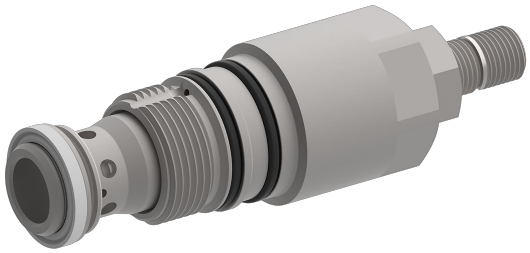
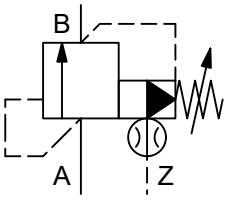
# Pressure valve
# Compensator function

$Q_{max}$ = 140 l/min, $p_{max}$ = 350 bar
Pilot operated, spool type, hydraulical operation
Type series: DWVP_-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
- With integral pressure-relief function
- Available with 5 bar or 8 bar pressure balance spring
- High flow rates
- Excellent stability over the whole pressure and flow range
- External remote-control port with integral damping orifice
- With internal pilot-oil drain to B
- Available with hand-knob or tamper-proof cap

## Symbol




## Description

These two-stage pressure valves, series DWVP_-2-10..., are size 10, crew-in cartridge valves with a seated pilot stage and an M24x1.5 mounting thread. They are designed on the proven sliding-spool principle. 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 spring chamber is internally drained to the secondary connection. The secondary connection should be preferably drained to the tank without pressure. These valves are mainly used in mobile and stationary applications where pressureless circulation is desired. The setting is by means of an adjusting spindle. All external parts of the screw-in valves are zinc-nickel plated and are thus suitable for use in the harshest operating environments. For installation and further information, please refer to the section related data sheets.

## Technical data

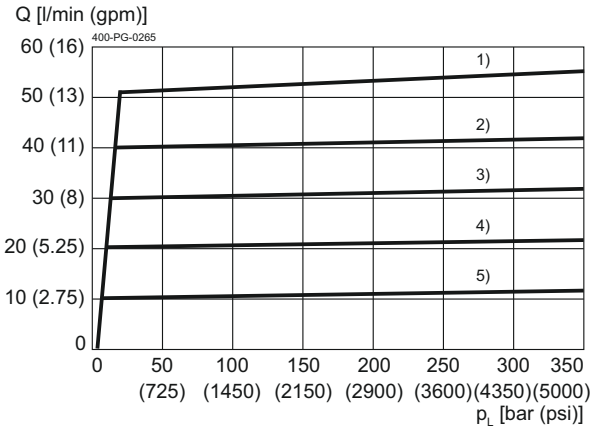
| General characteristics | Description, value, unit |
|---|---|
| Function group | pressure valve |
| Function | compensator function |
| Design | screw-in cartridge valve |
| Controls | hydraulical operation |
| Characteristic | pilot operated, spool type |
| Construction size | NG 10 |
| Thread size | M24×1,5 |
| Mounting attitude | unrestricted |
| Weight | 0.25 kg |
| Cavity acc. factory standard | DD |
| Tightening torque steel | 65 Nm |
| Tightening torque aluminium | 50 Nm |
| Tightening torque tolerance | ± 10 % |
| Minimum ambient temperature | - 30 °C |
| Maximum ambient temperature | + 80 °C |
| 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-216-N / FKM: DS-216-V |

| Hydraulic characteristics | Description, value, unit |
|---|---|
| Maximum operating pressure | 350 bar |
| Maximum flow rate | 140 l/min |
| Flow direction | see symbol |
| Hydraulic fluid | HL and HLP mineral oil according to DIN 51 524; other fluids on request! |
| Minimum fluid temperature | - 30 °C |
| Maximum fluid temperature | + 80 °C |
| 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 |
| Opening pressure | pressure range L = 10 ... 65 barnpressure range M = 10 ... 210 bar<br>pressure range N = 10 ... 350 bar |

## Performance graphs

measured with oil viscosity 33.0 mm²/s (cSt)

