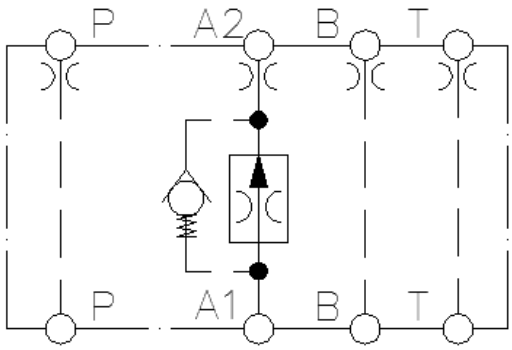
Sandwich plate valve with flow control function (ZFM2RP06)

SIZE: ISO 4401-03-02-0-05

Operating principle

The ZFM2RP06 is a sandwich plate valve with a flow control function in port A. The flow control function is active for flows from port A1 to Port A2. Parallel to the flow control valve is a bypass check valve enabling free flow port A2 to Port A1.



Advantages

- Maximum operating pressure: 420 bar
- Flow rates available in multiple orifice configurations from 0.4 to 6.0 l/min. The flow rate is adjusted by changing out the installed orifice.
- Results in a very soft unloading function, without any loss in closing time, when used as a pilot valve to control a 2-way slip-in cartridge valve
- Flow control function in a compact sandwich plate design
- Can be combined with other sandwich plate valves, directional valves and control covers to achieve more complex control functions.
- Threads in the P, A2, B and T ports enable further orifices to be used if needed.

Applications

The ZFM2RP06 sandwich plate valve can be used as a flow control valve with bypass check valve in port A for a maximum controlled flow of 6 l/min.

In combination with an RM* cartridge cover and an appropriate pilot valve; the ZFM2RP06 can be used to control a 2-way slip in cartridge.

When used in this fashion, the flow control valve will vent the pilot oil from the cartridge valve at constant flow rate independent of the pressures present. Depending on the diameter of the flow control orifice used, this vented flow will be between 0.4 and 6 l/min. Allowing the cartridge valve to open in a uniform and controlled manner; resulting in a soft unloading of the hydraulic system.

In the opposite direction, the flow of pilot oil to the cartridge valve will bypass the flow control orifice. This will result in a rapid closing of the cartridge valve independent of the flow control orifice used.

Figure 4 (page 6) shows an example of a soft unloading pressure valve.

