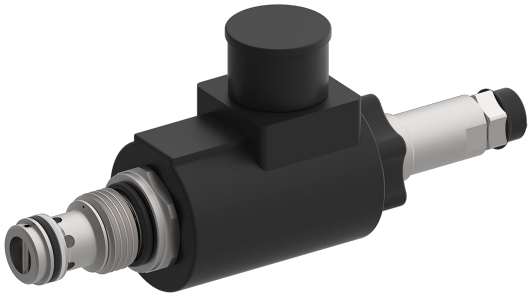
Pressure valve
Relief function

Q_{max} = 60 l/min, p_{max} = 400 bar
pilot operated, main stage in spool type, proportional solenoid
Type series: DBVSA-1L...

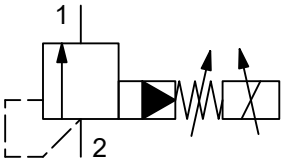


- Screw-in cartridge valve
- For cavity AL
- All external parts with zinc-nickel plating according to DIN EN ISO 19598
- Installation in threaded port body type GALA
- Seated pilot stage
- Fail-safe function
- Excellent stability over the whole pressure and flow range
- High pressure wet-armature solenoids
- The slip-on coil can be rotated, and it can be replaced without opening the hydraulic envelope
- Various plug-connector systems and voltages are available

Description

The proportional pressure-reducing valves, series DBVS_-1L... , are size 5, pilot-operated, high performance screw-in valves with a 3/4-16 UNF-2A mounting thread. They consist of a spool-type main stage and a leak-free, poppet-type pilot stage with a rising characteristic. Thanks to the damp ing of the solenoid armature, these pressure-relief car tridges exhibit excellent stability over the whole pressure and flow range. With these proportional pressure-relief car tridges, the relief pressure is dependent on the electrical control current and can be continuously varied. Any pressure at port 1 is additive to the valve setting at port 2, therefore port 1 should preferably be con nected directly to tank. In control mode, the relief pressure is proportional to the change in the required value (amplifier output current). To obtain a reliable pressure setting over the entire pressure range, the overall pressure range is divided into different pressure levels. These valves are mainly used in certain mobile and industrial applications to limit the system pressure. The setting is by means of an adjusting spindle. The slip-on coils can be replaced without opening the hydraulic envelope and can be positioned at any angle through 360°. 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.

Symbol



Technical data

General characteristics	Description, value, unit
Function group	Pressure valve
Function	Relief function
Design	Screw-in cartridge valve
Controls	proportional solenoid
Characteristic	pilot operated, main stage in spool type
MTTFd value	150 years
Construction size	NG 5
Thread size	3/4-16 UNF-2A
Mounting attitude	unrestricted (preferably vertical, coil down)
Weight	0.40 kg
Cavity acc. factory standard	For cavity AL
Tightening torque steel	40 Nm
Tightening torque aluminium	40 Nm
Tightening torque tolerance	± 10 %
Minimum ambient temperature	- 30 °C
Maximum ambient temperature	+ 50 °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-284-N / FKM: DS-284-V

Hydraulic characteristics	Description, value, unit
Maximum operating pressure	400 bar
Restriction of the operating pressure	250 bar [1])
Maximum flow rate	60 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	+ 70 °C
Viscosity range	15 ... 380 mm^2/s (cSt)
Recommended viscosity range	20 ... 130 mm^2/s (cSt)
Minimum fluid cleanliness (cleanlineless class according to ISO 4406:1999)	class 18/16/13

Hydraulic characteristics	Description, value, unit
Opening pressure	...90 / ...150 / ...230 / ...300 / ...330 bar
Internal leakage flow rate	pressure range 090: ...0.15 l/min pressure range 150: ... 0.25 l/min pressure range 230: ...0.36 l/min pressure range 300/330: ...0.45 l/min

