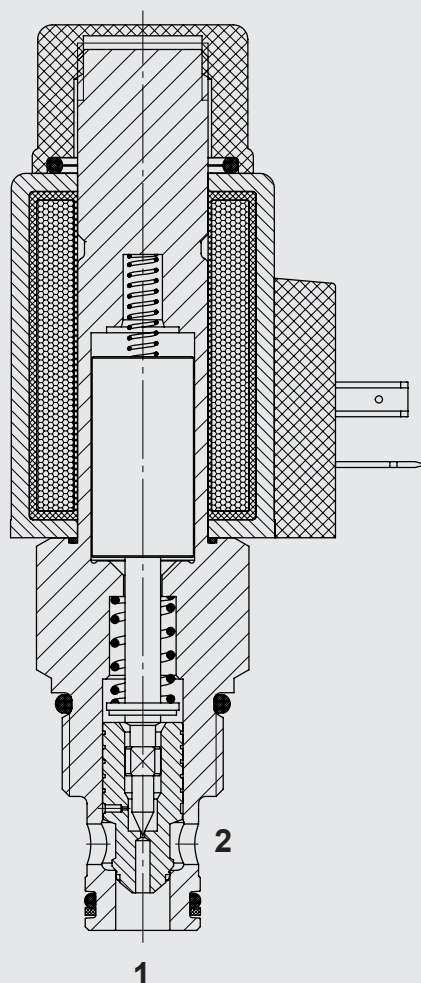


up to 100 l/min
up to 350 bar

FUNCTION



Proportional flow throttle valve

PWS10Z-11/-12/-13

Poppet type, pilot-operated,
normally closed

Screw-in cartridge valve UNF – 350 bar

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

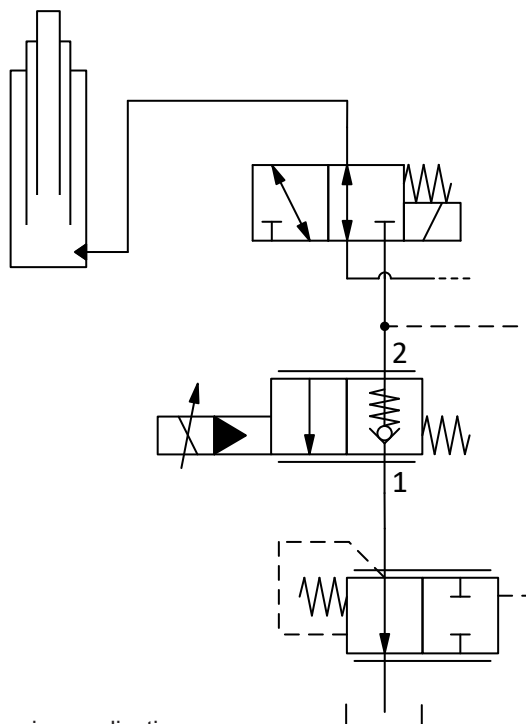
The proportional flow throttle valve is a pilot-operated, spring-loaded throttle valve in poppet design – normally closed position.

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.

Together with a pressure compensator the proportional flow throttle valve can be used as a proportional flow regulator – for example when required to lift/lower variable loads at the same velocity.

See example of application.



Example of lifting-lowering application

TECHNICAL CHARACTERISTICS¹⁾

Operating pressure	max. 350 bar
Flow rate	max. 100 l/min
Internal leakage	max. 10 drops/min (0.5 cm ³ /min) at nominal pressure, $v = 34 \text{ mm}^2/\text{s}$
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 mm ² /s to max. 420 mm ² /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	$\leq 1.5 \%$ of I_{nom}
Reversal error	$\leq 2 \%$ of I_{nom}
Sensitivity of response	$\leq 1 \%$ of I_{nom}
Coil design	Coil 12P...-50-1836 or 24P...-50-1836

Note:

