

## Safety and shut-off block SAF/DSV

### 1. DESCRIPTION

#### 1.1. GENERAL

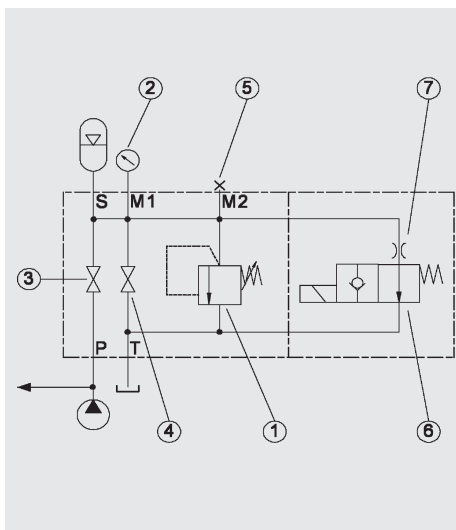
The HYDAC safety and shut-off block is a hydraulic accessory element that is used to protect against excess pressure on the fluid side and to shut-off and relieve hydraulic accumulators.

It takes into account the applicable safety regulations according to DIN EN ISO 4413 and the German Industrial Safety Regulation (BetrSichV).

The HYDAC pressure relief valve (DB12) is used in the SAF series. It is a direct-acting pressure relief valve in a poppet valve construction with excellent opening and closing characteristics. This version of the DB12 complies with the requirements of the European Pressure Equipment Directive (PED) with CE marking and is supplied with a declaration of conformity and operating instructions.

**The operating instructions must be observed!**  
**No. 5.169.B**

#### 1.1.1 Circuit diagram



DB12 pressure relief valve

② M1 connection  
(optional pressure gauge available)  
ISO 228 - G 1/4 (SAF10, SAF8)  
ISO 228 - G 1/2 (all others)

③ Shut-off valve

④ Pressure release valve

⑤ M2 connection (e.g. for  $p_0$ -Guard)  
ISO 228 - G 1/4 (all sizes)

These devices are combined in a compact, space-saving HYDAC safety and shut-off block. The following devices are also available:

⑥ Solenoid-operated release valve  
(optional for type SAF...E...)

⑦ Throttle

S Hydraulic accumulator connection

P Pump connection

T Tank connection

#### 1.1.2 Product advantages

The compact combination of components considerably simplifies the connection of a consumer to the hydraulic system and provides the following benefits:

- Minimum of space, maintenance and piping required. Up to 10 fewer pipe fittings are necessary compared to individual piping.
- Considerable reduction in installation time.
- Connections for various accumulator designs and manufacturers are available – all imperial and metric thread types as well as manifold-mounted and weld nipple connections.
- Additional valves such as pilot-operated check valves, flow control valves and combined flow control and check valves can be fitted to system connection P.

## 1.2. DESIGN

The SAF safety and shut-off block consists of a valve block, an integrated HYDAC pressure relief valve, a main shut-off valve and a manually operated pressure release valve. The necessary pressure gauge connections are provided in addition to the tank connection.

In addition, an optional solenoid-operated 2-way directional valve allows automatic discharge of the accumulator or consumer and therefore of the hydraulic system in an emergency or for shut-down.

## 1.3. CONNECTIONS

The safety and shut-off block has the following connections:

- S – Hydraulic accumulator connection
- P – Pump connection  
Connection of the SAF to the system
- T – Tank connection  
The piping leading to the tank must be installed separately.  
This ensures that the flow can be channelled away to the tank unpressurised when the DB12 pressure relief valve is opened.
- M1 – With optional pressure gauge  
ISO 228 - G 1/4 (SAF10, SAF8)  
ISO 228 - G 1/2 (all others)
- M2 – E.g. for p<sub>0</sub>-Guard  
ISO 228 - G 1/4 (all sizes)

## 1.4. SPECIFICATIONS

### 1.4.1 Operating fluids

Mineral oil to DIN 51524  
Part 1 and Part 2  
(other fluids on request)

### Viscosity range

min. 10 mm<sup>2</sup>/s  
max. 380 mm<sup>2</sup>/s

### Filtration

Max. permitted contamination level of the operating fluid to ISO 4406  
Class 21/19/16 or SAE AS 4059 Class 11.  
We therefore recommend a filter with a minimum retention rate of  $\beta_{20} \geq 100$ .  
The fitting of filters and regular replacement of the filters guarantees correct operation, reduces wear and extends the service life.

### 1.4.2 Permitted operating temperature

Standard design  
-10 °C ... +80 °C  
(ambient temperature for E type limited to  
-10 °C ... +60 °C)

Low-temperature version  
-40 °C ... +80 °C

### 1.4.3 Max. operating pressure

400 bar

### 1.4.4 Model with solenoid-operated pressure release

#### Type

Solenoid-operated by means of pressure-tight, oil-immersed, single-stroke solenoids in accordance with VDE 0580. Actuating solenoid with male connector to DIN 43650, standard for general industrial applications, available for 24 V DC and 230 V AC.

#### Type of voltage

DC solenoid

When connected to AC voltage, the necessary DC voltage is produced by means of a bridge rectifier connector.

#### VOLTAGE TOLERANCE

±15 % of the nominal voltage

#### Nominal current

Dependent on the nominal voltage

24 V DC 0.80 A

230 V AC 0.11 A

#### Power consumption

p<sub>20</sub> = 18 W

#### DUTY CYCLE

100 % DC = CO (continuous operation)

#### Switching time

This depends on the symbol, pressure at the individual ports and the flow rate

WSM06020Y:

on: 50 ms

off: 35 ms

WSM06020Z:

on: 35 ms

off: 50 ms

### 1.4.5 Notice

All work with HYDAC safety and shut-off blocks must only be carried out by suitably trained staff.

Incorrect installation or handling can lead to serious accidents.

**The operating instructions must be observed!**

**No. 3.551.BA**

Relevant PDF documents can be accessed at:

[www.hydac.com](http://www.hydac.com) » Downloads »

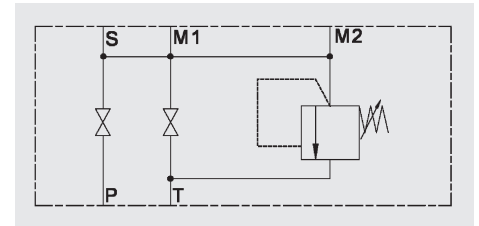
Documents » Accumulator Division

## 1.5. STANDARD DESIGNS

### 1.5.1 Model with manually operated pressure release

The basic model of the safety and shut-off block has a manually operated pressure release valve, code "M", and a direct-acting pressure relief valve.

Sizes: SAF10, SAF20, SAF32

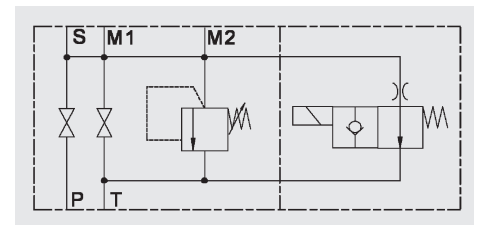


### 1.5.2 Model with solenoid-operated pressure release

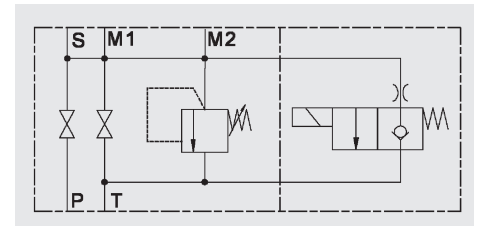
The E type safety and shut-off block has a solenoid-operated 2-way directional valve for automatic pressure release of the accumulator and the hydraulic system.

Sizes: SAF10, SAF20, SAF32

#### Normally open "Y"



#### Normally open "Z"



## 1.6. $\Delta p$ -Q GRAPHS FOR SAF

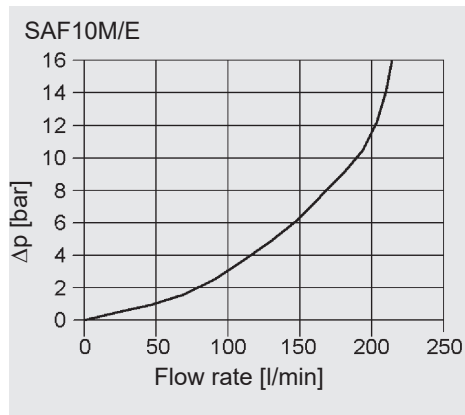
Measured at:

$\nu = 32 \text{ mm}^2/\text{s}$

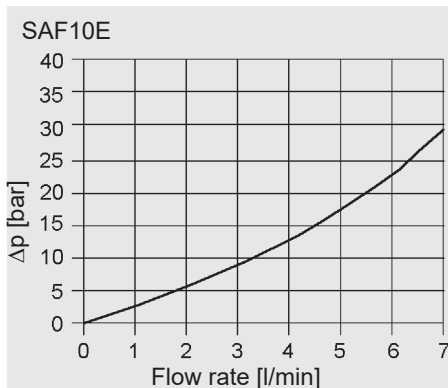
$t_{\text{oil}} = 40 \text{ }^\circ\text{C}$

Operating pressure = 400 bar  
with DB12 pressure relief valve

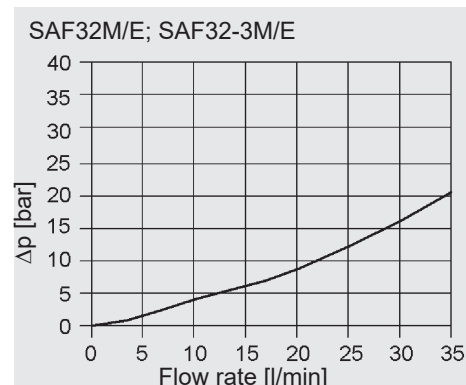
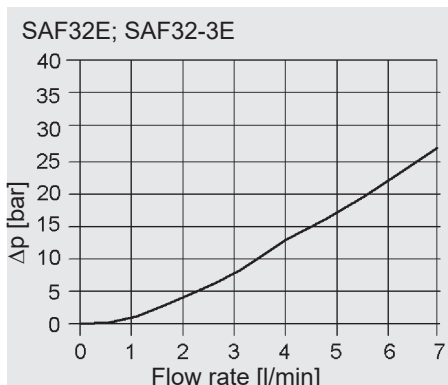
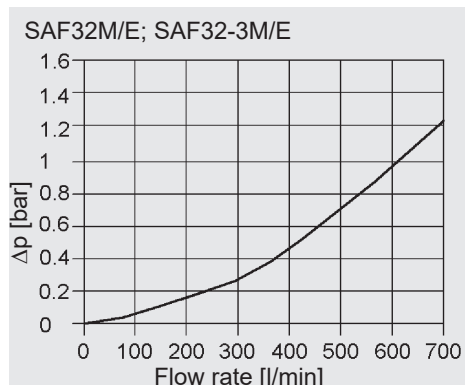
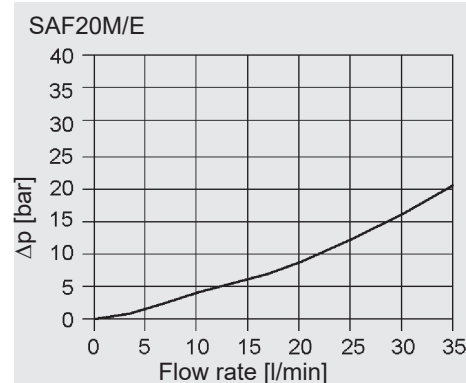
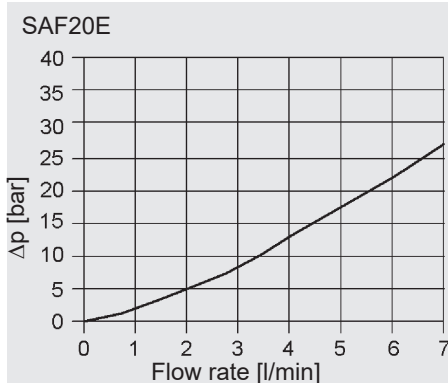
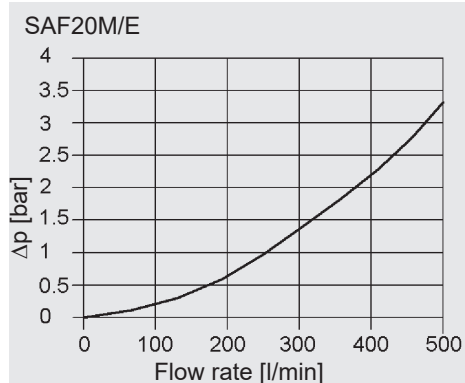
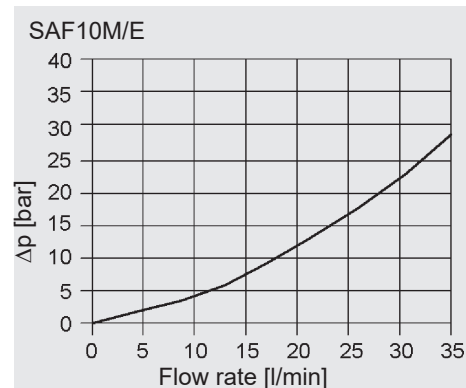
### 1.6.1 Flow from the pump to the accumulator



### 1.6.2 Flow from the accumulator via the pressure release valve to the tank



### 1.6.3 Flow from the accumulator via the pressure release valve to the tank



## 2. MODEL CODE FOR SAF

SAF 20 E 1 2 Y 1 T 210 A - S 13 - LPI - A9

Not all combinations are possible. Order example.  
For further information, please contact HYDAC.

