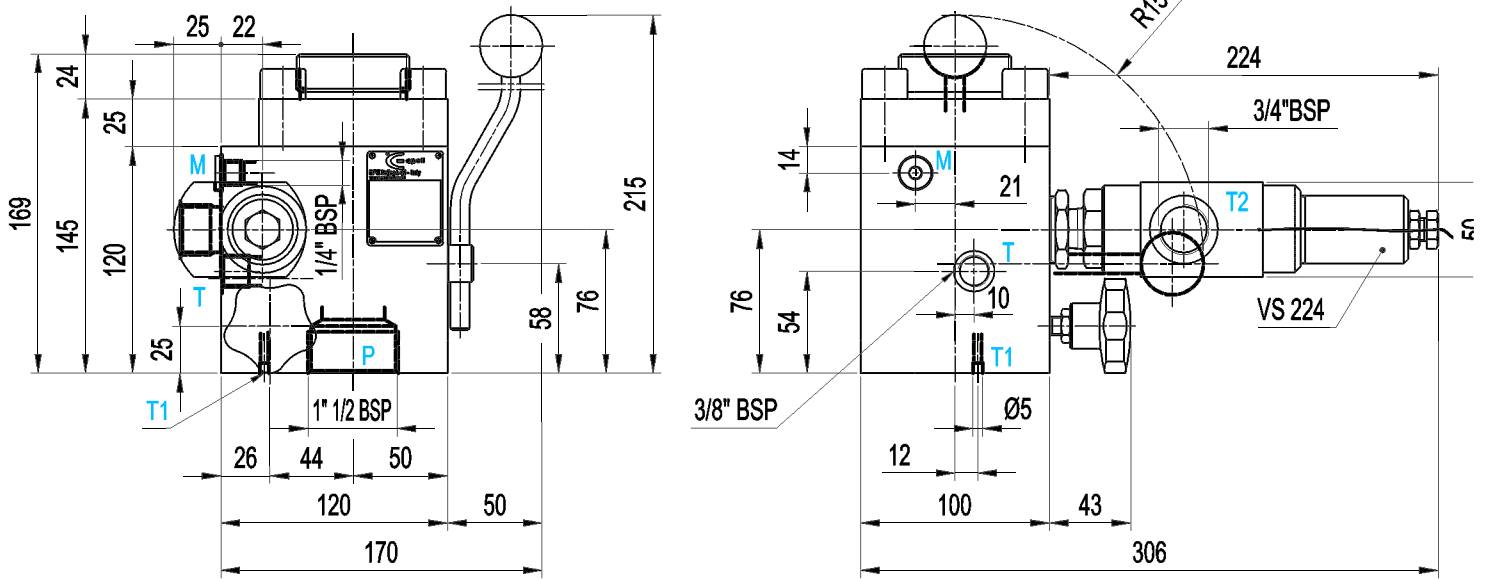


Order code	ØA	Weight
BS32MP...A7...	1" 1/4 BSP	12.7
BS32MP...A9...	2" BSP	12.9

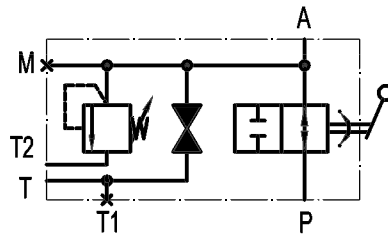


9.3cn