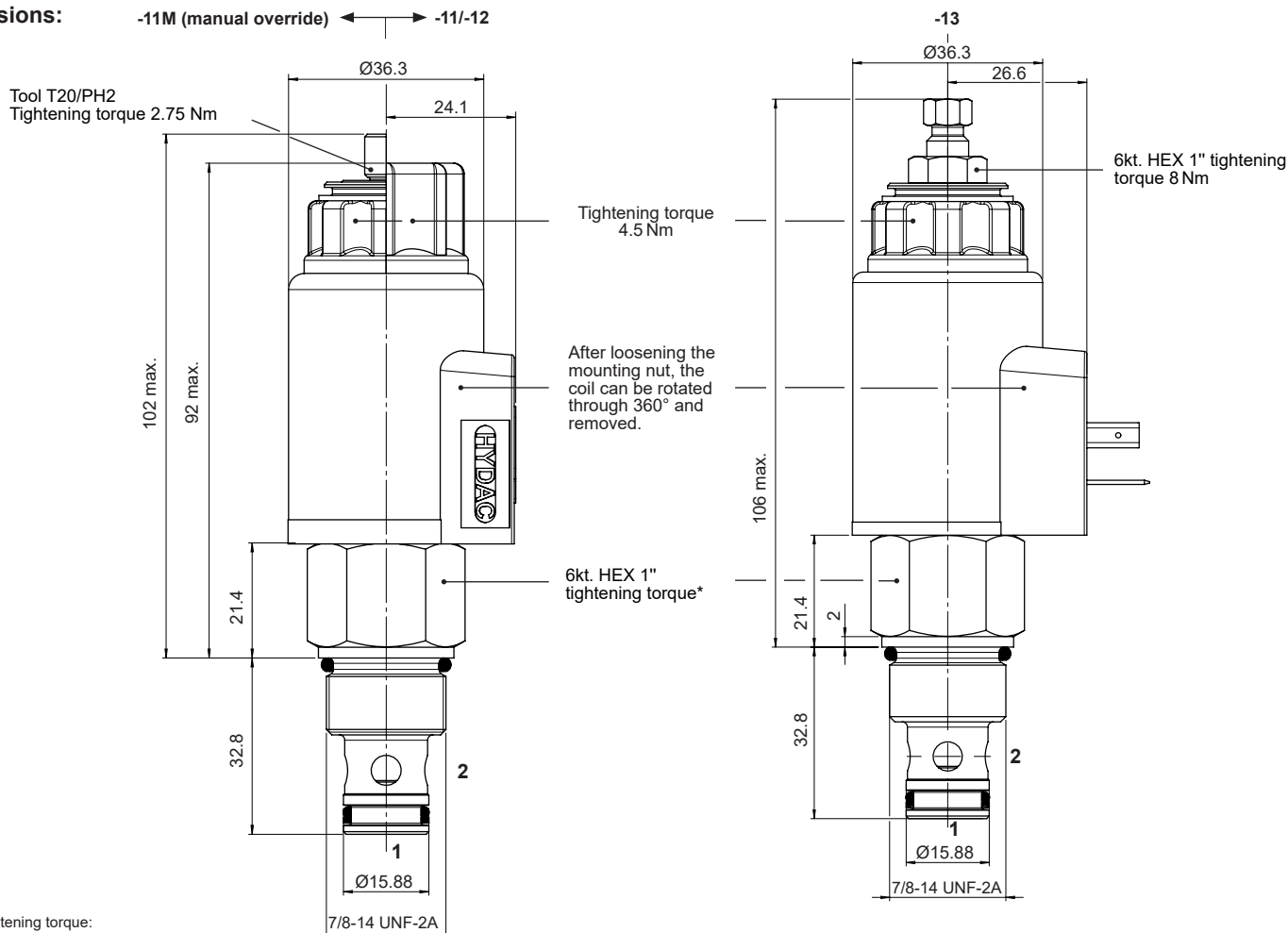
For optimum efficiency, any trapped air should be vented using the bleed screw on the pole tube.

¹⁾ See "Conditions and Instructions for Valves" in brochure 53.000

DIMENSIONS

Versions:

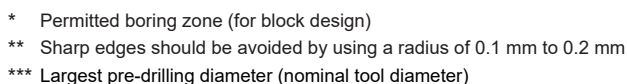
-11M (manual override) ← → -11/-12



* 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.

FC10-2



Millimetre
Subject to technical modifications.

