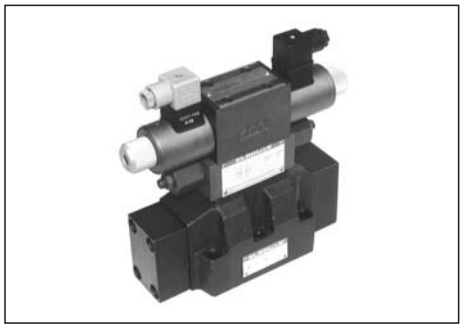
4/2, 4/3 -WAY DIRECTIONAL VALVES type KV

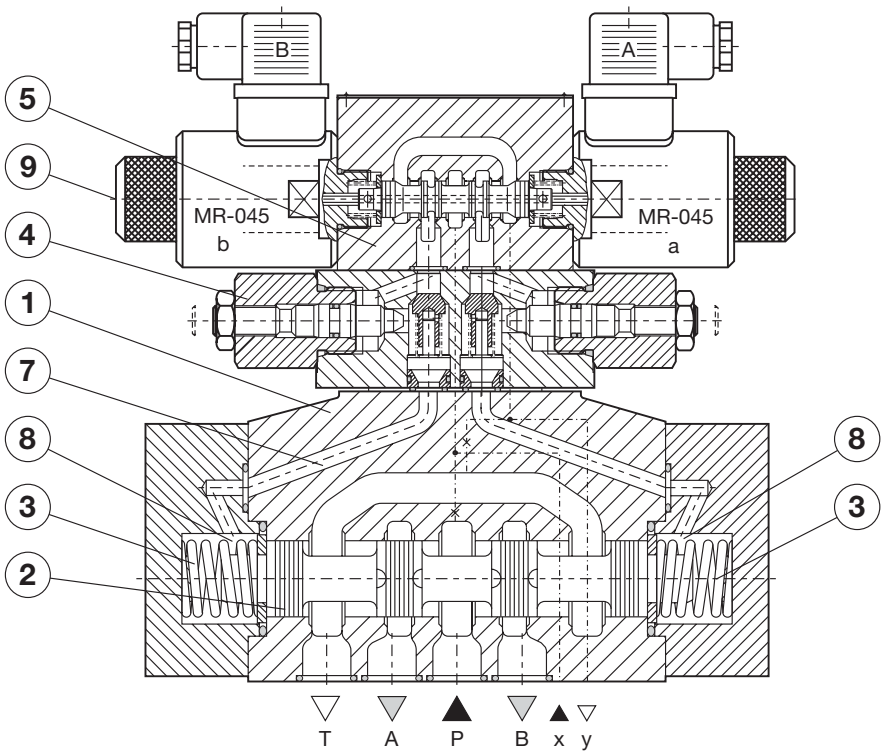
- NS-16
- to 350 bar
- to 300 l/min

- Indirect, solenoid, and mechanical (by lever) operation
- Connection diagram and connecting dimensions to ISO 4401
- Plug-in solenoid connector to ISO 4400
- Protection of solenoid IP 65 to DIN EN 60529
- Fulfil EMC (89/336/EEC)



KV-4/3-16-..

Description of operation

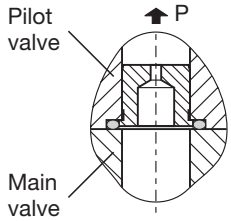


Directional valves type KV with indirect, solenoid-hydraulic operation control the hydraulic fluid flow direction.
These valves consist of the main valve (1), a control spool (2), two return springs (3) in 4/3-way valves and none in 4/2-way valves, a double throttle check/valve (4) and a pilot valve (5).
The pilot valve (5) is connected with the pressure chambers (8) via the pilot line (7). Feeding of the pilot valve oil is either or external (via the port "x"). Change-over of the control spool to one of the operating position is activated by the introduction of oil via the pilot valve (5) into one of the pressure chambers (8). A pressure rise in chambers provokes the movement of the control spool (2). Suitable links between ports A,B,P,T according to spool types are established as set forth in the table.
When the solenoid of the pilot valve (5) are de-energised a link between the pressure chamber (8) and the return line "y" for the pilot oil discharge is established. A pressure drop in the chamber actuates the main valve return spring (3) which automatically return the control spool to the neutral position.