Q = f (pl) Flow rate load-pressure

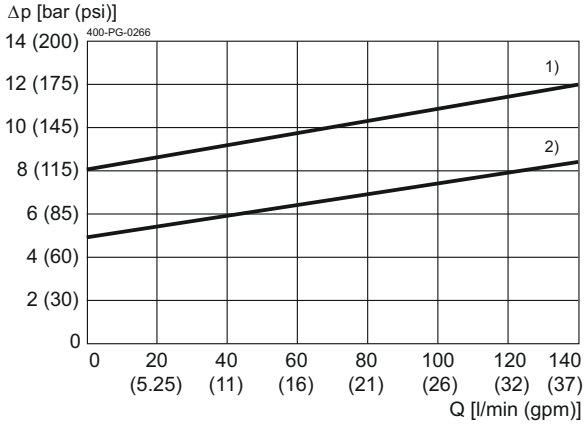



Throttle- / Orifice diameters [mm]

| | Throttle / orifice diameters [mm] | |
|---|---|---|
| Graph | Δp = 5 bar | Δp = 8 bar |
| 1) | | ∅ 5.5…6.0 |
| 2) | ∅ 5.5…6.0 | ∅ 5.0…5.5 |
| 3) | ∅ 4.5…5.0 | ∅ 4.0…4.5 |
| 4) | ∅ 4.0…4.5 | ∅ 3.5…4.0 |
| 5) | ∅ 3.5…4.0 | ∅ 2.5…3.0 |

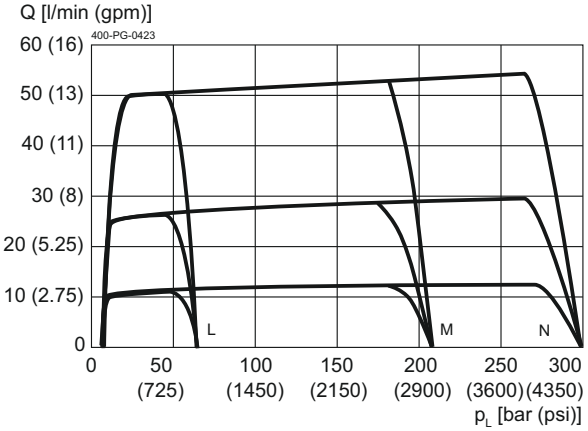
Δp = f (Q) Pressure drop-flow rate characteristic

port Z completely unloaded




1) 8 bar control Δp (fixed)
2) 5 bar control Δp (fixed)