PWS10Z – 11M – C – N – P40 – 24 PG 18.0

Proportional flow throttle valve

11 = standard

11M = with manual override
12 = slightly damped
13 = with adjustable maximum stroke limit

C = Screw-in cartridge valve

N = NBR (standard)
V = FKM

P40 = 40 l/min (progressive performance curve)
H40 = 40 l/min (hyper-progressive performance curve)
Further versions on request.

DC voltage:

12 = 12 V DC
24 = 24 V DC

Further versions on request.

DC:

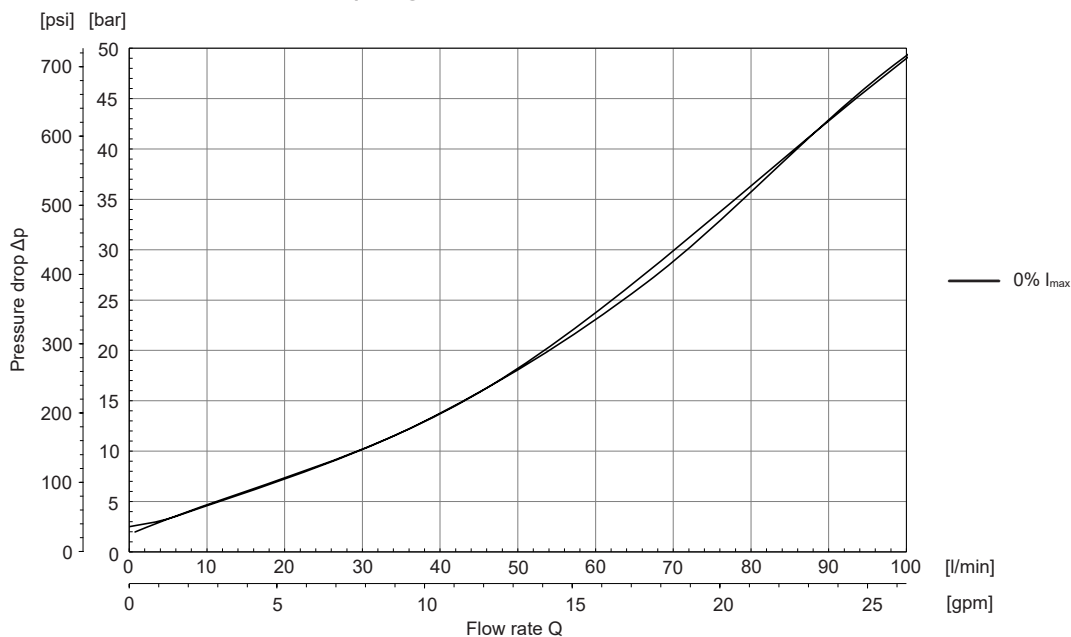
PG = DIN plug connector to EN175301-803
PT = AMP Junior Timer, 2-pole, radial
PL = two flying leads, 457 mm long, 0.75 mm²
PN = Deutsch plug connector, 2-pole, axial

Further versions on request.