Flow control orifice determines the flow rate through the valve

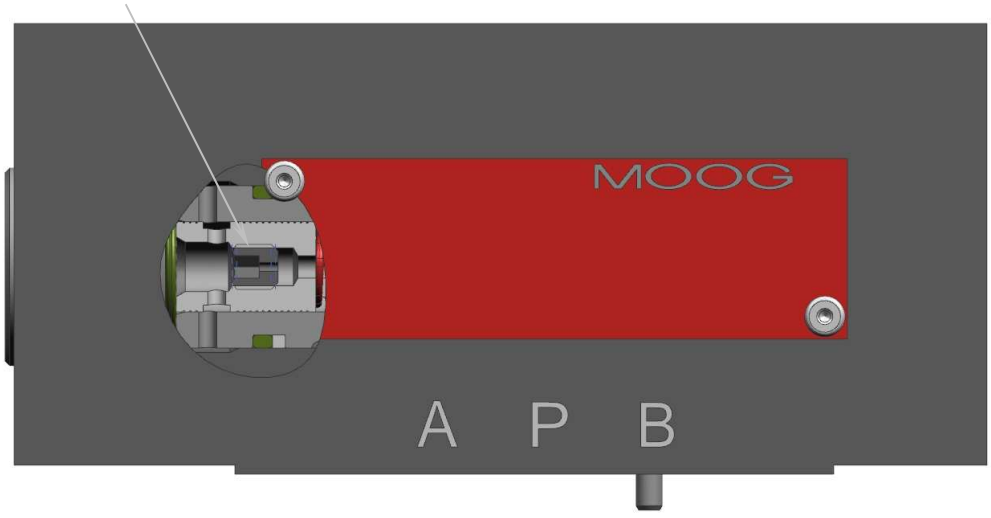


Figure 1: Location of flow control orifice

* see catalog „*Cartridge Covers ISO 7368 Sizes 16 to 100*“

General Data	Value	Unit	Specification
Valve type	-	-	Direct operating sandwich plate valve
Mounting type	-	-	Subplate mounting
Mounting orientation	-	-	any
Size (port pattern)	-	-	ISO 4401-03-02-0-05
Ambient temperature range	min.	°C	-30
	max.	°C	+80
Weight	m	kg	1,6
Hydraulic			
Max. operating pressure	P,A,B, T	MPa	42
Max. flow rate	Q_{max}	l/min	6 : from port A1 to port A2 (flow control function) 35 : from port A2 to port A1 (via bypass check valve)
Seals* for hydraulic fluids	-	-	N (NBR) : Mineral oil based hydraulic fluids; HFB,HFC type fluids Seals for other hydraulic fluids on request
Hydraulic fluid temperature range	min.	°C	-30
	max.	°C	+80
Viscosity range	min.	mm²/s	2,8
	max.	mm²/s	380
Cleanliness class according to ISO Code	max.	-	ISO 4406 (C), class 20/18/15

Bypass check valve performance curve

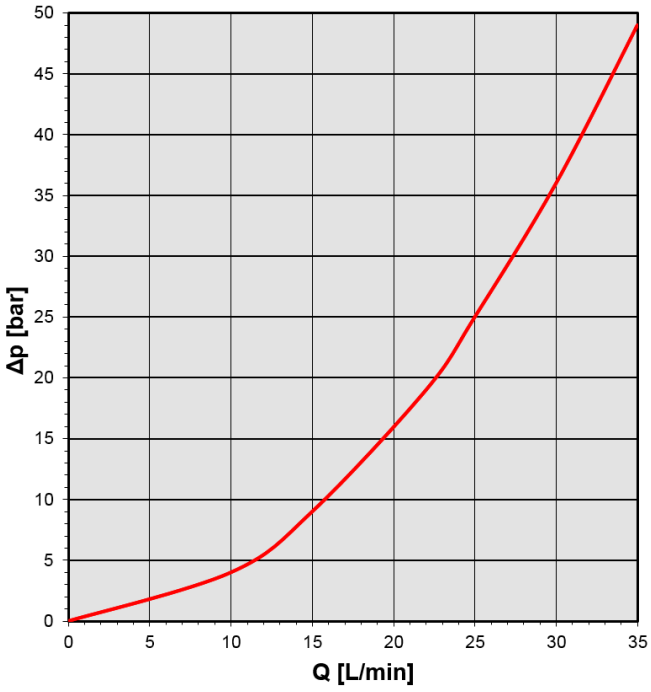


Figure 2: Pressure drop over flow curve for the bypass check valve

Selection of the flow control orifice

The following performance curves can be used to select the proper flow control orifice. The desired flow rates shown on the left hand side of the graph line up nicely with the orifice sizes shown on the right hand side thanks to the pressure independent characteristics of this valve. The largest orifice, with a diameter of 2.5 mm, will result in a constant flow of 6 l/min where as an 1.5 mm orifice will result in a constant flow of 3 l/min.

In comparison, a conventional cartridge valve orifice configuration would require a 0.65mm orifice to produce a pilot oil flow of ca. 3,0 l/min at a Δp = 200 bar. In short, the ZFM2RP06 is able to provide the same pilot oil flow rate using a much larger orifice diameter. This has the addition advantage of creating a more robust hydraulic system.