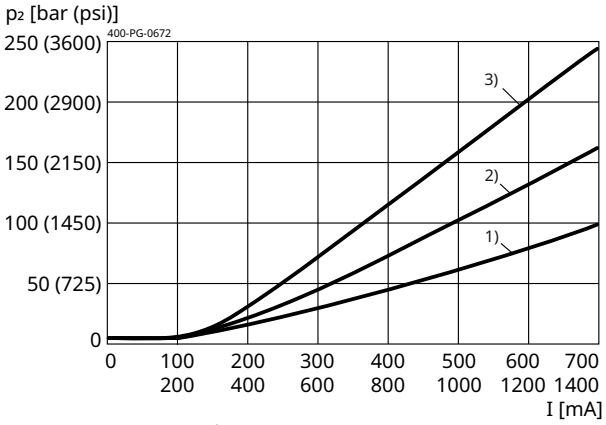
NOTE!
[1]) Please note that any tank or return-line pressures acting at port 1 are additive to the pressure setting at port 2.

Electric characteristics	Description, value, unit
Actuator type	solenoid coil
Solenoid coils type	D36
Supply voltage DC	12/24 V DC
Supply voltage tolerance	± 10 %
Control current	12 V = 0...1400 mA / 24 V = 0...700 mA
Nominal power consumption	17 W
Relative duty cycle	100 %
Minimum ambient temperature	- 30 °C
Maximum ambient temperature	+ 50 °C
Coil resistance R	Cold value at 20°C 12 V = 5.8 Ω 24 V = 21 Ω max. warm value 12 V = 8.6 Ω 24 V = 32 Ω
Recommended PWM frequency	200 Hz
Response sensitivity with PWM	< 1 % I_N
Reproducibility with PWM	< 2 % p_N
Hysterese with PWM	2...4 % I_N
Reversal error with PWM	2...4 % I_N
Electrical connection coil	several connection types available, see ordering code
Protection class solenoid coil to ISO 20 653 / EN 60 529	IP 65 / IP 67 / IP 69K, see “Ordering code” (with appropriate mating connector and proper fitting and sealing)

Performance graphs

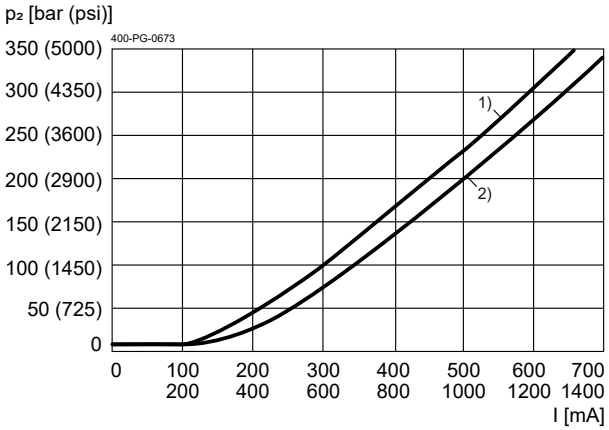
measured with oil viscosity 33.0 mm²/s (cSt)

p = f (I) Pressure adjustment



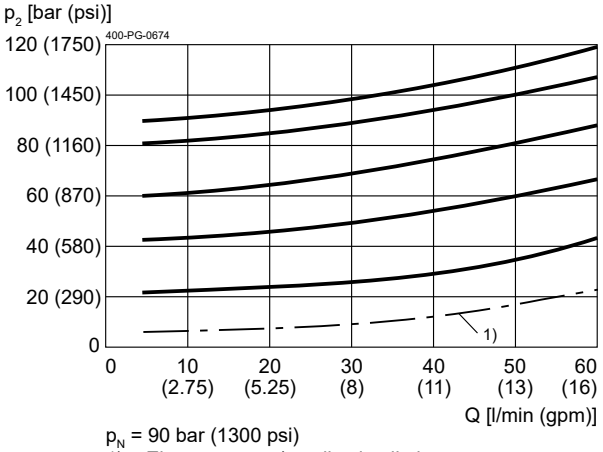
1) p_N = 90 bar (1300 psi)
2) p_N = 150 bar (2150 psi)
3) p_N = 230 bar (3350 psi)

