Ordering details

FD			2X /		V	*

Nominal size 12 **= 12**
Nominal size 16 **= 16**
Nominal size 25 **= 25**
Nominal size 32 **= 32**

For manifold mounting (cartridge valve) **= KA**
For sub-plate mounting **without** secondary DBV **= PA**
For SAE flange connections **without** secondary DBV **= FA**
For SAE flange connections **with** secondary DBV **= FB**

Series 20 to 29 **= 2X**
(20 to 29: unchanged installation and connection dimensions)

Further details in clear text

V = FKM seals, suitable for mineral oil to DIN 51 524 (HL, HLP) and phosphate ester (HFD-R)

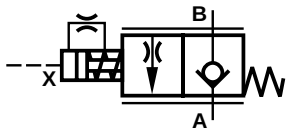
B00 = **Without** orifice
B03 = Orifice Ø 0.30 mm (sizes 12 and 16)
B04 = Orifice Ø 0.40 mm (size 25)
B06 = Orifice Ø 0.60 mm (size 32)
(other orifice diameters on request)

Pressure range of the secondary pressure relief valve
Valve with SAE flange connections (**only** for version "FB")

200 = Pressure setting up to 200 bar
300 = Pressure setting up to 300 bar
400 = Pressure setting up to 400 bar

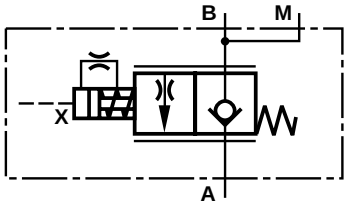
Symbols

Without secondary pressure relief valve



Valve type:

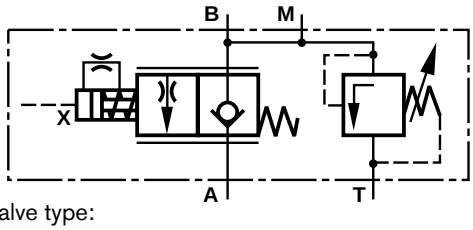
FD 12 KA 2X/B03..
FD 16 KA 2X/B03..
FD 25 KA 2X/B04..
FD 32 KA 2X/B06..



Valve type:

FD 12 PA 2X/B03.. FD 12 FA 2X/B03..
FD 16 PA 2X/B03.. FD 16 FA 2X/B03..
FD 25 PA 2X/B04.. FD 25 FA 2X/B04..
FD 32 PA 2X/B06.. FD 32 FA 2X/B06..

With secondary pressure relief valve



Valve type:

FD 12 FB 2X/.B03..
FD 16 FB 2X/.B03..
FD 25 FB 2X/.B04..
FD 32 FB 2X/.B06..

Functional description, section

Check-Q-meters are used in hydraulic systems to influence the speeds of hydraulic motors and cylinders independent of the load (prevents running away). In addition there is an isolator function for pipe burst safety.

The check-Q-meter comprises basically of the housing (1), main poppet (2), pilot part (3), pilot spool (4), damping spool (5) and pilot damping (6).

Lifting the load

With free-flow from A to B the main spool (2) is opened. If the load pressure fails (e.g. pipe break between the directional valve and port A) then the main spool (2) immediately closes. This function is achieved by the connection of the load side (7) with chamber (8).

Lowering the load (circuit examples)

The direction of flow is from B to A. Port A is connected to tank via the directional valve. The piston rod side of the cylinder has a flow applied which corresponds to the working conditions. The relationship between the control pressure at port X and the load pressure at port B = 1 : 20.

When the control pressure is reached the pre-opening of the main spool takes place. Via the control spool (4) the pilot stage (3) is lifted off its seat and chamber (8) is de-compressed via this drilling and port A to tank. At the same time the load pressure in port B is no longer applied to chamber (8), this is due to the longitudinal movement of the pilot stage (3) within the main spool. The main poppet (2) is thereby unloaded. The reverse side of the control spool (4) at the main poppet (2), lies against the collar of the damping spool (5).

The pressure required at port X to open B to A is now only influenced by the spring in chamber (9). The pressure required to begin opening the connection B to A is 20 bar; to fully open the connection 50 bar is required.

