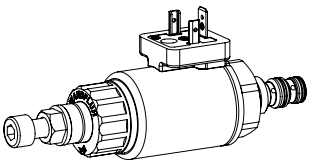
Proportional pressure reducing cartridge inverse

- direct operated
- Q_{max} = 6 l/min
- p_{max} = 210 bar (350 bar)
- $p_{N\ red\ max}$ = 40 bar

M16 x 1,5
Wandfluh standard



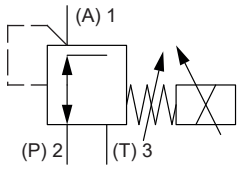
DESCRIPTION

Direct operated proportional pressure reducing valve with inverse function in screw-in cartridge construction for cavity according to Wandfluh standard. The proportional pressure reducing valve controls the pressure in port A (1). With the solenoid deenergised, maximum working pressure is present. If the solenoid current increases, the pressure in port A drops (1). The valve operates practically independently of the pressure in port P (2). Pressure increase in port A (1) to above the adjusted value, e.g. through an active consumer, is avoided by discharging excess oil to the tank (3). For the control, Wandfluh proportional amplifiers are available (see register 1.13).

APPLICATION

These valves are used in hydraulic systems where the pressure has to be changed frequently. The electrical remote control in conjunction with process controls allows economical solutions with repeatable processes. For machining the cartridge cavity in steel and aluminum blocks, cavity tools are available (hire or purchase). Please refer to the data sheets in register 2.13.

SYMBOL



ACTUATION

Actuation	Proportional solenoid, wet pin push type, pressure tight
Execution	W.S37 / 19 x 50 (Data sheet 1.1-173) M.S35 / 19 x 50 (Data sheet 1.1-174)
Connection	Connector socket EN 175301 – 803 Connector socket AMP Junior-Timer Connector Deutsch DT04 – 2P

STANDARDS

Cartridge cavity	Wandfluh standard
Solenoids	DIN VDE 0580
Connection execution D	EN 175301 – 803
Protection class	EN 60 529
Contamination efficiency	ISO 4406

INSTALLATION NOTES

Mounting type	Screw-in cartridge type M16 x 1,5
Mounting position	Any, preferably horizontal
Tightening torque	M_D = 30 Nm Screw-in cartridge M_D = 5 Nm knurled nut

TYPE CODE

M D I PM16 - [ ] - [ ] / [ ] [ ] - [ ] [ ] # [ ]

Pressure reducing valve			
Direct operated			
Proportional, inverse			
Screw-in cartridge M16 x 1,5			
Nominal pressure range $p_{N\,red}$	25 bar	25	
	40 bar	40	
Nominal voltage U_N	12 VDC	G12	
	24 VDC	G24	
	without coil	X5	
Slip-on coil	Metal housing round		W
	Metal housing square		M
Connection execution	Connector socket EN 175301-803 / ISO 4400		D
	Connector socket AMP Junior - Timer		J
	Connector Deutsch DT04 - 2P		G
Sealing material	NBR		
	FKM (Viton)	D1	
	System pressure max. 210 bar		
	System pressure max. 350 bar		Z406
Design index (subject to change)			

2.3-603

GENERAL SPECIFICATIONS

Designation	Proportional pressure reducing valve
Construction	Direct operated
Mounting	Screw-in cartridge construction
Nominal size	M16 x 1,5 according to Wandfluh standard
Actuation	Proportional solenoid
Ambient temperature	-25…+70 °C
Weight	0,45 kg
MTTFd	150 years

ELECTRICAL SPECIFICATIONS

Protection class	Connection execution D: IP65 Connection execution J: IP66 Connection execution G: IP67 and IP69K
Relative duty factor	100 % DF
Standard nominal voltage	12 VDC, 24 VDC
Limiting current at 50 °C	I_G = 1360 mA (U_N = 12VDC) I_G = 680 mA (U_N = 24VDC)

Note! Other electrical specifications see data sheet 1.1-173 (slip-on coil W) and 1.1-174 (slip-on coil M)

