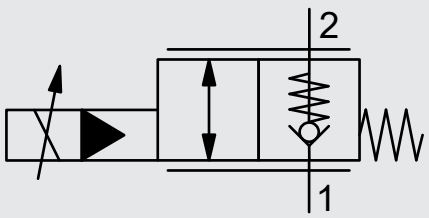
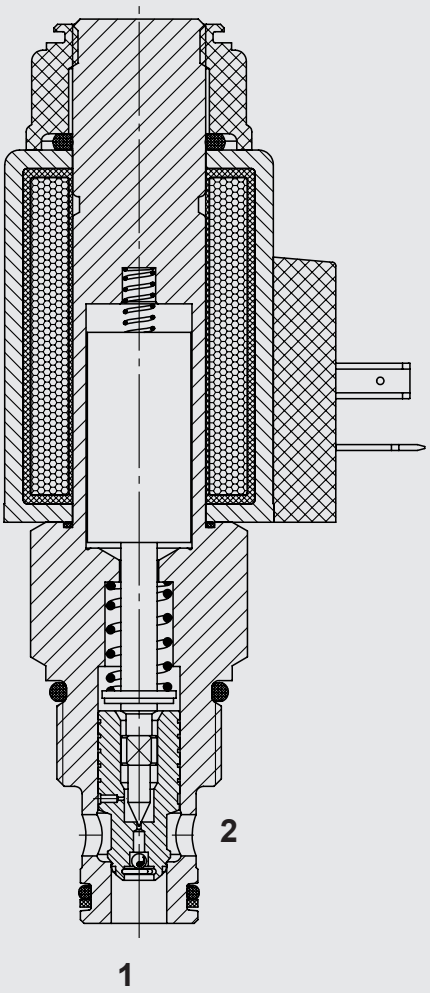


up to 100 l/min
up to 350 bar

Proportional flow throttle valve
PWS10ZR-11/-12

Poppet type, pilot-operated, normally closed
Screw-in cartridge valve UNF – 350 bar

FUNCTION



PRODUCT ADVANTAGES

- Continuous adjustment of the flow rate, depending on the coil current
- Excellent stability over the entire flow range
- Very good dynamic performance
- Optional: mechanical adjustment of a point on the performance curve (cannot be combined with emergency manual function)
- Optional: Softshift function with longer switching times possible
- External surfaces with advanced corrosion protection thanks to ZnNi coating (1,000 h salt spray test)

DESCRIPTION OF FUNCTION

The proportional flow throttle valve is a pilot-operated, spring-loaded throttle valve in poppet design – normally closed position.

It provides smooth and pressure-dependent throttling of flow from port 2 to port 1. The pilot stage opens depending on the current fed through the coil and oil flows to the rear side of the main spool through a combination of orifices.
This creates a pressure difference and the main piston follows the pilot stage. The valve acts as a check valve when de-energised. After a spring preload force is overcome, it allows free flow from 1 to 2 and closes tightly from 2 to 1 in the opposite direction.

When the coil is energised, there is free flow through the valve in both directions.

TECHNICAL CHARACTERISTICS[1)]

