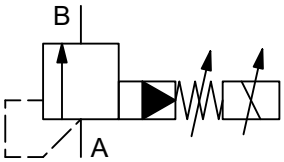
BUCHER hydraulics

Pressure valve
Relief function

Q_{max} = 120 l/min, p_{max} = 300 bar
Pilot operated, spool type, proportional solenoid with emergency override
Type series: DBVSA-1CG...

- Screw-in cartridge valve for cavity DC
- All external parts with zinc-nickel plating according to DIN EN ISO 19598
- Installation in threaded port body type DC-12
- Damped design
- 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

Symbol



Description

The invers proportional pressure-relief valves, series DBVS_-1CG..., are size 10, pilot-operated, high performance screw-in valves with a M24x1.5 mounting thread. They consist of a spool-type main stage and a leak-free, poppet-type pilot stage with a falling pressure/current 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. When the solenoid is de-energised (initial position), the relief pressure is the nominal pressure of the applicable spring range (failsafe function). Any pressure at port B is additive to the valve setting at port A, therefore port B should preferably be con nected directly to tank. In control mode, the relief pressure is inversely 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. If a proportional solenoid is faulty, for example, the integral manual pressure

setting enables the required pressure to be set mechanically. 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.

Technical data

General characteristics	Description, value, unit
Function group	pressure valve
Function	relief function
Design	screw-in cartridge valve
Controls	proportional solenoid with emergency override
Characteristic	pilot operated, spool type
Construction size	NG 10
Thread size	M24×1,5
Mounting attitude	unrestricted (preferably vertical, coil down)
Weight	0.55 kg
Cavity acc. factory standard	DC
Tightening torque steel	65 Nm
Tightening torque aluminium	50 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-298-N / FKM: DS-298-V

Hydraulic characteristics	Description, value, unit
Maximum operating pressure	300 bar
Restriction of the operating pressure	250 [1])
Maximum flow rate	120 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
Opening pressure	...50 / ...63 / ...100 / ...160 / ...230 / ...300 bar
Internal leakage flow rate	pressure range 050: ...0.10 l/min pressure range 063: ...0.10 l/min pressure range 100: ...0.13 l/min pressure range 160: ...0.16 l/min pressure range 230: ...0.24 l/min pressure range 300: ...0.30 l/min

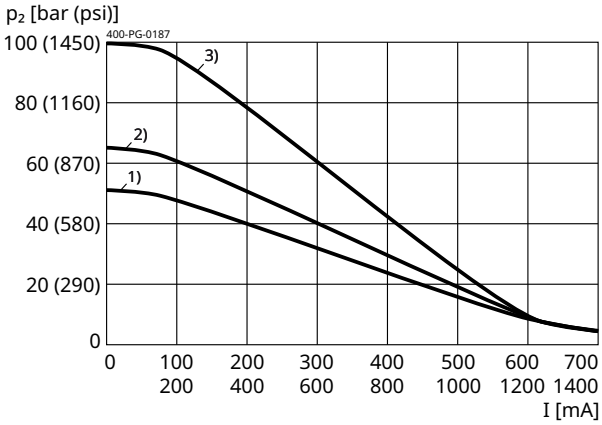
ATTENTION!
If there is pressure at the secondary connection, this is added to the set pressure value.

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...760 mA
Nominal power consumption	19 W
Relative duty cycle	100 %
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	DIN EN 175301-803, 3-pole 2 P+E (IP 65)
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

