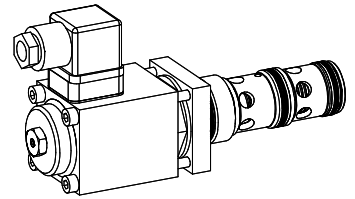


- Proportional 3-way flow control valve
- Screw-in cartridge
- Direct operated, pressure compensated
- $Q_{max} = 100 \text{ l/min}$ ,  $p_{max} = 350 \text{ bar}$
- $Q_{Nmax} = 63 \text{ l/min}$

**M33x2**  
 ISO 7789

**DESCRIPTION**

Direct operated, pressure compensated proportional flow control valve as a screw-in cartridge with a thread M33x2 for cavity acc. to ISO 7789. Two flow ranges are available. The volume flow is adjusted by a Wandfluh proportional solenoid (VDE standard 0580). Almost linear flow increase and low hysteresis are typical for this valve. A special surface treatment guarantees a good protection against corrosion and wear as well as very good low-friction characteristics of the pressure compensating and throttle spools. The solenoid is zinc-coated.

**FUNCTION**

The 3-way flow control valve is designed to keep the oil flow to any actuator constant irrespective of the load. Surplus volume flow will be diverted to the tank line thus saving energy and preventing an overheating of the hydraulic system. The force controlled proportional solenoid running in the fluid acts directly on the control spool which opens the throttling notches in the cartridge body. The throttle opening, and therefore the flow volume changes proportionally to the current absorption of the proportional solenoid. When the solenoid is without current, the control spool is held in the closed position by a spring. To control the valve, proportional amplifiers are available from Wandfluh (see register 1.13).

**APPLICATION**

Proportional flow control valves are suitable for precise feed control system where the supply volume flow needs to be kept constant even when the load fluctuates. The screw-in cartridge is very suitable for mounting in control blocks, flange bodies and sandwich plates of the size NG10. Cavity tools are available for machining cartridge cavities (hire or purchase). Please refer to the data sheets in register 2.13.

**CONTENTS**

|  |   |
|--|---|
| GENERAL SPECIFICATIONS.....            | 1 |
| HYDRAULIC SPECIFICATIONS.....          | 1 |
| ELECTRIC SPECIFICATIONS.....           | 1 |
| SYMBOLS.....                           | 1 |
| CHARACTERISTICS.....                   | 2 |
| DIMENSIONS/<br>SECTIONAL DRAWINGS..... | 2 |
| PARTS LIST.....                        | 2 |
| ACCESSORIES.....                       | 2 |

**TYPE CODE**

|                                   |          |   |   |      |   |  |   |  |   |  |
|-----------------------------------|----------|---|---|------|---|--|---|--|---|--|
| Flow control valve                | Q        | D | P | PM33 | - |  | - |  | # |  |
| 3-way construction                |          |   |   |      |   |  |   |  |   |  |
| Proportional                      |          |   |   |      |   |  |   |  |   |  |
| Screw-in cartridge M33x2          |          |   |   |      |   |  |   |  |   |  |
| Nominal volume flow rates $Q_N$ : | 32 l/min |   |   |      |   |  |   |  |   |  |
|                                   | 63 l/min |   |   |      |   |  |   |  |   |  |
| Standard nominal voltage $U_N$ :  | 12 VDC   |   |   |      |   |  |   |  |   |  |
|                                   | 24 VDC   |   |   |      |   |  |   |  |   |  |
| Design-Index (Subject to change)  |          |   |   |      |   |  |   |  |   |  |

**GENERAL SPECIFICATIONS**

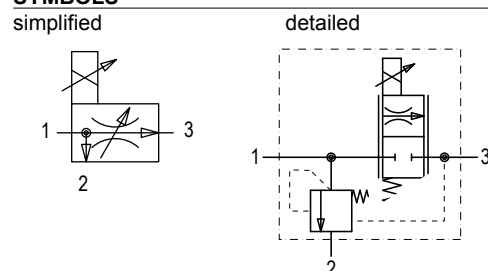
|                     |  |
|---------------------|--|
| Description         | 3-way proportional flow control valve  |
| Construction        | Screw-in cartridge for cavity acc. to ISO 7789   |
| Operations          | Proportional solenoid  |
| Mounting            | Screw-in thread M33x2  |
| Ambient temperature | -20...+50 °C   |
| Mounting position   | any  |
| Fastening torque    | $M_D = 80 \text{ Nm}$ for screw-in cartridge<br>$M_D = 5,2 \text{ Nm}$ (Qual. 8.8) for solenoid screws |
| Weight              | $m = 1,3 \text{ kg}$   |
| Flow direction      | see symbol   |

