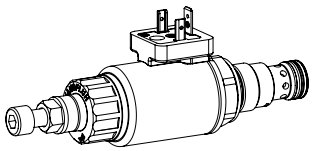
## Proportional pressure relief cartridge inverse

- pilot operated
- $Q_{max}$ = 100 l/min
- $p_{max}$ = 400 bar
- $p_{N\,max}$ = 350 bar

**M22 x 1,5**
**ISO 7789**



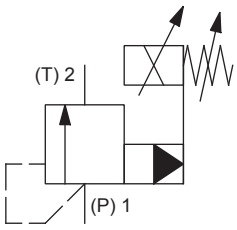
## DESCRIPTION

Pilot operated proportional pressure relief valve with inverse function in screw-in cartridge construction for cavity according to ISO 7789. High flow capacity, very sensitively adjustable. When the operating pressure adjusted by means of the proportional solenoid is reached, the valve opens and connects the protected line with the drain to the tank. With the solenoid deenergised, maximum working pressure is present. If the solenoid current increases, the pressure in port P (1) drops. The back pressure in T (2) affects the pressure in P (1). For the control, Wandfluh proportional amplifiers are available (see register 1.13).

## APPLICATION

The electrical remote control in conjunction with process controls allows economical solutions with repeatable processes. By means of the inverse function, the maximum system pressure is maintained if the electrical valve control falls out (safety function).The screw-in cartridge is perfectly suitable for installation in control blocks and is installed in sandwich- (vertical stacked systems) and in flange plates (corresponding data sheets in this register). 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 |

## TYPE CODE

B V I PM22 - [ ] - [ ] / [ ] [ ] - [ ] # [ ]

| | | | | |
|---|---|---|---|---|
| Pressure relief valve | | | | |
| Pilot operated | | | | |
| Proportional, inverse | | | | |
| Screw-in cartridge M22 x 1,5 | | | | |
| Nominal pressure range $p_N$ | 20 bar | 20 | 200 bar | 200 |
| | 63 bar | 63 | 275 bar | 275 |
| | 100 bar | 100 | 350 bar | 350 |
| | 160 bar | 160 | | |
| 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 | | |
| Design index (subject to change) | | | | |

2.3-528

## GENERAL SPECIFICATIONS

| | |
|---|---|
| Designation | Proprtional pressure relief valve with inverse function |
| Construction | Pilot operated |
| Mounting | Screw-in cartridge construction |
| Nominal size | M22 x 1,5 according to ISO 7789 |
| Actuation | Proportional solenoid |
| Ambient temperature | -25…+70 °C |
| Weight | 0,70 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 | $I_G$ = 1320 mA ($U_N$ = 12VDC)<br>$I_G$ = 660 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)

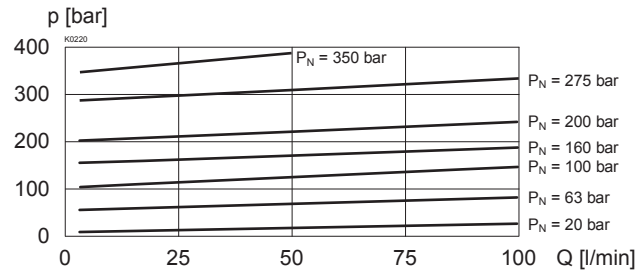
## HYDRAULIC SPECIFICATIONS

| | |
|---|---|
| Working pressure | $p_{max}$ = 400 bar |
| Tank pressure | $p_{T\,max} = p_P$ + 20 bar |
| Nominal pressure range | $P_N$ = 20 bar, 63 bar, 100 bar, 160 bar, 200 bar, 275 bar, 350 bar<br>Adjustable via adjustment screw (-20 % / +30 %) |
| Volume flow range | Q = 5...100 l/min |
| Leakage oil | See characteristics |
| Hysteresis | ≤ 4 % at optimal dither signal |
| Repeatability | ≤ 3 % 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 |

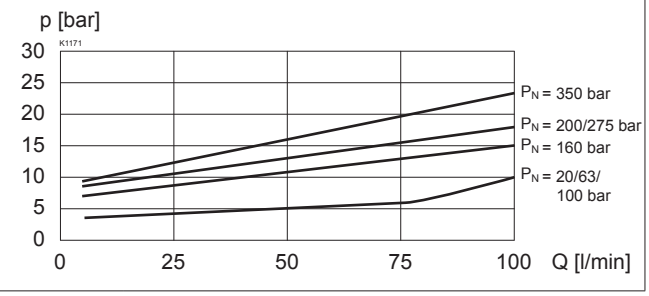
## PERFORMANCE SPECIFICATIONS

Oil viscosity $\upsilon$ = 30 mm²/s

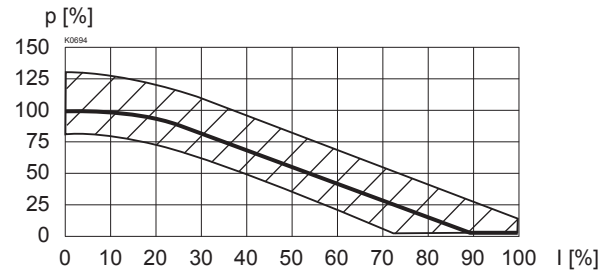
$p_{red} = f(Q)$ **Pressure volume flow characteristics**
Adjusted at Q = 5 l/min at nominal pressure