Dischange of the return pilot oil from the pressure chambers is either internal or external (via the port "y").
Manual change-over of the main valve is also possible by pressing the emergency hand operator (9).
Indirect directional valves can also be provided with a manual pilot valve. These valves are manually operated by moving the operating lever.

Throttle

If the pilot oil supply rate (x) is greater than permissible a cartridge throttle shall be fitted into the P line of the directional valve.



Ordering code

KV - 4 / - 16 - - - *

- Number of control spool positions
- Spool type
- Pilot oil supply and discharge
- Supply voltage
- Plug in connector
- Pilot oil control with a double throttle valve
- Pilot oil control with pressure reducing valve
- Pre-load valve
- Throttle
- Seal type
- Special requirements to be briefly specified

Number of control spool position

two positions = **2**
three positions = **3**

Pilot oil supply and discharge

external x,y = **Z**
internal x,y = **N**
internal x, external y = **XN**
internal y, external x = **YN**

for supply and discharge with spool types 2 and 3, refer to the table of technical data

Supply voltage

direct voltage		alternating voltage		
24 V	= **no desig.**	12 V	= **12 AC**	
12 V	= **12 DC**	24 V	= **24 AC**	
48 V	= **48 DC**	48 V	= **48 AC**	
110 V	= **110 DC**	110 V	= **110 AC**	
230 V	= **230 DC**	230 V	= **230 AC**	*

- Alternating voltage solenoids are fitted with a bridge rectifier.
- With solenoids of over 48 V an earthing clamp (⏚) to DIN EN 175301-8003 must be connected.

* To fulfil EMC (89/336/EEC) a capacitor must be built in (see 10.2.2)

Plug-in connector

without signal lamp = **no design**
with signal lamp = **L**

Pilot oil control with a double throttle valve

without a double throttle valve = **no desig.**
with a double throttle valve = **H**

Pilot oil control with pressure reducing valve

without pressure reducing valve = **no desig.**
with pressure reducing valve = **RT**

Pre-load valve

without pre-load valve = **no desig.**
with pre-load valve = **V**

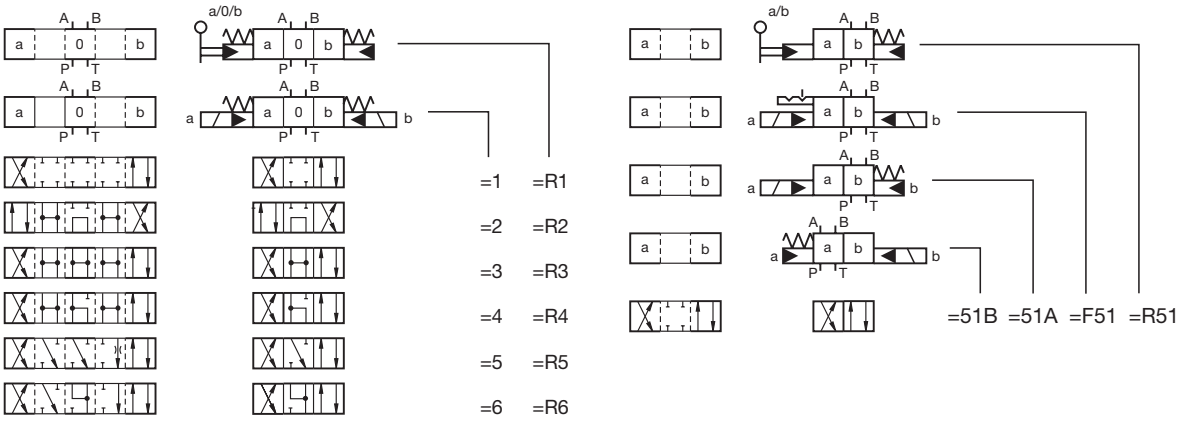
Throttle

without throttle in "P" line = **no desig.**
throttle 0,8 mm dia = **D08**
throttle 1,0 mm dia = **D10**
throttle 1,2 mm dia = **D12**

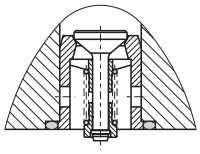
Seal type

NBR seals for mineral oil HL, HLP, to DIN 51524 = **no desig.**
FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380 = **E**

Spool types



Pre-load valve



In valves with a low pressure bypass and internal pilot oil feed, minimum pilot pressure is obtained by installing a pre-load valve in the P-port of the main valve.
The cracking pressure is approx. 4,5 bar.

