

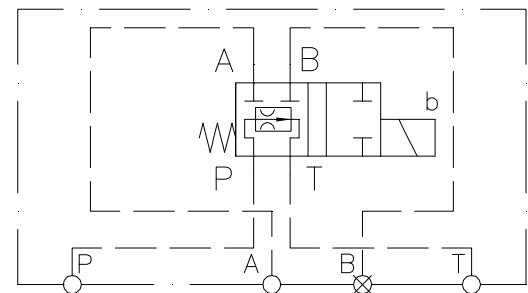
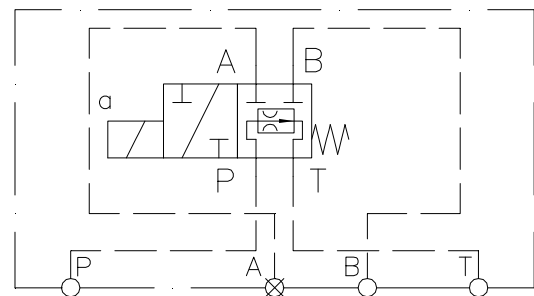
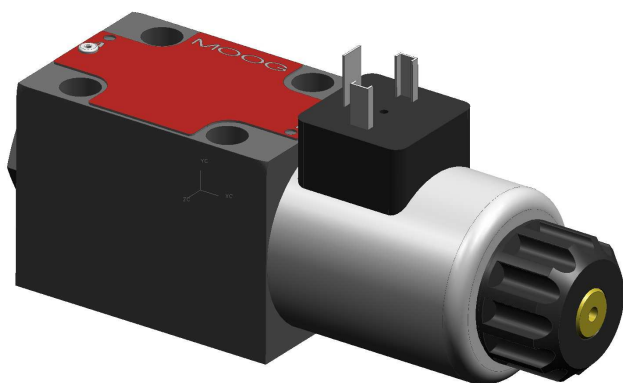
Directional valve with flow control function in normal position (07/2017)

Directional valve with flow control functionality (WE42P06HMC1P)

Nominal size ISO 4401-03-02-0-05 (NB06/CETOP3)

General description

WE42P06HMC1 valves are directional valves with a flow control function when deenergized.



Advantages

- Maximum operating pressure: 350 bar
- When used as a pilot valve for a cartridge, the result is a very soft opening characteristic combined with a very fast closing capability.
- Compact, cost-efficient design thanks to the integrated flow control function.
- Changing of the solenoid coil is fast, simple and possible without any oil contact.
- A single solenoid electrical connector according to ISO 4400
- Modular design allows for combinations with sandwich plates and DRE control covers.

Applications

The WE42P06HMC1P valve can be used as both a primary flow control valve from P→T for a maximum controlled flow of 4 L/min and as a pilot valve for cartridge control applications.

Pilot valve applications are possible when used in combination with a DRE control cover. With the solenoid deenergized, the spring centered normal position results in a controlled flow from P→T.

Depending upon the size of the orifice in the control spool an oil flow of 0,25 L/min to approximately 4 L/min will be removed, independent of pressure, from the cartridge control volume. This will result in a slow, controlled, constant velocity opening of the cartridge element which will make a soft loading and unloading of the hydraulic system possible. An example of an application using a soft unloading pilot valve is shown on page 6, Figure 3.