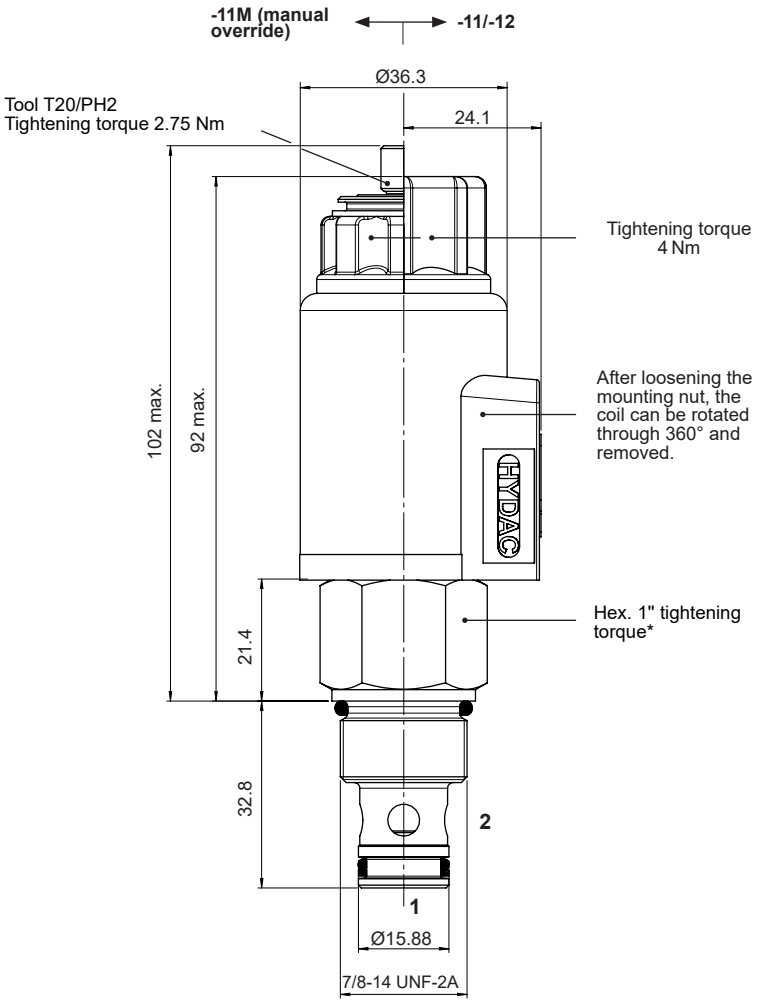
Operating pressure	max. 350 bar	
Flow rate	max. 100 l/min	
Internal leakage	max. 10 drops/min (0.5 cm³/min) at nominal pressure, ν = 34 mm²/s	
Pressure fluid	Hydraulic oil to DIN 51524 Part 1, 2 and 3	
Ambient temperature range	min. -20 °C to max. +60 °C	
Temperature range of operating fluid	NBR: min. -30 °C to max. +100 °C FKM: min. -20 °C to max. +120 °C	
Viscosity range	min. 10 mm²/s to max. 420 mm²/s	
Filtration	Permitted operating fluid contamination level according to ISO 4406 Class 19/17/14 or higher	
$MTTF_D$	150 - 1200 years, assessment according to DIN EN ISO 13849-1:2016, Table C.1, Confirmation of ISO 13849-2:2013; Tables C.1 and C.2	
Installation position	User-definable	
Material	Valve body:	Steel
	Spools:	Steel, hardened and ground
	Seals:	NBR (standard) FKM (optional)
	Support rings:	PTFE
	Coil:	Steel / polyamide
Cavity	FC10-2	
Weight	0.5 kg (with coil)	
Electric system		
Control current range	850 mA, 18.0 ohm (24 V) 1750 mA, 4.1 ohm (12 V)	
Dither frequency	120 Hz – 250 Hz (120 Hz recommended)	
Hysteresis with dither	4 - 6 % of I_{nom}	
Repeatability	≤ 1.5 % of I_{nom}	
Reversal error	≤ 2 % of I_{nom}	
Sensitivity of response	≤ 1 % of I_{nom}	
Coil design	Coil 12P...-50-1836 or 24P...-50-1836	

Note:
For optimum efficiency, any trapped air should be vented using the bleed screw on the pole tube.

[1)] See “Conditions and Instructions for Valves” in brochure 53.000

DIMENSIONS

Versions:

