Bypass Compensator Cartridge, Size 16

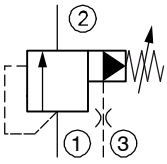
Q_{max} = 350 l/min, p_{max} = 420 bar
Seated pilot stage, fixed compensator setting, integral pressure-relief function
Series DWVPA-2B…, DWVPY-2B…, DWVPZ-2B…

- Choice of 5, 8 or 12 bar compensator spring
- Integral pressure-relief function is available in 6 different pressure ranges
- External remote-control port 3 with integral damping orifice
- With internal pilot-oil drain to port 3
- High flow rates
- Excellent stability over the whole pressure and flow range
- Available with hand-knob or tamper-proof cap
- All exposed parts with zinc-nickel plating
- Can be fitted in a line-mounting body

1 Description

These two-stage bypass pressure-compensator (hydrostat) cartridges, series DWVPA-2B-… / DWVPY-2B-… / DWVPZ-2B-… are size 16, high performance screw-in cartridges with an M42x2 mounting thread. The cartridges have a seated pilot stage, and the main stage is designed on the sliding-spool principle. Three models can be supplied, with compensator spring settings of 8 bar (version "A"), 12 bar (version "Y"), or 5 bar (version "Z"). Due to the fixed compensator-spring setting, the control pressure difference between inlet and outlet pressure in hydraulic circuits - for example, across a throttle (an orifice) - is maintained at a constant level. This means that the flow rate is independent of the load pressure at the actuator. The compensator cartridges are also provided with an integral pressure-relief function, available in 6 different pressure ranges. The 1 → 2 pressure-relief function requires a damping orifice before the port 3. A suitable orifice is already incorporated in the screw-in cartridge and is therefore not needed in the manifold block. To safeguard pressure settings, the adjusting screw can be sealed with a tamper-proof cap. Pilot oil is drained internally to port 2. This port should preferably be routed directly to tank, because any pressure surges in port 2 will affect the valve pressure setting by the same amount. By venting the port 3, the main flow can be vented through the pressure compensator from 1 → 2. These screw-in cartridges are used in hydraulic circuits in mobile and industrial applications, predominantly in conjunction with a throttle cartridge. All external parts of the cartridge are zinc-nickel plated according to DIN EN ISO 19 598 and are thus suitable for use in the harshest operating environments. For self-assembly, please refer to the section related data sheets.

2 Symbol



3 Technical data

General characteristics	Description, value, unit
Designation	bypass pressure-compensator cartridge
Design	seated pilot stage, fixed compensator-spring setting, integral pressure-relief function, external remote-control port 3 with integral damping orifice
Mounting method	screw-in cartridge M42x2
Tightening torque	200 Nm ± 10 %

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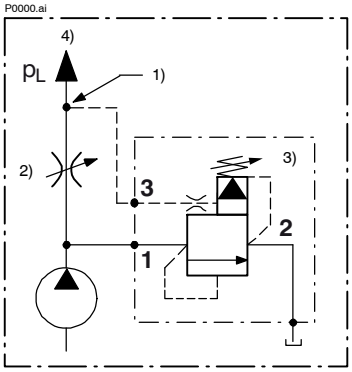
General characteristics	Description, value, unit
Size	nominal size 16, cavity type EB to ISO 7789-42-06-0-07
Weight	0.96 kg
Mounting attitude	unrestricted
Ambient temperature range	-25 °C … +80 °C

Hydraulic characteristics	Description, value, unit
Maximum operating pressure	420 bar
Maximum allowable pressure in port 3	420 bar
Pressure adjustment range: - pressure range “42” - pressure range “35” - pressure range “25” - pressure range “16” - pressure range “10” - pressure range “04”	15 … 420 bar 15 … 350 bar 15 … 250 bar 15 … 160 bar 15 … 100 bar 10 … 40 bar
Maximum flow rate 1 → 2	350 l/min
Maximum flow rate attainable at the actuator	280 l/min
Flow direction	1 → 2, see symbols
Hydraulic fluid	HL and HLP mineral oil to DIN 51 524; for other fluids, please contact BUCHER
Hydraulic fluid temperature range	-25 °C … +80 °C
Viscosity range	10…650 mm^2/s (cSt), recommended 15...250 mm^2/s (cSt)
Minimum fluid cleanliness Cleanliness class to ISO 4406 : 1999	class 20/18/15