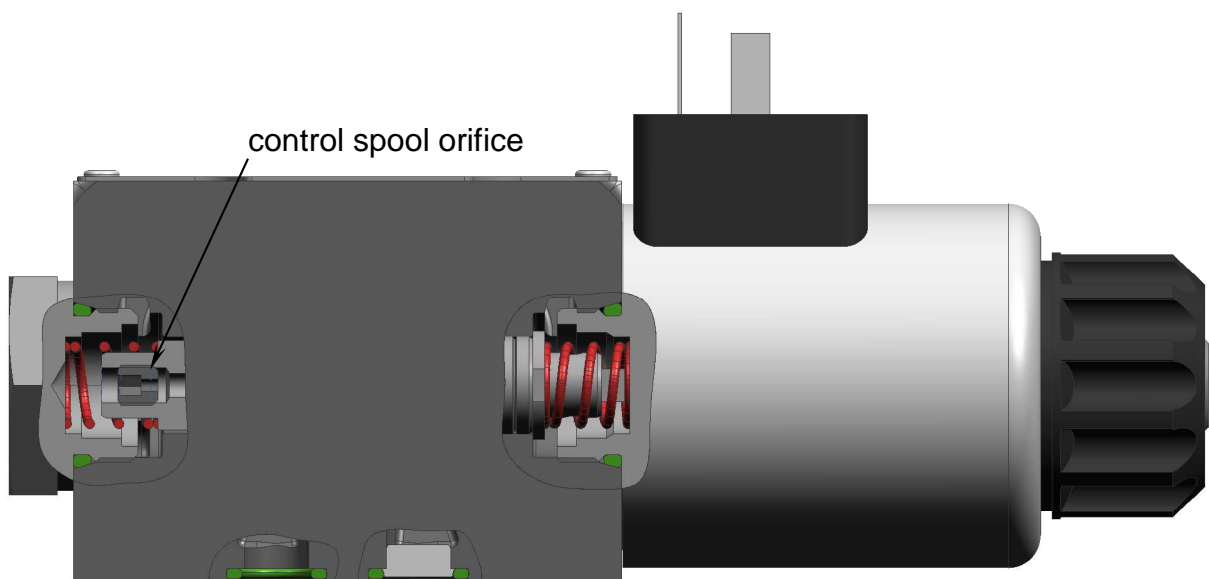


Figure 1: Location of the control spool orifice

* DRE control covers available upon request

Specifications

General Data	Value	Units	Specifications
Valve design	-	-	Direct controlled spool valve
Mounting style	-	-	Manifold mount
Mounting orientation	-	-	preferably solenoid pointing down
Port sizing	-	-	ISO 4401-03-02-0-05
Ambient temperature range	min.	°C	-20
	max.	°C	+60
Weight	m	kg	1,6
Hydraulic			
Max. operating pressure	P,A,B	MPa	35
	T	MPa	21
Max. flow	Q _{max}	L/min	30 (P→A or P→B) 4 (max. controlled P→T)
Seal material : Hydraulic fluid (NBR is standard)	-	-	NBR: mineral oil based hydraulic fluids, HFA-,HFB,HFC hydraulic fluids.
			FKM: Mineral oil based hydraulic fluids; HFD hydraulic fluids
			Seals for other hydraulic fluids available upon request
Hydraulic fluid temperature range	min.	°C	-30 (NBR) / -10 (FKM)
	max.	°C	+80 (NBR + FKM)
Viscosity range	min.	mm ² /s	2,8
	max.	mm ² /s	380
Fluid cleanliness (ISO Code)	-	-	Max. allowable contamination of the hydraulic fluid according to ISO 4406 (C), Class 20/18/15
Electric			
Operating voltage	DC	V	24
Acceptable supply voltage tolerance	-	%	±10
Max. switching frequency	Cycles/h	-	10.000
Duty cycle		%	100
Lifetime-expectancy (number of switching cycles)	-	-	10 ⁷
Protection class (EN 60529)	-	-	IP 65
Solenoid connector plug	-	-	ISO 4400 type connector plug
Solenoid type	-	-	Solenoid switching in oil
Power consumption	max.	W	30
Max. solenoid coil temperature	max.	°C	155
Response time *	On	ms	30...50
	Off	ms	30...100

* measured with a viscosity of $\nu = 32 \text{ mm}^2/\text{s}$

Pressure - Flow characteristics

The WE42P06HMC1P directional valve can provide a pressure independent flow control of up to 4 L/min depending on the size of the orifice in the control spool. Selection of the proper orifice size for the flow desired can be done using Figure 2.

In addition to the pressure independent flow characteristics, Figure 2 demonstrates a further advantage of this valve. In order to achieve a flow of approximately 2,5 L/min with a $\Delta p=300$ bar, a conventional orifice configuration would require a 0,6 mm orifice. With the directional valve it is possible to achieve the same flow control using a 1,5 mm orifice in the control spool. As a result of this larger orifice size, the entire hydraulic system is therefore less prone to failure.