### Safety and shut-off block

Series SAF

### Nominal size of main shut-off valve

- 8 = DN8
- 10 = DN10
- 20 = DN20
- 32 = DN32
- 32-3 = DN32 with 3 size 12 pressure relief valves
- 50 = DN50

### Type

- M = manual discharge
- E = solenoid-operated and manual discharge

### Block material <sup>1)</sup>

- 1 = carbon steel
- 3 = stainless steel
- 6 = carbon steel (low temperature)

### Seal material (elastomer)

- 2 = NBR
- 5 = EPDM <sup>6)</sup>
- 6 = FKM
- 7 = other

### Type - poppet valve <sup>4)</sup>

- Y = normally open (2/2 directional valve WSM06020Y)
- Z = normally closed (2/2 directional valve WSM06020Z, only up to 350 bar)

### Voltage type – poppet valve <sup>4)</sup>

- 1 = 24 VDC
- 2 = 115 VAC
- 3 = 230 VAC
- 6 = 120 VAC
- 7 = other

### Pressure relief valve

- T = pressure setting with TÜV
- N = pressure setting without TÜV <sup>6)</sup>

### Pressure setting

e.g. 210 bar

### Threaded connection to

- A = ISO 228 (BSP) <sup>3)</sup>
- B = DIN 13, to ISO 965/1 (metric) <sup>2)</sup>
- C = ANSI B1.1 (UNF, O-ring seal to SAE) <sup>2)</sup>

### Adapter

to accumulator (see section 8.)  
e.g. S13 = ISO 228 - G 2A

### Additional equipment (see section 5.)

- L = lockable main shut-off valve (locking device)
- LPI = model L with additional position monitoring (inductive proximity switch)
- LPM = model L with additional position monitoring (mechanical limit switch with roller lever)
- LS = lockable pressure release valve

### Certification code DB12 <sup>5)</sup>

No details = European Pressure Equipment Directive (PED)  
A6 = Russia, and others  
A9 = China

### Accessories – please give full details when ordering, see section 8.

<sup>1)</sup> Dependent on type and pressure rating

<sup>2)</sup> On request

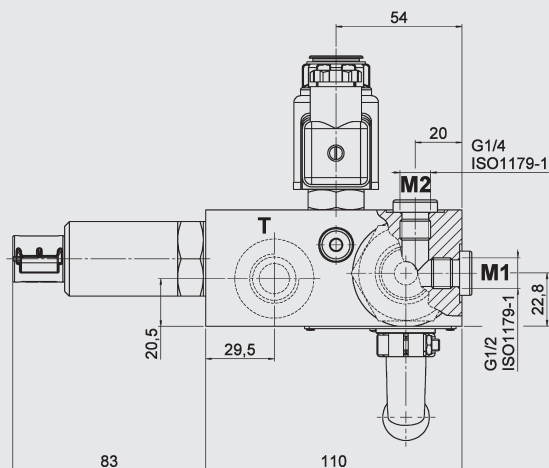
<sup>3)</sup> In conjunction with SAF8 = 9/16-18UNF or ISO 228 - G 1/4 (BSP)

<sup>4)</sup> Only for type E

<sup>5)</sup> For further information, see catalogue section Accumulator Technology, No. 3.000, section 4.

<sup>6)</sup> Only with pressure relief valve N

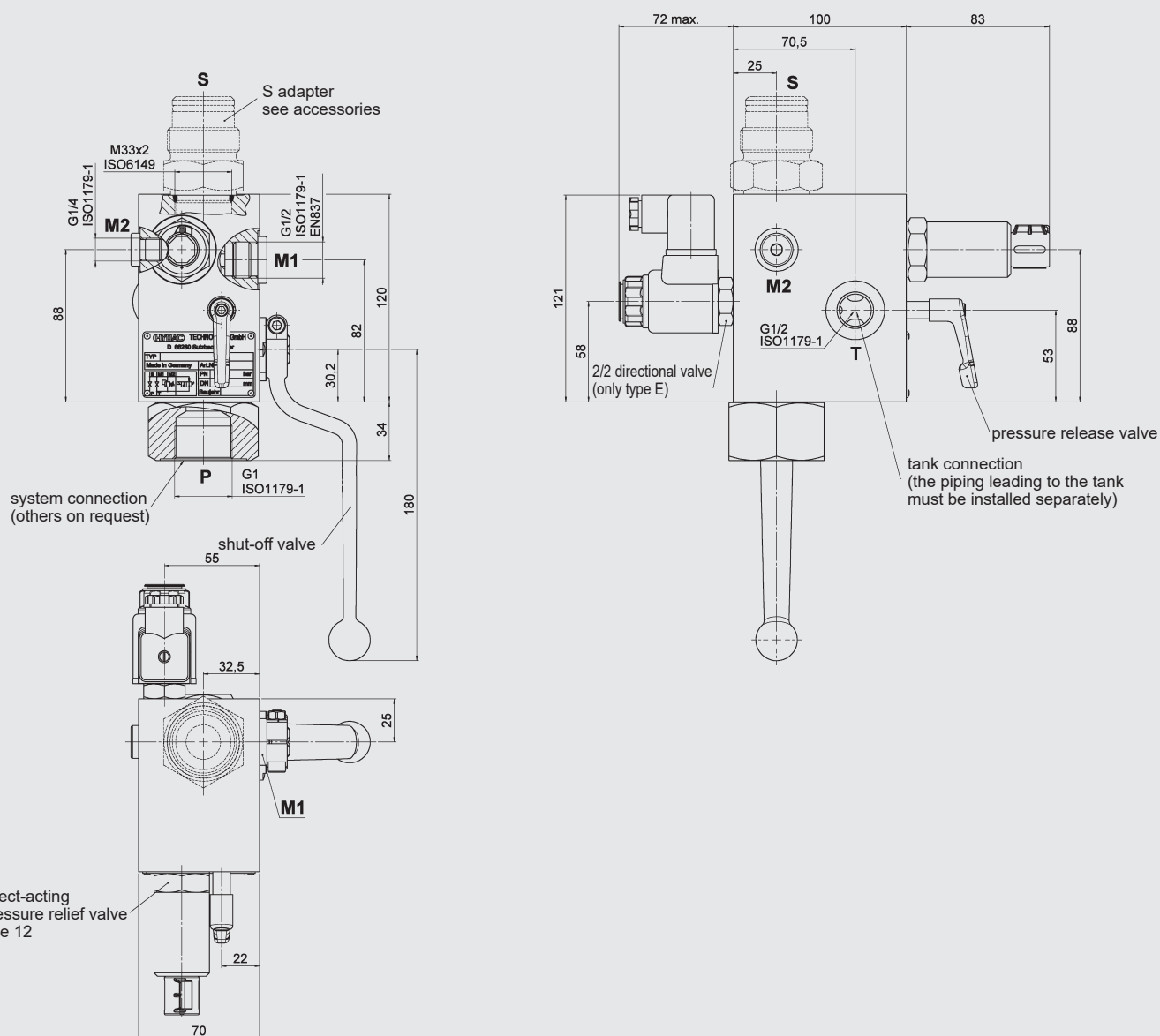
### 3.1. SAF10 SAFETY AND SHUT-OFF BLOCK SIZE 10



Type	Part no.	Type	Part no.
SAF10M12T400A	2121582	SAF10E12Y1T400A	2125858
SAF10M12T350A	2122208	SAF10E12Y1T350A	2122210
<b>SAF10M12T330A</b>	<b>2121236*</b>	<b>SAF10E12Y1T330A</b>	<b>2122211*</b>
SAF10M12T315A	2121121	SAF10E12Y1T315A	2122212
SAF10M12T300A	2121354	SAF10E12Y1T300A	2122213
SAF10M12T250A	2121353	SAF10E12Y1T250A	2122214
SAF10M12T210A	2121346	SAF10E12Y1T210A	2121662
SAF10M12T200A	2121351	SAF10E12Y1T200A	2122215
SAF10M12T150A	2121345	SAF10E12Y1T150A	2122216
SAF10M12T100A	2121344	SAF10E12Y1T100A	2122041
SAF10M12T070A	2121350	SAF10E12Y1T070A	2122217
SAF10M12T050A	2122207	SAF10E12Y1T050A	2122218
SAF10M12T035A	2121349	SAF10E12Y1T035A	2122219

HYDAC | 133

### 3.2. SAF20 SAFETY AND SHUT-OFF BLOCK SIZE 20



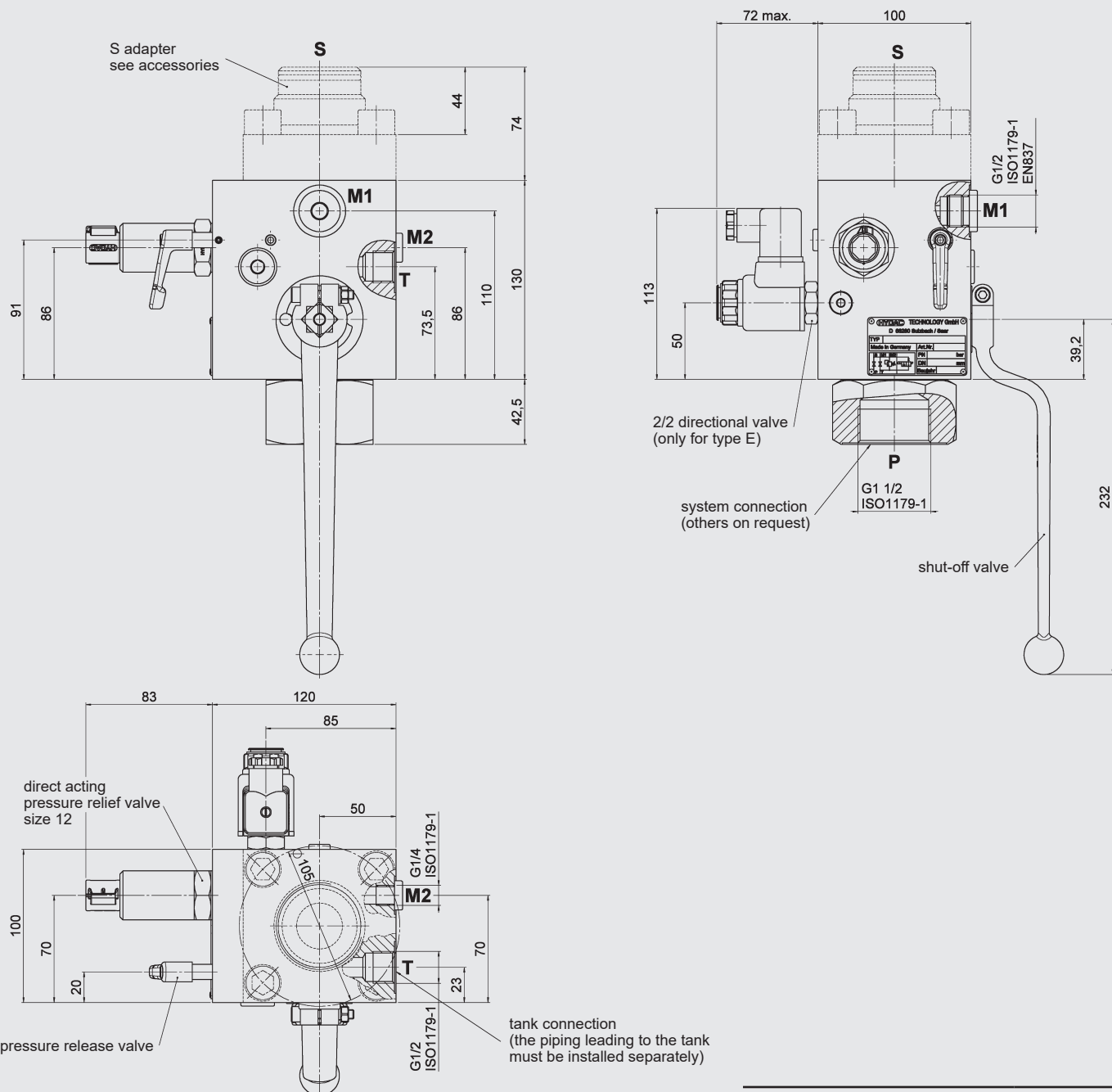
Type	Weight
SAF20M...	6.8 kg
SAF20E...	7.2 kg

#### SAF20 Standard types

Type	Part no.	Type	Part no.
SAF20M12T400A	2120317	SAF20E12Y1T400A	2121022
SAF20M12T350A	2120434	SAF20E12Y1T350A	2121979
<b>SAF20M12T330A</b>	<b>2120323*</b>	<b>SAF20E12Y1T330A</b>	<b>2120394*</b>
SAF20M12T315A	2120324	SAF20E12Y1T315A	2120833
SAF20M12T300A	2120332	SAF20E12Y1T300A	2120836
SAF20M12T250A	2120432	SAF20E12Y1T250A	2120851
SAF20M12T210A	2120319	SAF20E12Y1T210A	2120320
SAF20M12T200A	2120325	SAF20E12Y1T200A	2120835
SAF20M12T150A	2120330	SAF20E12Y1T150A	2120832
SAF20M12T100A	2120401	SAF20E12Y1T100A	2120369
SAF20M12T070A	2120326	SAF20E12Y1T070A	2120849
SAF20M12T050A	2122172	SAF20E12Y1T050A	2121000
SAF20M12T035A	2120281	SAF20E12Y1T035A	2122220