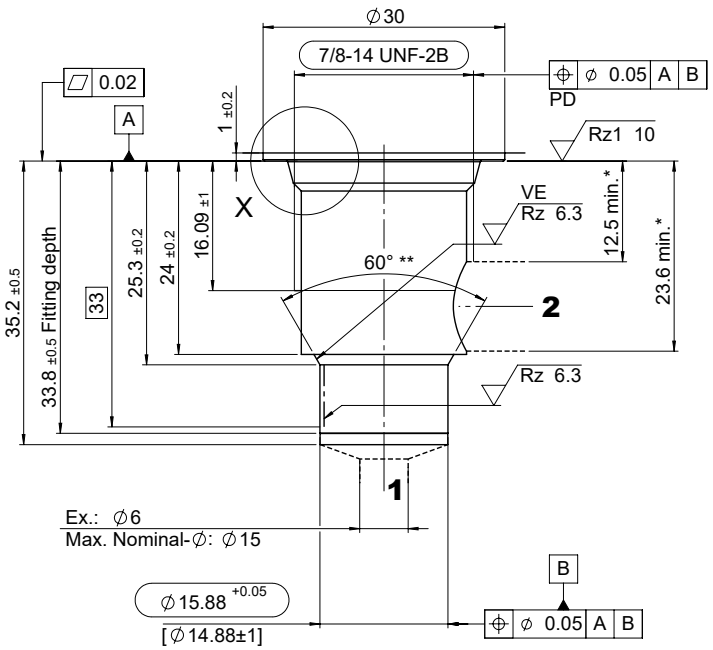


* Tightening torque:
Steel housing (burst strength > 360 N/mm²): 50 Nm
Aluminium housing (burst strength > 330 N/mm²): 45 Nm
(With torque tool according to DIN EN ISO 6789, tool type II class A or B).

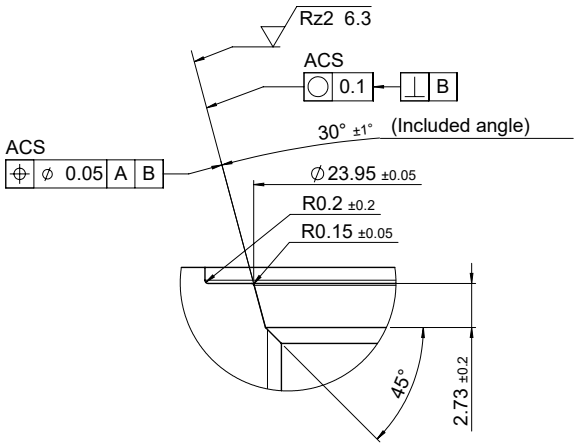
Millimetres
Subject to technical modifications.

CAVITY

FC10-2



X 4 : 1



VE = Visual Examination

Ra 6.3 (Rz 6.3 Rz 10)

* Permitted boring zone (for block design)

** Sharp edges should be avoided by using a radius of 0.1 mm to 0.2 mm

*** Largest pre-drilling diameter (nominal tool diameter)

Millimetre

Subject to technical modifications.

MODEL CODE

PWS10ZR – 11M – C – N – P40 – 24 PG 18.0

Designation

Proportional flow throttle valve

Design

11 = standard

11M = with manual override

12 = slightly damped

Body and ports

C = Screw-in cartridge valve

Sealing material

N = NBR (standard)

V = FKM

Flow range at Δp = 5 bar

P40 = 40 l/min (progressive performance curve)

Further versions on request.

Nominal voltage

DC voltage:

12 = 12 V DC

24 = 24 V DC

Further versions on request.

Coil design (50-1836)

DC:

PG = DIN plug connector to EN175301-803

PT = AMP Junior Timer, 2-pole, radial

PL = two flying leads, 457 mm long, 0.75 mm²

PN = Deutsch plug connector, 2-pole, axial

Further versions on request.