4 Performance graphs

measured with oil viscosity 33 mm^2/s (cSt) and in a cavity **with an annular groove**

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

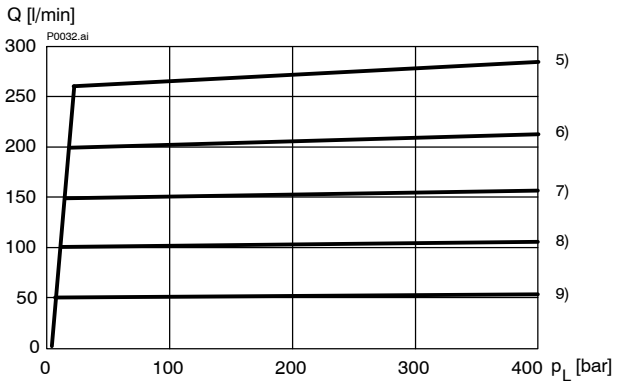


1) Load sensing immediately after orifice 2)
2) Throttle function (orifice size, see performance graphs)
3) Bypass pressure-compensator cartridge
4) Actuator port (p_L = load pressure)

IMPORTANT!
The load sensing and compensator inlet (port 1) 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.

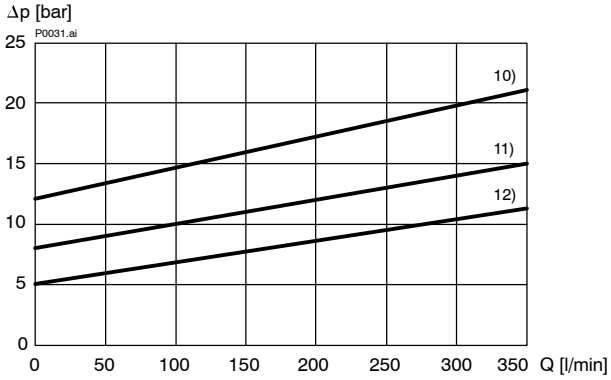
IMPORTANT!
All characteristics were recorded with a **surplus flow of 10…15 l/min**.

Q = f (p_L) Flow rate v. load pressure characteristic



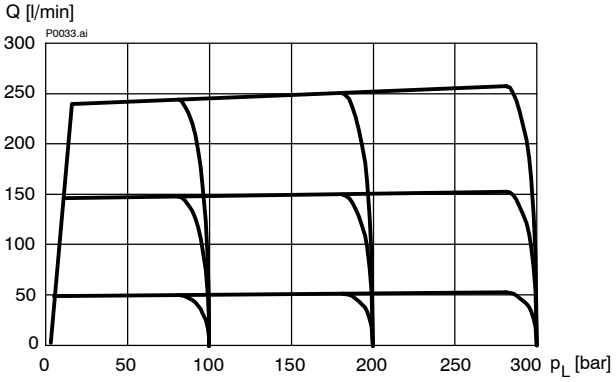
	Throttle / orifice diameters [mm]		
Graph	Δp = 5 bar	Δp = 8 bar	Δp = 12 bar
5)	∅ 14…15	∅ 12…13	∅ 11…12
6)	∅ 12…13	∅ 10.5…11.5	∅ 9.5…10.5
7)	∅ 10.5…11.5	∅ 9…10	∅ 8…9
8)	∅ 8.5…9.5	∅ 7.5…8.5	∅ 6.5…7.5
9)	∅ 6…7	∅ 5…6	∅ 4.5…5.5

Δp = f (Q) Pressure-drop characteristic (control Δp, 1→2)
(port 3 completely unloaded)



10) 12 bar control Δp (fixed)
11) 8 bar control Δp (fixed)
12) 5 bar control Δp (fixed)

Q = f (p_L) Pressure cut-off v. Load pressure characteristic
(only some examples are shown)



5 Installation information

IMPORTANT!
When fitting the cartridges, use the specified tightening torque. The pressure that the pilot valve is required to open at (15…420 bar depending on pressure range) is set with the adjusting screw (s_1 4). After you have set the valve, lock the adjusting screw with the lock nut.