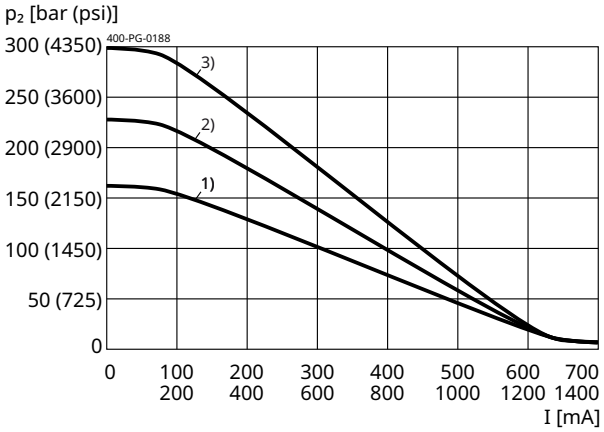
measured with oil viscosity 33.0 mm²/s (cSt)

p = f (I) Pressure adjustment



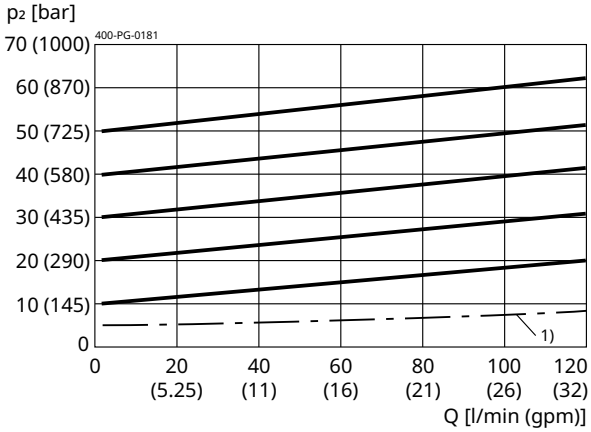
1) p_n = 50 bar (725 psi)
2) p_n = 63 bar (915 psi)
3) p_n = 100 bar (1450 psi)

p = f (I) Pressure adjustment



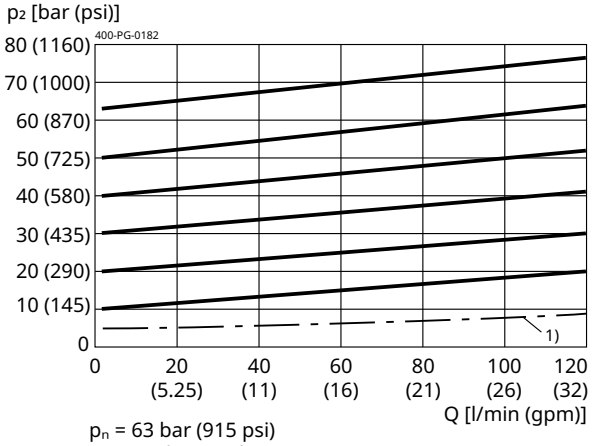
1) p_n = 160 bar (2300 psi)
2) p_n = 230 bar (3350 psi)
3) p_n = 300 bar (4350 psi)

p = f (Q) Pressure-flow rate



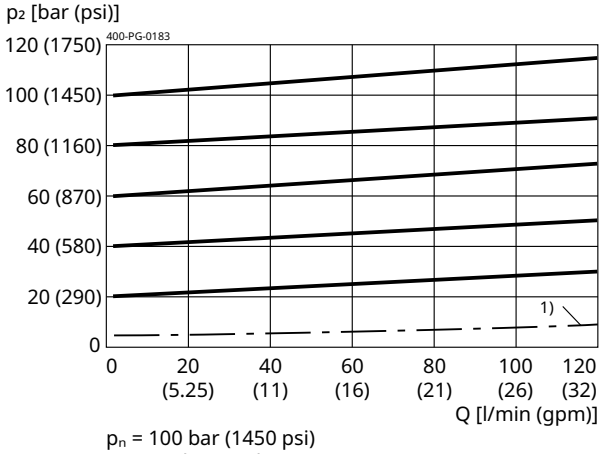
p_n = 50 bar (725 psi)
1) = Application limit (p min. / I = max. mA)

