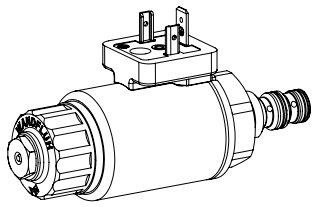
## Proportional pressure reducing cartridge

- 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**



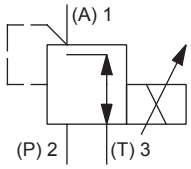
## DESCRIPTION

Direct operated proportional pressure reducing valve in screw-in cartridge construction for cavity according to Wandfluh standard. Proportionally to the solenoid current, the solenoid force and the pressure in port A (1) rise. The valve functions practically independently of the pressure in port P (2). Pressure increase in the consumer port A (1) to above the adjusted value, e.g. through an active consumer, is avoided by discharging excess oil to the tank T (3). With the solenoid deenergised, the oil flows freely from consumer port A (1) to port T (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)<br>M.S35 / 19 x 50 (Data sheet 1.1-174) |
| Connection | Connector socket EN 175301 – 803<br>Connector socket AMP Junior-Timer<br>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<br>$M_D$ = 5 Nm knurled nut<br>$M_D$ = 9,5 Nm HB0<br>$M_D$ = 5,5 Nm HB4,5 |

## TYPE CODE

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

| | | | |
|---|---|---|---|
| Pressure reducing valve | | | |
| Direct operated | | | |
| Proportional | | | |
| 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 | |
| Manual override | Manual override | | HB4,5 |
| | Screw plug | | HB0 |
| | System pressure max. 210 bar | | |
| | System pressure max. 350 bar | | Z406 |
| Design index (subject to change) | | | |

2.3-605

## 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<br>Connection execution J: IP66<br>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)<br>$I_G$ = 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)

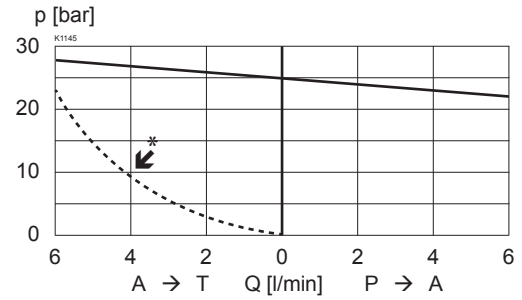
## HYDRAULIC SPECIFICATIONS

| | |
|---|---|
| Working pressure | $p_{max}$ = 210 bar (350 bar) |
| Nominal pressure range | $P_{N\,red}$ = 25 bar, 40 bar |
| Minimum adjustable pressure | < 0,5 bar |
| Volume flow range | Q = 0…6 l/min |
| Leakage oil | **25 bar execution at $p_{sys}$ = 210 bar**<br>$p_{red}$ = 0 bar: < 10 ml/min<br>$p_{red}$ = 25 bar: < 50 ml/min<br>**40 bar execution at $p_{sys}$ = 210 bar**<br>$p_{red}$ = 0 bar: < 10 ml/min<br>$p_{red}$ = 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)<br>-20…+70 °C (FKM) |
| Contamination efficiency | Class 18 / 16 / 13 |
| Filtration | Required filtration grade ß 6…10 ≥ 75, see data sheet 1.0-50 |

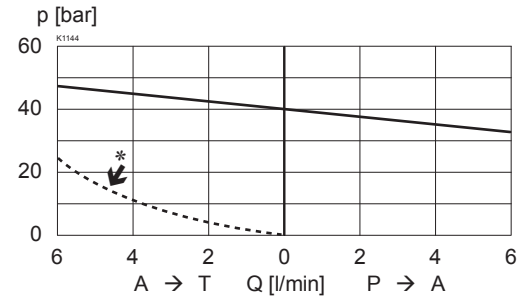
## PERFORMANCE SPECIFICATIONS

Oil viscosity $\upsilon$ = 30 mm²/s

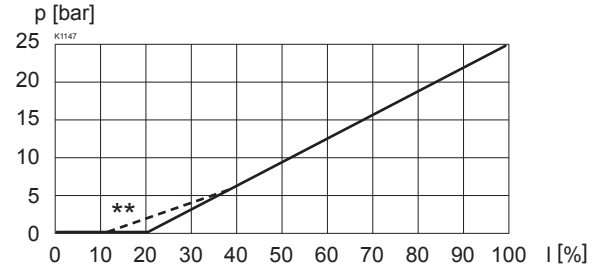
$p_{red}$ = f (Q) **Pressure volume flow characteristics**
Maximal adjustable pressure
25 bar execution
*Limit of the operating range



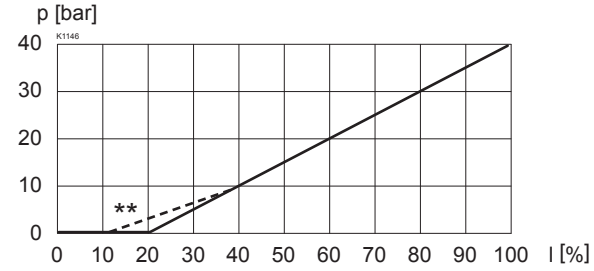

$p_{red}$ = f (Q) **Pressure volume flow characteristics**
Maximal adjustable pressure
40 bar execution
*Limit of the operating range




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




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




## 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 |

## MANUAL OVERRIDE

HB4,5
Optionally: Screw plug (HB0), no actuation possible

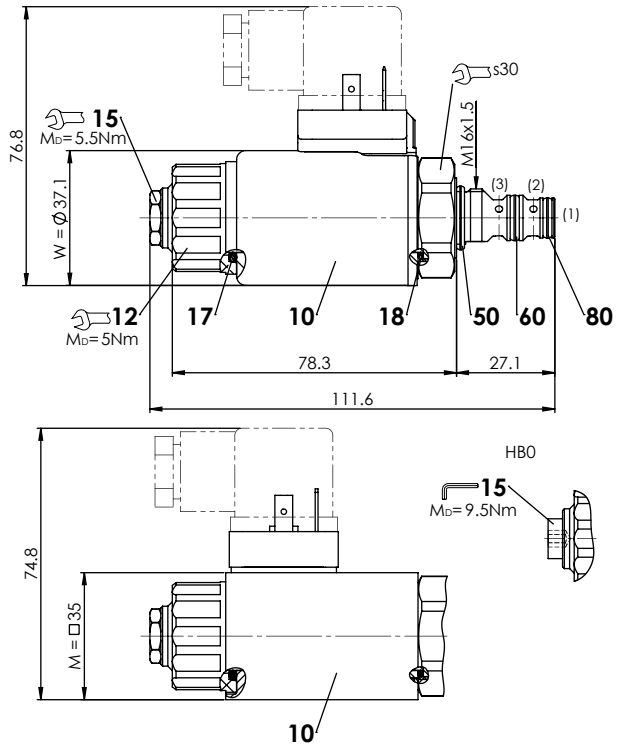
## SURFACE TREATMENT

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

## SEALING MATERIAL

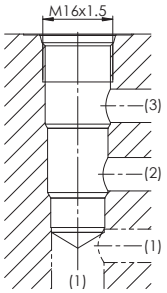
NBR or FKM (Viton) as standard, choice in the type code

## DIMENSIONS




## 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 | 253.8000 | HB4,5 manual override |
| | 239.2033 | HB0 Screw plug |
| 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) |

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