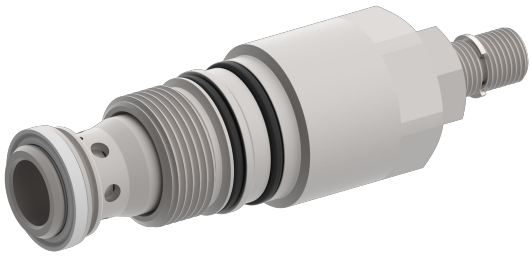
BUCHER hydraulics

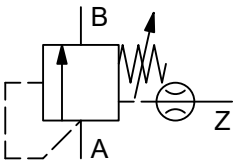
Pressure valve
Bypass compensator

Q_{max} = 36 gpm, p_{max} = 5000 psi
Direct acting, spool type, hydraulically operated
Type series: DWDPB-2D-10-...

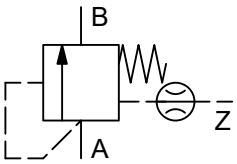


- Screw-in cartridge valve for cavity DD
- All external parts with zinc-nickel plating according to DIN EN ISO 19598
- Installation in threaded port body type DD-12
- External remote-control port with integral damping orifice
- High flow rates
- Excellent stability over the whole pressure and flow range
- Available with hand-knob or tamper-proof cap
- With spoollocking option to allow application with variable or fixeddisplacement pumps

Symbol



DWDPB-2D-10-...S0715...



DWDPB-2D-10-...F...

Description

These direct-acting bypass pressure-compensator (hydrostat) cartridges, series DWDPB-2D...-10..., are size 10, high performance screw-in valves with an M24×1.5 mounting thread. The main stage is designed on the sliding-spool principle. The range includes a model with an adjustable pressure-compensator spring (7 ... 15 bar) and six models with a fixed compensator spring (3, 5, 8, 10, 12 or 15 bar). In addition, a model with a lockable spool is available as an option. This enables the valve to be used in load-sensing systems with either variable displacement pumps (closed center) or fixed-displacement pumps (open center). Pressure-compensator cartridges maintain the control pressure difference between inlet and outlet pressure - for example, across a throttle (an orifice) - at a constant level. This means that the flow rate is independent of the load pressure at the actuator. The adjusting screw or the hand-knob enable the user to carry out system optimization directly on the equipment, without any need to install or replace components that have different flow ranges (e.g. proportional valves). To safeguard valve settings, the adjusting screw can be sealed with a tamper-proof cap. By fitting external pilot controls (pressure-relief valves or 2/2 unloading valves) in the line to the port Z, additional functions such as pressure relief or vented bypass from A to B can be produced. All external parts

of the cartridges are zinc-nickel plated and are thus suitable for use in the harshest operating environments. These screw-in valves are used in hydraulic circuits in mobile and industrial applications, predominantly in conjunction with a throttle cartridge. For self-assembly, please refer to the section related data sheets.

Technical data

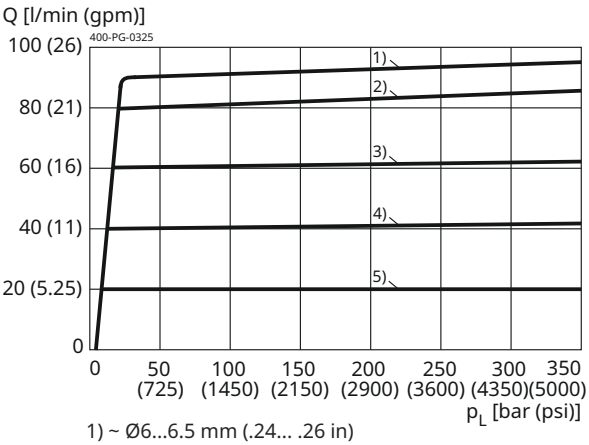
General characteristics	Description, value, unit
Function group	pressure valve
Function	bypass compensator
Design	screw-in cartridge valve
Controls	hydraulically operated
Characteristic	direct acting, spool type
Construction size	NG 10
Thread size	M24×1,5
Mounting attitude	unrestricted
Weight	0.55 lb
Cavity acc. factory standard	DD
Tightening torque steel	48 ft·lb
Tightening torque aluminium	37 ft·lb
Tightening torque tolerance	± 10 %
Minimum ambient temperature	- 22 °F
Maximum ambient temperature	+ 176 °F
Surface protection	all external parts with zinc-nickel plating according to DIN EN ISO 19598
Sealing material	see ordering code
Seal kit order number	NBR: DS-288-N / FKM: DS-288-V