p = f (Q) Pressure-flow rate



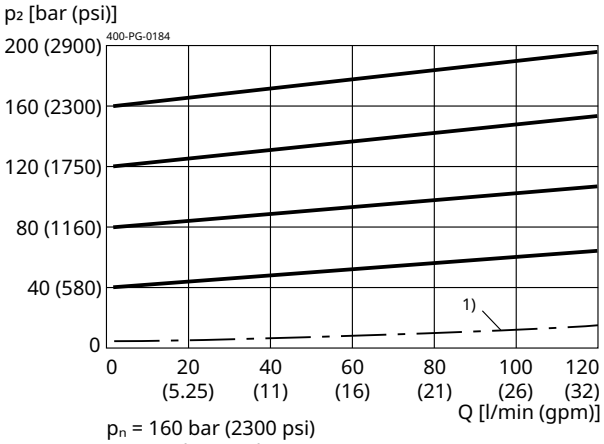
p_n = 63 bar (915 psi)
1) = Application limit (p min. / I = max. mA)

p = f (Q) Pressure-flow rate



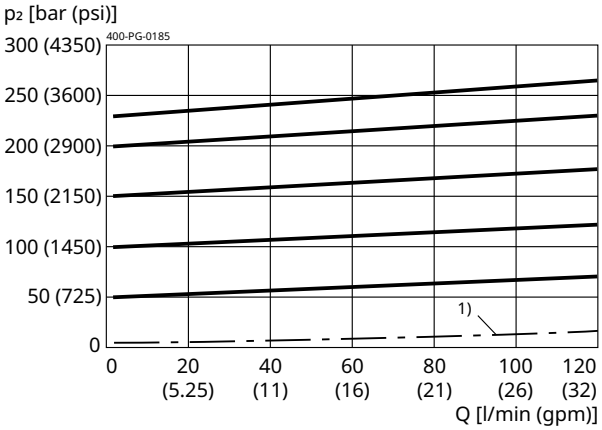
p_n = 100 bar (1450 psi)
1) = Application limit (p min. / I = max. mA)

p = f (Q) Pressure-flow rate



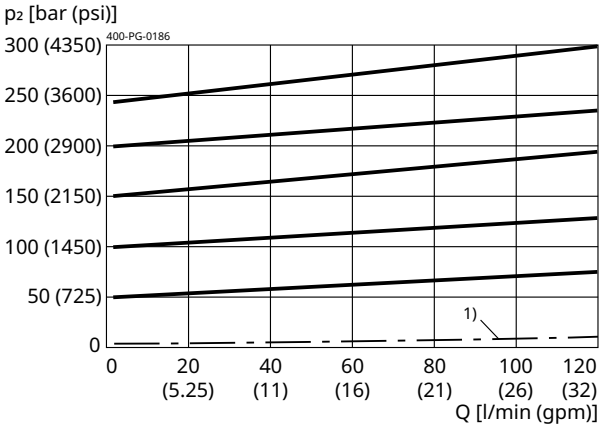
p_n = 160 bar (2300 psi)
1) = Application limit (p min. / I = max. mA)

p = f (Q) Pressure-flow rate



p_n = 230 bar (3350 psi)
1) = Application limit (p min. / I = max. mA)