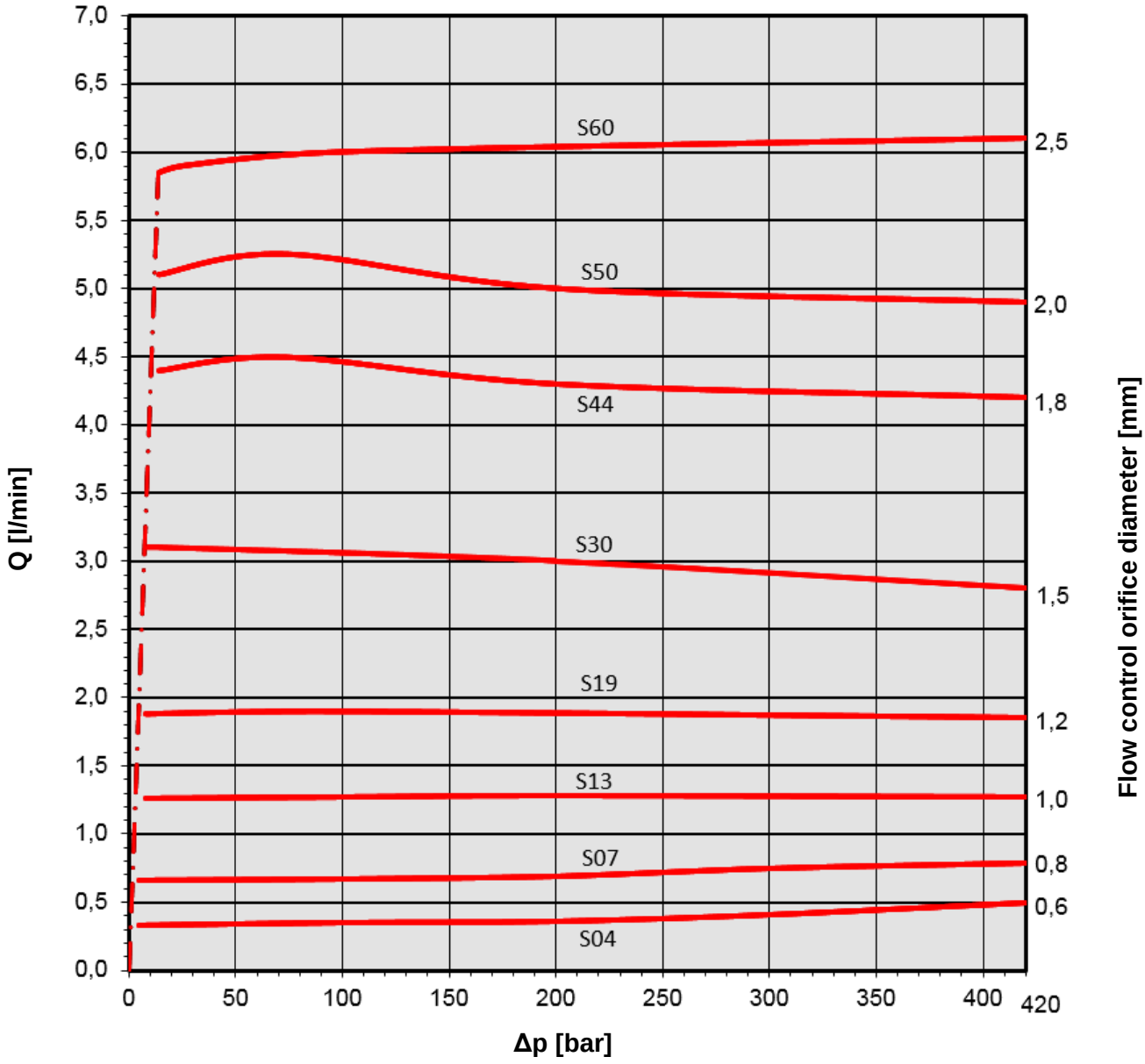


Figure 3: Performance in relation to the installed flow control orifice

A soft unloading pressure valve

Figure 4 shows an example of soft unloading pressure valve, with a pressure relief function, using a ZFM2P06 sandwich valve.

A directional pilot valve and RM cartridge cover complete the stack; resulting in a very cartridge valve capable of a very soft, pressure independent unloading. The bypass check valve ensures that a rapid closing of the valve is still possible. Figure 5 shows the soft unloading capabilities of this type of configuration.

In general, every cartridge valve can profit from a soft unloading function like this.