\* Preferred models

### 3.3. SAF32 SAFETY AND SHUT-OFF BLOCK SIZE 32



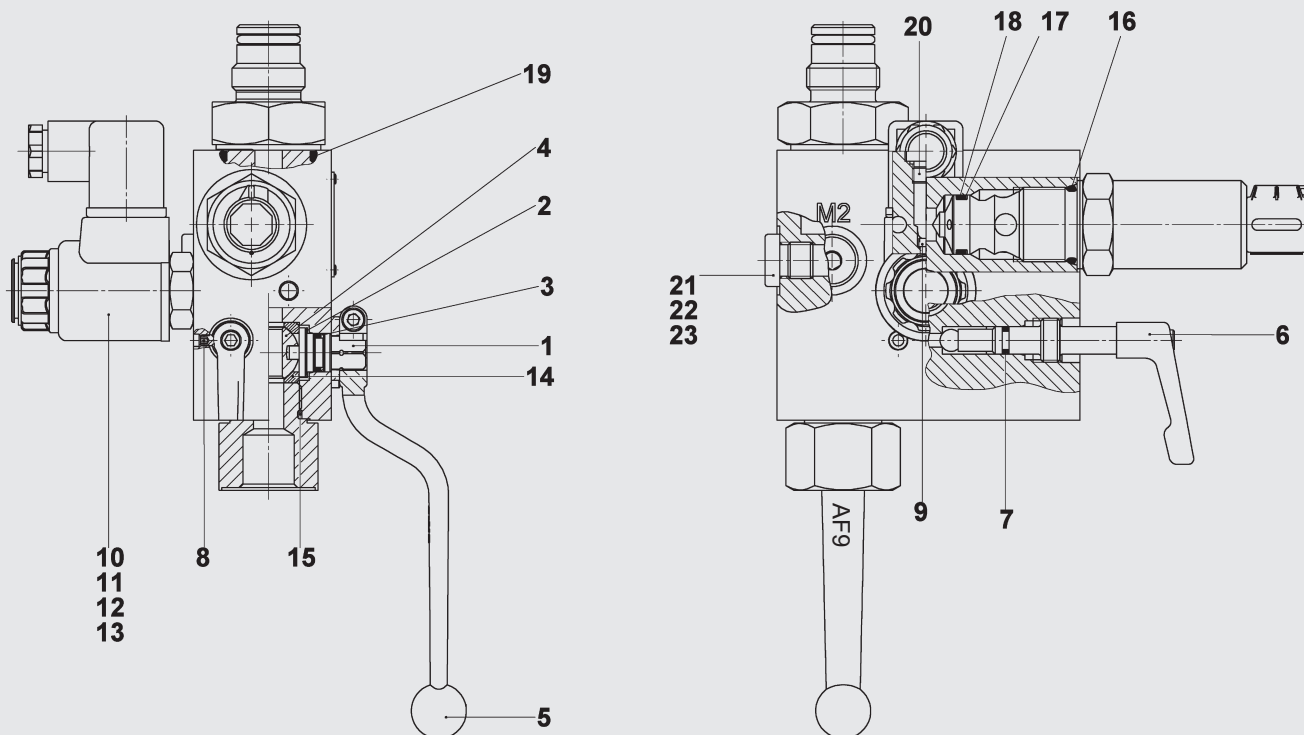
Type	Weight
SAF32M...	12.0 kg
SAF32E...	12.4 kg

#### SAF32 Standard types

Type	Part no.	Type	Part no.
SAF32M12T400A	2125856	SAF32E12Y1T400A	2123123
SAF32M12T350A	2122230	SAF32E12Y1T350A	3125142
<b>SAF32M12T330A</b>	<b>2122231*</b>	<b>SAF32E12Y1T330A</b>	<b>2120371*</b>
SAF32M12T315A	2121136	SAF32E12Y1T315A	2122222
SAF32M12T300A	2120837	SAF32E12Y1T300A	2120834
SAF32M12T250A	2122233	SAF32E12Y1T250A	2122223
SAF32M12T210A	2120321	SAF32E12Y1T210A	2120318
SAF32M12T200A	2121135	SAF32E12Y1T200A	2122224
SAF32M12T150A	2121134	SAF32E12Y1T150A	2122225
SAF32M12T100A	2121129	SAF32E12Y1T100A	2122226
SAF32M12T070A	2122234	SAF32E12Y1T070A	2122227
SAF32M12T050A	2121137	SAF32E12Y1T050A	2122228
SAF32M12T035A	2121125	SAF32E12Y1T035A	2122229

\* Preferred models

## 4. SPARE PARTS



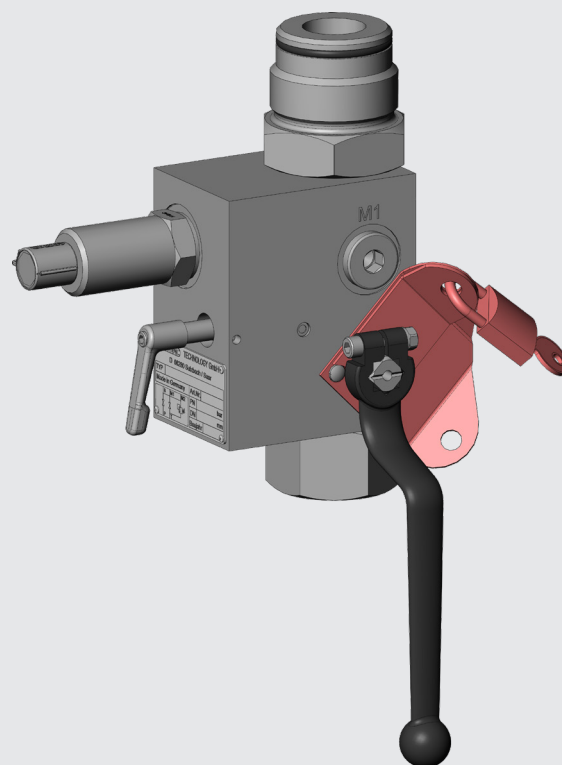
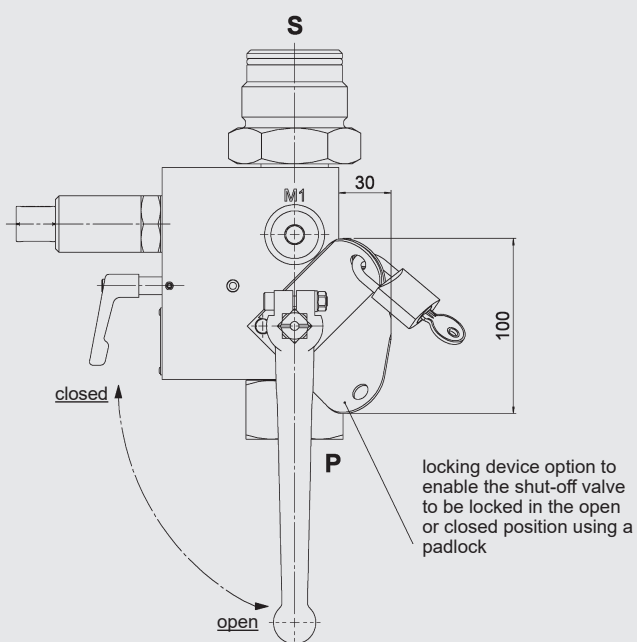
Type of safety and shut-off block		SAF10M, SAF10E	SAF20M, SAF20E	SAF32M, SAF32E			
Description	Item	Dimensions or part no.					
<b>Repair kit</b> consisting of:		2122238 (NBR) 2122240 (FKM)	2122242 (NBR) 2122244 (FKM)	2122246 (NBR) 2122248 (FKM)			
Spindle	1						
Disc	2						
O-ring	3				10x2	15x2.5	20x3
Ball	4						
Switching handle	5						
Spindle	6	6x2					
O-ring	7						
Threaded pin	8				M4x6	M4x10	
Orifice	9				Ø1.5 mm (Q <sub>max</sub> – 25.5 l/min)		
O-ring	11				17x2		
Support ring	12	11.7x15x1					
O-ring	13	11x2					
Sealing cup	14	23.47x2.62					
O-ring	15				21x2	34x2.5	56.7x2.8
O-ring	16						
Support ring	17				18.3x21.5x1		
O-ring	18				18x2		
O-ring	19	29.7x2.8	29.7x2.8	37.2x3			
Locking screw	20	G 1/8	G 1/8	G 1/8			
	21	G 1/4	G 1/4	G 1/4			
	22	–	G 3/8	G 3/8			
	23	–	G 1/2	G 1/2			
<b>2/2 directional valve assembly</b> (only for E type)	10	WSM06020Y – normally open WSM06020Z – normally closed	3153871 (350 bar); 3153874 (350 bar);	3156869 (400 bar) 3156873 (400 bar)			
<b>Locking screw assembly</b> (converts "E" type to "M" type)		277645					
<b>Seal kit</b> consisting of: Items 3, 7, 8, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23		2121699 (NBR) 2121701 (FKM)	2121703 (NBR) 2121705 (FKM)	2121707 (NBR) 2121709 (FKM)			
<b>Spindle repair kit</b> consisting of: Items 6, 7, 8		2115648 (NBR) 2115649 (FKM)					



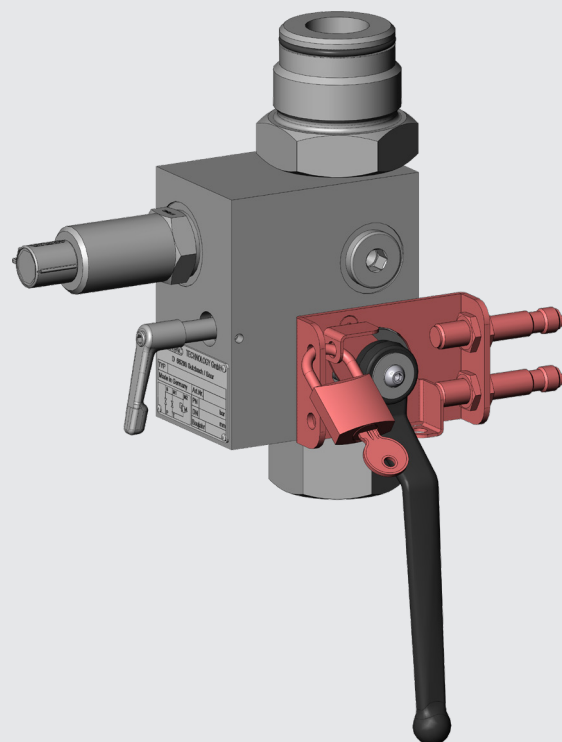
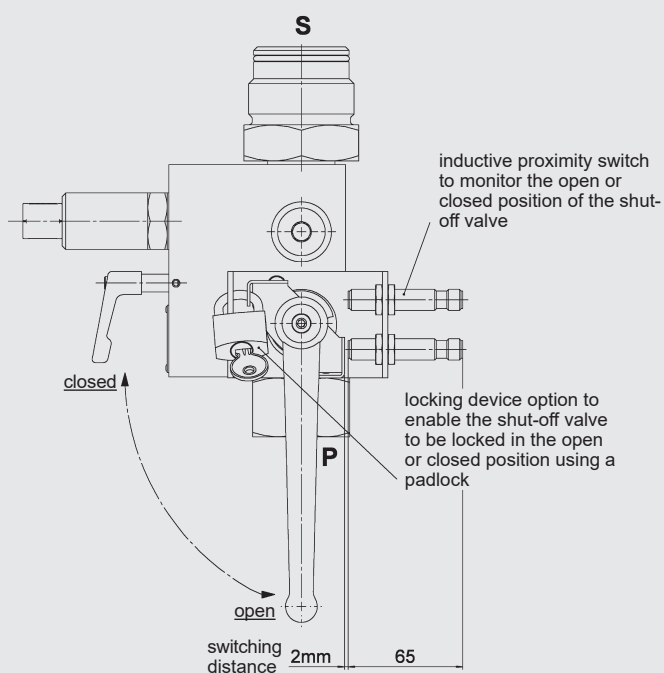
## 5. ADDITIONAL EQUIPMENT FOR SAFETY AND SHUT-OFF BLOCKS

In safety and shut-off blocks, the position of the shut-off valve/the pressure release valve can be secured. HYDAC supplies various additional devices for this (retrofit options, see section 8.):