Symbol

◯ ... connection in line ⊗ ... no connection in line

Simplified symbol	Elaborated symbol	Simplified symbol	Elaborated symbol
N		N	
YN		YN	
XN		XN	
Z		Z	

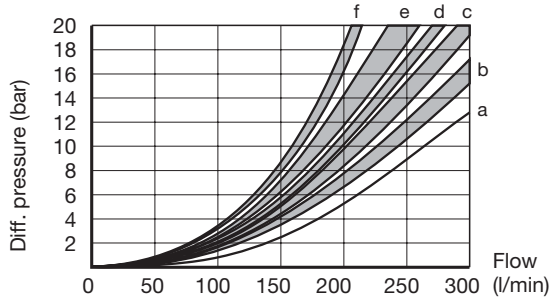
Technical data

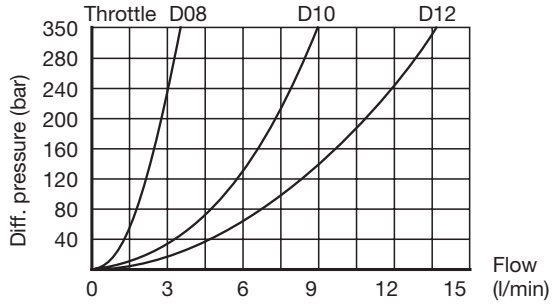
Flow rate		l/min	300
Operating pressure	ports P, A, B port T	bar bar	350 210
Pilot oil pressure (x-external)		bar	50-250
Pilot oil pressure (x-internal) Pre-load valve is fitted into P-port of the main valve Without Pre-load valve in the P-port of the main valve	In valve types with internal pilot oil supply (x) the spool types 2, 3, and 4 are possible only when the oil flow in the direction from P towards T achieves the flow rate Q = 150 l/min, with the control spool in the centre position.		
Fluid temperature range		°C	-20 to +70
Viscosity range		mm^2/s	15 to 380
Required pilot oil volume	two-position valve three-position valve	cm^3	7,8 3,9
Mass	main valve 4/3 pilot valve 4/2 pilot valve throttle/check valve pressure reducing valve	kg	8 2,50 2,20 1,45 1,70
Mounting position	optional, horizontal for spool types 4/2		
Switch-on time Solenoid change-over from the centre to the operating position	three-position valve two-position valve	ms ms	60 85
Switch-off time Solenoid change-over from the operating to the centre position	three-position valve two-position valve	ms ms	45 50
Filtration		NAS 1638	8
Ambient temperature range		°C	to +150
Coil temperature range		°C	to +180
Power		W	29*
Voltage		V	≂12,24,48,110,230

The switch-on and switch-off times apply to 24 V DC solenoids.

* - 12 V supply voltage - 36 W

Δp - Q Performance curves (measured at t = 50 °C and υ = 32 mm²/s)





Spool types	P-A	P-B	A-T	B-T	P-T
1,R1,51B,51A,F51,R51	e	e	e	f	-
2,R2	a	b	c	e	f
3,R3	b	b	c	d	-
4,R4	b	c	c	e	-
5,R5	b	c	c	e	-
6,R6	b	c	d	e	-