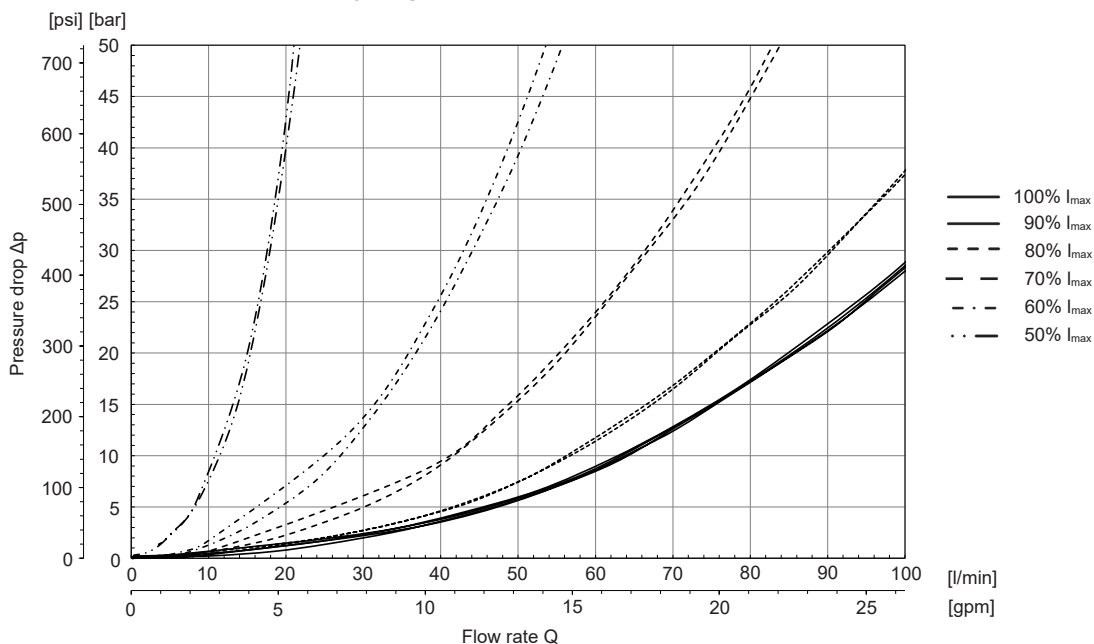
$$\begin{array}{l} 4.1 = 4.1 \, \Omega \, (12 \, \text{V}) \\ 18.0 = 18.0 \, \Omega \, (24 \, \text{V}) \end{array}$$

TYPICAL PERFORMANCE CURVE

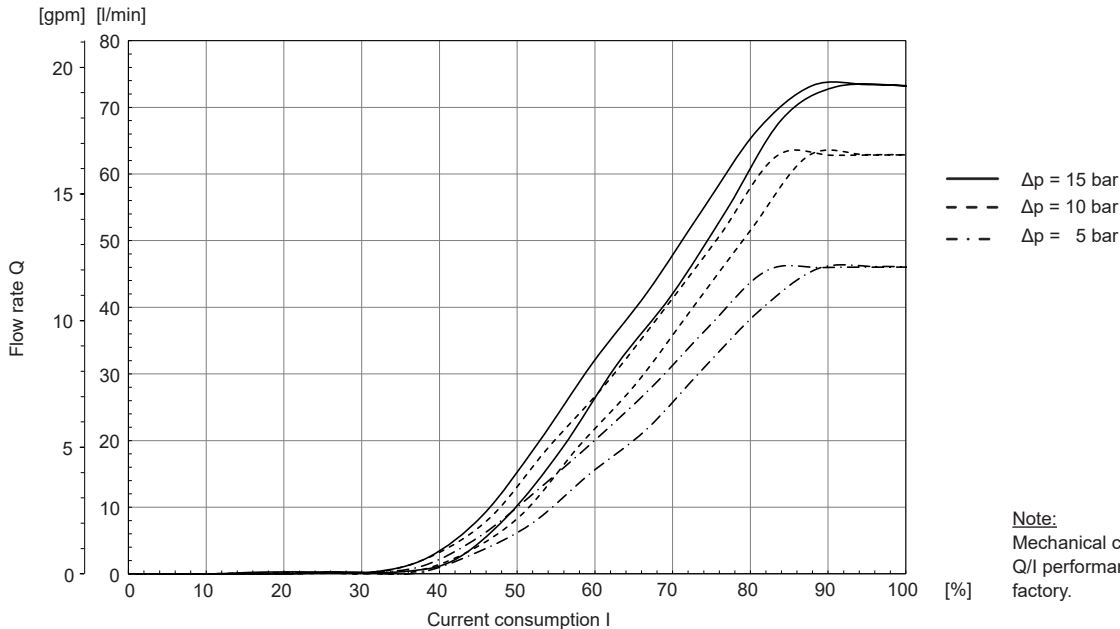
$\Delta p/Q$ performance curve 1→2 | progressive (P40) measured at $v = 34 \text{ mm}^2/\text{s}$, $T_{\text{Oil}} = 46 \text{ }^\circ\text{C}$



$\Delta p/Q$ performance curve 2→1 | progressive (P40) measured at $v = 34 \text{ mm}^2/\text{s}$, $T_{\text{Oil}} = 46 \text{ }^\circ\text{C}$