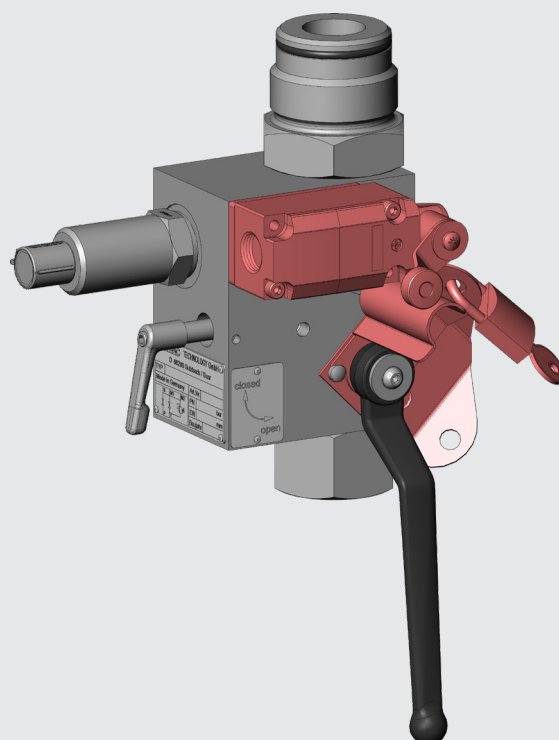
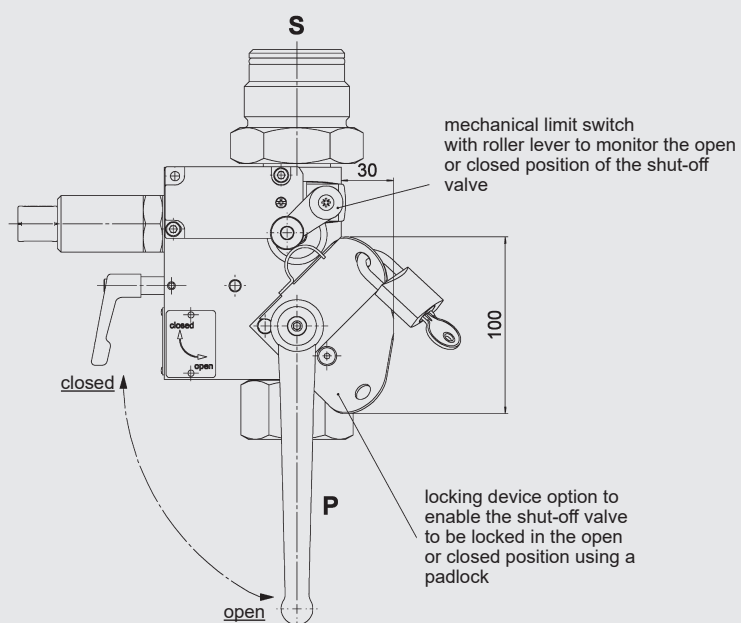
### Additional device L



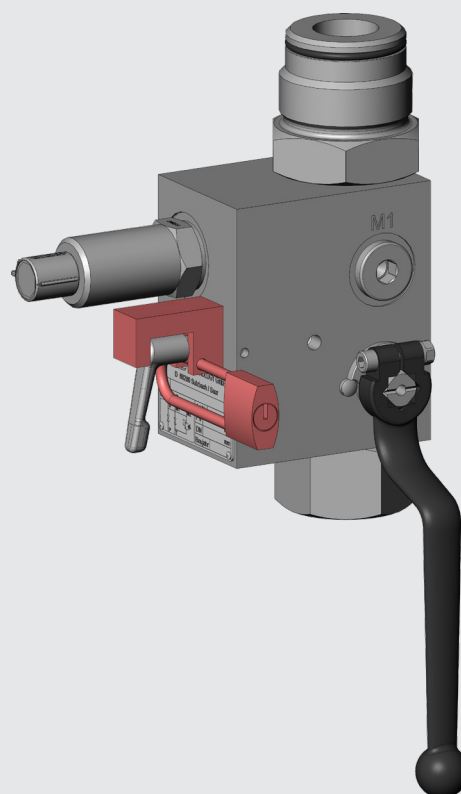
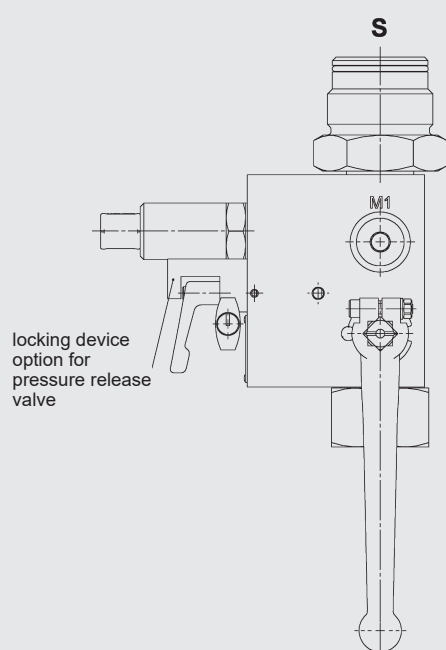
### Additional device LPI



## Additional device LPM



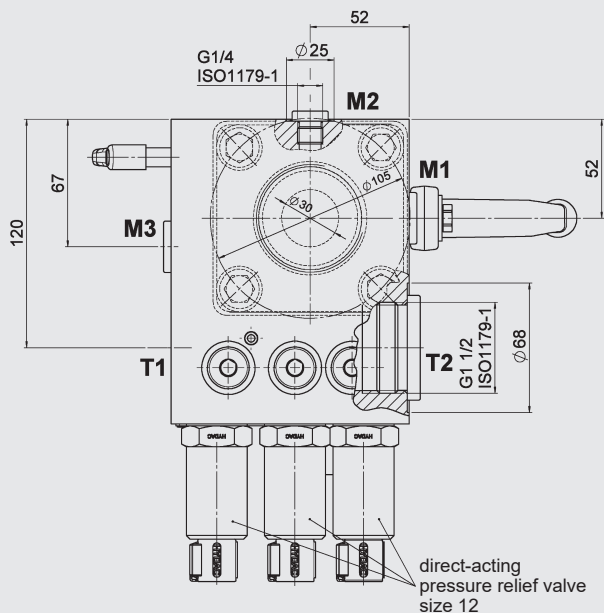
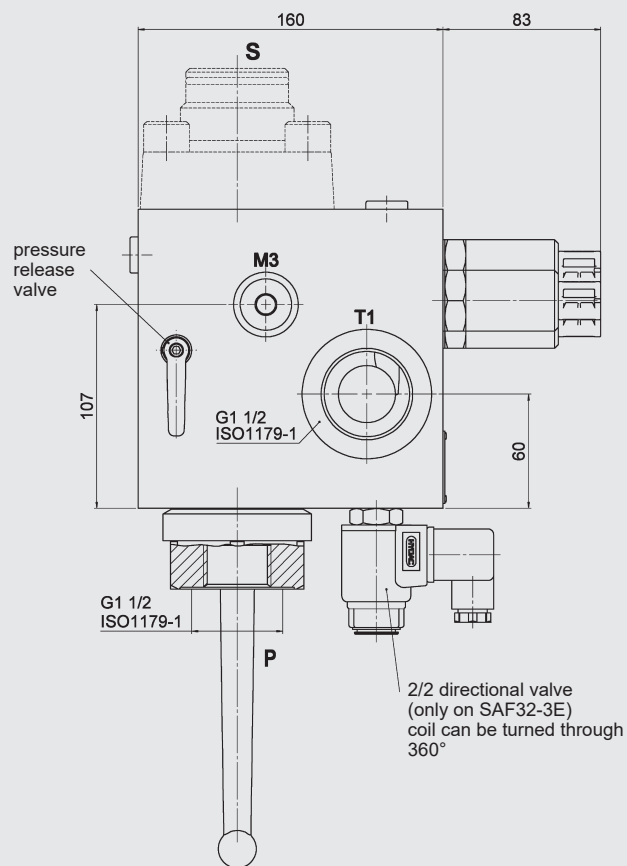
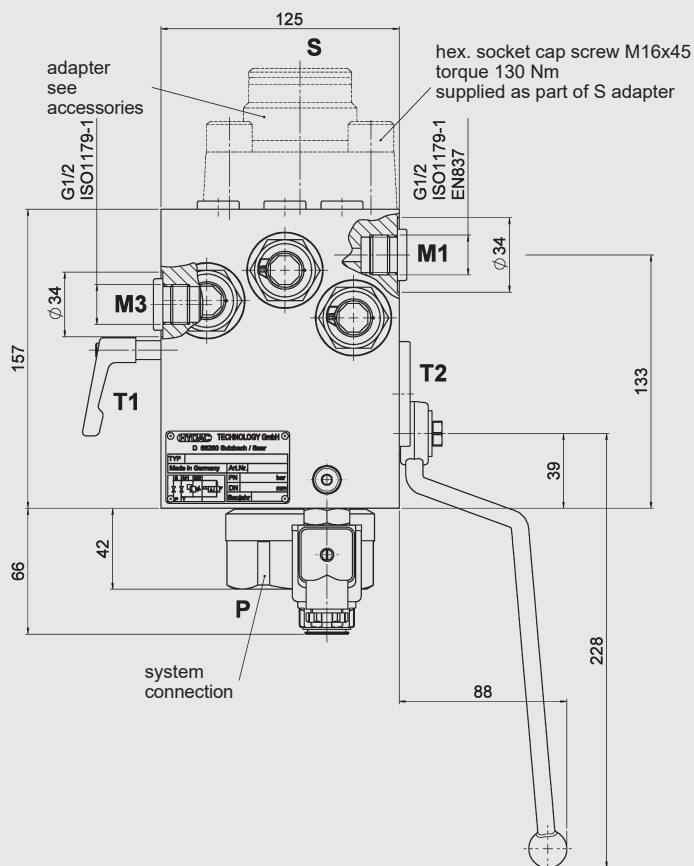
## Additional device LS



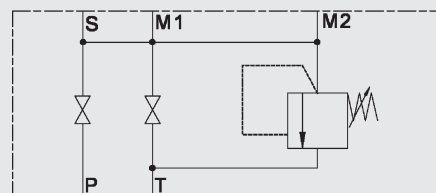
## 6. SPECIAL MODELS

### 6.1. TYPE SAF32-3M(E)

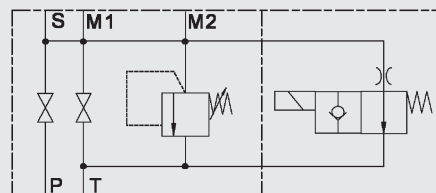
with 3 direct acting pressure relief valves size 12  
(max. operating pressure 400 bar)



SAF32-3M



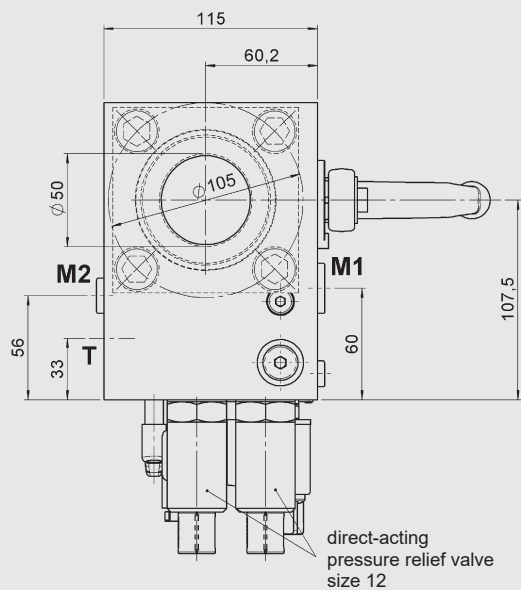
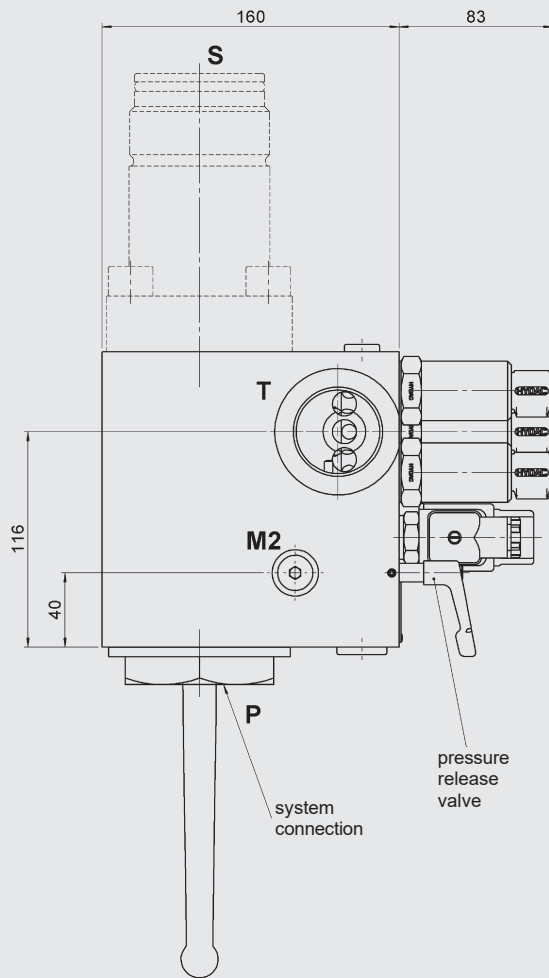
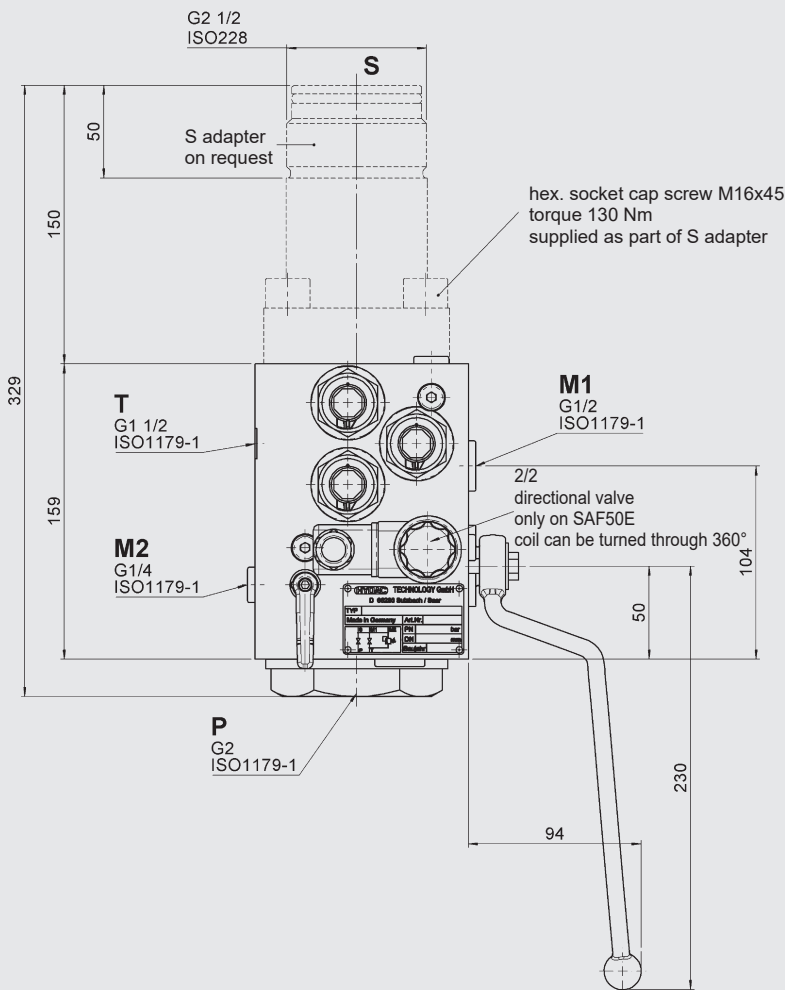
SAF32-3E



