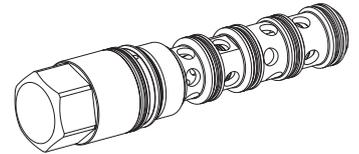


## Proportional spool valve

### Screw-in cartridge construction

- ◆ pilot operated
- ◆  $Q_{max} = 150$  l/min
- ◆ 1 volume flow level
- ◆  $Q_{Nmax} = 90$  l/min
- ◆  $p_{max} = 350$  bar

**M33 x 2**
**Wandfluh standard**


## DESCRIPTION

Pilot operated proportional spool valve in screw-in cartridge construction. Precise spool fit, low leakage, long service life time. Spool made of hardened steel. The valve is controlled externally through a pilot pressure via the x and y connections. Without control, the piston is held in the central position by a spring. Proportional to the pilot pressure, the spool opening and the valve volume flow increase. Thanks to the optimum spool form, sensitive movement processes are possible. For the control, Wandfluh proportional pressure valves (see register 2.3) and Wandfluh proportional amplifiers (see register 1.13) are available.

## APPLICATION

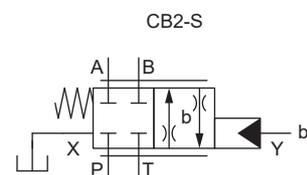
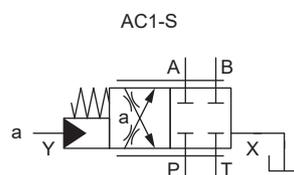
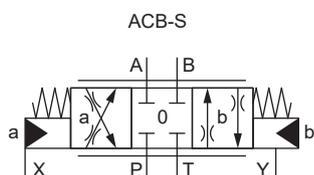
Proportional spool valves are perfectly suitable for demanding tasks due to the high resolution, large volume flow and low hysteresis. The applications are in the industry as well as in the mobile hydraulics for the smooth control of hydraulic actuators. Some examples: control of the rotor blades of wind generators, forestry and earth moving machines, machine tools and paper production machines, simple position controls, robotics and fan control.

## TYPE CODE

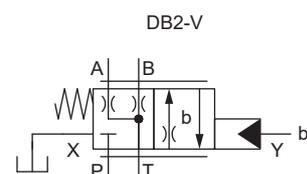
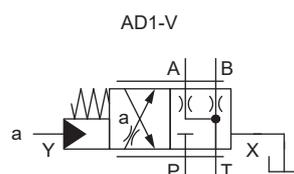
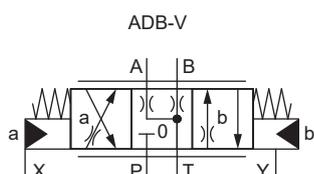
Spool valve	W V P PM33 - <input type="text"/> - <input type="text"/> - 90 # <input type="text"/>
Directly operated	
Proportional	
Screw-in cartridge M33 x 2	
Designation of symbols acc. to table	
Nominal volume flow rate $Q_N$ 90 l/min	
Design index (subject to change)	
<small>1.10-2310</small>	