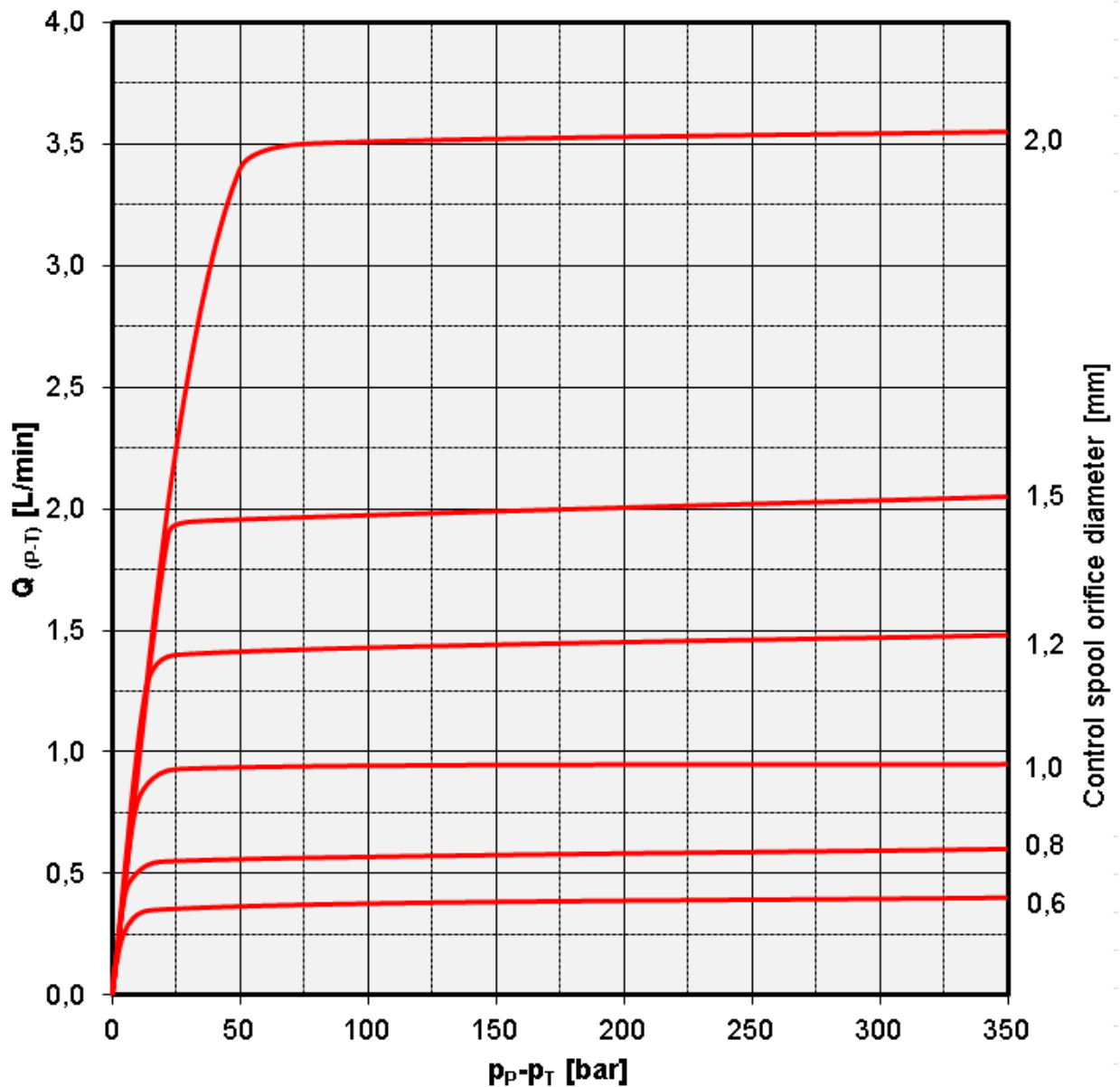


Figure 2: Control characteristics as a function of the control spool orifice size

Use as an unloading valve

Figure 3 shows an example of the directional valve used as an unloading pilot valve in a cartridge application. When used in combination with a pressure limiting pilot valve and a DRE control cover it is possible to achieve a very soft, pressure independent, unloading without any loss of closing speed. The soft unloading characteristic can be seen in Figure 4.

In general, this directional valve can be used as a pilot valve wherever a soft unloading characteristic is desired.