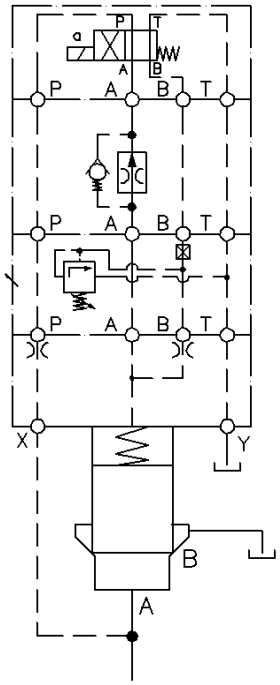


Figure 4: A soft unloading pressure valve (closed when de-energized)

Unloading function

Pressure unloading A⇨ B in relation to the pilot valve control signal over time, measured at T = 45°C

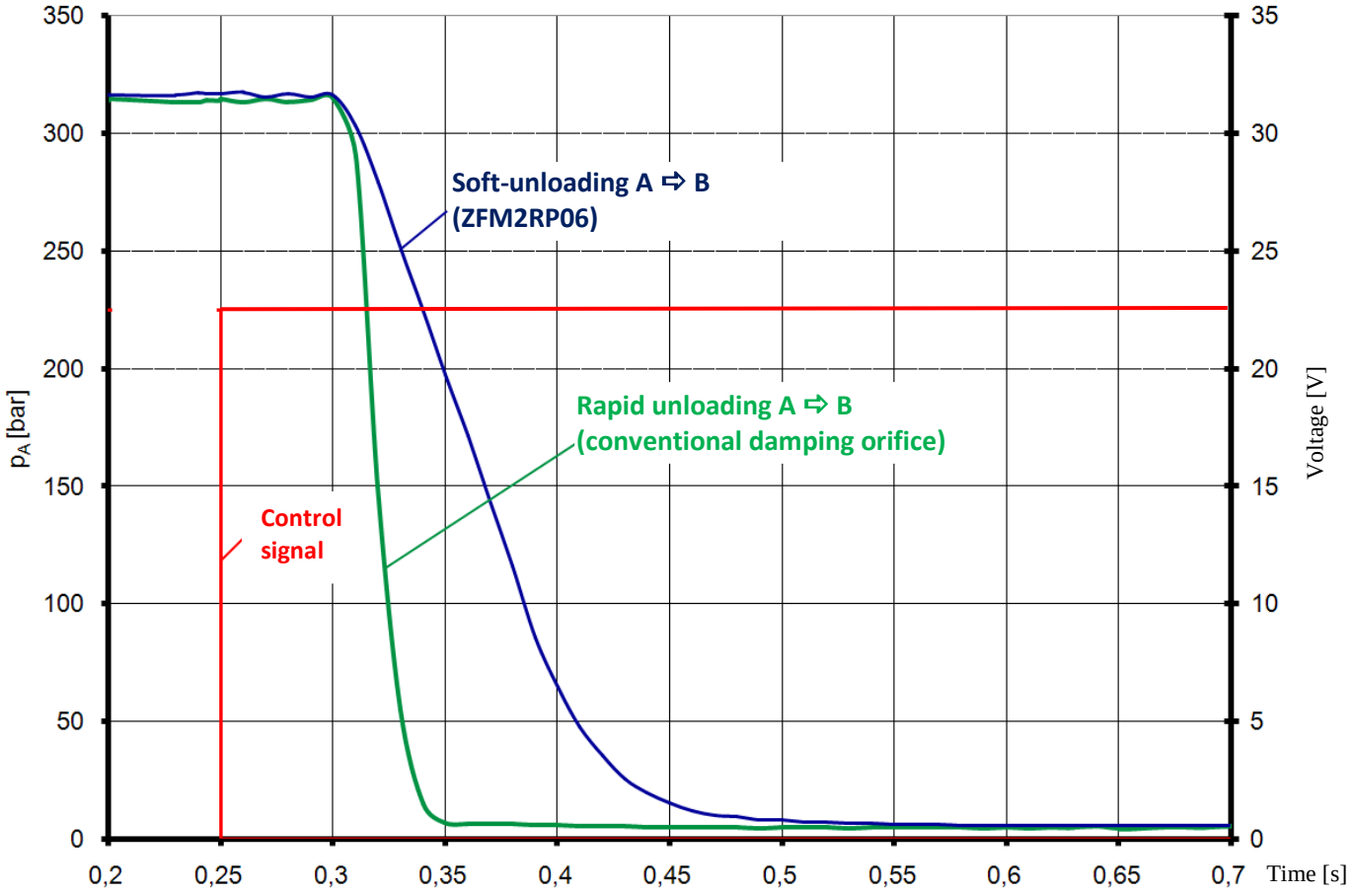
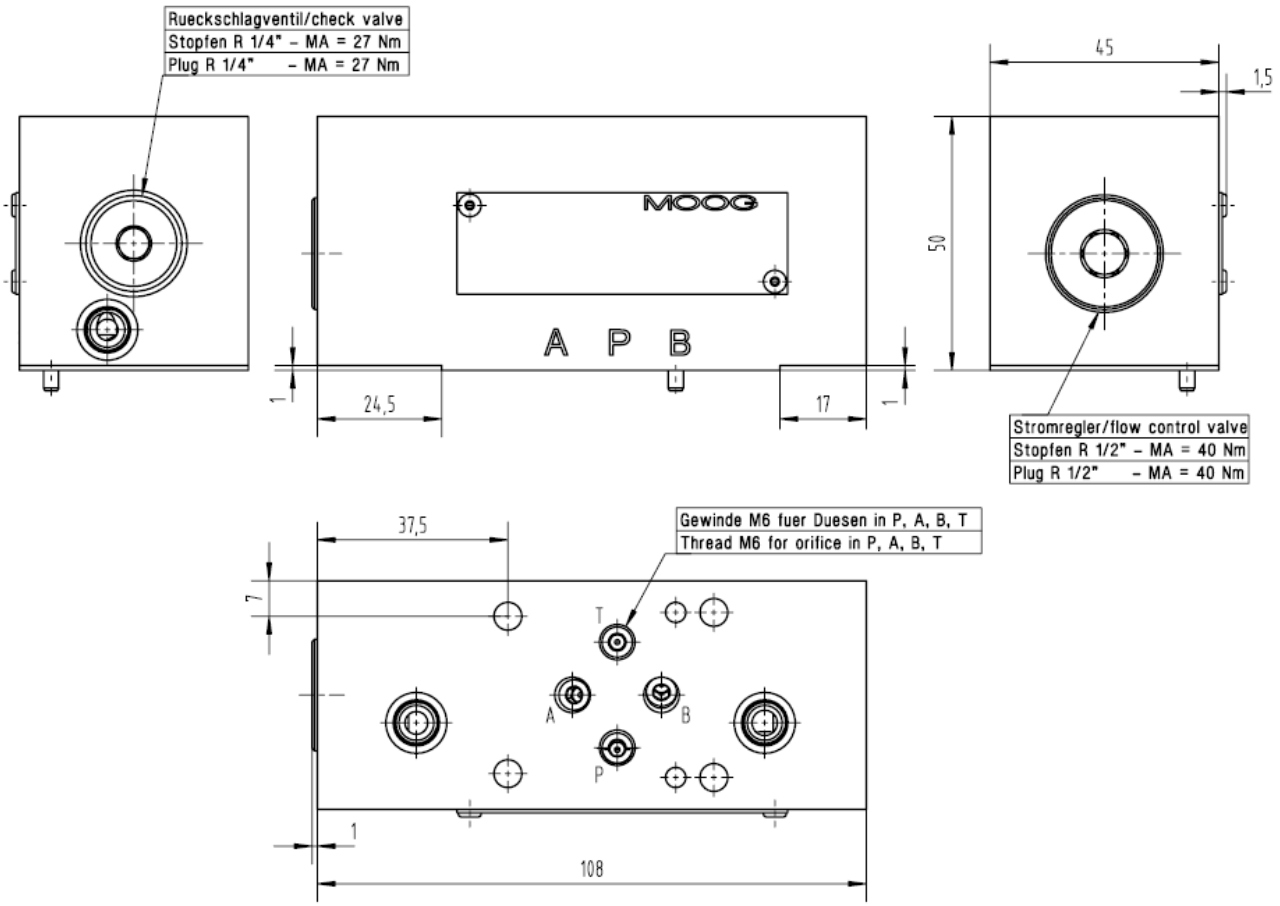
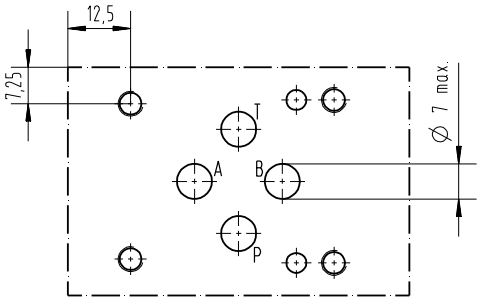