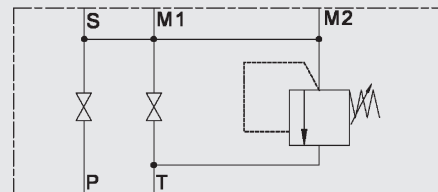
Type	Weight
SAF32-3M...	24 kg
SAF32-3E...	25 kg

6.2. TYPE SAF50M(E)

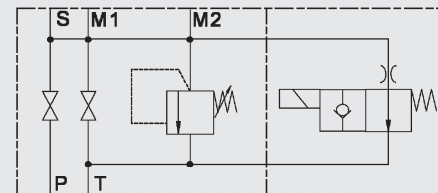
for high flow rates  
with 3-direct acting pressure relief valves size 12  
Max. operating pressure  
Type M: 400 bar  
Type E: 350 bar



SAF50M



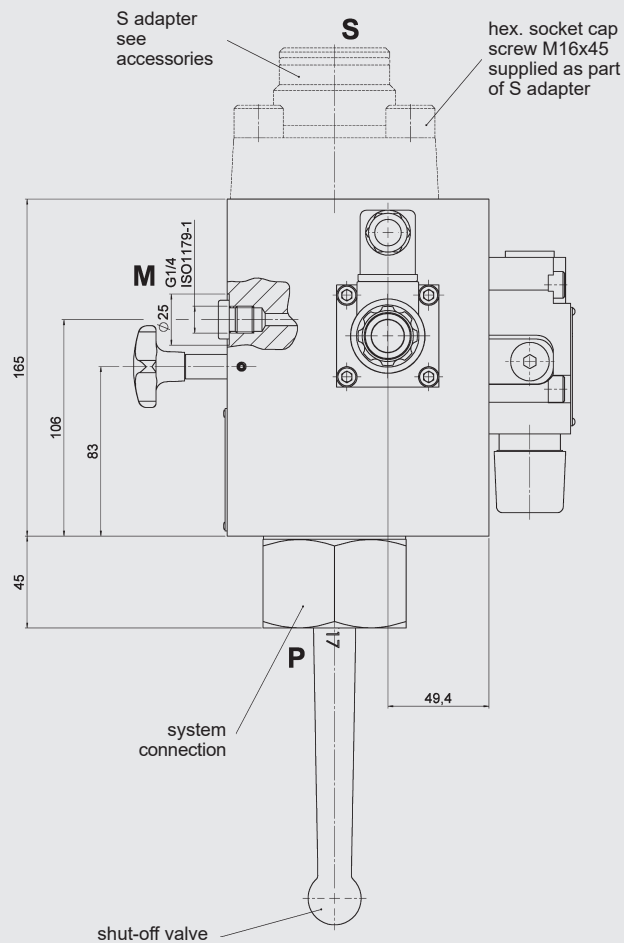
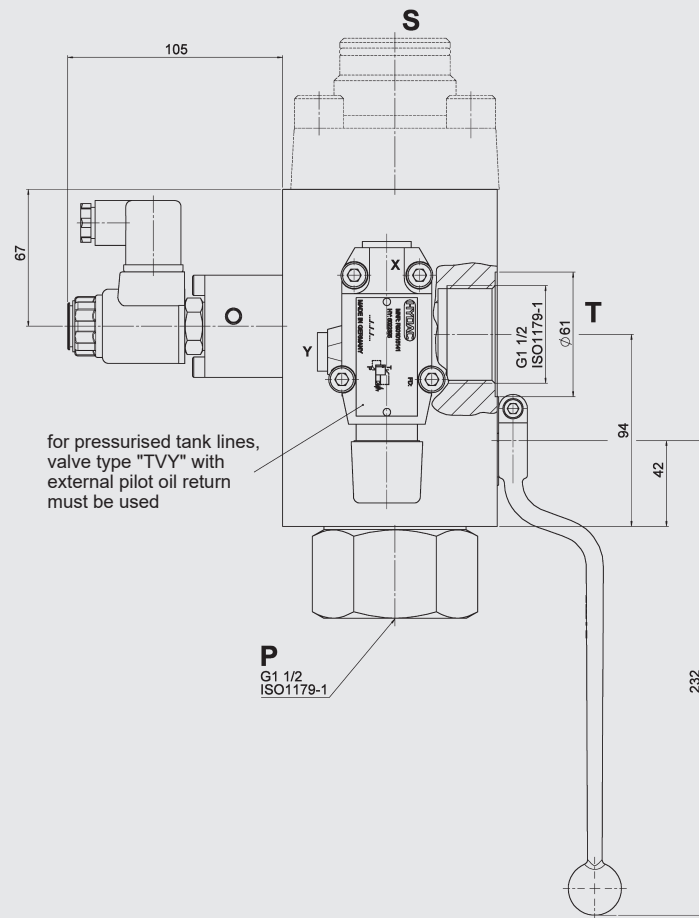
SAF50E

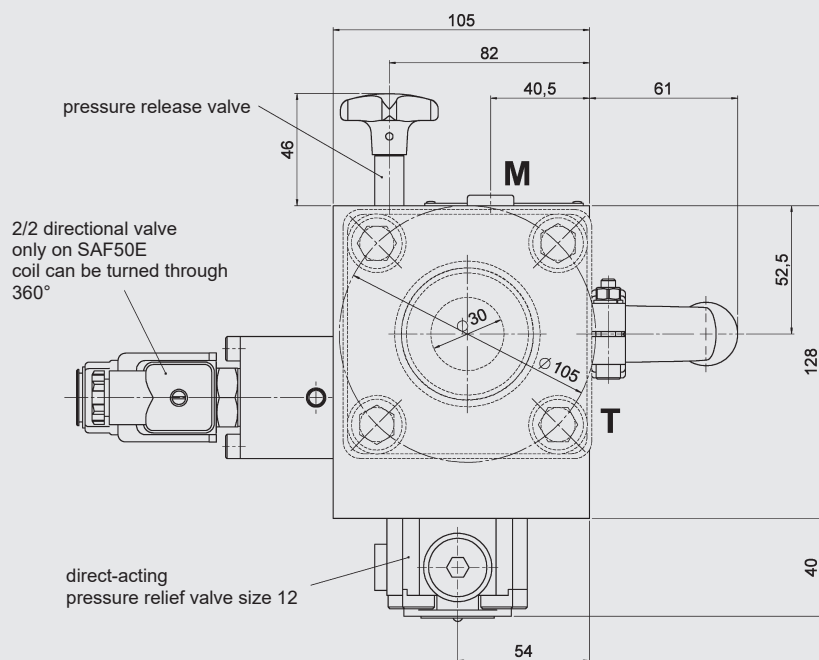


Type	Weight
SAF50M...	25 kg
SAF50E...	26 kg

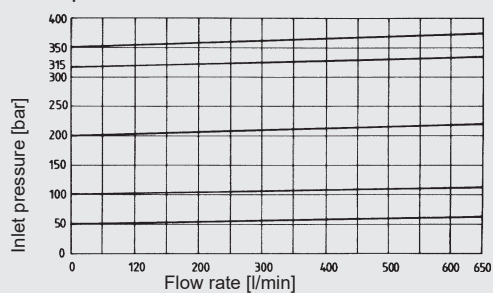
### 6.3. TYPE SA32M(E)29

with pilot-operated pressure relief valve ( $Q_{\max} = 600 \text{ l/min}$ )  
(max. operating pressure 330 bar)

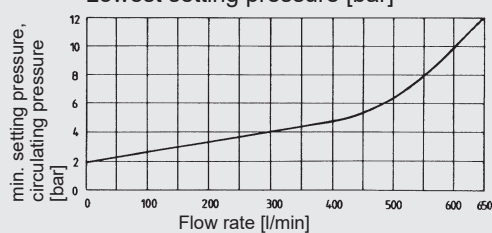




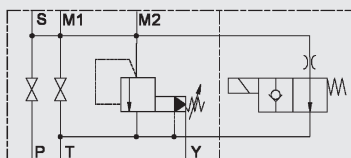
Pilot-operated pressure relief valve size 32



Lowest setting pressure [bar]



#### SA32E29TVY



The safety and shut-off block SA32M(E)29 is equipped with a pilot-operated pressure relief valve size 32 for high flow rates up to 600 l/min.

The E type of the safety and shut-off block has a solenoid-operated 2-way directional valve for automatic pressure release of the accumulator and the hydraulic system in an emergency or for shut-down.

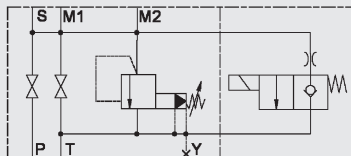
For unpressurised tank lines, valve type "TV" must be used (with internal pilot oil return to tank).

For pressurised tank lines, valve type "TVY" is recommended (with external pilot oil return to tank).

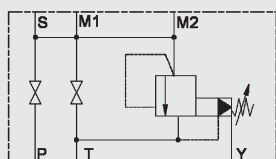
Two different models of the 2-way directional valve are available:

- WSM06020Y (normally open)
- WSM06020Z (normally closed)

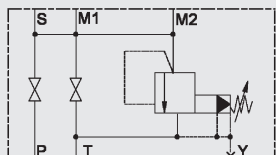
#### SA32E29TV



#### SA32M29TVY



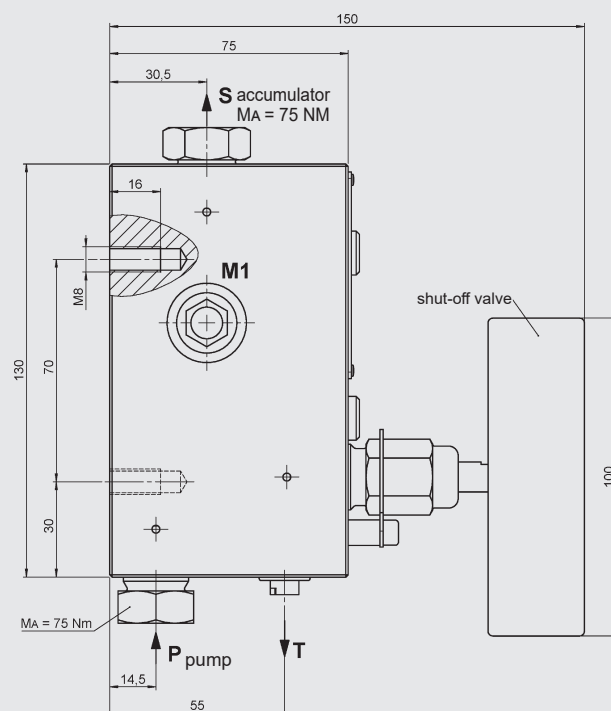
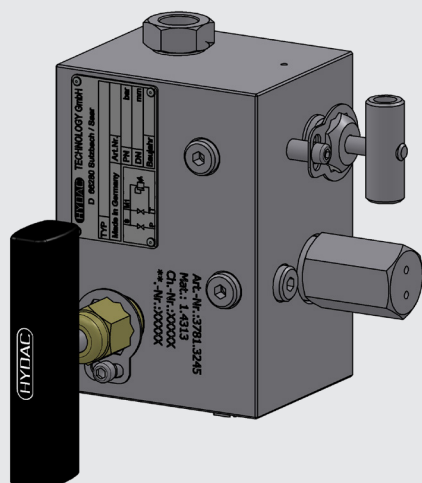
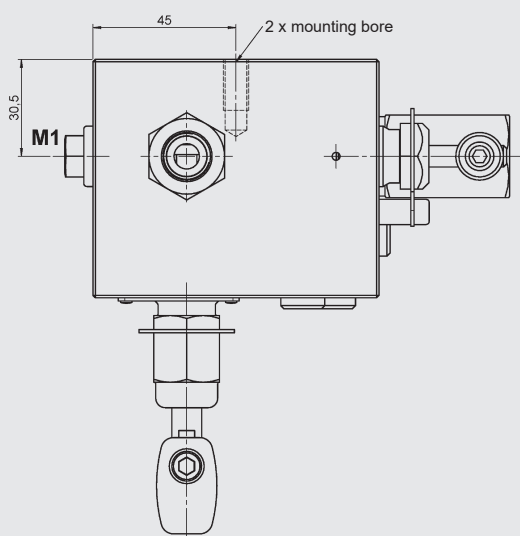
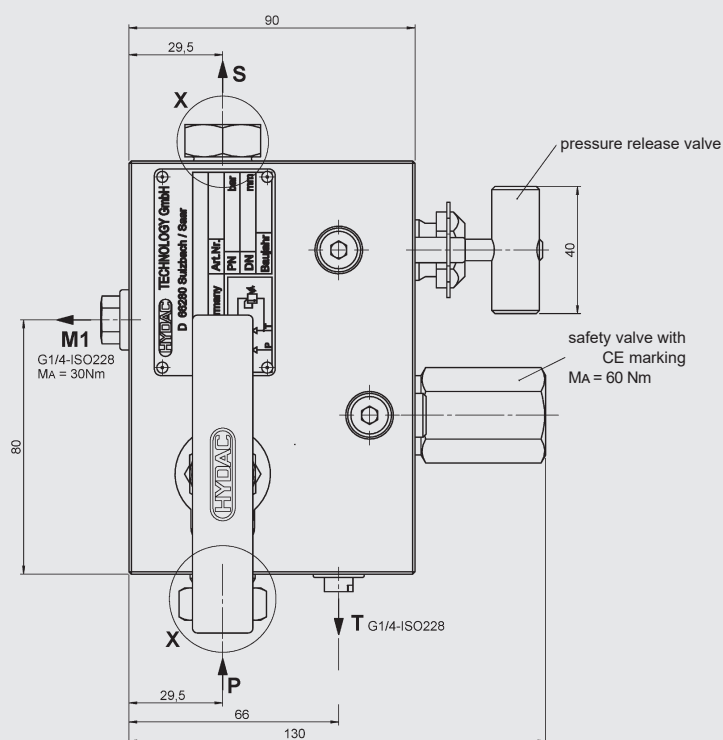
#### SA32M29TV