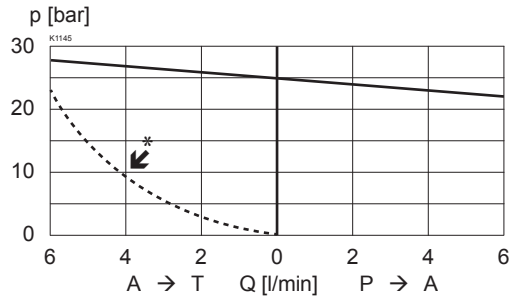
HYDRAULIC SPECIFICATIONS

Working pressure	p_{max} = 210 bar (350 bar)
Nominal pressure range	$P_{N\,red}$ = 25 bar, 40 bar Adjustable via adjustment screw (+20 % / -30 %)
Minimum adjustable pressure	< 0,5 bar
Volume flow range	Q = 0…6 l/min
Leakage oil	**25 bar execution at p_{sys} = 210 bar** p_{red} = 0 bar: < 10 ml/min p_{red} = 25 bar: < 50 ml/min **40 bar execution at p_{sys} = 210 bar** p_{red} = 0 bar: < 10 ml/min p_{red} = 45 bar: < 40 ml/min
Hysteresis	≤ 4 % at optimal dither signal
Repeatability	≤ 1 % at optimal dither signal
Fluid	Mineral oil, other fluid on request
Viscosity range	12 mm²/s…320 mm²/s
Temperature range fluid	-25…+70 °C (NBR) -20…+70 °C (FKM)
Contamination efficiency	Class 18 / 16 / 13
Filtration	Required filtration grade ß 6…10 ≥ 75, see data sheet 1.0-50

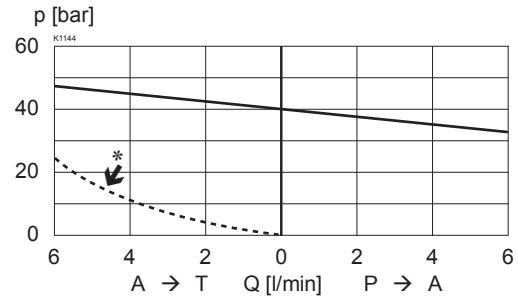
PERFORMANCE SPECIFICATIONS

Oil viscosity υ = 30 mm²/s

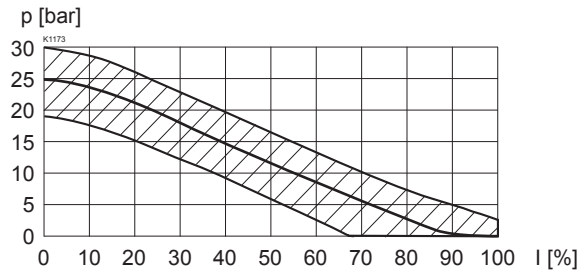
p_{red} = f (Q) **Pressure volume flow characteristics**
Statically adjusted at nominal pressure
25 bar execution
*Limit of the operating range



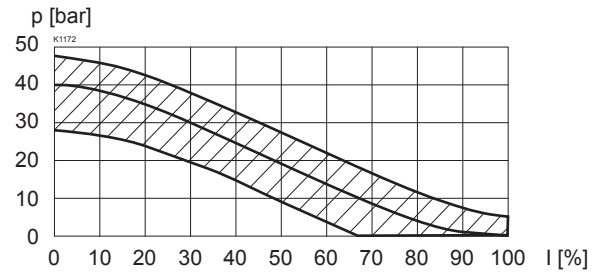
p_{red} = f (Q) **Pressure volume flow characteristics**
Statically adjusted to nominal pressure
40 bar execution
*Limit of the operating range



p_{red} = f (n) **Pressure adjustment characteristics**
Measured at Q = 0 l/min (static)
25 bar execution



p_{red} = f (n) **Pressure adjustment characteristics**
Measured at Q = 0 l/min (static)
40 bar execution