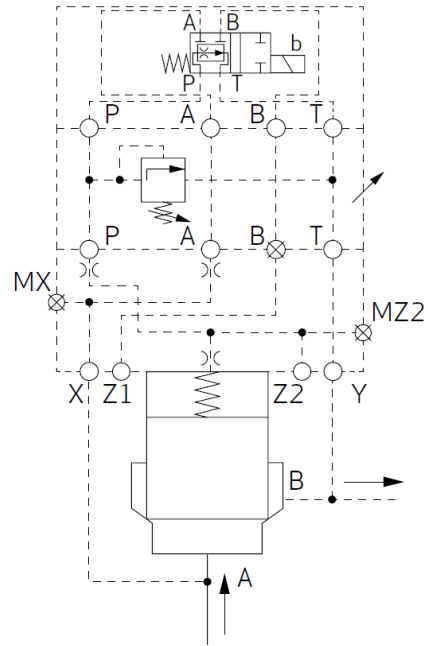


Figure 3: Use as an unloading valve

Unloading function

Pressure unloading A → B in relation to control signal and time, measured at $t = 45^\circ\text{C}$

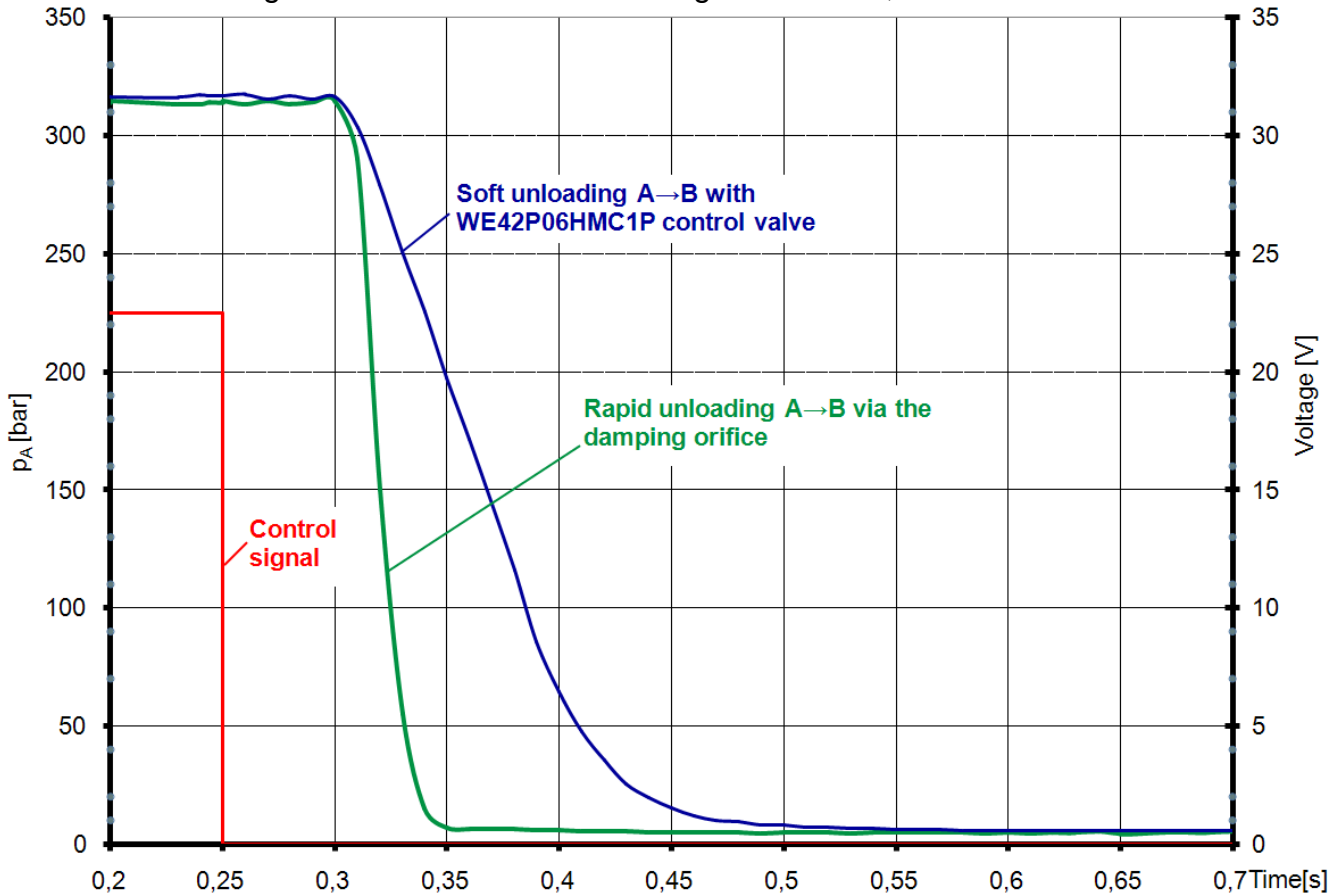
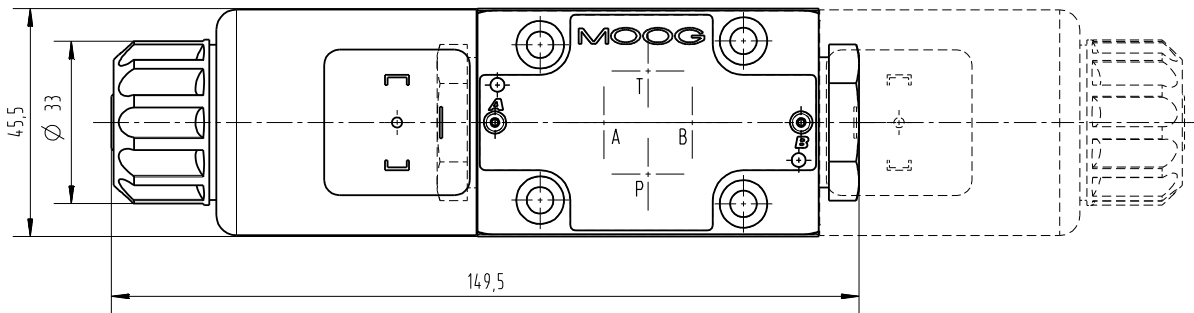
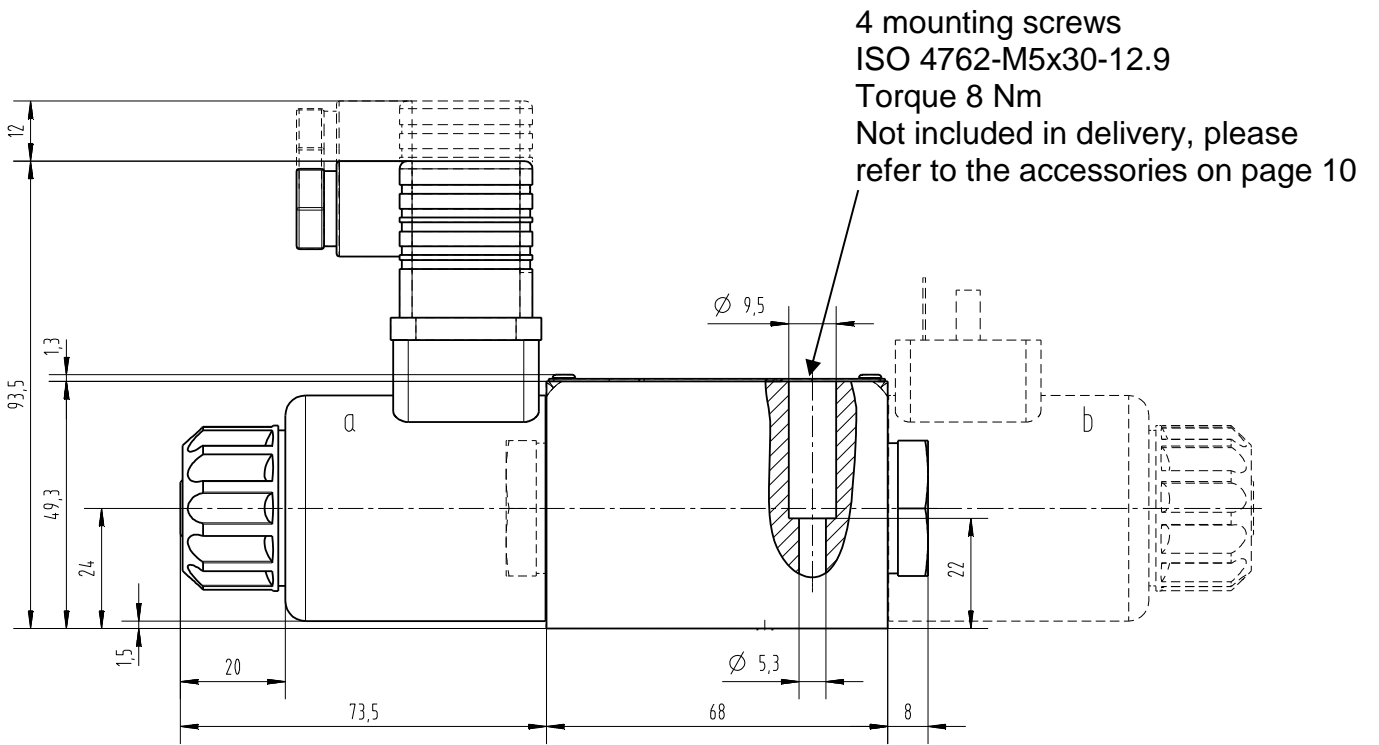
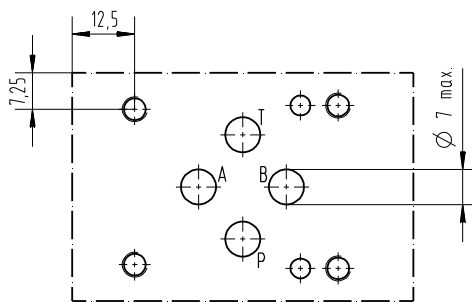