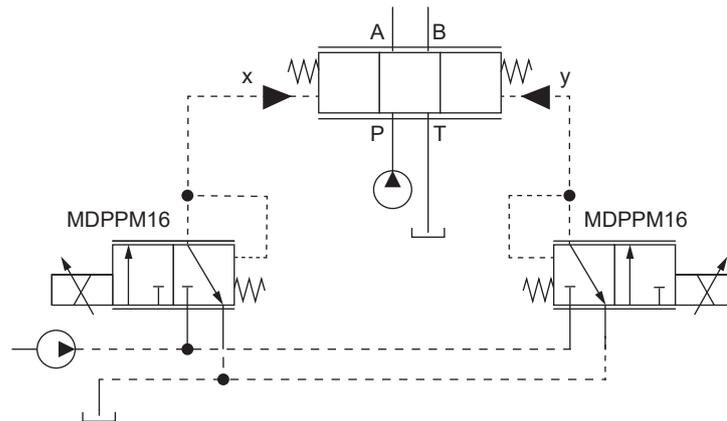
## SYMBOL

### Symmetrical control



### Meter-in control



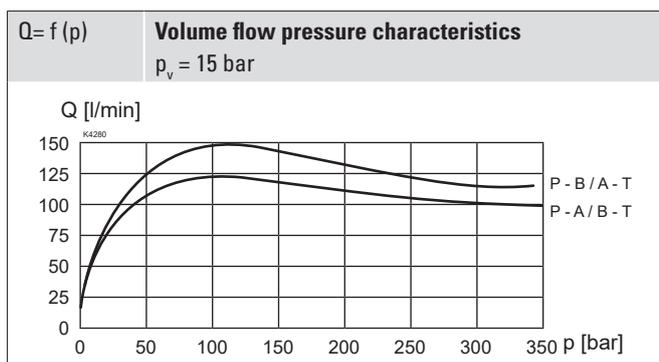
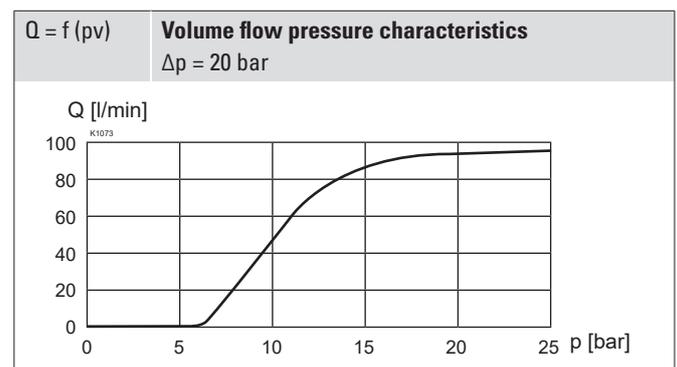
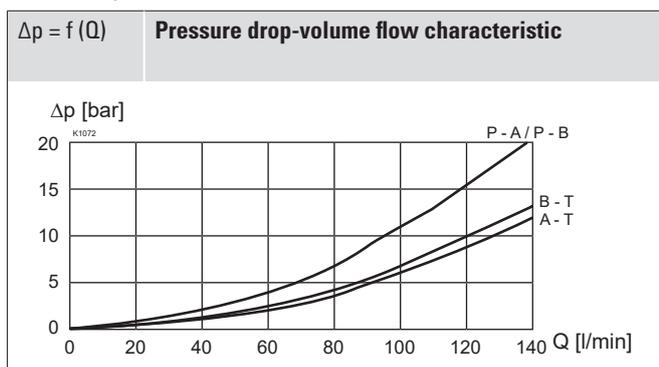
**Connection example**

**GENERAL SPECIFICATIONS**

Designation	Proportional spool valve
Construction	Pilot operated
Mounting	Screw-in cartridge construction
Nominal size	M33 x 2 according to Wandfluh standard
Actuation	Pilot valve
Ambient temperature	-30...+90 °C
Weight	0,79 kg
MTTFd	150 years

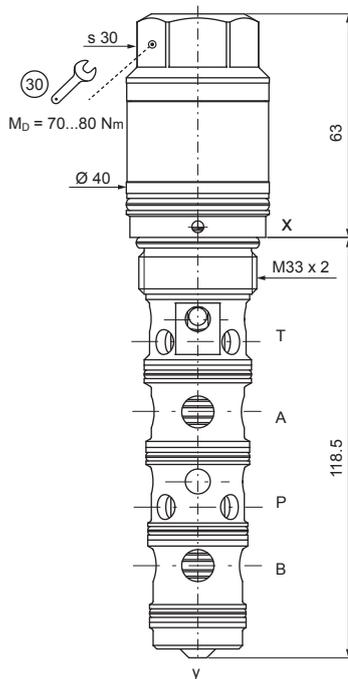
**HYDRAULIC SPECIFICATIONS**

Working pressure	$p_{max} = 350$ bar
Tank pressure	$p_{Tmax} = 100$ bar
Maximum volume flow	$Q_{max} = 150$ l/min, see characteristics
Nominal volume flow	$Q_N = 90$ l/min
Leakage oil	P → T (at 200 bar): < 0,4 l/min
Fluid	Mineral oil, other fluid on request
Viscosity range	12 mm <sup>2</sup> /s...320 mm <sup>2</sup> /s
Temperature range fluid	-25...+70 °C (NBR) -20...+70 °C (FKM)
Contamination efficiency	Class 18 / 16 / 13
Filtration	Required filtration grade $\beta_{6...10} \geq 75$ , see data sheet 1.0-50

**PERFORMANCE SPECIFICATIONS**

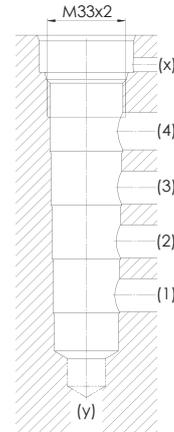
 Oil viscosity  $\nu = 30$  mm<sup>2</sup>/s


## DIMENSIONS



## HYDRAULIC CONNECTION

Cavity drawing according to Wandfluh standard



**Note!**



For detailed cavity drawing and cavity tools see data sheet 2.13-1053

## ACCESSORIES

Proportional pressure valves	Register 2.3
Proportional amplifier	Register 1.13
Technical explanations	Data sheet 1.0-100
Filtration	Data sheet 1.0-50

## ACTUATION

Actuation	Pilot control
Minimum pilot pressure	4,5 bar
Maximum pilot pressure	30 bar

## INSTALLATION NOTES

Mounting type	Screw-in cartridge M33 x 2
Mounting position	Any, preferably horizontal
Tightening torque	$M_D = 80$ Nm screw-in cartridge

## SURFACE TREATMENT

The external parts of the cartridge body are zink / nickel coated

## STANDARDS

Cartridge cavity	Wandfluh standard
Contamination efficiency	ISO 4406

## SEALING MATERIAL

NBR as standard