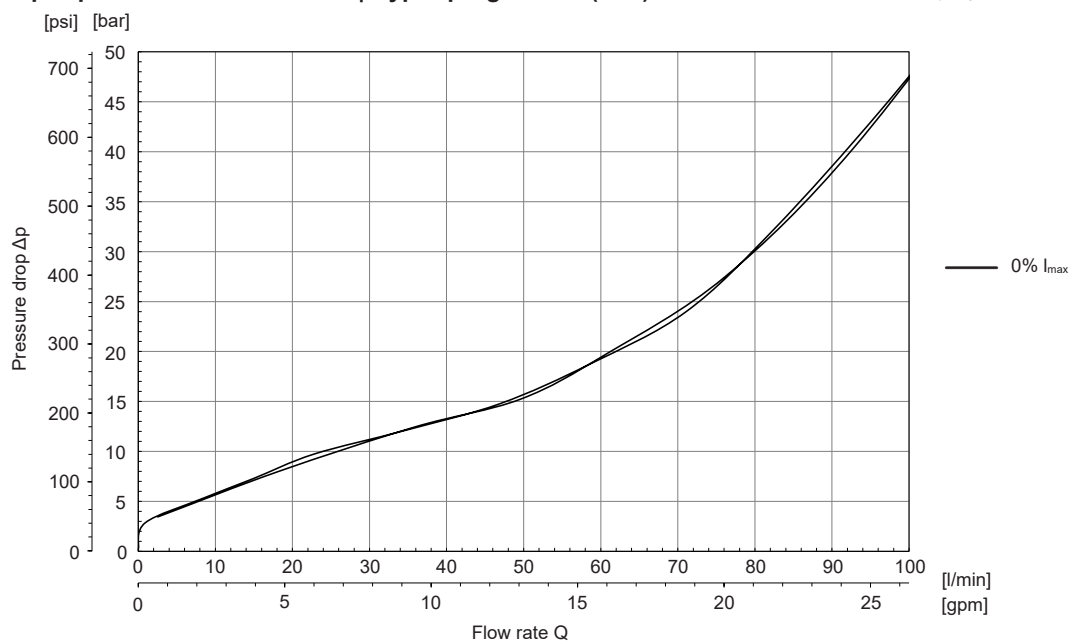
Q/I performance curve 2→1 | progressive (P40) measured at $v = 34 \text{ mm}^2/\text{s}$, $T_{\text{Oil}} = 46 \text{ }^\circ\text{C}$



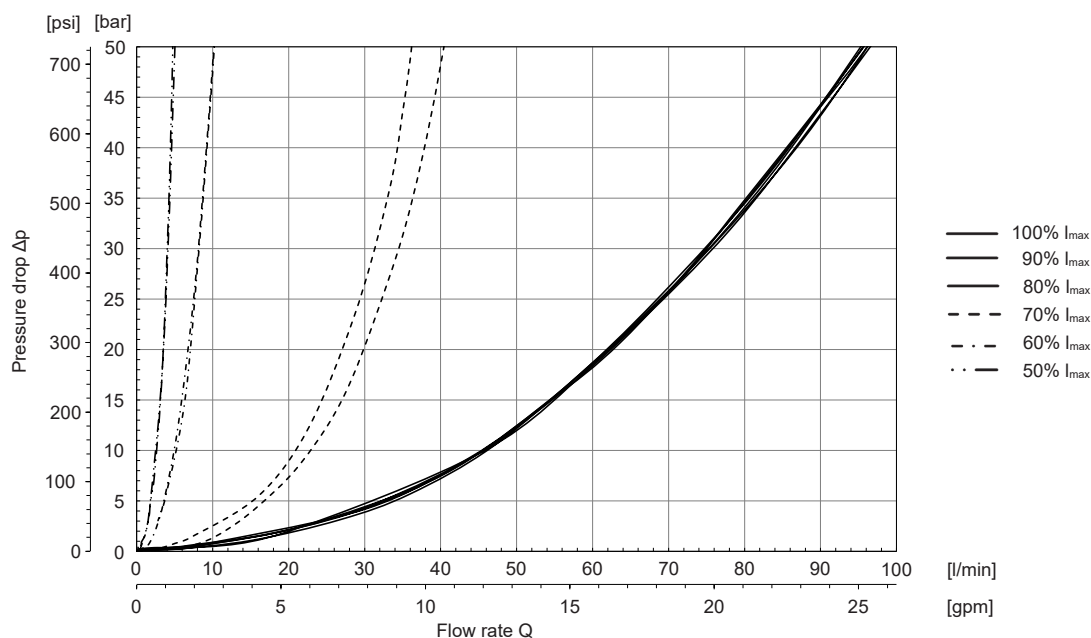
Note:
Mechanical calibration of a point on the Q/I performance curve is optionally possible at the factory.