**BS32MG..A.G.. - ...**

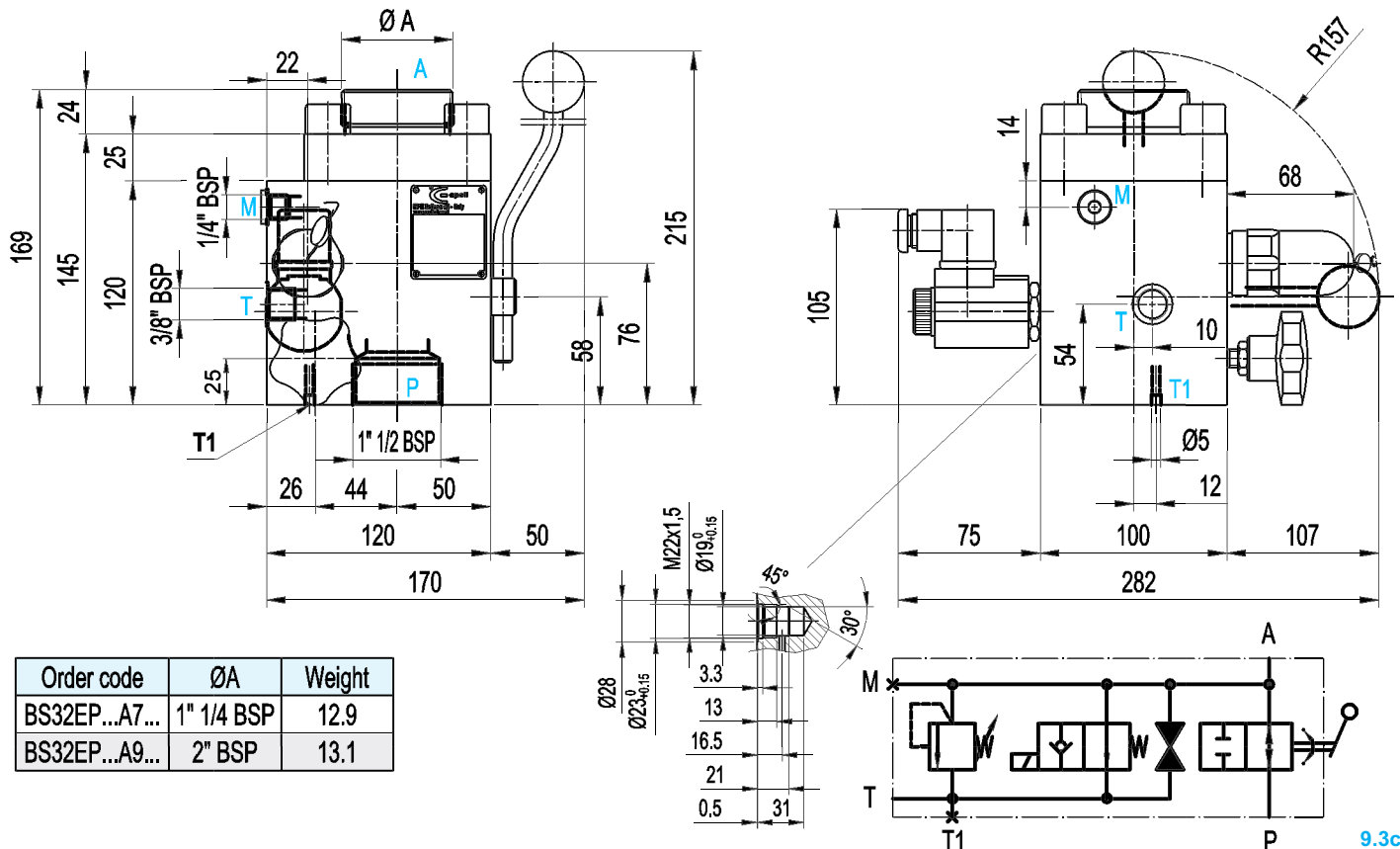


Order code	ØA	Weight
BS32MG...A7...	1" 1/4 BSP	14.5
BS32MG...A9...	2" BSP	14.6

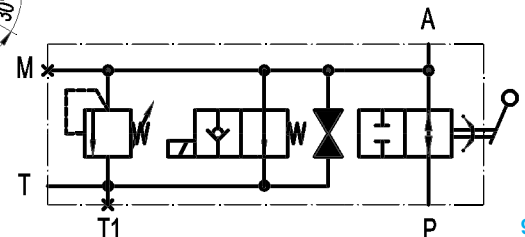
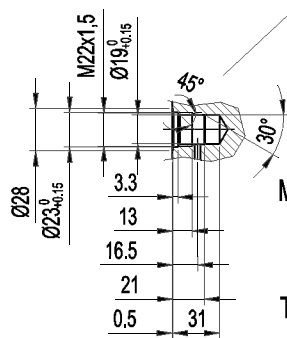