Q = f (pl) Pressure cut-off– load-pressure

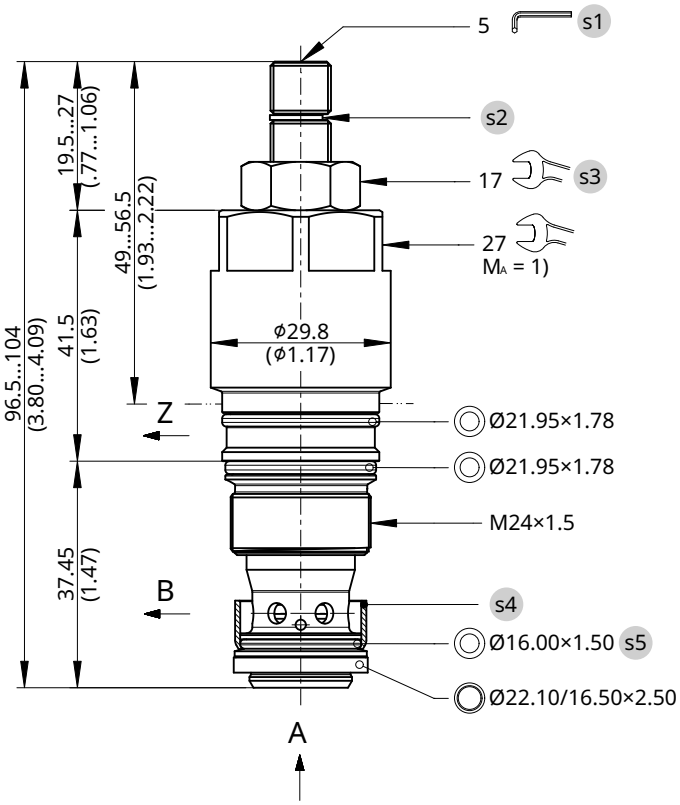


## Installation

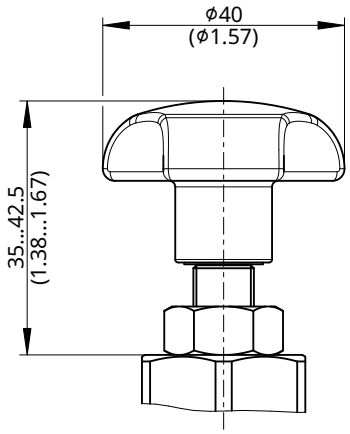
Beispiel für die Masseinheit:
Exampel for the dimensional units:

0.79 = 0.79 mm millimeter
(.031) = 0.031" inch

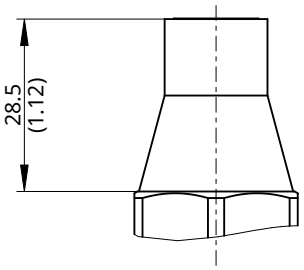
Version "S": Einstellschraube mit Innensechskant (Standard)
Version "S": adjustment screw with internal hexagon (standard)




Version "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.

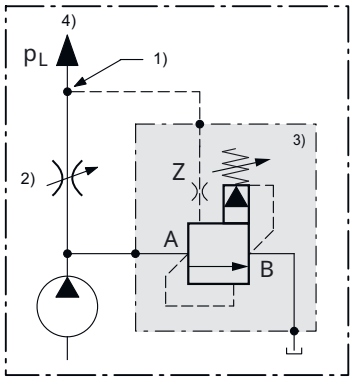
**NOTE!**
The seals are not available individually. The seal kit order number can be found in the chapter "Technical data".

**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)

## Application examples

The two-stage bypass compensator 8 takes on the following functions:

1. Limiting the maximum system pressure.
2. The load-sensing function: the highest load pressure at any one time is signaled back through the shuttle valves 5 11 13 20 , and the fixed-displacement pump works against this pressure only, plus a Δp = 8 bar (115 psi) from the main stage of the pressure compensator 8 .
3. Vented bypass (approx. 8 bar / 115 psi)

The speed of cylinder 1 is set with the orifice 6 .

The maximum pressure for cylinder 1 is set using the pilot stage of the bypass compensator 8 .