p = f (I) Pressure adjustment



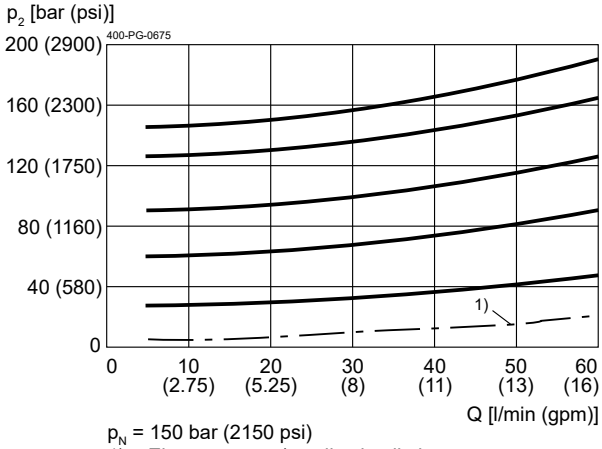
1) p_N = 300 bar (4350 psi)
2) p_N = 330 bar (4800 psi)

p = f (Q) Pressure-flow rate



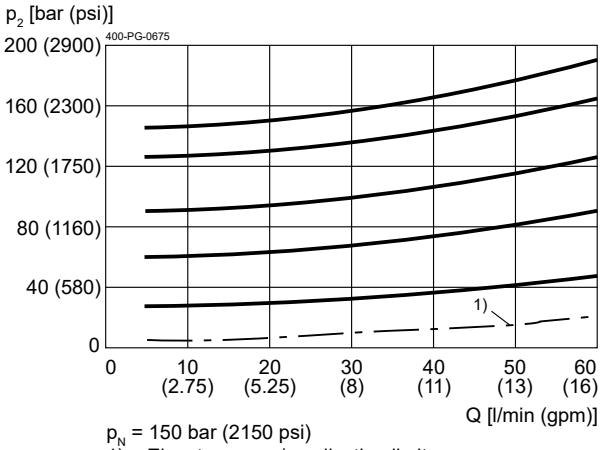
p_N = 90 bar (1300 psi)
1) = Einsatzgrenze / application limit
(p min. / I = max. mA)

p = f (Q) Pressure-flow rate



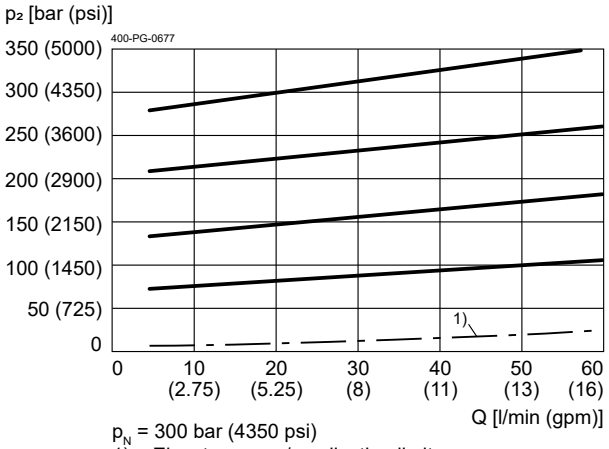
p_N = 150 bar (2150 psi)
1) = Einsatzgrenze / application limit
(p min. / I = max. mA)

p = f (Q) Pressure-flow rate



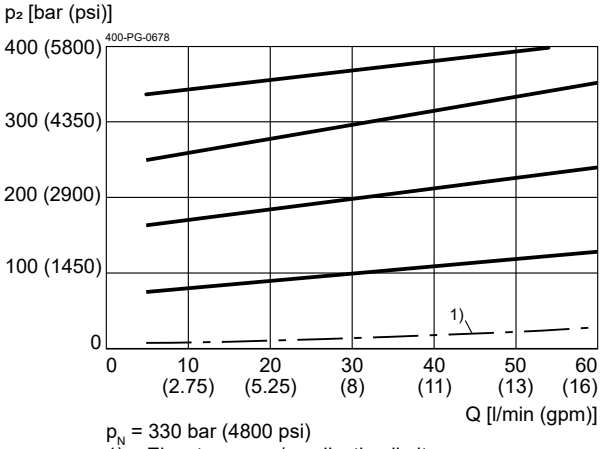
p_N = 150 bar (2150 psi)
1) = Einsatzgrenze / application limit
(p min. / I = max. mA)

p = f (Q) Pressure-flow rate



p_N = 300 bar (4350 psi)
1) = Einsatzgrenze / application limit
(p min. / I = max. mA)