9.3co

**BS32EP..A.G.. - ...**

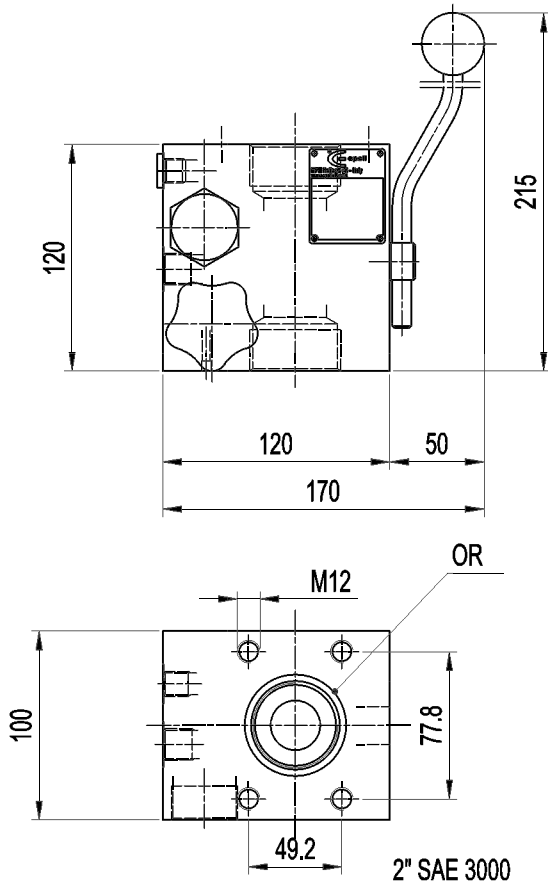


Order code	ØA	Weight
BS32EP...A7...	1" 1/4 BSP	12.9
BS32EP...A9...	2" BSP	13.1



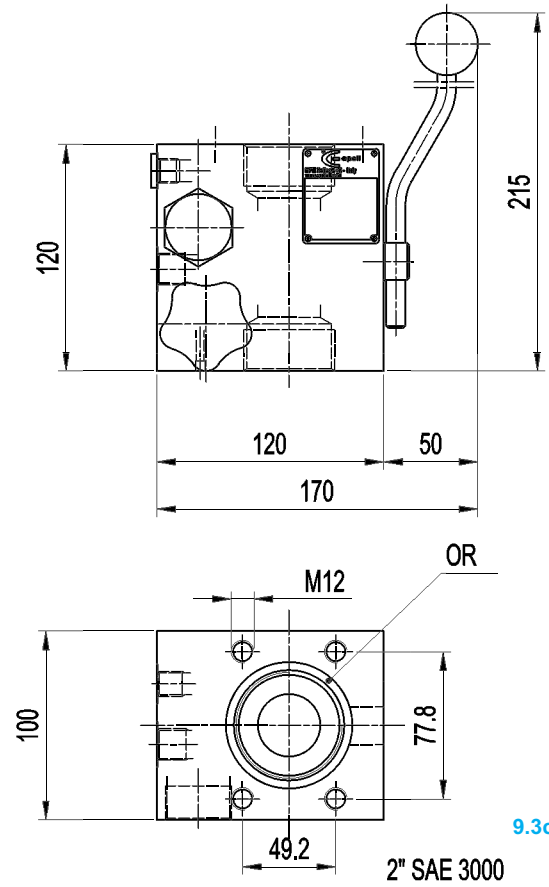
9.3cp

BS25M..L9..G.. - ...