Hydraulic characteristics	Description, value, unit
Maximum operating pressure	5000 psi
Maximum flow rate	36 gpm
Flow direction	see symbol
Hydraulic fluid	HL and HLP mineral oil according to DIN 51 524; other fluids on request!
Minimum fluid temperature	- 22 °F
Maximum fluid temperature	+ 176 °F
Viscosity range	10 ... 650 mm^2/s (cSt)
Recommended viscosity range	15 ... 250 mm^2/s (cSt)
Minimum fluid cleanliness (cleanlineless class according to ISO 4406:1999)	class 20/18/15
Pressure adjustment range	100...215 psi (1 turn ≈ 17 psi)

Performance graphs

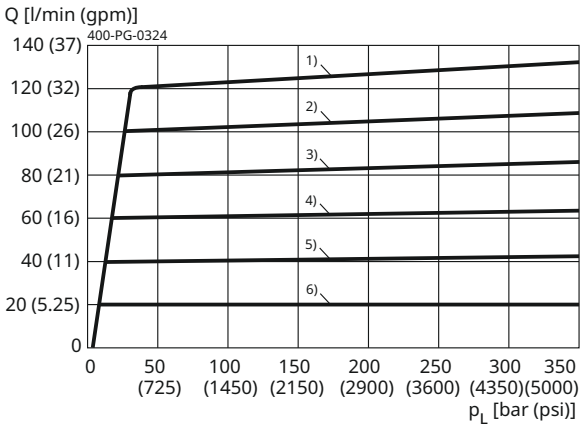
measured with oil viscosity 33.0 mm²/s (cSt)

p = f (l) Pressure adjustment



1) ~ Ø6...6.5 mm (.24... .26 in)
2) ~ Ø5.5...6 mm (.22... .24 in)
3) ~ Ø4.5...5.5 mm (.18... .22 in)
4) ~ Ø3.5...4.5 mm (.14... .18 in)
5) ~ Ø2.5...3.5 mm (.10... .14 in)
at the minimum compensator setting [7 bar (100 psi)]

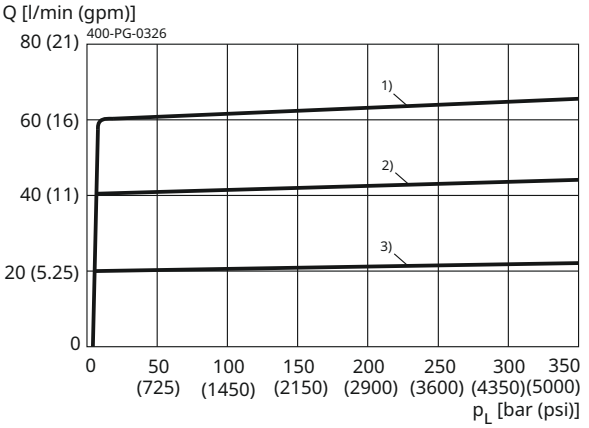
p = f (l) Pressure adjustment



1) ~ Ø 8.5...9.5 mm (.33... .37 in)
2) ~ Ø 7.5...8.5 mm (.30... .33 in)
3) ~ Ø 6.5...7.5 mm (.26... .30 in)
4) ~ Ø 5.5...6.5 mm (.22... .26 in)
5) ~ Ø 4.5...5.5 mm (.18... .22 in)
6) ~ Ø 3...4 mm (.13... .16 in)

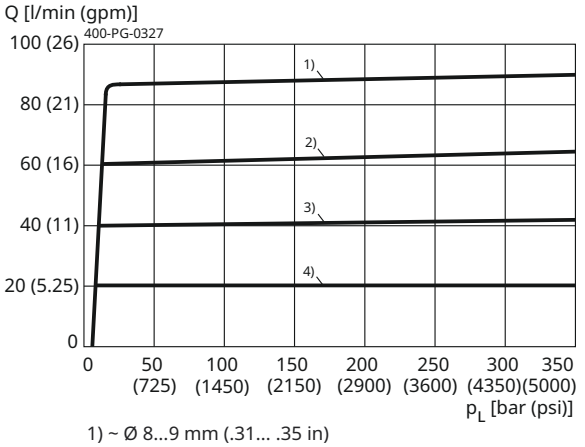
at the maximum compensator setting [15 bar (215 psi)]

p = f (Q) Pressure-flow rate



1) ~ Ø7.5...8.5 mm (.30... .33 in)
2) ~ Ø6...7 mm (.24... .28 in)
3) ~ Ø4...5 mm (.16... .20 in)
at the fixed compensator setting [3 bar (45 psi)]