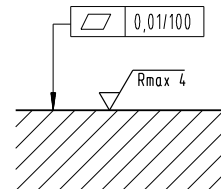
Figure 4: Comparison of unloading characteristics

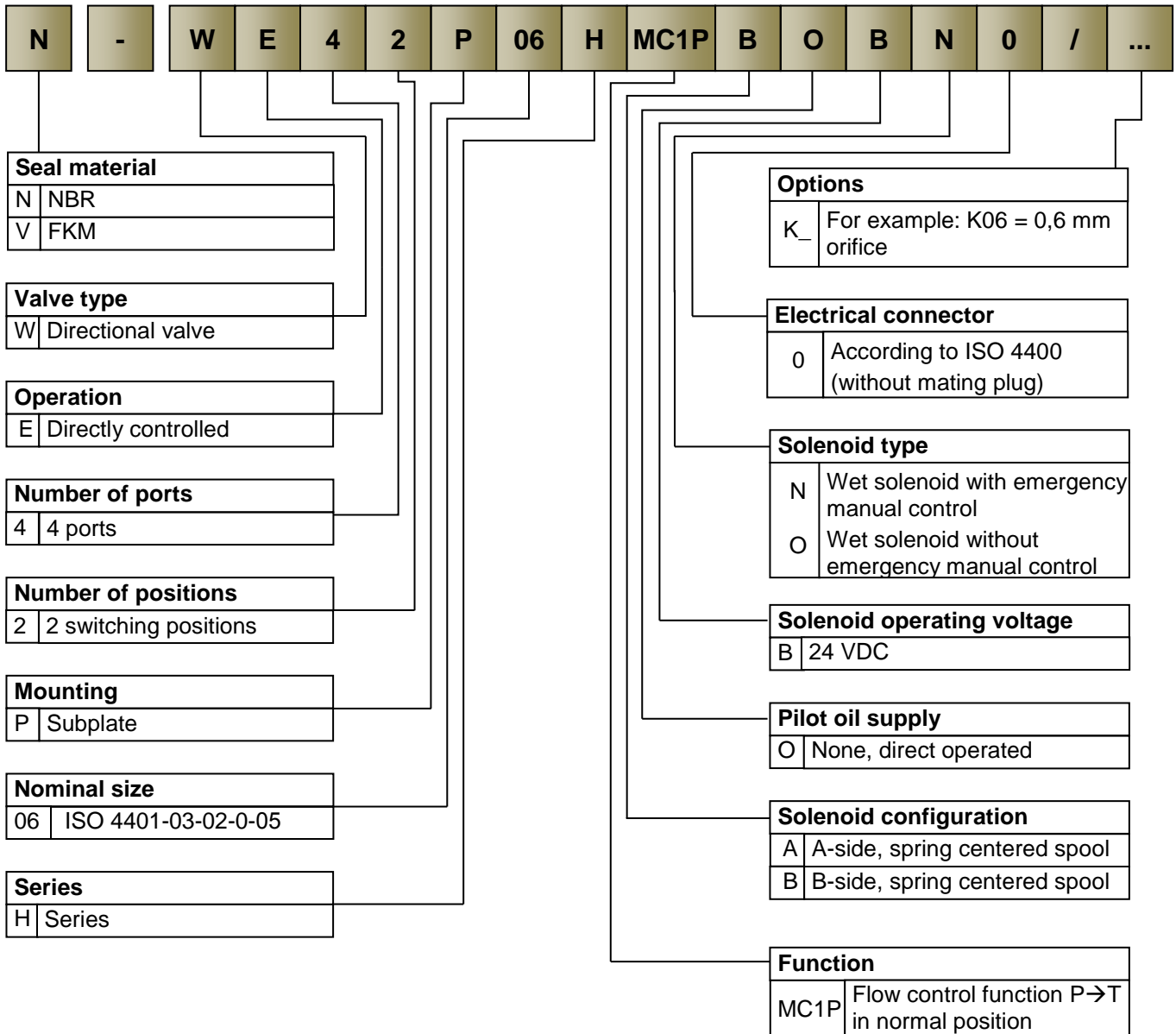


Mounting surface according to ISO 4401-03-02-0-05



Required surface quality of the mating part



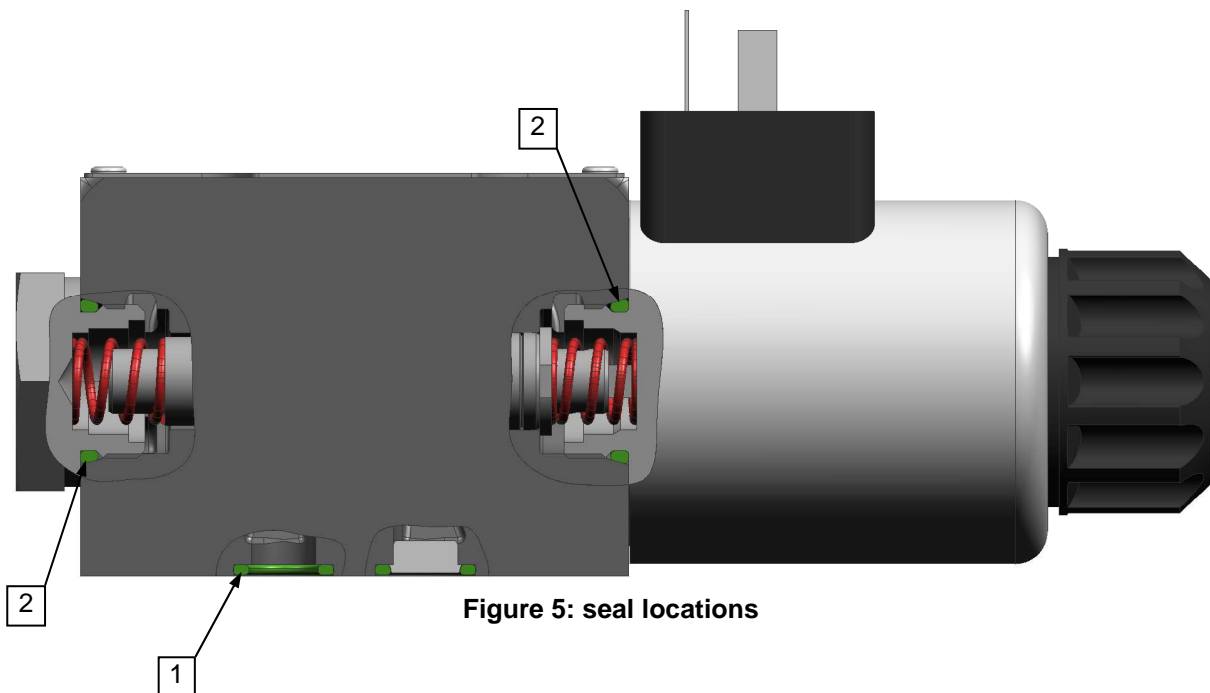


Order Number (NBR)	
Type Code	Order Number
without an orifice in the control spool	
N-WE42P06HMC1PAOBN0/K99	X820-MC1PA-000N01
N-WE42P06HMC1PBOBN0/K99	X820-MC1PB-000N01
Ø 0,6 mm orifice in the control spool	
N-WE42P06HMC1PAOBN0/K06	X820-MC1PA-002N01
N-WE42P06HMC1PBOBN0/K06	X820-MC1PB-001N01
Ø 0,8 mm orifice in the control spool	
N-WE42P06HMC1PAOBN0/K08	X820-MC1PA-003N01
N-WE42P06HMC1PBOBN0/ K08	X820-MC1PB-002N01

*Please use Figure 2 on page 5 when selecting an orifice size. For mounting information and order numbers see page 10.