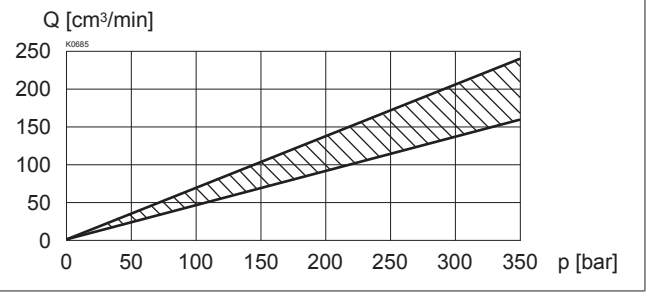

$p_{red} = f(Q)$ **Pressure volume flow characteristics**
Minimal adjustable pressure




$p_{red} = f(n)$ **Pressure adjustment characteristics**
Measured at Q = 1 l/min




$Q_L = f(p)$ **Leakage volume flow characteristic**




## SURFACE TREATMENT

- The cartridge body made of steel and the slip-on coil are zinc-nickel coated

## SEALING MATERIAL

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

## STANDARDS

| | |
|---|---|
| Cartridge cavity | ISO 7789 |
| 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 M22 x 1,5 |
| Mounting position | Any, preferably horizontal |
| Tightening torque | $M_D$ = 60 Nm Screw-in cartridge<br>$M_D$ = 5 Nm knurled nut |

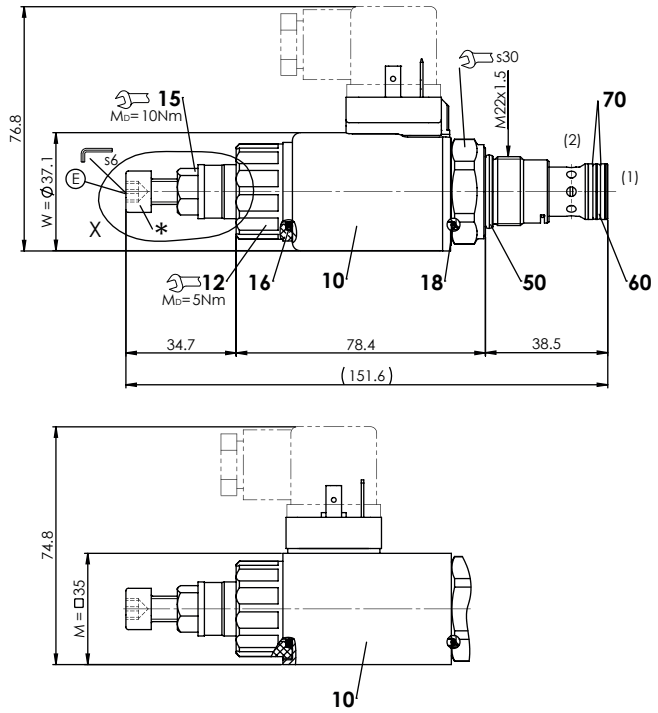
## ACCESSORIES

| | |
|---|---|
| Proportional amplifier | Register 1.13 |
| Electric plug B (black) | Article no. 219.2002 |
| Flange body / sandwich plate NG4-Mini | Data sheet 2.3-720 |
| Flange body / sandwich plate NG6 | Data sheet 2.3-740 |
| Flange body / sandwich plate NG10 | Data sheet 2.3-760 |
| Threaded body | Data sheet 2.9-200 |
| Technical explanations | Data sheet 1.0-100 |
| Filtration | Data sheet 1.0-50 |

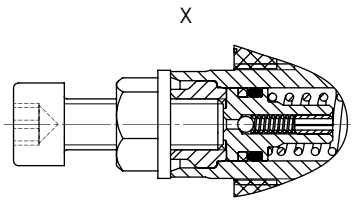
## MANUAL OVERRIDE

None

## DIMENSIONS

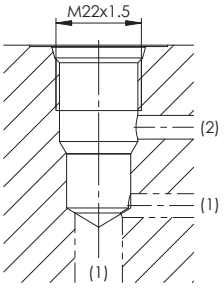



E = Air bleed screw
*Adjustment screw for adjusting the nominal pressure




## HYDRAULIC CONNECTION

Cavity drawing according to ISO 7789–22–02–0–98




**Note!** For detailed cavity drawing and cavity tools see data sheet 2.13-1003

## 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.

## PARTS LIST

| Position | Article | Description |
|---|---|---|
| 10 | 206.2…<br>260.5… | W.S37 / 19 x 50<br>M.S35 / 19 x 50 |
| 12 | 154.2700 | Knurled nut |
| 15 | 153.2401 | Dichtmutter Norm „Seal-Lock" 8 Zi - Ni M8 |
| | 251.5917 | Seal kit |
| | 251.5918 | Seal kit D1 |

**Seal kit consisting of:**

| | | |
|---|---|---|
| 16 | O-ring | ID 18,72 x 2,62 |
| 18 | O-ring | ID 17,17 x 1,78 |
| 50 | O-ring | ID 18,77 x 1,78 |
| 60 | O-ring | ID 14,00 x 1,78 |
| 70 | B.up ring | PTFE rd 14,6 x 17,5 x 1,4 |