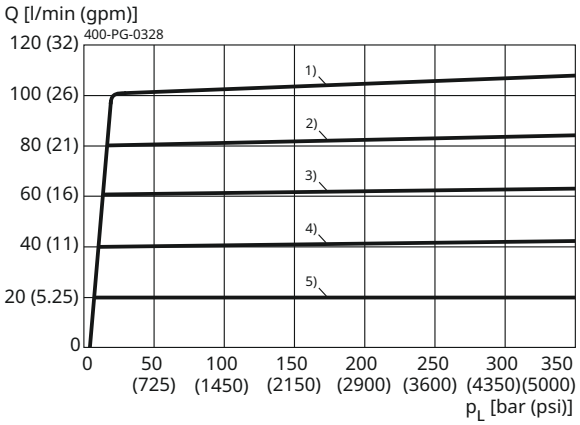
p = f (Q) Pressure-flow rate



1) ~ Ø 8...9 mm (.31... .35 in)
2) ~ Ø 6.5...7.5 mm (.26... .30 in)
3) ~ Ø 5...6 mm (.20... .24 in)
4) ~ Ø 3.5...4.5 mm (.14... .18 in)

at the fixed compensator setting [5 bar (70 psi)]

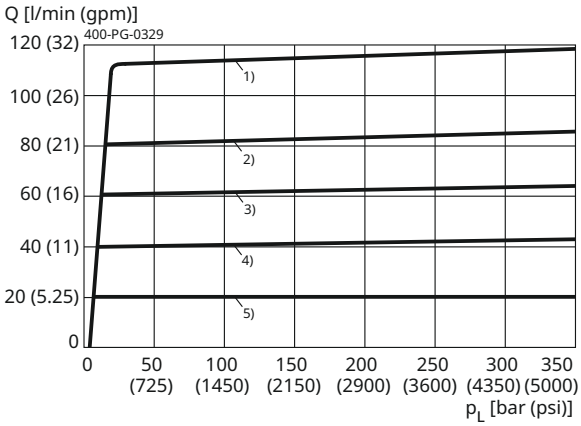
p = f (Q) Pressure-flow rate



1) ~ Ø 7.5...8.5 mm (.30... .33 in)
2) ~ Ø 6.5...7.5 mm (.26... .30 in)
3) ~ Ø 5.5...6.5 mm (.22... .26 in)
4) ~ Ø 4.5...5.5 mm (.18... .22 in)
5) ~ Ø 3...4 mm (.13... .16 in)

at the fixed compensator setting [8 bar (115 psi)]

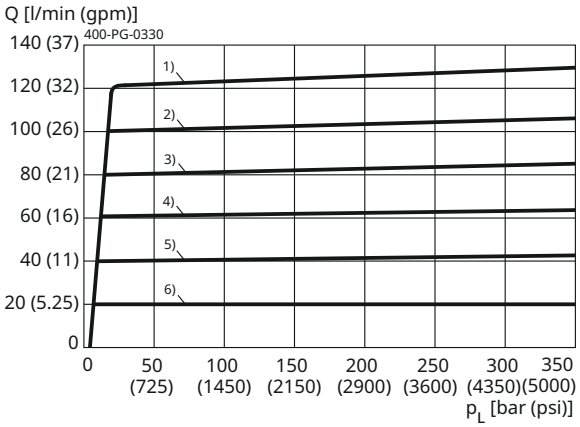
p = f (Q) Pressure-flow rate



1) ~ Ø 7.5...8.5 mm (.30... .33 in)
2) ~ Ø 6...7 mm (.24... .28 in)
3) ~ Ø 5...6 mm (.20... .24 in)
4) ~ Ø 4...5 mm (.16... .20 in)
5) ~ Ø 3...4 mm (.13... .16 in)

at the fixed compensator setting [10 bar (145 psi)]