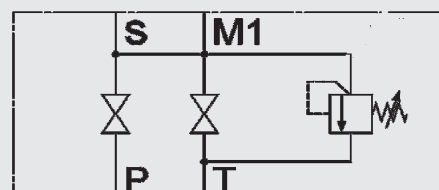
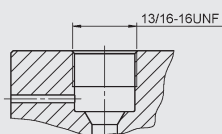
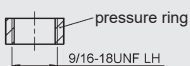
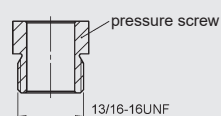
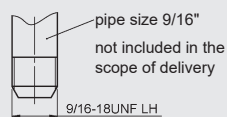
Type	Weight
SA32M29...	22.5 kg
SA32E29...	23.5 kg

## 6.4. TYPE SAF8M

For pressures of 400 bar and above in stainless steel with high-pressure ports  
(max. operating pressure 800 bar)



### X (1:1)



Type	Weight
SAF8M	7.5 kg

6.5. SAFETY AND SHUT-OFF BLOCK WITH 2-WAY CARTRIDGE VALVE (LOGIC ELEMENT)

This safety and shut-off block consists of a valve block, an integrated pressure relief valve and a solenoid-operated 2-way cartridge valve which replaces the main shut-off valve.

Advantages:

In addition to its compact design, this model is capable of rapid switching to control the fluid flow.

6.5.1 Function when using 4/2 directional valve

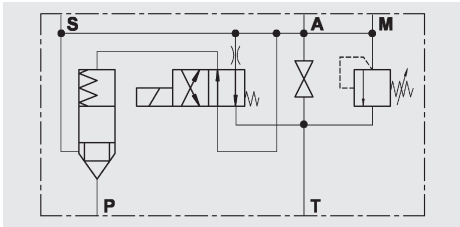
When the 4/2 directional valve is in the switching position shown (open when de-energised), the spring chamber of the logic element is pressurised via the accumulator pressure; the path from P to S is blocked and the hydraulic accumulator is automatically shut off from the system. By connecting the accumulator via the orifice in the pilot valve to the tank, it will slowly discharge.

When the 4/2 directional poppet valve is in the discharge position (energised) the spring chamber of the logic element is discharged, the path from P to S is open and the accumulator is charged.

Specifications:

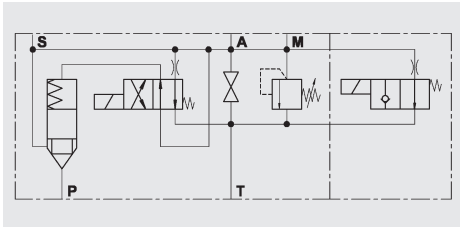
Type	Nominal size	Max. operating pressure	Pressure relief valve <sup>1)</sup>
SA20A50T...	DN20	400 bar	DB12 (2)
SA32A50T...	DN30	400 bar	DB12 (3)

<sup>1)</sup> Number of pressure relief valves



Type	Nominal size	Max. operating pressure	Pressure relief valve <sup>1)</sup>
SA20E50T...	DN20	400 bar	DB12 (2)
SA32E50T...	DN30	400 bar	DB12 (3)

<sup>1)</sup> Number of pressure relief valves



6.5.2 Function when using 3/2 directional poppet valve

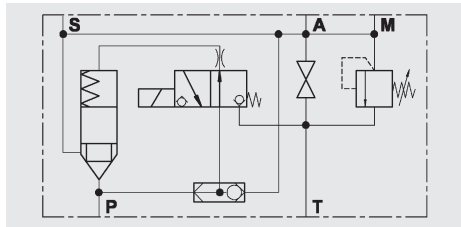
When the 3/2 directional poppet valve is in the switching position shown (open when de-energised), the spring chamber of the logic element is pressurised via the system pressure; the path from P to S is blocked and the hydraulic accumulator is shut off from the system. When the 3/2 directional poppet valve is in the discharge position (energised) the spring chamber of the logic element is discharged, the path from P to S is open and the hydraulic accumulator is charged.

If the pump breaks down or if it is switched off, the 3/2 directional poppet valve reverts to the "open when de-energised" position; the accumulator pressure shuts off the logic element via the shuttle change-over valve and shuts off the hydraulic accumulator from the system.

Specifications:

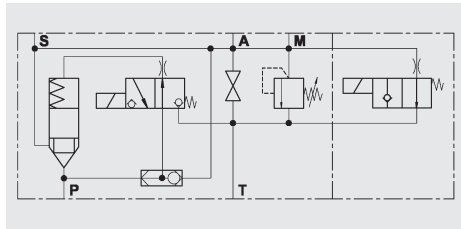
Type	Nominal size	Max. operating pressure	Pressure relief valve <sup>1)</sup>
SA20A51T...	DN20	400 bar	DB12 (2)
SA32A51T...	DN30	400 bar	DB12 (3)

<sup>1)</sup> Number of pressure relief valves



Type	Nominal size	Max. operating pressure	Pressure relief valve <sup>1)</sup>
SA20E51T...	DN20	400 bar	DB12 (2)
SA32E51T...	DN30	400 bar	DB12 (3)

<sup>1)</sup> Number of pressure relief valves





## 7. DESCRIPTION OF DSV10

### 7.1. GENERAL

#### DSV10 as a low cost alternative to SAF10

The three-way DSV10 safety block is used to isolate and discharge hydraulic accumulators and consumers. It complies with the relevant safety standards in accordance with DIN EN 4413 and the German Industrial Safety Regulation BetrSichV.

The HYDAC DB12 pressure relief valve is used with the DSV series. It is a direct-acting pressure relief valve in a poppet valve design with excellent opening and closing characteristics. This version of the DB12 complies with the requirements of the European Pressure Equipment Directive (PED) with CE marking.

There are four different versions:

- DSV10M  
manual discharge, standard L-ball
- DSV10M-T-ball  
manual discharge, T-ball
- DSV10EY  
manual/solenoid discharge, normally open
- DSV10EZ  
manual/solenoid discharge, normally closed

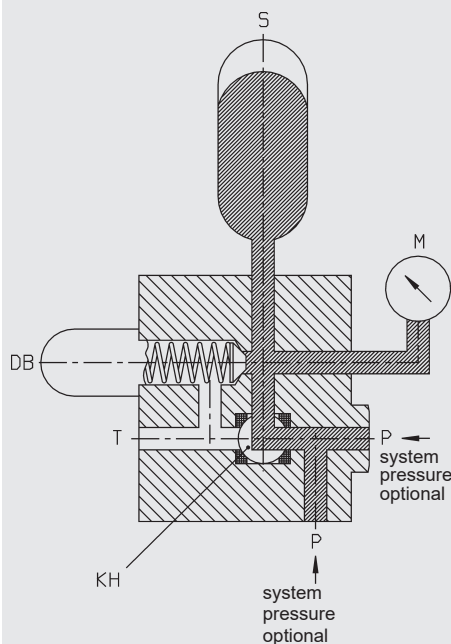
The essential difference compared to the SAF10 lies in the shut-off and discharge function of the DSV10. On request we can supply other models to cover almost all applications, e.g. for aggressive media.

On request we can supply test certificates to EN 10204 and quality test certificates to DIN 55350, Part 18.

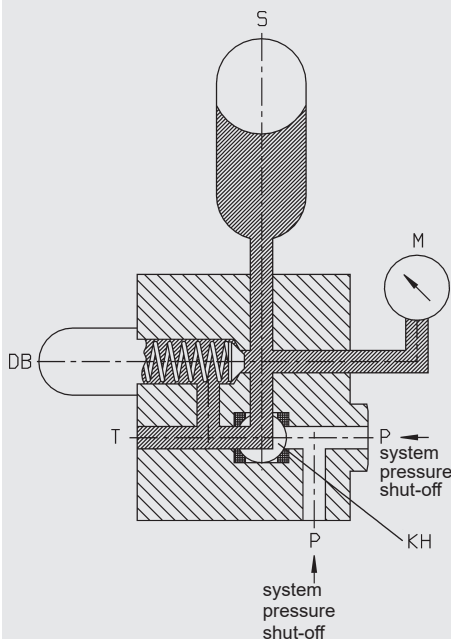
### 7.2. DESIGN

The DSV three-way safety block consists of a valve block with an integrated HYDAC pressure relief valve and the shut-off valve. It has connections for the pump, pressure gauge, tank and hydraulic accumulator. In addition, an optional solenoid-operated 2-way directional valve allows automatic discharge of the hydraulic accumulator or consumer.

#### Accumulator operation



#### Shutting off the system pressure and simultaneously discharging the hydraulic accumulator



- P – Pump connection
- S – Hydraulic accumulator
- KH – Change-over ball valve
- DB – Pressure relief valve
- M – Pressure gauge connection
- T – Tank connection

The DSV10 can be used as a cost-effective alternative to the SAF10. Unlike the SAF10, the DSV10 shuts off when discharging simultaneously to the tank.

### 7.3. CONNECTIONS

The DSV has the following connections:

- S – Hydraulic accumulator connection (M33x2 DIN 3852 Part 3)
- P – Pipe connection (ISO 228 – G 3/8 and G 1/2)
- T – Tank connection (ISO 228 – G 1/2)
- M – Pressure gauge connection (ISO 228 – G 1/4)

### 7.4. FUNCTION

When the accumulator is in operation the change-over ball valve connects the pump connection with the hydraulic accumulator. At the same time, the hydraulic accumulator is monitored for pressure via the built-in pressure relief valve.

By switching over the ball valve, the pump connection is shut off leakage-free on the inlet side and the hydraulic accumulator is discharged simultaneously to the tank.

During switching, all three ports (P, S and T) are momentarily interconnected (negative switching overlap). Automatic relief can be achieved by fitting a solenoid-operated 2/2 directional valve (e.g. in the event of a power failure or shut-down).

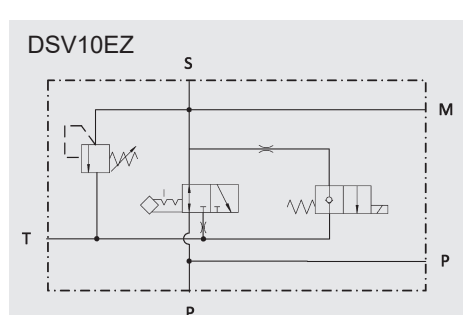
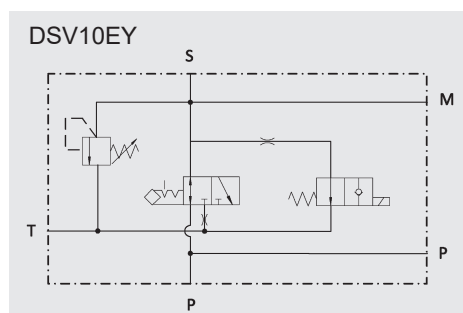
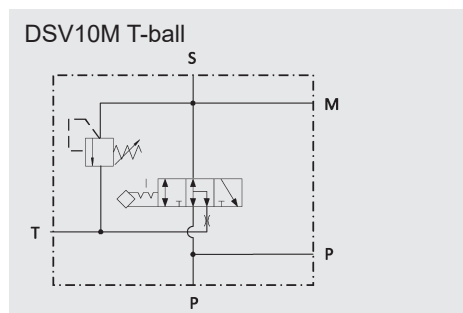
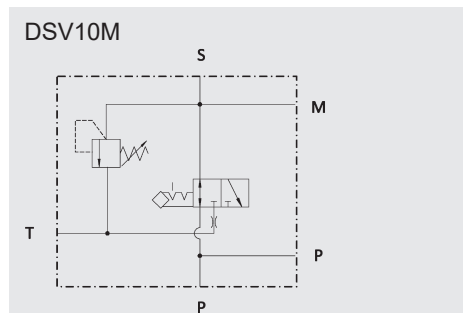
### 7.5. NOTES

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.

To ensure correct functioning, pressure and temperature specifications must be observed.