TYPICAL PERFORMANCE CURVE

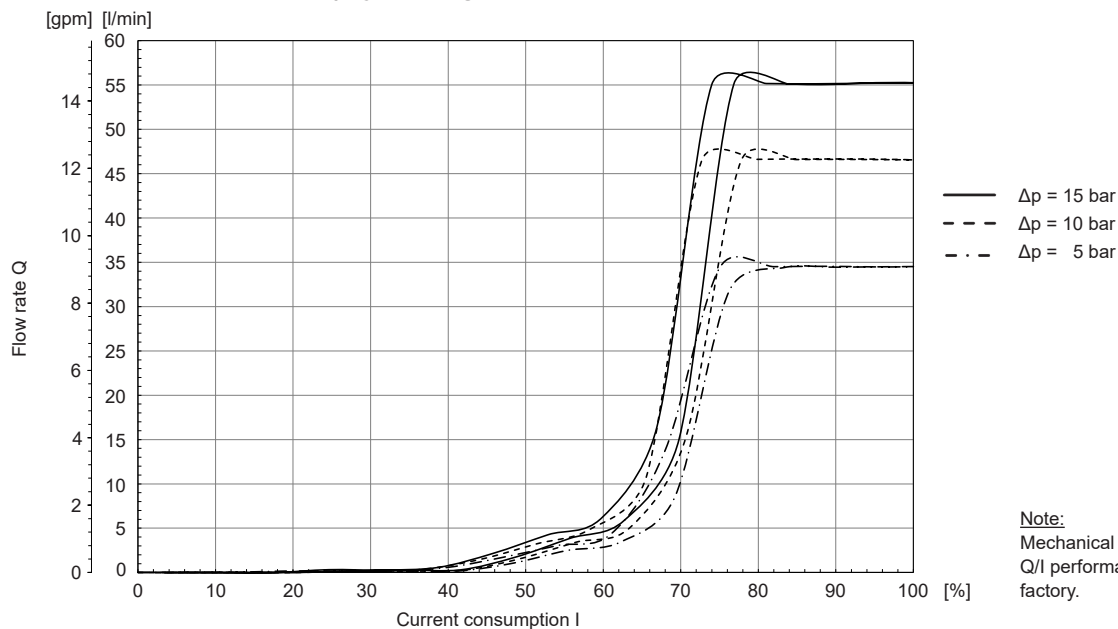
$\Delta p/Q$ performance curve 1→2 | Hyper-progressive (H40) measured at $v = 34 \text{ mm}^2/\text{s}$, $T_{\text{Oil}} = 46 \text{ }^\circ\text{C}$



$\Delta p/Q$ performance curve 2→1 | Hyper-progressive (H40) measured at $v = 34 \text{ mm}^2/\text{s}$, $T_{\text{Oil}} = 46 \text{ }^\circ\text{C}$



Q/I performance curve 2→1 | Hyper-progressive (H40) measured at $v = 34 \text{ mm}^2/\text{s}$, $T_{\text{Oil}} = 46 \text{ }^\circ\text{C}$



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.
PWS10Z-11-C-N-H40-24PG-18.0	3601805
PWS10Z-11-C-N-P40-12PG-4.1	3525207
PWS10Z-11-C-N-P40-24PG-18.0	3525205
PWS10Z-11M-C-N-P40-12PG-4.1	3525209
PWS10Z-11M-C-N-P40-24PG-18.0	3509716

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

NOTE

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