9.3cq

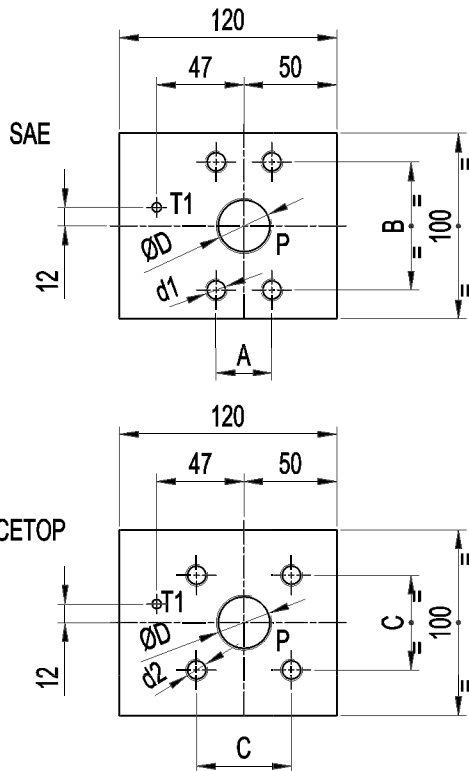
BS32M..L9..G.. - ...



9.3cr

Other dimensions see previous pages

Other dimensions see previous pages



9.3cs

Type.	On request								
	For SAE Flanges					For CETOP Flanges			
		A	B	d1	Thread deep		C	d2	Thread deep
BS25	1" 1/4 SAE 6000	31,6	66,7	M14	24	CETOP 1" 1/4-400	51,6	M12	20
	1" 1/4 SAE 6000	31,6	66,7	M14	24		51,6	M12	20
BS32	1" 1/2 SAE 6000	36,7	79,4	M16	24	CETOP 1" 1/2-400	60,1	M14	24
	1" 1/2 SAE 3000	35,7	70	M12	20				
	2" SAE 3000	42,9	77,8	M12	20				

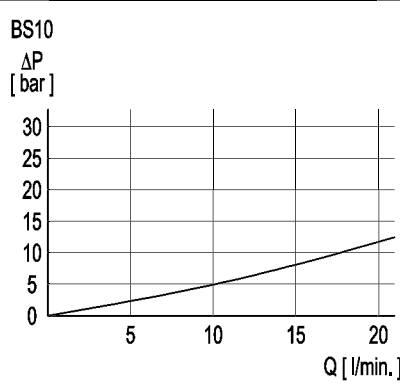
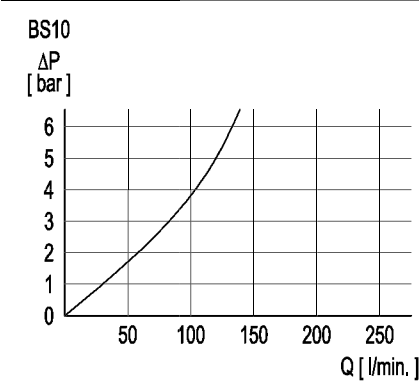
9.3ct