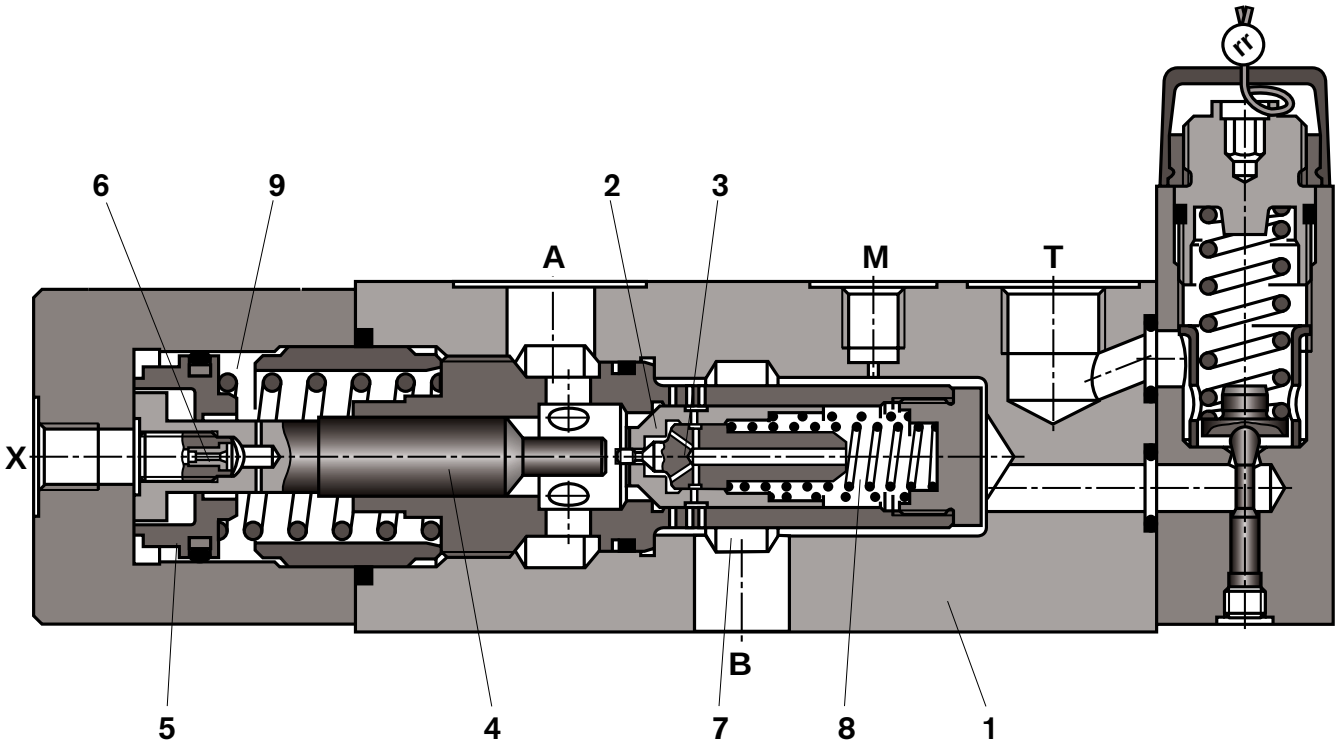
The opening cross-section for flow control increases progressively. It is created by the successive opeining of radial drillings in the bush and the main poppet (2) land.

The relationship between the control pressure, cracking pressure and differential pressure determines the flow to the actuator via the connection of B to A. Thus uncontrolled running away of the actuator is prevented.

The controlled lowering procedure is not affected even if there is a pipe burst between the directional valve and port A.

Guidelines for influencing the opening and closing times of the check-Q-meter.