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.

IMPORTANT!
Valve settings can be sealed by fitting the tamper-proof cap. To fit the cap, the snap ring 13) has to be removed. Subsequent adjustment is only possible by destroying the tamper-proof cap..

Seal kit NBR no. DS-344-N 14)

Item	Qty.	Description
1	1	O-ring no. 129 ∅ 39,34 x 2,62 N90
2	1	O-ring no. 125 ∅ 32,99 x 2,62 N90
3	1	O-ring no. 124 ∅ 31,42 x 2,62 N90
4	2	Backup ring ∅ 32,00 x 2,00 x 1,40 FI0751
5	2	Backup ring ∅ 30,00 x 2,00 x 1,40 FI0751
6	1	Seal kit NBR no. DS-350 N for DDPC-1L ...

IMPORTANT!
14) Seal kit with FKM (Viton) seals, no. DS-344-V

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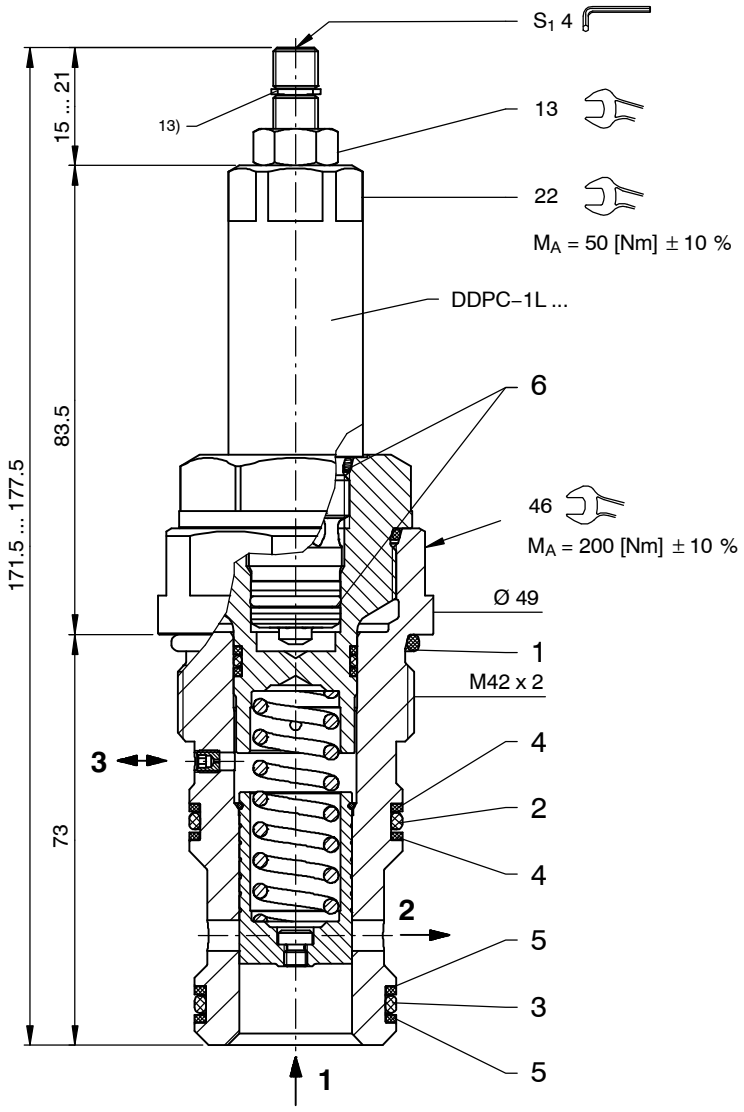
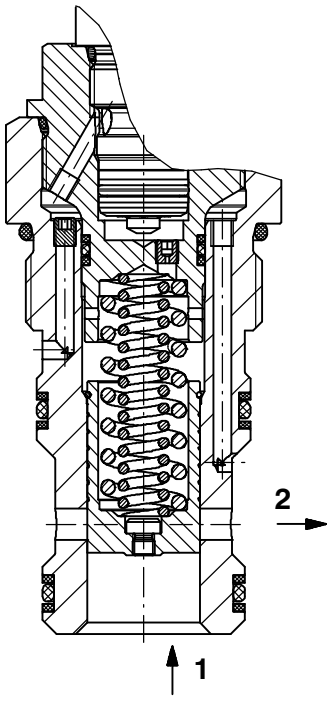
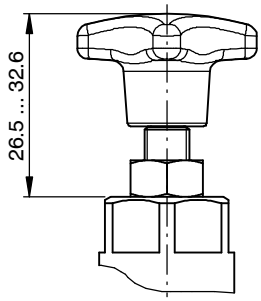
6 Dimensions & sectional view