## 7.6. SPECIFICATIONS

### 7.6.1 Symbols



### 7.6.2 Design

Ball valve isolating device

Pressure relief valve is a direct-acting poppet seat valve

Poppet valve is pilot-operated

### 7.6.3 Materials

Housing and locking screw in steel, surface protection: phosphate-plated. Ball in steel, hard-chromed, pressure relief valve and poppet valve in high tensile steel, closing element in hardened and ground steel, wear-resistant, surface protection: phosphate-plated, ball seal in high quality synthetic material (POM), soft seals in Perbunan (NBR), cranked handle AF09 in red anodised aluminium.

### 7.6.4 Installation

No orientation restrictions

### 7.6.5 Operating fluids

Mineral oil to DIN 51524

Part 1 and Part 2

(other fluids on request)

### Viscosity range:

min. 10 mm<sup>2</sup>/s

max. 380 mm<sup>2</sup>/s

### Filtration:

Max. permitted contamination level of the operating fluid to ISO 4406 Class 21/19/16 or SAE AS 4059 Class 11.

We therefore recommend a filter with a minimum retention rate of  $\beta_{20} \geq 100$ . The fitting of filters and the regular replacement of filter elements guarantees correct operation, reduces wear and increases the service life.

### 7.6.6 Permitted operating temperature

-10 °C ... +80 °C

(ambient temperature for

E type limited to

-10 °C ... +60 °C)

### 7.6.7 Maximum operating pressure

350 bar

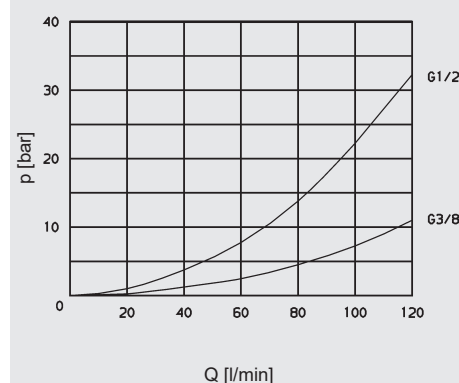
### 7.6.8 $\Delta p$ - Q characteristic curve

Measured at

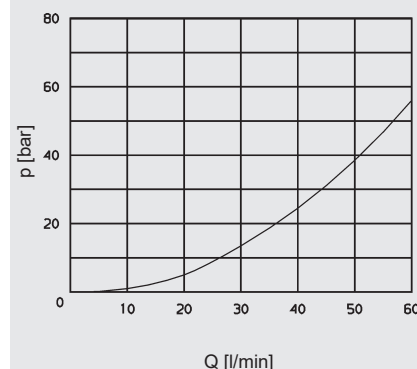
$t_{oil} = 50$  °C

$v = 30$  mm<sup>2</sup>/s

Flow rate from P to S



Flow rate from S to T



### 7.6.9 Model with solenoid-operated pressure release

#### Type

Solenoid-operated by means of pressure-tight, oil-immersed, single-stroke solenoids in accordance with VDE 0580. Actuating solenoid with male connector to DIN 43650, standard for general industrial applications, available for 24 V DC and 230 V AC.

#### Type of voltage

DC solenoid:

When connected to AC voltage, the necessary DC voltage is produced by means of a bridge rectifier connector.

#### Voltage tolerance

±15 % of the nominal voltage

#### Nominal current

dependent on the nominal voltage

24 V DC 0.80 A

230 V AC 0.11 A

#### Power consumption

$p_{20} = 18$  W

#### Duty cycle

100 % (continuous operation)

#### Switching time

Depending on symbol, pressure across the individual ports and flow rate.

WSM06020Y:

on: 50 ms

off: 35 ms

WSM06020Z:

on: 35 ms

off: 50 ms

## 7.7. SPARE PARTS

Please see brochure:

- 3-way safety block DSV No. 5.251

## 7.8. MODEL CODE FOR DSV10

(also order example)

**DSV - 10 - EY - 4 . 1 / 1 / X / T 210 - G 24 - Z4 S13**

### 3-way safety block

### Size

10

### Discharge

M = manual discharge

EY = solenoid-operated and manual discharge – normally open

EZ = solenoid-operated and manual discharge – normally closed

### Type of pressure relief valve

4 = DB12

### With/without fitted pressure relief valve

1 = with pressure relief valve

0 = without pressure relief valve

### Accumulator connection

1 = M33x2

### Series

(specified by manufacturer)

### Setting of pressure relief valve

T = pressure setting with TÜV

V = adjustable using tool

F = preset by manufacturer

x = model without relief valve cartridge

### Opening pressure setting

e.g. 210 bar opening pressure

xxx = model without relief valve cartridge

Pressure setting range

DB12 – 150 bar

DB12 – 250 bar

DB12 – 350 bar

### Type of voltage for solenoid

G = DC voltage

W = AC voltage

### Nominal voltage for solenoid

24 = 24 V for type G voltage (DC)

230 = 230 V for type W voltage (AC)

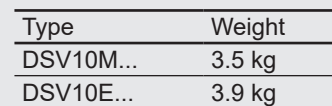
### Type of connection for solenoid

Z4 = connector to DIN 43650 - AF2 - PG11

### Additional information

S13 = S13 adapter to hydraulic accumulator (see section 8.)

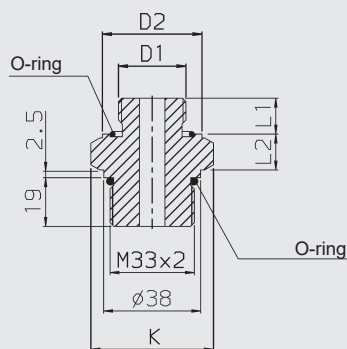
DSV10 3-way safety block  
(example: E type)



Type	Part no.	Type	Part no.
DSV-10-M-4.0/1/X/XXXX	555999	DSV-10-EY-4.0/1/X/XXXX-G24-Z4	557367
DSV-10-M-4.1/1/X/T100	555971	DSV-10-EY-4.1/1/X/T100-G24-Z4	555983
DSV-10-M-4.1/1/X/T150	555972	DSV-10-EY-4.1/1/X/T150-G24-Z4	555984
DSV-10-M-4.1/1/X/T200	555973	DSV-10-EY-4.1/1/X/T200-G24-Z4	555985
DSV-10-M-4.1/1/X/T210	555974	DSV-10-EY-4.1/1/X/T210-G24-Z4	555986
DSV-10-M-4.1/1/X/T250	555975	DSV-10-EY-4.1/1/X/T250-G24-Z4	555987
DSV-10-M-4.1/1/X/T300	555976	DSV-10-EY-4.1/1/X/T300-G24-Z4	555988
DSV-10-M-4.1/1/X/T315	555977	DSV-10-EY-4.1/1/X/T315-G24-Z4	555989
DSV-10-M-4.1/1/X/T330	555978	DSV-10-EY-4.1/1/X/T330-G24-Z4	555990
DSV-10-M-4.1/1/X/T350	555979	DSV-10-EY-4.1/1/X/T350-G24-Z4	555991

## 8. ACCESSORIES

### 8.1. ADAPTERS FOR DIAPHRAGM ACCUMULATORS



Type	Accumulator type	Volume [l]	D1 thread	Adapter	Part no. <sup>1)</sup> NBR/carbon steel	K AF	L1 [mm]	L2 [mm]	D2 [mm]	O-ring
SAF10/20 DSV10	SBO...E-	0.075 ... 1.4	G 1/2 A	S 30	<b>369485*</b>	41	14	17.5	33	22x3
	SBO...A6-	0.1 ... 0.6								
	SBO...E-	2.0 ... 3.5	G 3/4 A	S 31	<b>369486*</b>		16		40	28x3
	SBO...A6-	1.3 ... 4								

\* Preferred models

<sup>1)</sup> Others on request

### 8.2. ADAPTERS FOR PISTON ACCUMULATORS

#### 8.2.1 Standard piston accumulator

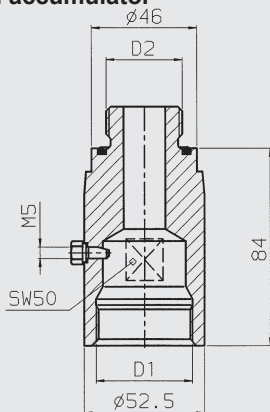


Fig. 1

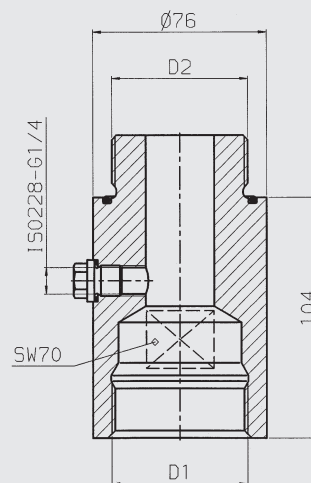
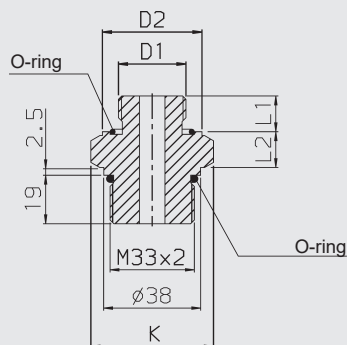


Fig. 2

Type	Accumulator type	Volume [l]	Adapter	Part no. <sup>1)</sup> NBR/carbon steel	D1 [mm]	D2 [mm]	O-ring	Corresponding S adapter	Part no. <sup>1)</sup> NBR/carbon steel	Fig.
SAF10/20 DSV10	SK210/350 -	2.5 ... 7.5	K 406	374929	G 1 1/4	G 1	35x3	S 12	369480	1
	SK210/350 -	10 ... 45	K 408	374931	G 2	G 1 1/2	53x3	S 13	369481	2
SAF32	SK210/350 -	50 ... 120	K 409	374933		G 2	62x3	S 309	366715	

<sup>1)</sup> Others on request

#### 8.2.2 SK280



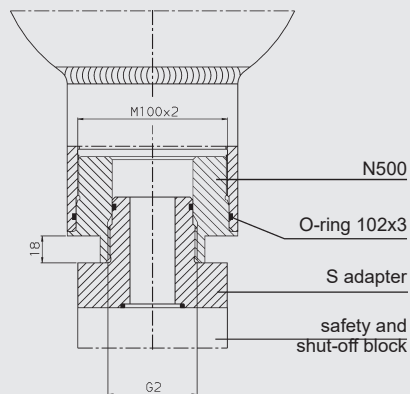
Type	Accumulator type	Fluid port SK280	D1 thread	Adapter	Part no. <sup>1)</sup> NBR/carbon steel	K AF	L1 [mm]	L2 [mm]	D2 [mm]	O-ring
SAF10/20 DSV10	SK280	AAD	G 1/2 A	S 30	<b>369485*</b>	41	14	17.5	33	22x3
		AAE	G 3/4 A	S 31	<b>369486*</b>		16		40	28x3
		AAF	G 1 A	S 32	369487	46	18	18.5	45	35x3

\* Preferred models

<sup>1)</sup> Others on request

## 8.3. ADAPTERS FOR BLADDER ACCUMULATORS

### 8.3.1 Low pressure bladder accumulators



Type	Accumulator type	Volume [l]	Adapter	Part no. <sup>1)</sup> NBR/carbon steel	Corresponding S adapter	Part no. <sup>1)</sup> NBR/carbon steel
SAF10/20 and DSV10	SB40	2.5 ... 50	N500	367229	S 13	369481
SAF32					S 309	366715

<sup>1)</sup> Others on request

### 8.3.2 Standard/high pressure bladder accumulators, threaded connection

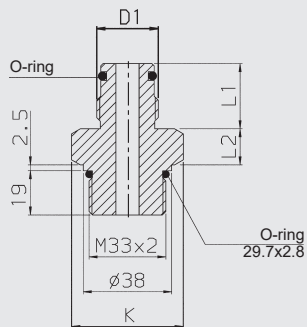


Fig. 1

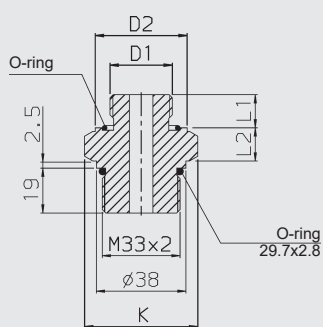


Fig. 2

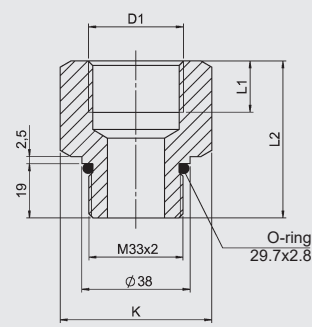


Fig. 3

Type	Accumulator type	Volume [l]	D1 thread	Adapter	Part no. <sup>1)</sup> NBR/carbon steel	K AF	L1 [mm]	L2 [mm]	D2 [mm]	O-ring [mm]	Fig.
SAF10 SAF20 DSV10	SB330/400-	0.6 ... 1	G 3/4A	S 10	<b>369479*</b>	41	28	16	—	17x3	1
	SB550/690-	1 ... 5	G 1A	S 11	372750	46	34	17	—	22x3	
	SB330/400-	2.5 ... 6	G 1 1/4A	S 12	<b>369480*</b>		37		—	30x3	
	SB330/400/ 550/600-	10 ... 50	G 2A	S 13	<b>369481*</b>	65	44	21	—	48x3	
	Connection with metric fine thread	—	M30x1.5	S 20	369482	41	15	18	40	32x2	2
		—	M40x1.5	S 21	369483	55	20	21	54	43x3	
		—	M50x1.5	S 22	369484	65			64	53x3	
	SB330/400-	2.5 ... 50	G 3/4	S 367861	369489	41	18	50	—	—	3
			G 1	S 379766	369490	46	20	55	—	—	
			G 1 1/4	S 379767	369498	65	22	60	—	—	