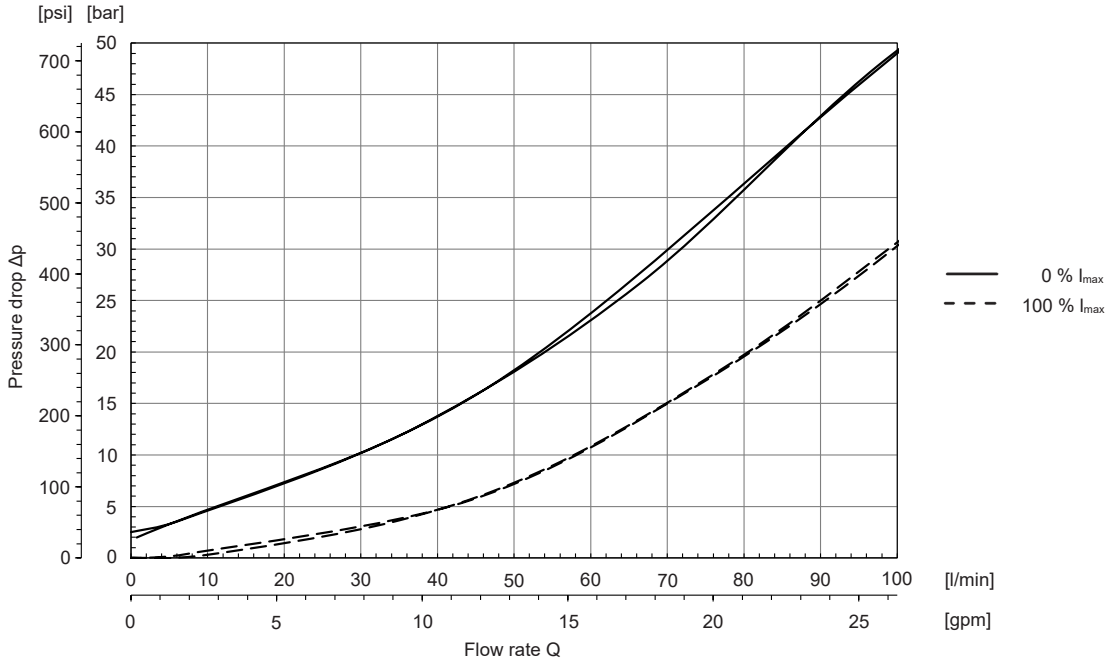
Coil resistance

4.1 = 4.1 Ω (12 V)

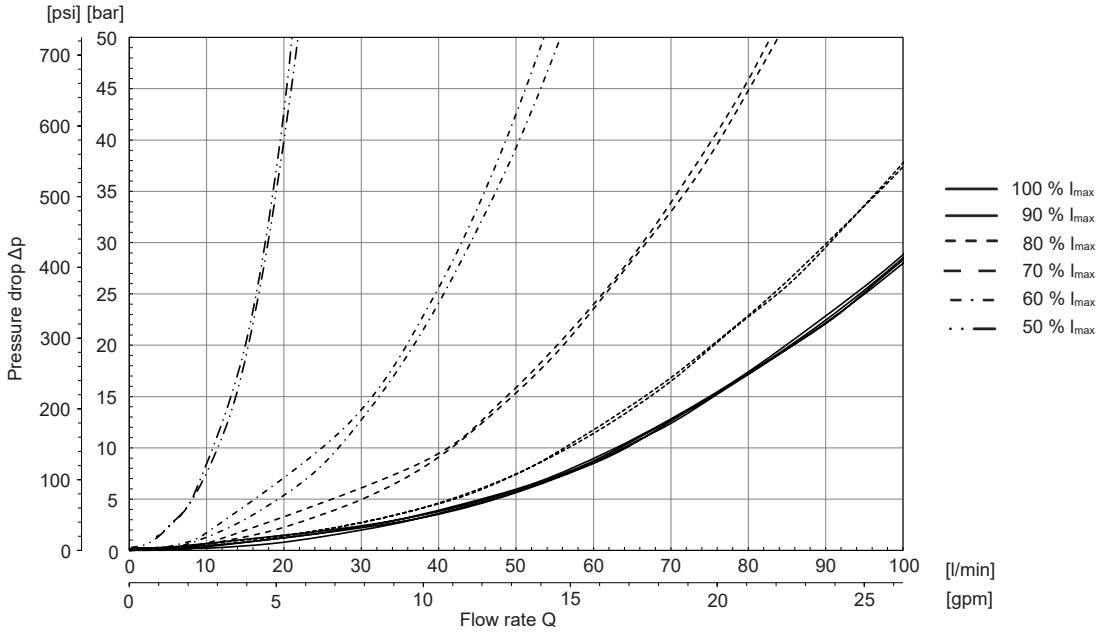
18.0 = 18.0 Ω (24 V)