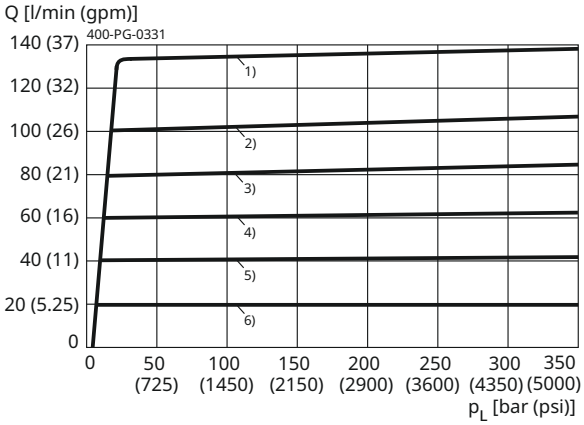
p = f (Q) Pressure-flow rate



1) ~ Ø 7.5...8.5 mm (.30... .33 in)
2) ~ Ø 6.5...7.5 mm (.26... .30 in)
3) ~ Ø 6...7 mm (.24... .28 in)
4) ~ Ø 5...6 mm (.20... .24 in)
5) ~ Ø 4...5 mm (.16... .20 in)
6) ~ Ø 2.5...3.5 mm (.10... .14 in)

at the fixed compensator setting [12 bar (175 psi)]

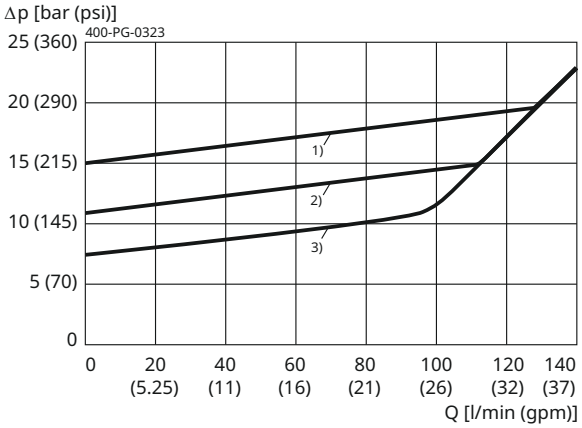
p = f (Q) Pressure-flow rate



1) ~ Ø 7.5...8.5 mm (.30… .33 in)
2) ~ Ø 6.5...7.5 mm (.26… .30 in)
3) ~ Ø 5.5...6.5 mm (.24… .28 in)
4) ~ Ø 5...6 mm (.20… .24 in)
5) ~ Ø 4...5 mm (.16… .20 in)
6) ~ Ø 2.5...3.5 mm (.10… .14 in)

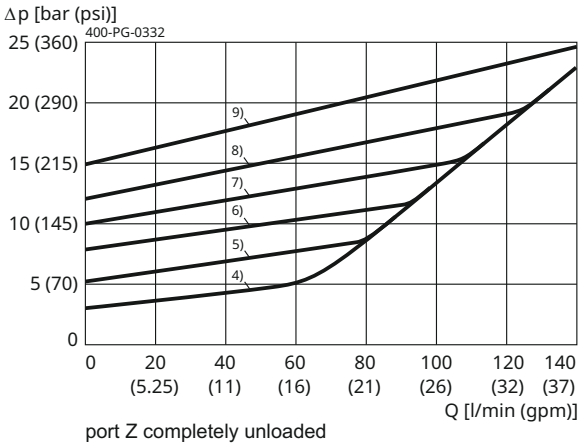
at the fixed compensator setting [15 bar (215 psi)]

Δp = f (Q) Pressure drop-flow rate characteristic



port Z completely unloaded
1) 15 bar (215 psi) control Δp setting (maximum value)
2) 11 bar (160 psi) control Δp setting (maximum value)
3) 7 bar (100 psi) control Δp setting (maximum value)