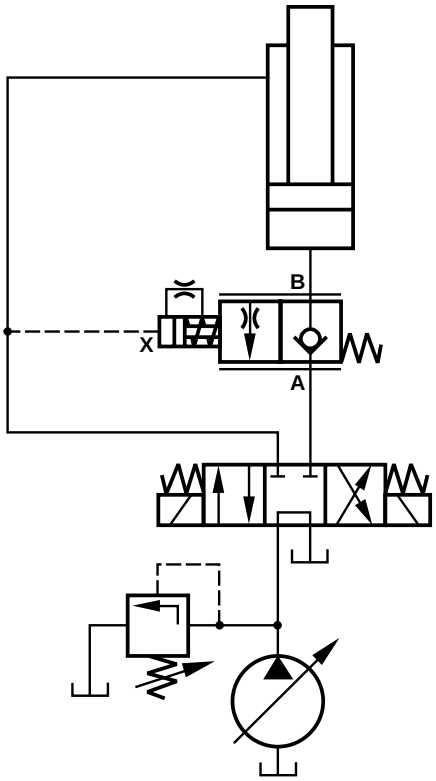
- Throttling of the opening sequence is via orifice (6) in the control spool (4) and both sides of the damping spool (5). The orifice (6) is protected by sieves.
- The closing movement of the check-Q-meter is virtually un-throttled.
- When being used in conjunction with cylinders the control line to port X can be fitted with a throttle check valve (meter-out control) to influence the closing sequence.
- When being used in conjunction with motors a throttle check valve should not be fitted in the control line to port X. In this case it is recommended that the control times of the directional valve are influenced.



Circuit examples

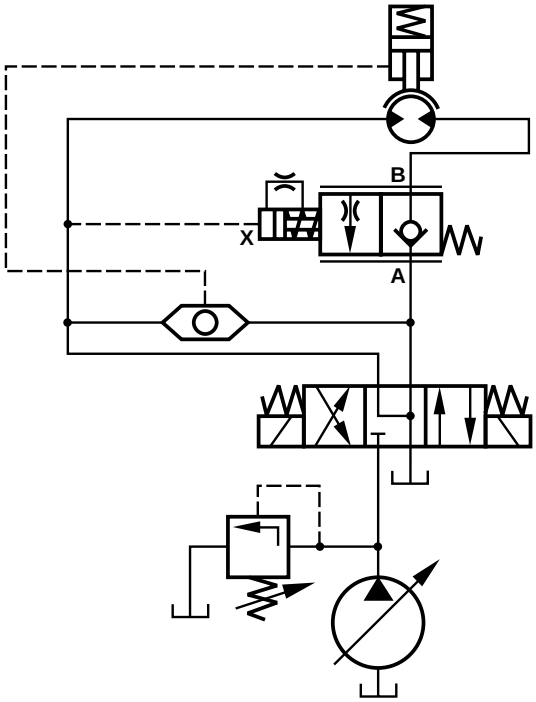
Differential cylinder

On safety grounds, a closed centre directional valve should always be used!



Hydraulic motor

So that the holding brake can operate both of the direction all valve ports have to be connected to port T in the de-energised position. If the brake is externally unloaded then it is possible to use a closed centre directional valve in the de-energised condition.

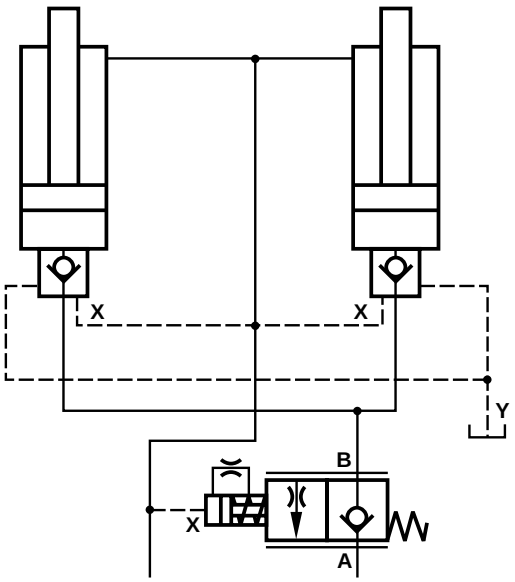


Note:

Two check-Q-meters cannot be used to control two cylinders which are forced mechanically to move together, as synchronisation and the same pressure cannot be guaranteed in each cylinder.

Therefore, the cylinders have to be equipped with two pilot operated check valves, type SL. The check-Q-meter is fitted in a common line.