Figure 5: Comparison of pressure relief functions



Port pattern according to
ISO 4401-03-02-0-05



Required surface
finish of mating part

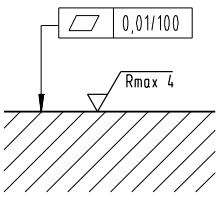
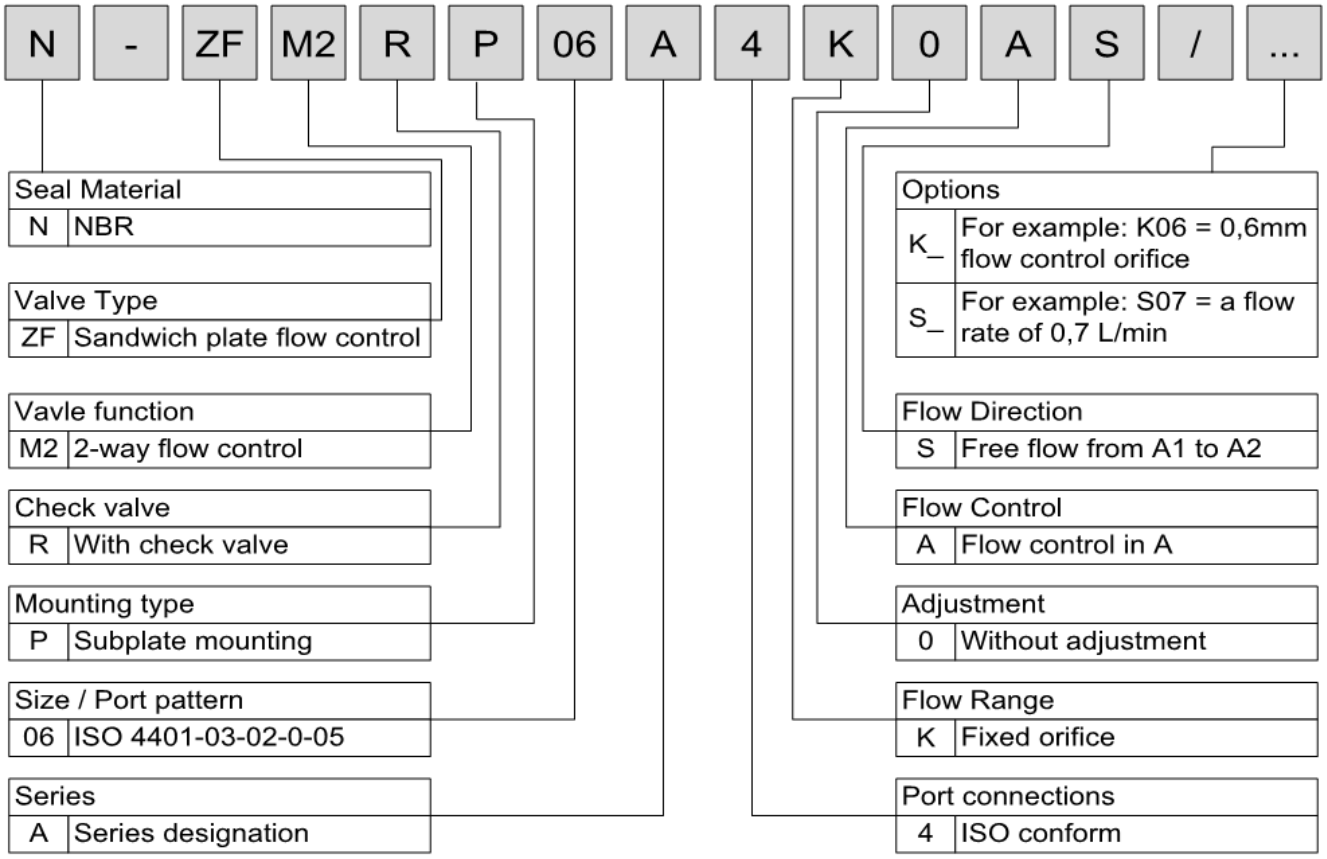