Seal kit *			
Pos.	Qty.	Description	Order Number
-	1	Complete seal kit NBR (Pos.1+2)	X820DMC_000N00
1	4	O-Ring NBR 9,25 x 1,78	
2	2	O-Ring NBR 17,17 x 1,78	

*Seal materials for other hydraulic fluid types available upon request



Accessories (must be ordered separately)		
Pos.	Description	Order Number
1	Mounting screws ISO 4762-M5x30-12.9 Torque [Nm] $8 \pm 0,4$	X784-10514
2	Plug X820	X784-94000
Available control spool orifices*		
3	Orifice – metric ISO 4026-M5x5x0,6	X784-90506
	Orifice – metric ISO 4026-M5x5x0,8	X784-90508
	Orifice – metric ISO 4026-M5x5x1,0	X784-90510
	Orifice – metric ISO 4026-M5x5x1,2	X784-90512
	Orifice – metric ISO 4026-M5x5x1,5	X784-90515
	Orifice – metric ISO 4026-M5x5x2,0	X784-90520

*additional orifices available upon request

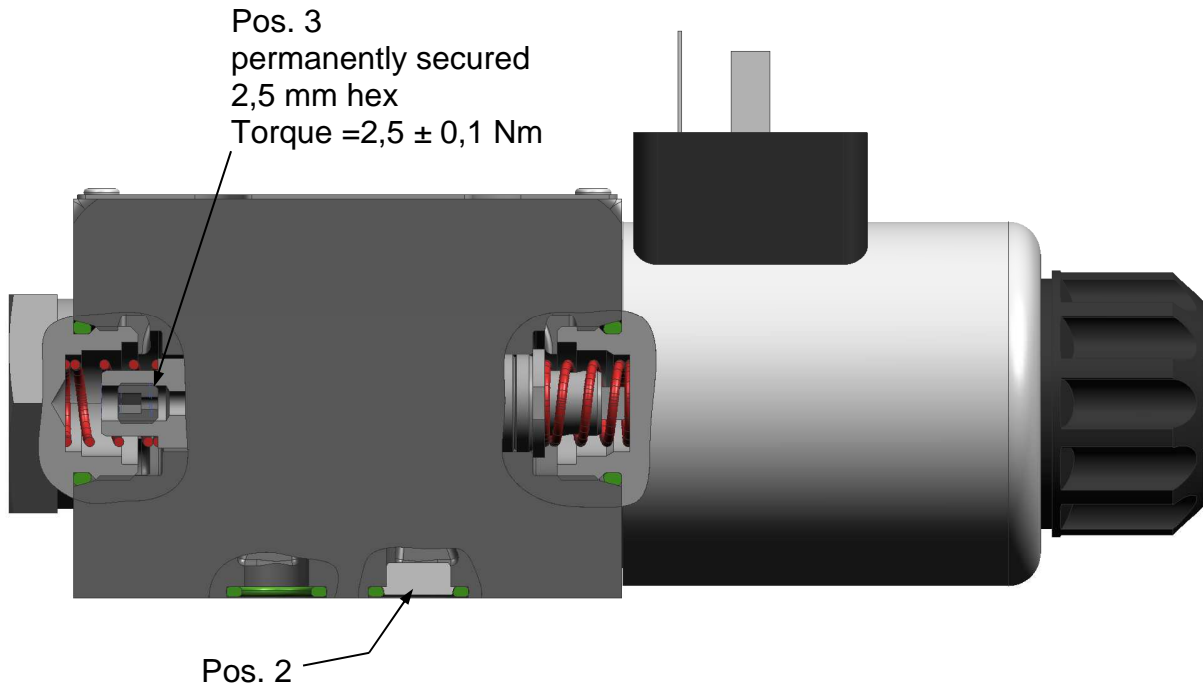


Figure 6: accessory locations

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Directional valve with flow control functionality (WE42P06HMC1P)
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