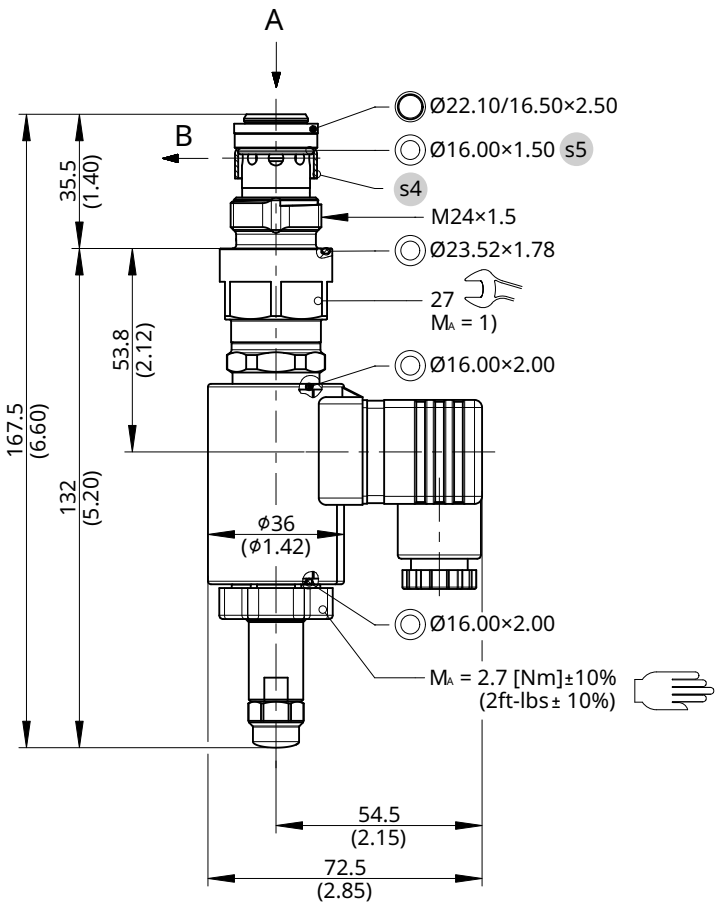
p = f (Q) Pressure-flow rate



p_n = 300 bar (4350 psi)
1) = Application limit (p min. / I = max. mA)

Installation

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



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!
To achieve the screw-in valve's maximum performance rating, fit the solenoid coil as shown (with the plug pins nearest the valve body). The valve must be installed in a steel body.

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

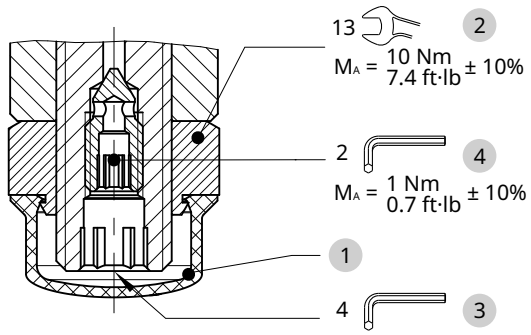
NOTE!
For installation in an aluminium housing, we recommend using the “S” version. This is equipped with a steel ring s4 and plastic ring s5 to protect the housing from possible damage.

NOTE!
To ensure proper function, the valve should be air-bled before commissioning. Refer to chapter "Air-bleeding before commissioning"

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

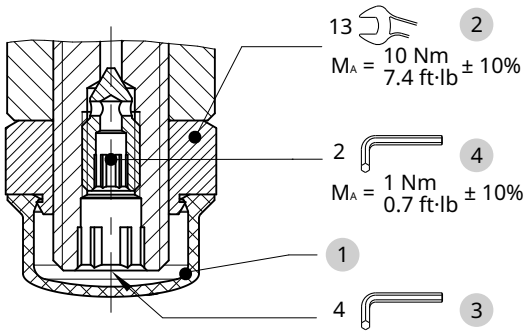
These inverse proportional pressure screw-in cartridge valves are equipped as standard with an integral manual pressure setting. If a proportional solenoid is faulty, for example, this manual pressure setting enables the required pressure to be set mechanically. The manual pressure setting can also be used to make minor pressure adjustments directly at the system. The following steps must be observed.



1. Remove the protective cap 1
2. Loosen the lock nut 2
3. Screw-in (turn to right) 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

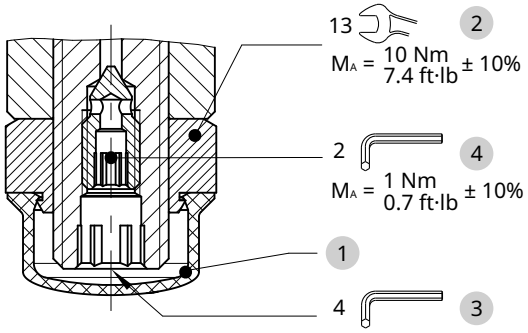
To reset the proportional pressure-relief cartridges to their initial position (the factory setting), a constant flow rate and a pressure gauge that measures the pressure in the input port are needed. The pressure setting must not exceed the nominal pressure of the spring range in use. The following steps must be observed.