9.3.10 CHARACTERISTIC CURVES

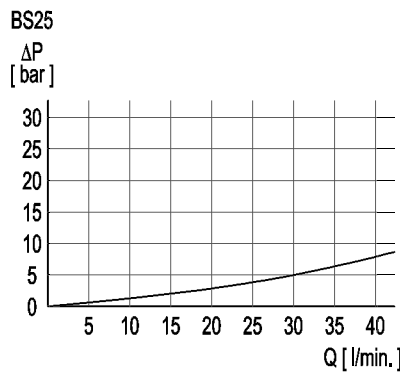
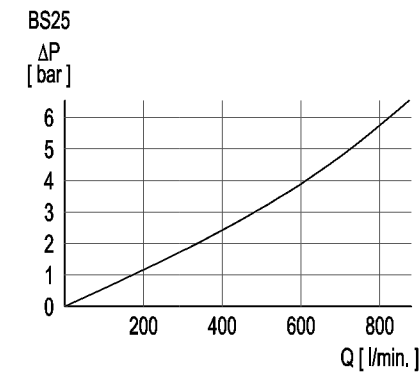
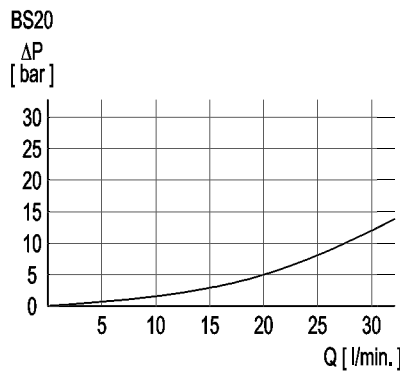
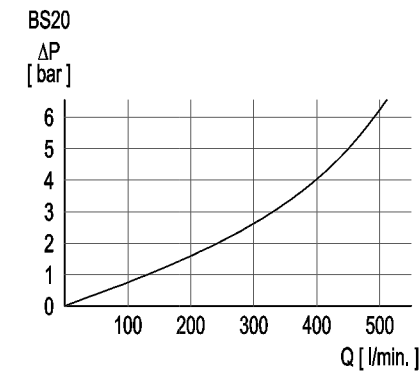
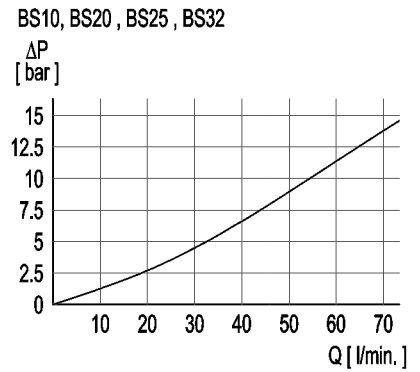
$\Delta P$  Curves

Flow rate from line to the accumulator and viceversa

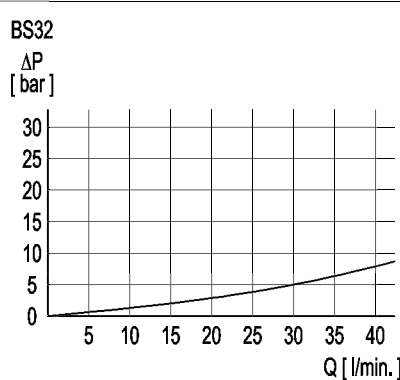
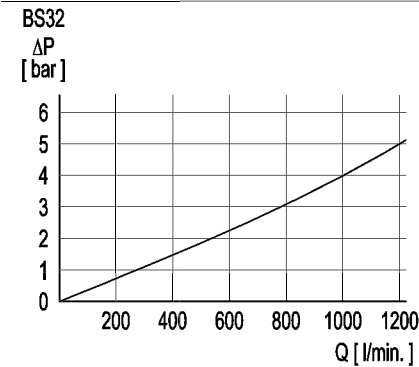
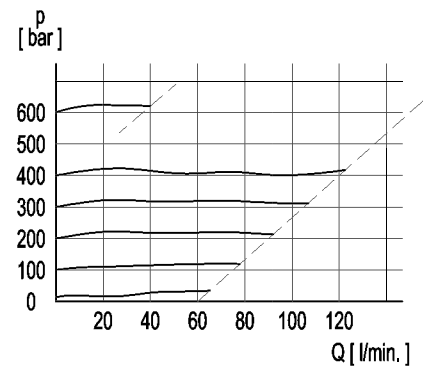
Flow rate from the accumulator to the tank



Flow rate from the accumulator via the solenoid valve to the tank



Flow rate from pressure relief valve to tank (only DBDS10)



Curves measured using mineral oil with viscosity of 36 cSt at 50°C