Figure 6: Dimensions



Ordering Codes (Example)		
Flow of [l/min]	**Description**	**Part Number**
0,4	N-ZFM2RP06K4K0AS/K06;S04	XZB10319-006N01
0,7	N-ZFM2RP06K4K0AS/K08;S07	XZB10319-008N01
1,3	N-ZFM2RP06K4K0AS/K10;S13	XZB10319-013N01
1,9	N-ZFM2RP06K4K0AS/K12;S19	XZB10319-019N01
3,0	N-ZFM2RP06K4K0AS/K15;S30	XZB10319-030N01
4,4	N-ZFM2RP06K4K0AS/K18;S44	XZB10319-044N01
5,0	N-ZFM2RP06K4K0AS/K20;S50	XZB10319-050N01
6,0	N-ZFM2RP06K4K0AS/K25;S60	XZB10319-060N01

Seal Kits*			
Pos.	**Qty.**	**Description**	**Part Number**
1	1	Complete seal kit; NBR 90 Shore	XZB10319D000N00
2	4	O-Ring NBR 9,25 x 1,78	

*Seal kits for other hydraulic fluids on request

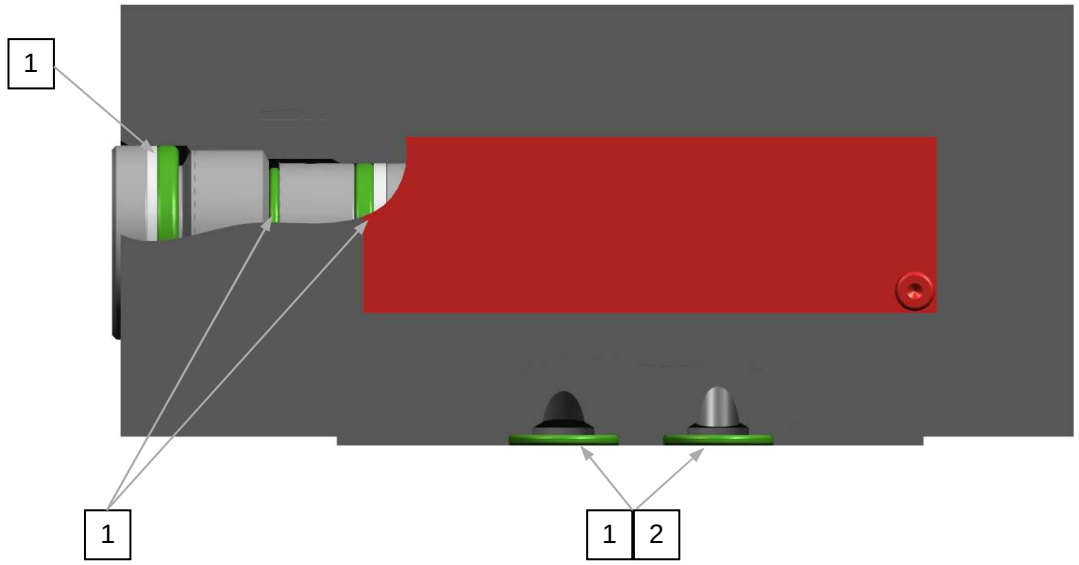


Figure 7: Seal positions

Accessories (must be ordered separately)		
Pos.	**Description**	**Part number**
See page 7	**A selection of orifices available for ports P,A,B,T***	
	Orifice – metric ISO 4026-M6x6x0,6	CA37690-060
	Orifice – metric ISO 4026-M6x6x0,8	CA37690-080
	Orifice – metric ISO 4026-M6x6x1,0	CA37690-100
	Orifice – metric ISO 4026-M6x6x1,2	CA37690-120
	Orifice – metric ISO 4026-M6x6x1,5	CA37690-150
	Orifice – metric ISO 4026-M6x6x2,0	CA37690-200

*other orifices available on request

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Sandwich plate valve with flow control function (ZFM2RP06)
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