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

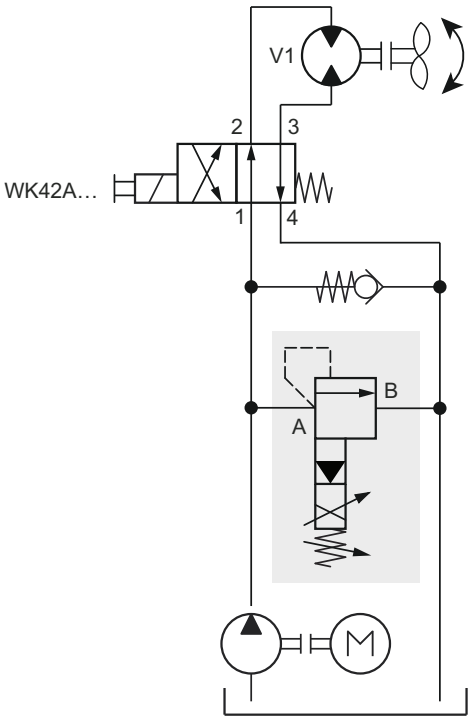
The integrated air-bleed screw allows the proportional pressure valves to be vented if necessary. If the screw-in valve is mounted as preferred (solenoid-coil hanging), it is self-venting. To vent the valve manually, follow the steps below.



1. Remove the protective cap 1
2. Loosen the air-bleed screw 4 approx. 2 turns
3. Switch the valve 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

Ex. D B V S A _ - 1 C G - 300 - 10 N - 3 24 D _

D	=	pressure-control valve
B	=	pressure relief valve
V	=	pilot operated
S	=	electrically operated, D36, 8 W, proportional
A ... Q	=	standard model according to valid data sheet
Z ... R	=	special model (on request)
(blank)	=	without steel ring (for use in steel housing)
S	=	with steel ring (for use in aluminium housing)
1	=	pressure relief with internal spring space relief
C	=	cavity type DC
G	=	proportional solenoid, inverse type (pulling)
050	=	pressure range ...50 bar / ...725 psi
063	=	pressure range ...63 bar / ...915 psi
100	=	pressure range ...100 bar / ...1450 psi
160	=	pressure range ...160 bar / ...2300 psi
230	=	pressure range ...230 bar / ...3350 psi
300	=	pressure range ...300 bar / ...4350 psi
10	=	nominal size 10
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)
...	=	voltage e.g. 24 (24 V)
D	=	current DC

(blank)	=	DIN EN 175301-803 connection	3-pole 2 P+E **(standard)**	(IP 65)	with mating plug
T	=	DIN EN 175301-803 connection	3-pole 2 P+E, with protection diode	(IP 65)	with mating plug
M100	=	DIN EN 175301-803 connection	3-pole 2 P+E	(IP 65)	mating plug not supplied
J	=	Junior Timer plug connection	2-pole radial	(IP 65)	
JT	=	Junior Timer plug connection	2-pole radial, with protection diode	(IP 65)	
I	=	Junior Timer plug connection	2-pole axial	(IP 65)	
IT	=	Junior Timer plug connection	2-pole axial, with protection diode	(IP 65)	
D	=	Deutsch plug connection DT04-2P	2-pole 45°	(IP 67/69K)	
DT	=	Deutsch plug connection DT04-2P	2-pole 45°, with protection diode	(IP 67/69K)	

other plug-variants, please consult BUCHER.

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-060111	cavity DC
400-P-120110	solenoid coil D36
400-P-740101	threaded port body DC-12

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