TYPICAL PERFORMANCE CURVE

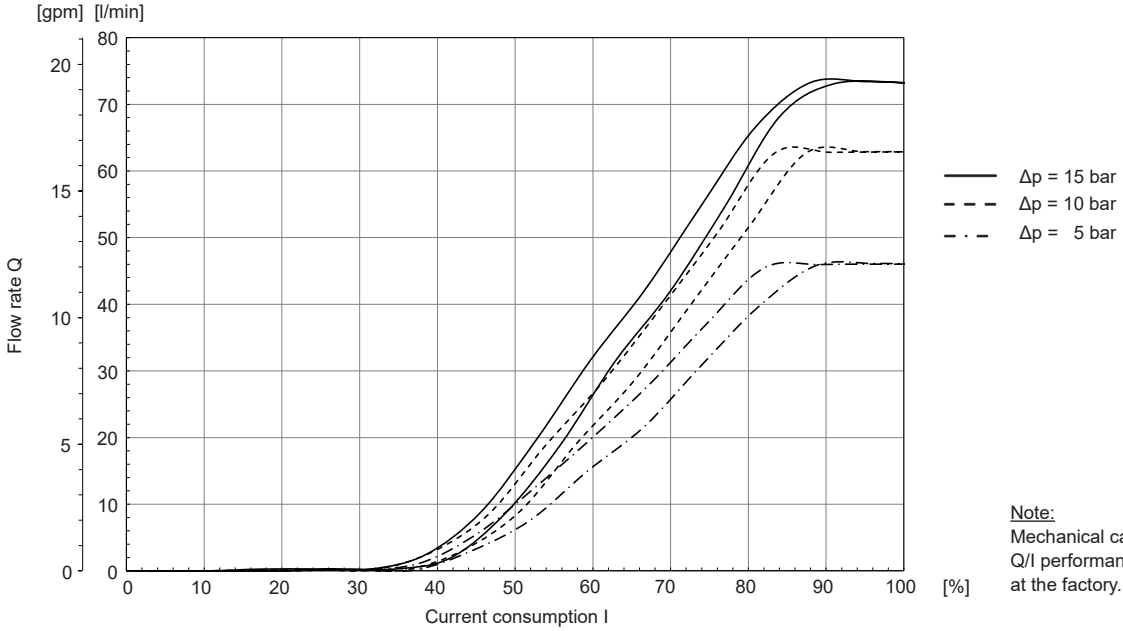
Δp/Q performance curve 1→2 | progressive (P40) measured at ν = 34 mm²/s, T_{Oil} = 46 °C



Δp/Q performance curve 2→1 | progressive (P40) measured at ν = 34 mm²/s, T_{Oil} = 46 °C



Q/I performance curve 2→1 | progressive (P40) measured at ν = 34 mm²/s, T_{Oil} = 46 °C



Note:
Mechanical calibration of a point on the Q/I performance curve is optionally possible at the factory.

MATERIAL OVERVIEW

Standard models

Designation	Part no.
PWS10ZR-11-C-N-P40-0	3530343
PWS10ZR-11-C-V-P40-0	4372750
PWS10ZR-11M-C-N-P40-0	3669952
PWS10ZR-12-C-N-P40-0	3638685

Further versions on request.

Spare parts, seal kits

Designation	Material	Code	Part no.
Seal kit	NBR	FS UNF10/N	3651557
Seal kit	FKM	FS UNF10/V	3651559

Housing

Designation	Material	Code	Pressure	Connections	Weight	Part no.
Inline connection housing	Steel, zinc-plated	FH102-SB4	350 bar	G1/2"	0.54 kg	3037594
Inline connection housing	Aluminium, anodised	FH102-AB4	210 bar	G1/2"	0.20 kg	3037777

Cavity tools

Designation	Part no.
Countersink	176379
Reamer	165706

COMMENT

The information in this brochure relates to the operating conditions and applications described. For applications and operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

Documents are only valid if they have been obtained via the website and are up-to-date.

HYDAC FLUIDTECHNIK GMBH
Justus-von-Liebig-Str.
66280 Sulzbach/Saar
Germany
Phone: +49 6897 509-01
E-mail: valves@hydac.com
Internet: www.hydac.com