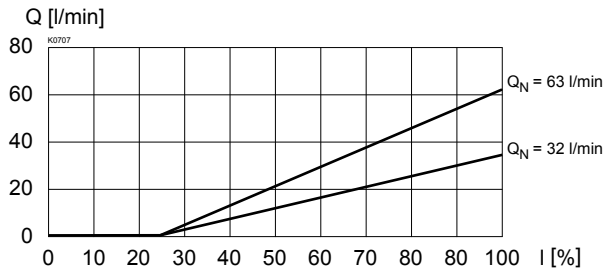
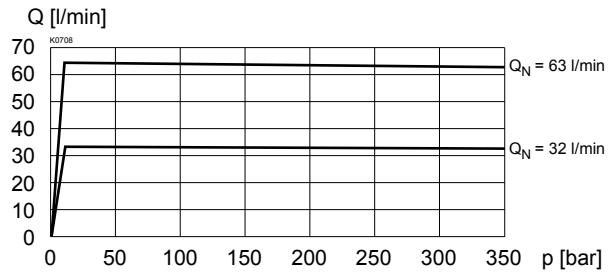
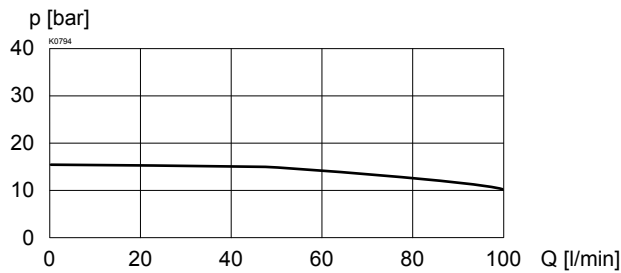
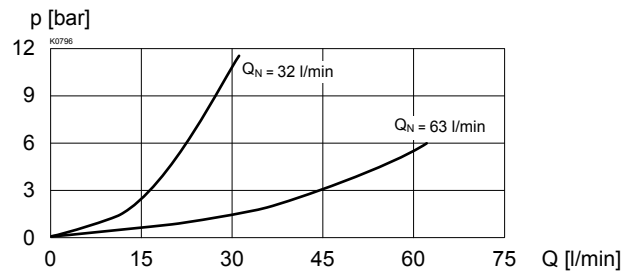
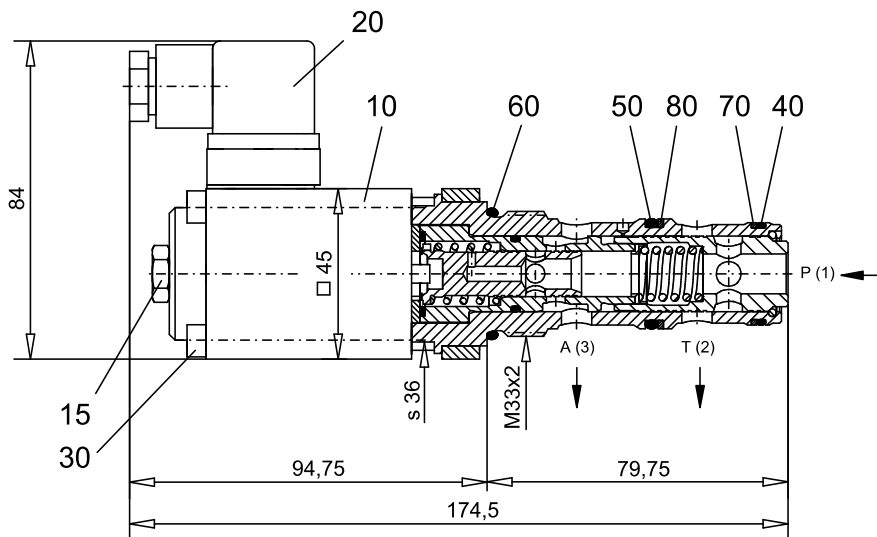
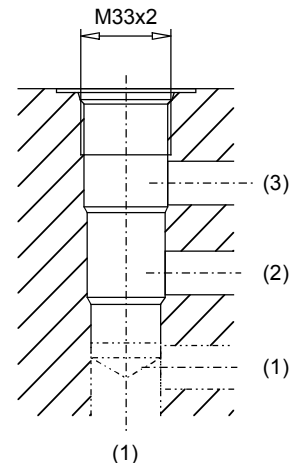
**HYDRAULIC SPECIFICATIONS**