Δp = f (Q) Pressure drop-flow rate characteristic

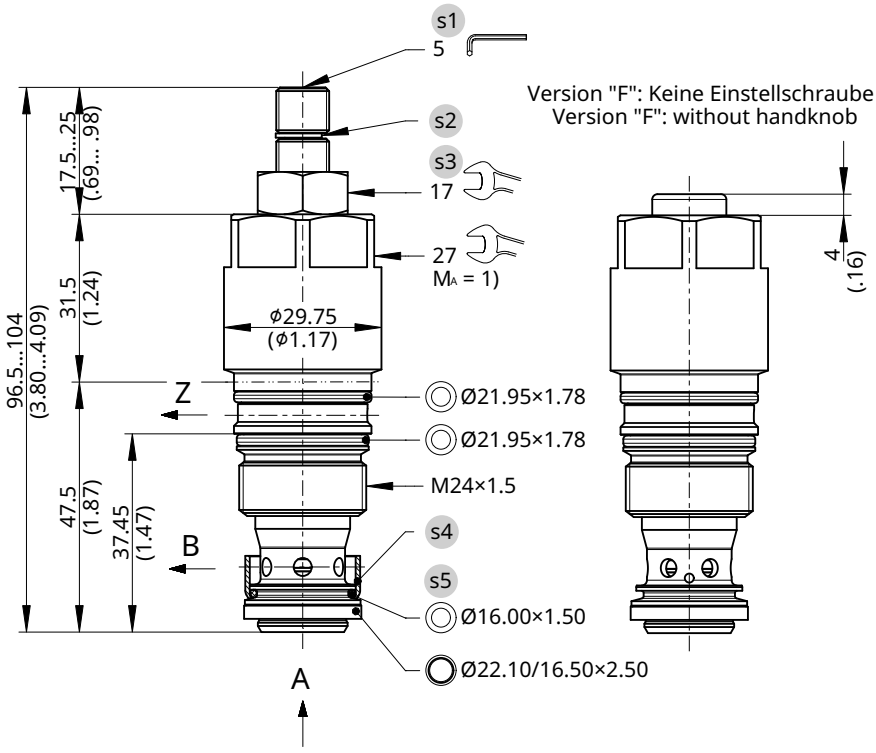


port Z completely unloaded
4) 3 bar (45 psi) control Δp fix
5) 5 bar (70 psi) control Δp fix
6) 8 bar (115 psi) control Δp fix
7) 10 bar (145 psi) control Δp fix
8) 12 bar (175 psi) control Δp fix
9) 15 bar (215 psi) control Δp fix

Installation

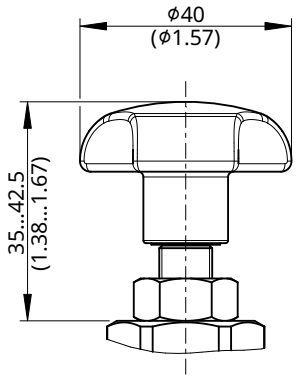
Beispiel für die Masseinheit:
Exampel for the dimensional units:
0.79 = 0.79 mm millimeter
(.031) = 0.031" inch

Version "S": Einstellschraube mit Innensechskant (Standard)
Version "S": adjustment screw with internal hexagon (standard)

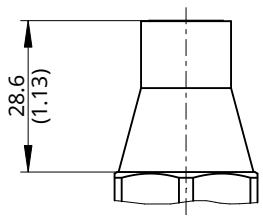


Version "F": Keine Einstellschraube
Version "F": without handknob

Version "H": Einstellschraube mit Handrad
Version "H": adjustment screw with handknob



Einstellschraube mit Sicherungskappe
adjustment screw with tamper-proof cap



NOTE!
1) When fitting the screw-in cartridge valve, use the specified tightening torque. The value can be found in the chapter "Technical data".

NOTE!
Set the required pressure with the adjusting screw s1 . After you have set the valve, lock the adjusting screw s1 with the lock nut.

NOTE!
Valve settings can be sealed by fitting the tamper-proof cap. To fit the cap, the snap ring s2 has to be removed. Subsequent adjustment is only possible by destroying the tamper-proof cap.

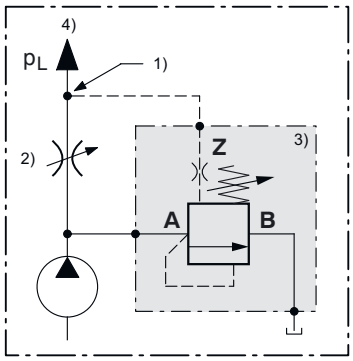
NOTE!
The seals are not available individually. The seal kit order number can be found in the chapter "Technical data".