p = f (Q) Pressure-flow rate

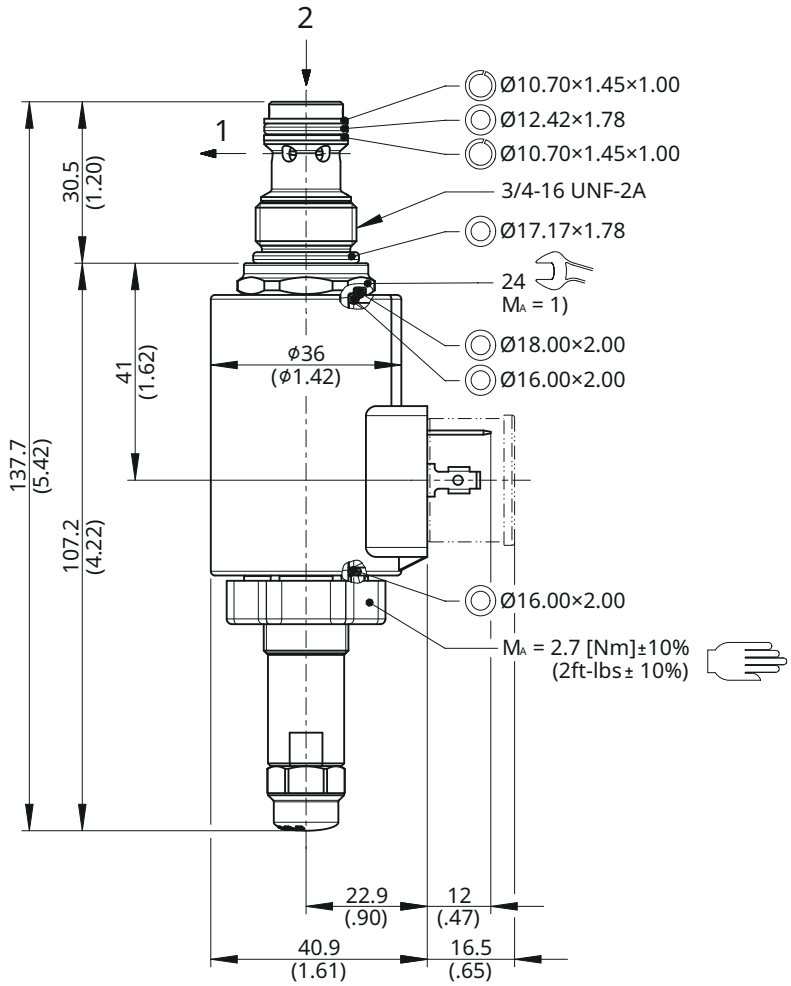


p_N = 330 bar (4800 psi)
1) = Einsatzgrenze / application limit
(p min. / I = max. mA)

Dimensions and sectional view

Beispiel für die Masseinheit:
Exampel for the dimensional units:

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



Installation information

NOTE!
To achieve the screw-in valve's maximum performance rating, fit the solenoid coil as shown (with the plug pins nearest the valve body).

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

ATTENTION!
To prevent any pressure surges, port 1 must be routed to tank with the least possible back-pressure. Any tank pressure acting at port 1 is additive to the pressure setting at the main port 2.

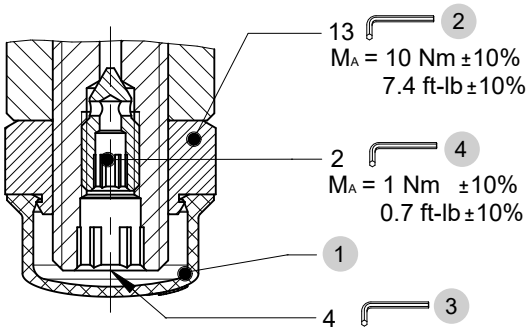
ATTENTION!
Only qualified personnel with mechanical skills may carry out any maintenance work. Generally, the only work that should ever be undertaken is to check, and possibly replace, the seals. When changing seals, oil or grease the new seals thoroughly before fitting them.