\* Preferred models

<sup>1)</sup> Others on request

### 8.3.3 Standard/high pressure bladder accumulators, flange connection

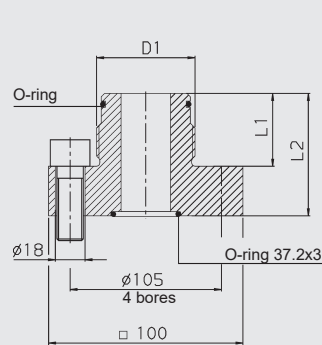


Fig. 4

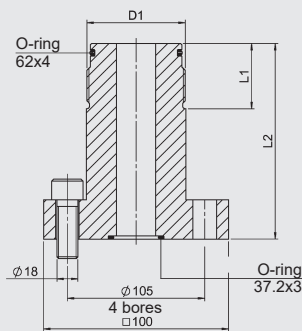


Fig. 5

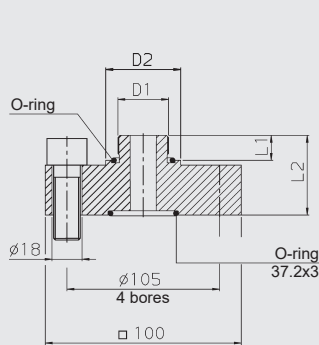


Fig. 6

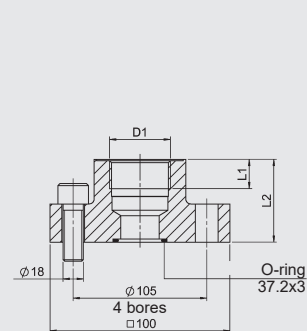


Fig. 7

Type	Accumulator type	Volume [l]	D1 thread	Adapter	Part no. <sup>2)</sup> NBR/carbon steel	K AF	L1 [mm]	L2 [mm]	D2 [mm]	O-ring [mm]	Fig.
SAF32	SB330/400-	0.6 ... 1	G 3/4A	S 305 <sup>1)</sup>	366723	—	28	58	—	17x3	4
	SB550/690-	1 ... 5	G 1A	S 306 <sup>1)</sup>	2102855	—	34	64	—	22x3	
	SB330/400-	2.5 ... 6	G 1 1/4A	S 307 <sup>1)</sup>	366724	—	37	67	—	30x3	
	SB330/400/600-	10 ... 50	G 2A	S 309 <sup>1)</sup>	<b>366715*</b>	—	44	74	—	48x3	
	SB550-	10 ... 50		S 308 <sup>1)</sup>	376813	—	—	115	—	—	5
	SB330H-	10 ... 50	G 2 1/2A	S 365922	377283	—	50	150	—	62x4	
	Connection with metric fine thread	—	M30x1.5	S 330 <sup>1)</sup>	366735	—	15	47	45	32x2	6
		—	M40x1.5	S 340 <sup>1)</sup>	366736	—	20	51	60	43x3	
		—	M50x1.5	S 350 <sup>1)</sup>	366737	—	—	75	53x3	—	
	SB330/400-	10 ... 50	G 1	S 365637	2106583	—	20	60	—	—	7
			G 1 1/4	S 369658	2106578	—	22	—	—	—	
			G 1 1/2	S 237838	2103869	—	24	65	—	—	

\* Preferred models

<sup>1)</sup> Adapter supplied with 4 hex. socket cap screws M16x45 (part no. 6032726) torque 130 Nm

<sup>2)</sup> Others on request

### 8.3.4 High pressure bladder accumulators

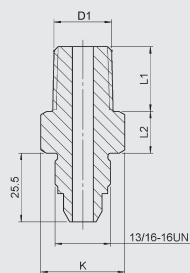


Fig. 8

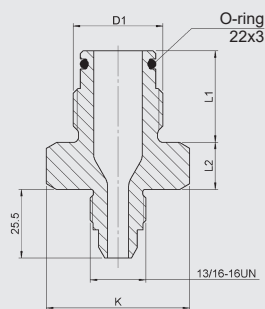


Fig. 9

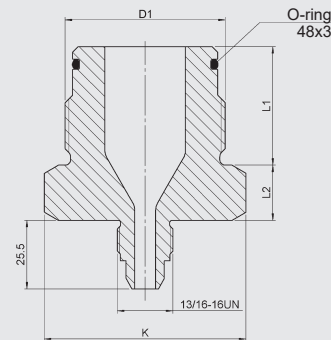


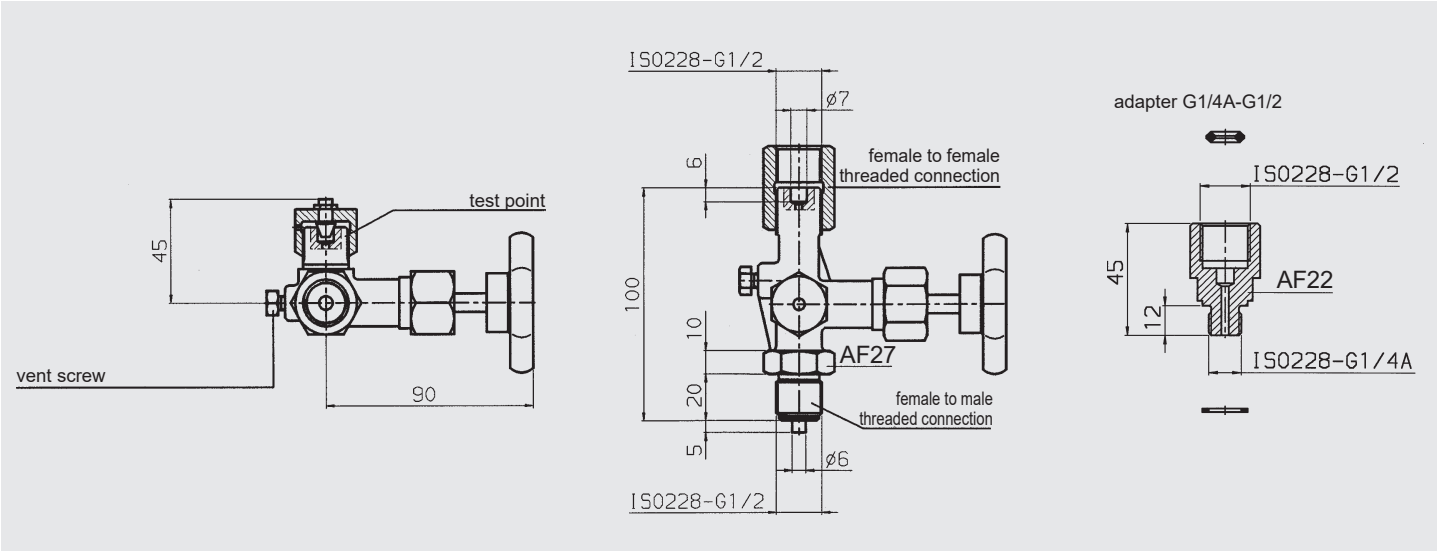
Fig. 10

Type	Accumulator type	Volume [l]	D1 thread	Adapter	Part no. <sup>2)</sup> carbon steel	K AF	L1 [mm]	L2 [mm]	D2 [mm]	O-ring [mm]	Fig.
SAF8	SB500	≥ 10	G 2	S3961818	4158379 <sup>1)</sup>	65	44	20.5	—	48.3	10
	SB550	≤ 10	G 1	S3956412	4158378 <sup>1)</sup>	46	34	17.5	—	22.3	9
	SB690	1 ... 54	1/2" NPT	S3936571	3936571	27	27	15.5	—	—	8

<sup>1)</sup> NBR O-ring

<sup>2)</sup> Others on request

8.4. GAUGE SHUT-OFF VALVE

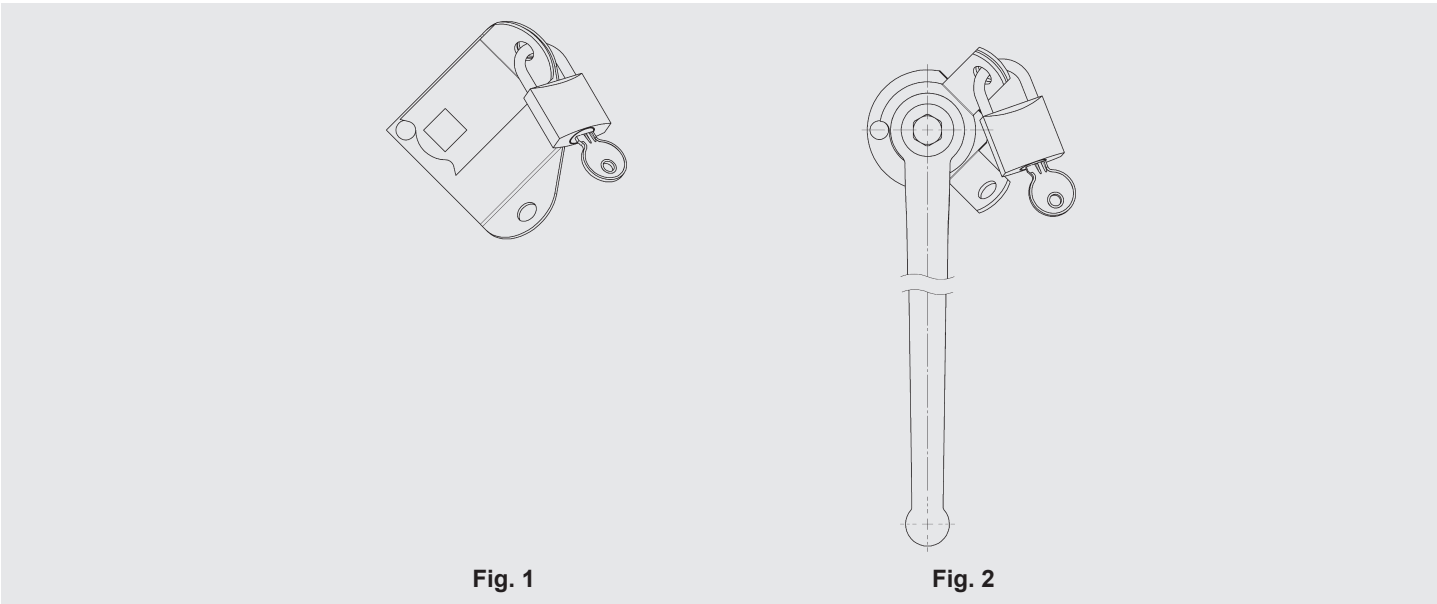


Part no.	Designation	Consisting of:
611903	Shut-off valve AG DIN 16271	<div><div>– Pressure release valve</div><div>– Female to female threaded connection</div><div>– Female to male threaded connection</div><div>– Test point</div></div>
370754	Adapter G1/4A-G1/2	

8.5. ADDITIONAL DEVICES FOR RETROFITTING

HYDAC supplies the following additional devices for retrofitting to prevent accidental alteration of the position of the shut-off valve or the pressure release valve on the SAF block. For mounting onto the SAF, see section 5. Additional equipment for safety and shut-off blocks.

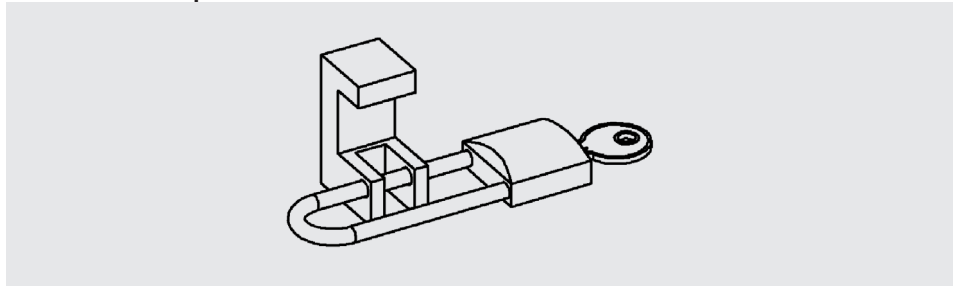
8.5.1 Lockable main shut-off valve (locking device) - L



Part no.	Designation	Consisting of:	Fig.
4334727	Lockable main shut-off valve for SAF10	<div><div>– Plates</div><div>– Padlock</div></div>	1
4334730	Lockable main shut-off valve for SAF20	<div><div>– Plates</div><div>– Padlock</div></div>	
4334731	Lockable main shut-off valve for SAF32	<div><div>– Plates</div><div>– Padlock</div><div>– Switching handle</div><div>– Screw</div></div>	2



### 8.5.2 Lockable pressure release valve – LS



Part no.	Designation	Consisting of:
3580490	Spindle lock SAF	– Spindle lock SAF – Padlock

### 8.6. ACCUMULATOR CHARGING VALVE



HYDAC accumulator charging valves control the charging of the accumulator within an adjustable switching range. By combining the charging valve with an accumulator, pumps and motors on oil-hydraulic systems with fluctuating flow requirements can be sized smaller. This saves costs and energy - thus preventing unnecessary heat generation.

For further information and technical specifications, see catalogue section:

- DLHSD DLHSR Accumulator charging valve  
No. 5.190.1

## 9. NOTE

The information in this brochure relates to the operating conditions and fields of application described.

For applications and/or operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

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