NOTE!
For installation in an aluminium housing, we recommend using the “S” version. This is equipped with a steel ring s4 and plastic ring s5 to protect the housing from possible damage.

ATTENTION!
Only qualified personnel with mechanical skills may carry out any maintenance work. Generally, the only work that should ever be undertaken is to check, and possibly replace, the seals. When changing seals, oil or grease the new seals thoroughly before fitting them.

Test setup

Test setup (for flow rate v. load pressure characteristic)



1. Load sensing immediately after orifice
2. Throttle function (orifice size, see performance graphs)
3. Bypass pressure-compensator cartridge
4. Actuator port (p_L = load pressure)

IMPORTANT!
The load sensing and compensator inlet (port A) tapping points must be located immediately after the throttle (orifice) and before it respectively. This minimises the pressure drop and gives the best flow rate / load pressure values.

IMPORTANT!
All characteristics were recorded with a surplus flow of 10...15 l/min. (2.75...4 gpm)

Option: spool locking (with hand-knob)

In a loadsensing system, the optional model featuring spool locking can be changed over to allow operation with either a fixeddisplacement pump (open center) or a variabledisplacement pump (closed center) For use with variabledisplacement pumps, the spindle is screwed in fully This locks the spool and closes the connection from A to B.

IMPORTANT!
Carry out the changeover only when the valve is unpressurized.

Application examples

The following diagram shows a typical manifold block that uses our direct acting, bypass pressure-compensator cartridges.

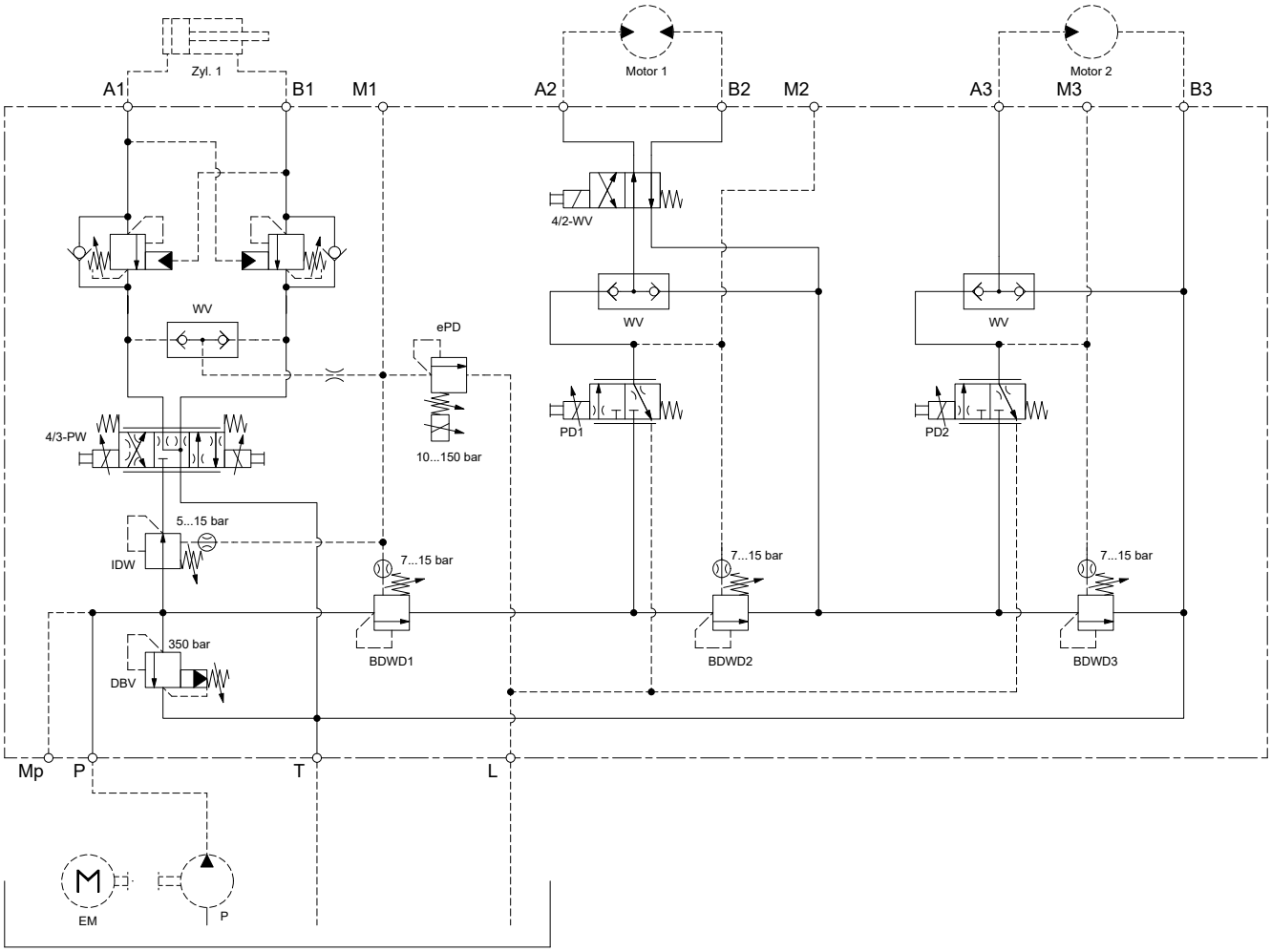
Because the port can be pressurized by the returning oil, priority and series circuits can be constructed.