Manual pressure setting

These inverse proportional pressure-relief cartridges are equipped as standard with an integral manual pressure setting. If a proportional solenoid is faulty, for example, this ma nual pressure setting enables the required pressure to be set mechanically. The manual pressure setting can also be used to make minor pressure adjustments directly at the system.

Note!
Any changes to the manual pressure setting have a direct effect on the factory settings.

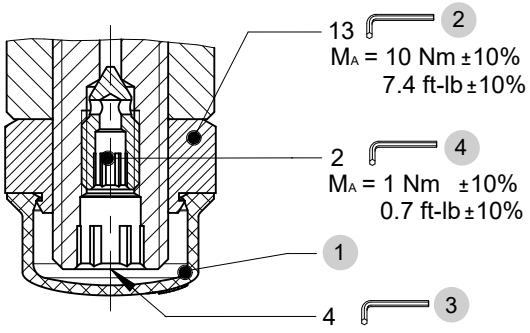
1. Remove the protective cap 1 .
2. Loosen the lock nut 2 .
3. Unscrew (turn to left) the adjusting spindle 3 until the required pressure is set.
4. Tighten the lock nut 2 to the specified torque.
5. Fit the protective cap 1 .



Reset to factory settings

To reset the proportional pressure-relief cartridges to their initial position (the factory setting), a constant flow rate and a pressure gauge that measures the pressure in the main port A are needed. The pressure setting must not exceed the nominal pressure of the spring range in use. The procedure is as follows:

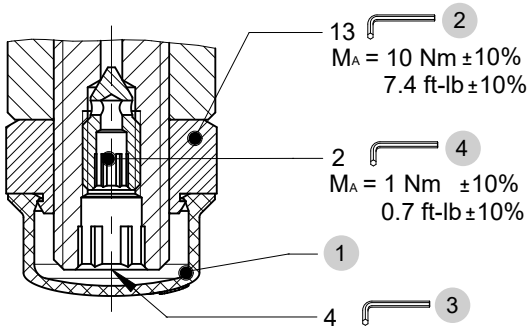
1. Ensure that the solenoid coil is de-energized.
2. Remove the protective cap 1 .
3. Loosen the lock nut 2 .
4. Unscrew the adjusting spindle 3 to its end-stop.
5. screw in the adjusting spindle 3 until the pressure on the gauge reaches the nominal pressure (pN) of the spring range in use.
6. Tighten the lock nut 2 to the specified torque.
7. Fit the protective cap 1 .



Air-bleeding

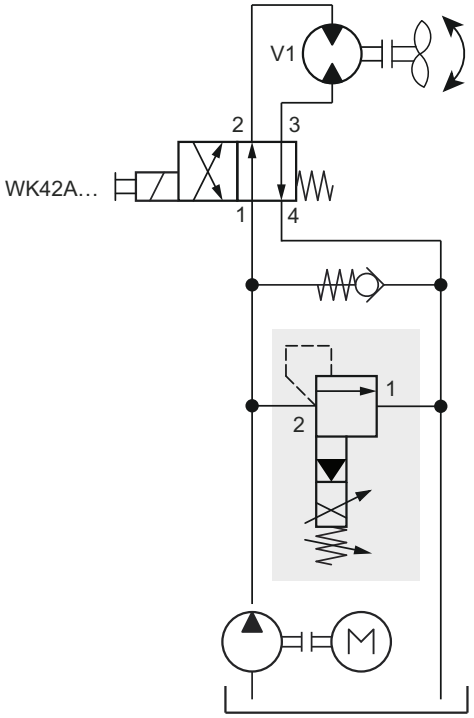
If necessary, air can be purged from these proportional pressure-reducing cartridges by using the integral air-bleed screw. If the cartridge is mounted as preferred (solenoid coil hanging), the valve behaves as self-venting. To vent the valve, follow these steps:

1. Remove the protective cap 1 .
2. Loosen the air-bleed screw 4 approx. 2 turns.
3. Switch the pressure-relief cartridge ON/OFF several times until no more air bubbles escape.
4. Tighten the air-bleed screw 4 to the specified torque.
5. Fit the protective cap 1 .