|                           |   |
|---------------------------|---|
| Fluid                     | Mineral oil, other fluid on request   |
| Contamination efficiency  | ISO 4406:1999, class 18/16/13<br>(Required filtration grade $\beta_{6...10} \geq 75$ )<br>see data sheet 1.0-50/2 |
| Viscosity range           | 12 mm <sup>2</sup> /s...320 mm <sup>2</sup> /s  |
| Fluid temperature         | -20...+70 °C  |
| Peak pressure             | $p_{max} = 350 \text{ bar}$   |
| Nominal volume flow rates | $Q_N = 32 \text{ l/min}$ , 63 l/min   |
| Max. volume flow          | $Q_{max} = 100 \text{ l/min}$ (1 → 2)   |
| Min. volume flow          | $Q_{min} = 0,2 \text{ l/min}$   |
| Hysteresis                | $\leq 5\%$ *<br>* at optimal dither signal  |

**ELECTRICAL SPECIFICATIONS**

|                                 |  |                        |
|---------------------------------|--|------------------------|
| Construction                    | Proportional solenoid, wet pin push type, pressure tight |                        |
| Standard nominal voltage        | U = 12 VDC   | U = 24 VDC             |
| Limiting current                | $I_G = 1780 \text{ mA}$                                  | $I_G = 810 \text{ mA}$ |
| Relative duty factor            | 100 % ED (see data sheet 1.1-430)                        |                        |
| Protection class                | IP 65 acc. to EN 60 529                                  |                        |
| Connection/                     | Over device plug connection to                           |                        |
| Power supply                    | ISO 4400 / DIN 43650, (2P+E)                             |                        |
| Other electrical specifications | see data sheet 1.1-130 (PI45V)                           |                        |

**SYMBOLS**


**CHARACTERISTICS** Oil viscosity  $\nu = 30 \text{ mm}^2/\text{s}$ 
 $Q = f(l)$  Volume flow adjustment characteristics 1 → 3

 $Q = f(p)$  Volume flow pressure characteristics

 $\Delta p = f(Q)$  Pressure drop volume flow characteristics 1 → 2

 $\Delta p = f(Q)$  Pressure drop volume flow characteristics 1 → 3

**DIMENSIONS / SECTIONAL DRAWINGS**

 Cavity drawing acc. to  
 ISO 7789-33-04-0-98

 For detailed cavity drawing  
 and cavity tools see data  
 sheet 2.13-1040

**PARTS LIST**

| Position | Article  | Description                              |
|----------|----------|--|
| 10       | 256.4454 | Proportional solenoid PI45V-G24          |
| 15       | 253.8001 | Plug with integrated manual override HB6 |
| 20       | 219.2002 | Plug (black)                             |
| 30       | 246.2171 | Socket head cap screw M5x70 DIN 912      |
| 40       | 160.2236 | O-ring ID 23,52x1,78                     |
| 50       | 160.2238 | O-ring ID 23,81x2,62                     |
| 60       | 160.2298 | O-ring ID 29,82x2,62                     |
| 70       | 049.3276 | Back-up ring RD 24,1x27x1,4              |
| 80       | 049.3297 | Back-up ring RD 24,5x29x1,4              |

**ACCESSORIES**

Proportional amplifier register 1.13

Technical explanation see data sheet 1.0-100E