ACCESSORIES

Proportional amplifier	Register 1.13
Electric plug B (black)	Article no. 219.2002
Technical explanations	Data sheet 1.0-100
Filtration	Data sheet 1.0-50

SURFACE TREATMENT

- The cartridge body is gas-nitro carburised
- The slip-on coil and the armature tube are zinc nickel coated

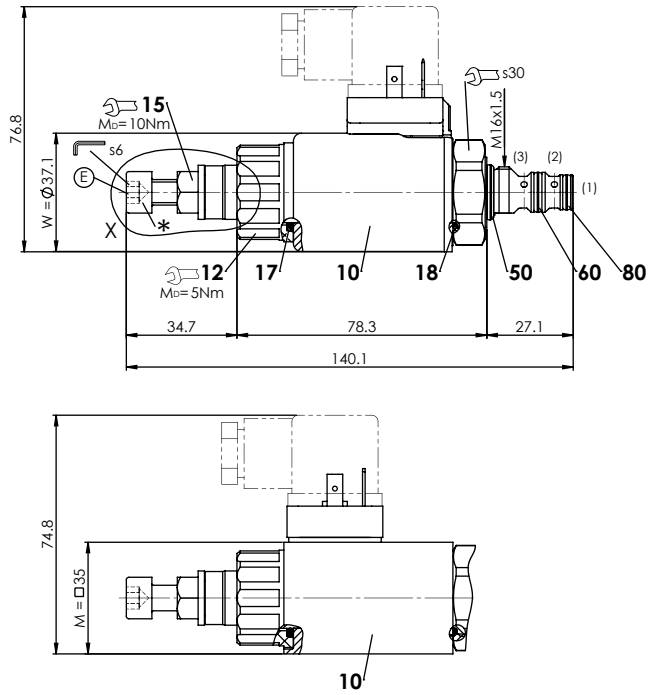
SEALING MATERIAL

NBR or FKM (Viton) as standard, choice in the type code

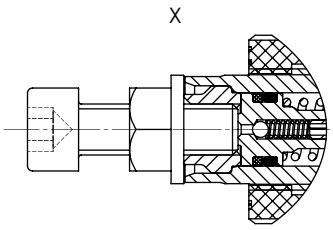
MANUAL OVERRIDE

None

DIMENSIONS

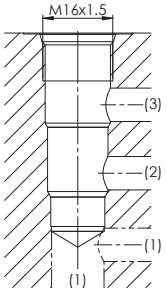


E = Air bleed screw
*Adjustment screw for adjusting the nominal pressure



HYDRAULIC CONNECTION

Cavity drawing according to Wandfluh standard



Attention! For detailed cavity drawing and cavity tools see data sheet 2.13-1051

PARTS LIST

Position	Article	Description
10	206.2…	W.S37 / 19 x 50
	260.5…	M.S35 / 19 x 50
12	154.2700	Knurled nut
15	153.2401	Dichtmutter Norm „Seal-Lock" 8 Zi - Ni M8
17	160.2187	O-ring ID 18,72 x 2,62 (NBR)
18	160.2170	O-ring ID 17,17 x 1,78 (NBR)
50	160.2140	O-ring ID 14,00 x 1,78 (NBR)
	160.8140	O-ring ID 14,00 x 1,78 (FKM)
60	160.2093	O-ring ID 9,25 x 1,78 (NBR)
	160.8092	O-ring ID 9,25 x 1,78 (FKM)
80	160.2076	O-ring ID 7,65 x 1,78 (NBR)
	160.8076	O-ring ID 7,65 x 1,78 (FKM)

COMMISSIONING

When commissioning, the valve must be vented under pressure as follows (see detail X in Dimensions):

- Loosen lock nut
- Remove screw (E)
- Push the non-return valve (with pin or hex key < 1,3 mm)
- Screw-in the screw (E)
- Adjust the required pressure and tighten the lock nut

Attention! Therewith oil flows out with the corresponding pressure! Cover with a cloth.