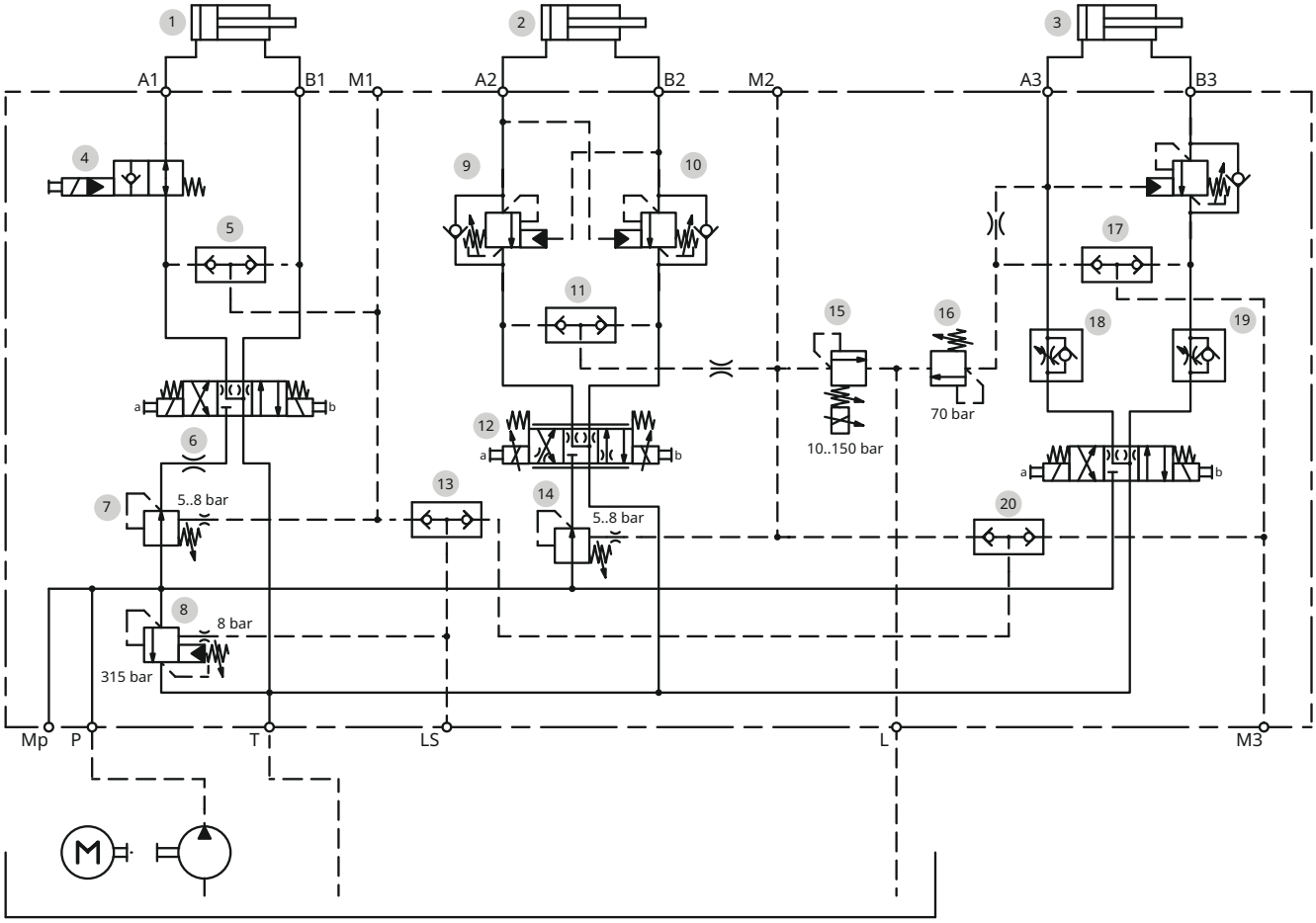
The speed of cylinder 2 is determined by the 4/3 proportional directional valve 12 .

The pressure setting for cylinder 2 is determined by the pilot valve 15 in the load-sensing line, which is a proportional pressure-relief valve.

The inline compensator 14 and the proportional pressure-relief pilot valve 15 interact to provide a proportional 2-way pressure-reducing function.

Because the cylinders 1 and 2 have to travel together and at constant speed in each case, the two inline compensators 7 and 14 must be provided in the circuit. The Δp between the compensator and the measuring point can be set between 5 and 8 bar (70 and 115 psi).

The lifting cylinder 3 travels on its own, and its speed must be independent of the load. This speed is set using the throttle check valves 18 und 19 .
Because the cylinder 3 is installed in a vertical position and must be protected against buckling during lowering, pressure is cut off (70 bar / 1000 psi) by the pilot pressure valve 16 .



## Ordering code

Ex. DW V P A _ - 2 D - 10 - S N N - 4

| | | |
|---|---|---|
| DW | = | compensator |
| V | = | pilot operated |
| P | = | cartridge design |
| A | = | model, with compensator spring Δp = 8 bar / 115 psi **(standard)** |
| Z | = | model, with compensator spring Δp = 5 bar / 70 psi |
| Y ... R | = | special model (on request) |
| (blank) | = | without steel ring |
| S | = | with steel ring (to protect the housing) |
| 2 | = | pressure relief with additional 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 |
| L | = | pressure range 10...65 bar / 145...940 psi (light spring) |
| M | = | pressure range 10...210 bar / 145...3000 psi (medium spring) |
| N | = | pressure range 10...350 bar / 145...5000 psi (normal spring) |
| N | = | NBR (nitril-butadien-rubber / BUNA) seals **(standard)** |
| V | = | FKM (fluorocarbon rubber / VITON) seals<br>(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.

## 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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