If the direct acting bypass compensator (BDWD1) does not receive a load signal from the shuttle valve (WV), it forwards the oil flow to the next actuator with a pressure drop that, at its maximum, is equal to the control Δp hat has been set or the fixed compensator spring rating that was chosen. If the 4/3 proportional directional valve (4/3-PW) is now operated, the inline compensator (IDW) ensures load-independent travel at a speed that is determined by the 4/3 proportional directional valve.

A maximum pressure can be set with the proportional pressure-relief pilot valve (ePD). The direct acting bypass compensator (BDWD1) ensures that the 4/3 proportional directional valve (4/3-PW) is supplied with the oil flow rate that it requires, regardless of the other actuators.

The surplus flow is made available to the other actuators. If the ventable proportional throttles (PD1 and PD2) are not operated, the flow is routed to tank through the bypass compensators (BDWD2 and BDWD3).

If the proportional throttles (PD1 and/or PD2) are activated, the hydraulic motors (Motor 1 and/or Motor 2) rotate at speeds that are independent of their loads. The speed is determined by the respective proportional throttle. The direction of rotation of Motor 1 can be reversed by operating the 4/2 directional valve (4/2-WV). The hydraulic motors (Motor 1 and Motor 2) work in a series mode in which either or both can be switched on, and their speeds can be set individually at any required level and will be independent of load.



Ordering code

Ex. DW D P B _ - 2 D - 10 - S 0715 N - 1

DW	=	compensator
D	=	direct acting
P	=	cartridge design
A ... Q	=	standard model according to valid data sheet
Z ... R	=	special model (on request)
(blank)	=	without steel ring
S	=	with steel ring (to protect the housing)
2	=	pressure function 2, with remote control oil connection
D	=	cavity type DD
10	=	nominal size 10
S	=	adjustment screw with internal hexagon **(standard)**
H	=	adjustment screw with hand knob
F	=	adjustment, fixed pressure balance spring
HA*	=	adjustment screw with hand knob, piston lockable
0715	=	continuously adjustable pressure balance spring (control-Δp), 7...15 bar / 100...215 psi
03	=	fixed pressure balance spring (control-Δp), 3 bar / 45 psi
05	=	fixed pressure balance spring (control-Δp), 5 bar / 70 psi
08	=	fixed pressure balance spring (control-Δp), 8 bar / 115 psi
10	=	fixed pressure balance spring (control-Δp), 10 bar / 145 psi
12	=	fixed pressure balance spring (control-Δp), 12 bar / 175 psi
15	=	fixed pressure balance spring (control-Δp), 15 bar / 215 psi
N	=	NBR (nitril-butadien-rubber / BUNA) seals **(standard)**
V	=	FKM (fluorocarbon rubber / VITON) seals (special seals on request)
1 ... 9	=	technical design no. (omit by ordering)

IMPORTANT!
When required, the tamper-proof cap (the adjustment seal) must be ordered separately in plain language.

* = Piston locking with handwheel for optional use with variable displacement or fixed displacement pump
Only available in combination with fixed pressure balance spring 10 bar or 12 bar.

Related data sheets

Reference	Description
400-P-040011	form tools
400-P-060121	cavity DD
400-P-740112	threaded port body DDY-12

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