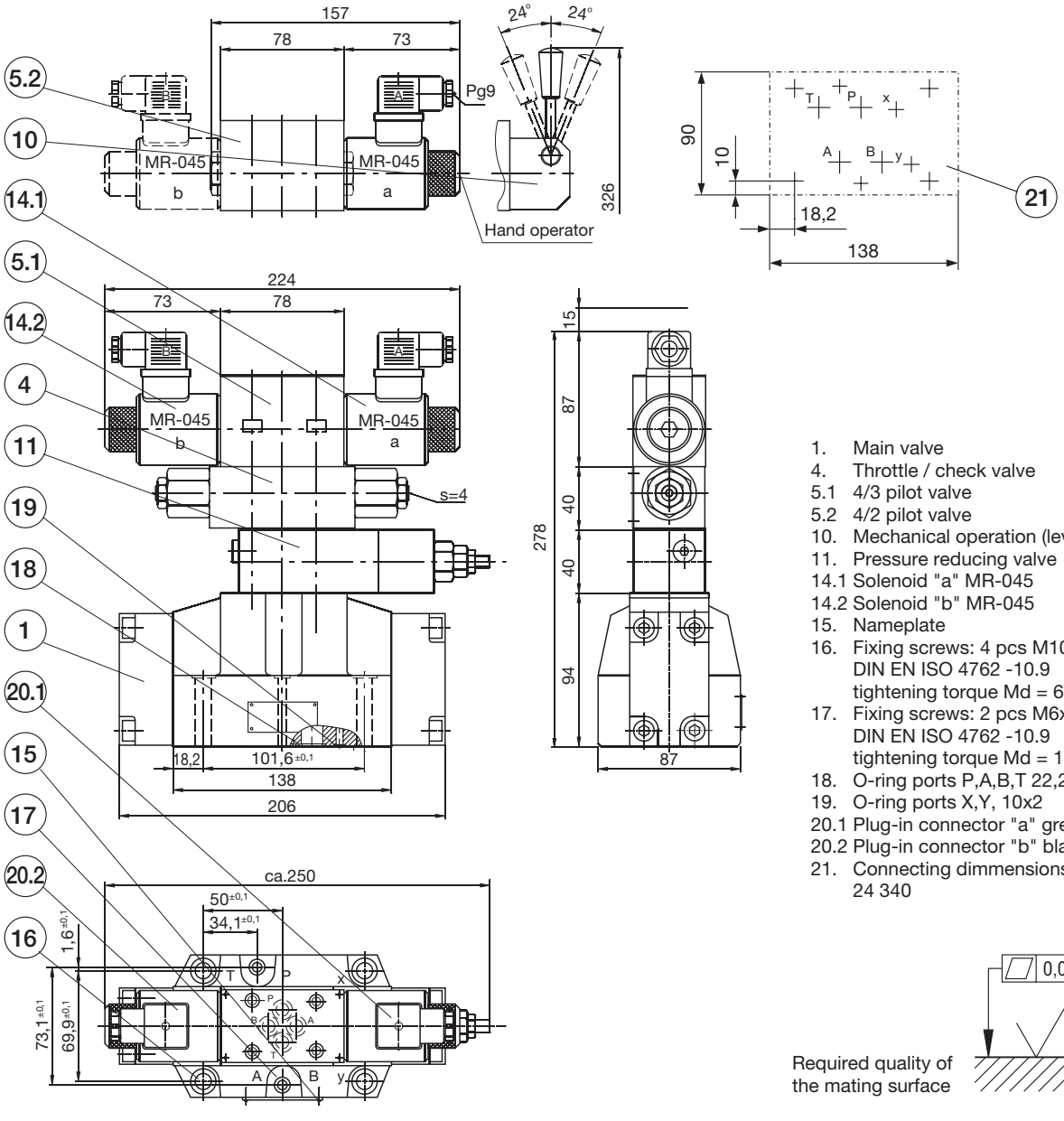
Throttle check valve

The throttle/check valve used for setting the supply flow rate of the pilot oil to the pressure chambers. Simultaneously, the change-over speed of the main control spool is adjusted. In this way a smoother change-over, without hydraulic shocks is provided.

Pressure reducing valve

The pressure reducing valve used when the pilot oil "X" pressure exceeds the permissible limit p = 250 bar.

Dimensions (mm)



1. Main valve
4. Throttle / check valve
5.1 4/3 pilot valve
5.2 4/2 pilot valve
10. Mechanical operation (lever)
11. Pressure reducing valve
14.1 Solenoid "a" MR-045
14.2 Solenoid "b" MR-045
15. Nameplate
16. Fixing screws: 4 pcs M10x60 to DIN EN ISO 4762 -10.9 tightening torque Md = 64 Nm
17. Fixing screws: 2 pcs M6x55 to DIN EN ISO 4762 -10.9 tightening torque Md = 14 Nm
18. O-ring ports P,A,B,T 22,22 x 2,62
19. O-ring ports X,Y, 10x2
20.1 Plug-in connector "a" grey
20.2 Plug-in connector "b" black
21. Connecting dimmensions to DIN 24 340

Required quality of the mating surface