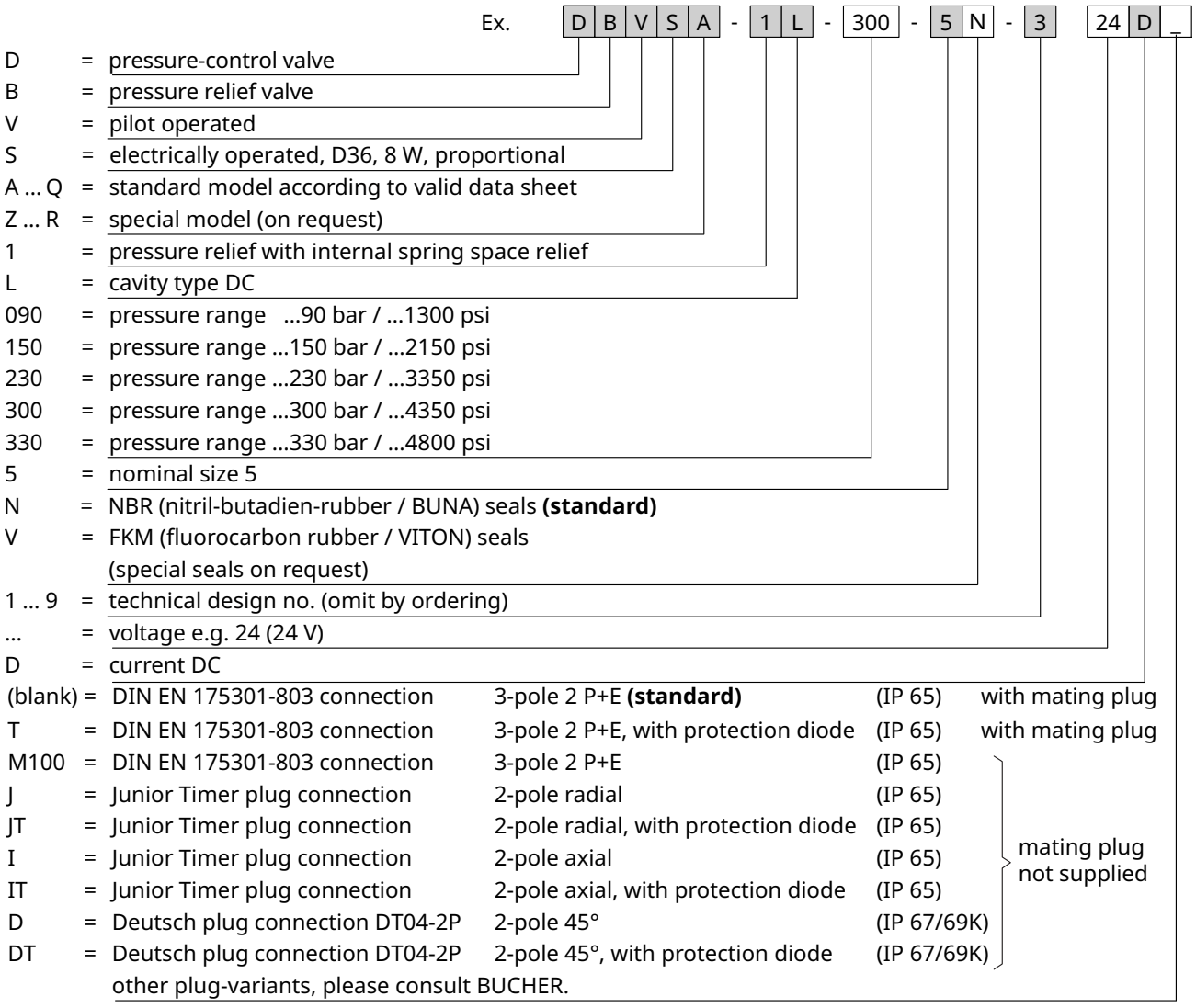


Application example

The application example shows a reversible fan drive.



Ordering code



IMPORTANT!
Not every combination of voltage values, current type and plug connections vailable.

Related data sheets

Reference	Description
400-P-040011	Form tools
400-P-040171	Cavity AL
400-P-120110	Solenoid coil D36
400-P-720101	Threaded port body GALA
400-P-010101	MTTFd Values for Hydraulic Valves

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