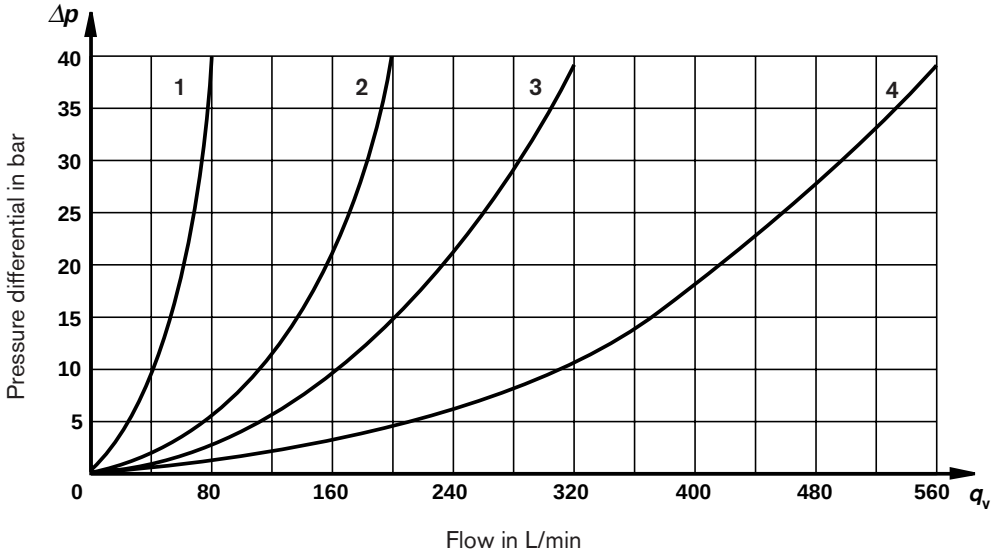
In this case, the load pressure must not exceed 200 bar!



Technical Data (For application outside these parameters, please consult us!)

Operating pressure, ports A, X	bar	up to 350
port B	bar	up to 420
Pilot pressure, port X (flow control range)	bar	min. 20 to 50, max. 350
Cracking pressure, A to B	bar	2
Setting pressure for secondary pressure relief valve	bar	up to 400
Flow	L/min	80 (size 12), 200 (size 16), 320 (size 25), 560 (size 32)
Area ratio of the pre-opening		$\frac{\text{poppet seat area}}{\text{area of pilot spool}} = \frac{1}{20}$
Pressure fluid		mineral oil to DIN 51524 (HL,HLP); phosphate ester (HFD-R)
Pressure fluid temperature range	°C	– 20 to + 80
Viscosity range	mm^2/s	10 to 800
Degree of contamination (maximum permissible		ISO 4406 (C) class 20/18/15

Characteristic curves (measured at $\nu = 41\ mm^2$ and $\vartheta = 50\ °C$)

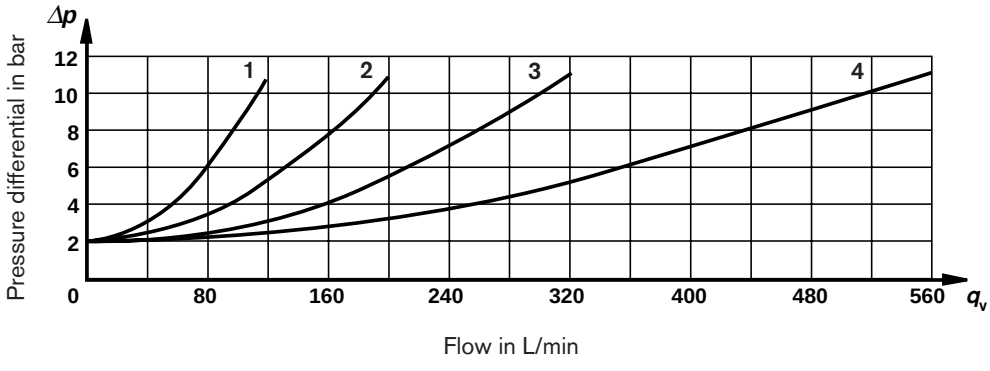


Pressure differential Δp in relation to flow q_v, measured at throttle position:

Throttle fully open ($p_x = 50$ bar)

B to A

1 = size 12
2 = size 16
3 = size 25
4 = size 32



Pressure differential Δp in in relation to flow q_v, measured over the check valve

A to B