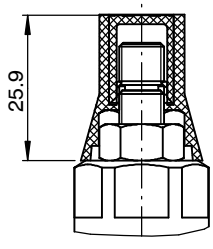
With adjusting screw “S”







With hand-knob adjuster “H”



Adjusting screw with tamper-proof cap
(order separately in plain language)

7 Application examples

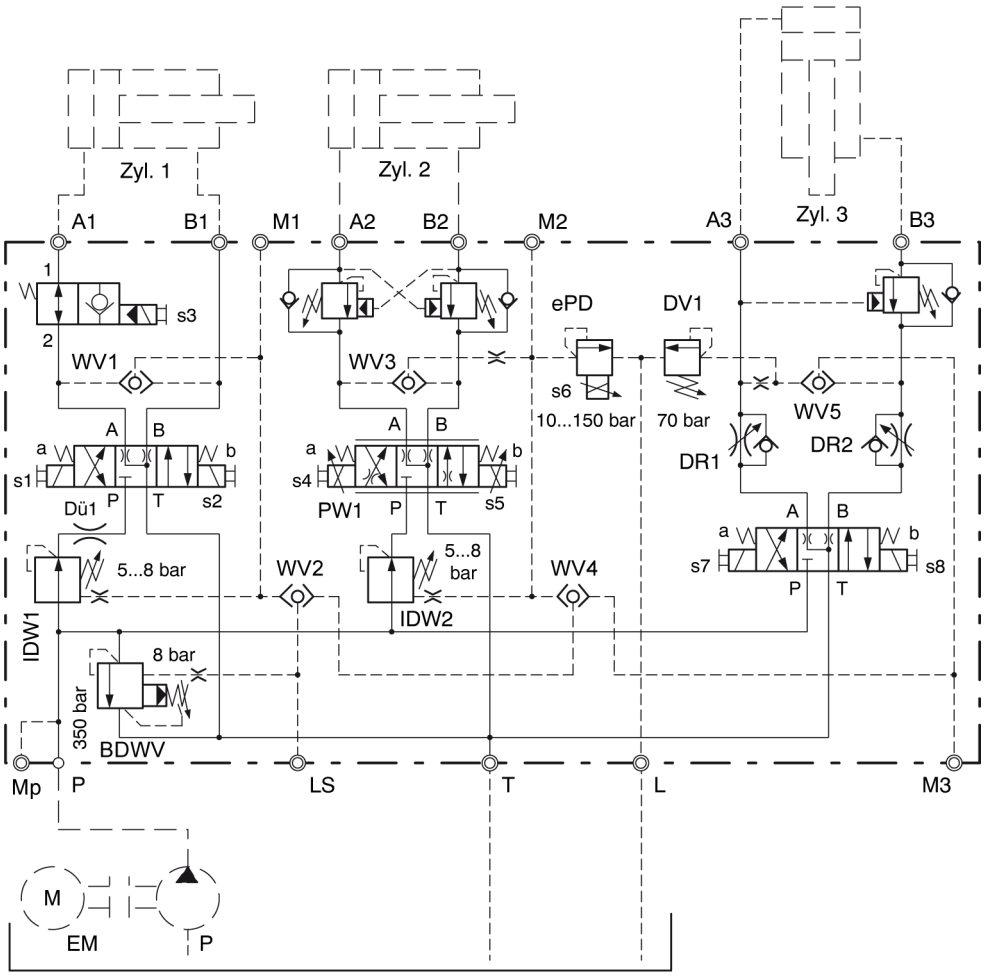
Typical manifold block for load-sensing circuit with fixed-displacement pump (OPEN CENTRE).
The two-stage bypass compensator (BDWV) takes on the following functions:

a. Limiting the maximum system pressure (315 bar).

b. The load-sensing function: the highest load pressure at any one time is signalled back through the shuttle valves WV1 to WV5, and the fixed-displacement pump works against this pressure only, plus a Δp (8 bar) from the main stage of the preessure compensator.

c. Vented bypass (approx. 8 bar)

Because the cylinders (Zyl. 1 and Zyl. 2) have to travel together and at constant speed in each case, the two inline compensators (IDW1 and IDW2) must be provided in the circuit. The Δp between the compensator and the measuring point can be set between 5…8 bar. The speed of cylinder 1 (Zyl. 1) is set with the orifice (Dü1). The maximum pressure for cylinder 1 (Zyl. 1) is set using the pilot stage of the bypass compensator (BDWV). The speed of cylinder 2 (Zyl.2) is determined by the 4/3 proportional directional valve. The pressure setting for cylinder 2 (Zyl. 2) is determined by the pilot valve (ePD) in the load-sensing line, which is a proportional pressure-relief valve. The inline compensator and the proportional pressure-relief pilot valve interact to provide a proportional 2-way pressure-reducing function. The lifting cylinder (Zyl. 3) travels on its own, and its speed must be independent of the load. This speed is set using the throttle check valves (DR1 and DR2). The cylinder rod must be protected against buckling when travelling downwards, and therefore pressure limiting (70 bar) is provided by the pressure-relief pilot valve (DV1).



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8 Ordering code

Ex. DW | V | P | A - 2 | B - 16 - 42 - S | _ - 1

DW	=	compensator
V	=	two-stage
P	=	cartridge design
A ... Q	=	standard model, with compensator spring Δp = 8 bar
Y	=	model with compensator spring Δp = 12 bar
Z	=	model with compensator spring Δp = 5 bar
X ... R	=	special features - please consult BUCHER
2	=	pressure function 2 (with external remote-control port 3)
B	=	cavity type EB
16	=	nominal size 16
42	=	pressure range 15 … 420 bar
35	=	pressure range 15 … 350 bar
25	=	pressure range 15 … 250 bar
16	=	pressure range 15 … 160 bar
10	=	pressure range 15 … 100 bar
04	=	pressure range 10 … 40 bar
S	=	screw adjuster (**standard**)
H	=	hand-knob adjuster
(blank)	=	NBR (Nitrile) seals (**standard**)
V	=	FKM (Viton) seals (special seals - please contact BUCHER)
1 ... 9	=	design stage (omit when ordering new units)

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

9 Related data sheets

Reference	(Old no.)	Description
400-P-040011	(i-32)	The form-tool hire programme
400-P-080111	(i-55.2)	Cavity type EB to ISO 7789-42-06-0-07
400-P-260111	(D-2.151)	Pressure-relief cartridge, size 4, series DDPC-1L…
400-P-750115	(G-29.22)	Line-mounting body, type GEBAA (G 1”)

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Classification: 430.305.320.305.330.355