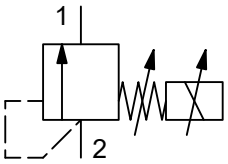
BUCHER hydraulics

Pressure valve
Relief function

Q_{max} = 24 l/min, p_{max} = 300 bar
Direct acting, spool type, proportional solenoid with emergency override
Type series: DBDSB-1LG-...

- 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
- Inverse-proportional design
- Nominal pressure when solenoid de-energized (fail-safe function)
- With integral manual pressure setting
- 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

Series DBDS_-1LG... inverse proportional pressure-relief valves are direct acting screw-in valves of sliding-spool design with a falling pressure/current characteristic and a 3/4-16-UNF mounting thread. With these pressure-relief valves, the relief pressure is dependent on the electrical control signal and can be continuously varied. When the solenoid is de-energized (initial position), the relief pressure is the nominal pressure of the applicable spring range (failsafe function). Any pressure at port 1 is additive to the valve setting at port 2, therefore port 1 should preferably be connected directly to tank. In control mode, the relief pressure is inversely proportional to the change in the required value (amplifier output current). In order to obtain precise pressure settings over the whole of the required pressure range (optimum resolution); the pressure relief valves are available in six spring ranges. If a proportional solenoid is faulty, for example, the integral manual pressure setting enables the required pressure to be set mechanically. All external parts of the screw-in valves are zinc-nickel plated and are thus suitable for use in the harshest operating environments. The slip-on coils can be replaced without opening the hydraulic envelope and can be positioned at any angle through 360°. These

valves are predominantly used in mobile and industrial applications to allow a pressure in hydraulic installations to be limited electro-proportionally. For self-assembly, 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	direct acting, spool type
Construction size	NG 4
Thread size	3/4-16 UNF-2A
Mounting attitude	unrestricted (preferably vertical, coil down)
Weight	0.40 kg
Cavity acc. factory standard	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	300 bar
Restriction of the operating pressure	port 1 = max. 250 [1])
Maximum flow rate	24 l/min
Restriction of the flow rate	depending on the nominal pressure stage
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
Nominal pressure range	nominal pressure range 018: ...18 bar nominal pressure range 045: ...45 bar ominal pressure range 070: ...70 bar nominal pressure range 110: ...110 bar nominal pressure range 160: ...160 bar nominal pressure range 250: ...250 bar
Internal leakage flow rate	nominal pressure range 018: ...0.10 l/min nominal pressure range 045: ...0.10 l/min nominal pressure range 070: ...0.15 l/min nominal pressure range 110: ...0.20 l/min nominal pressure range 160: ...0.25 l/min nominal pressure range 250: ...0.25 l/min

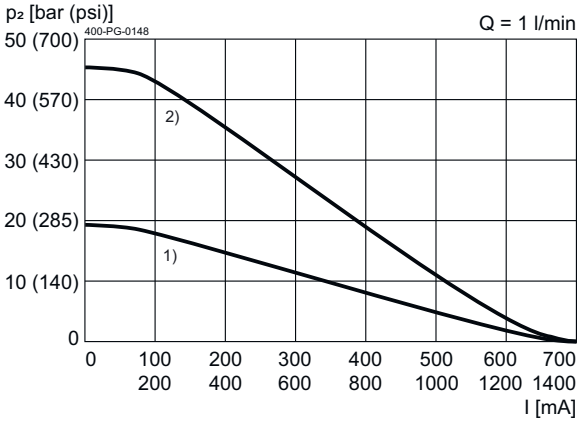
NOTE!
[1]) Please note that any tank or return-line pressures acting at port 1 are additive to the pressure setting at port 2.

Electric characteristics	Description, value, unit
Actuator type	solenoid coil
Solenoid coils type	D36
Supply voltage DC	12/24 V DC
Control current	12 V = 0...1400 mA / 24 V = 0...700 mA
Nominal power consumption	19 W
Switching time	6 ... 90 ms (Solenoid ON) 6 ... 20 ms (Solenoid OFF) These times are strongly influenced by fluid pressure, flow rate and viscosity, as well as by the dwell time under pressure
Relative duty cycle	100 %
Coil resistance R	Cold value at 20° - 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

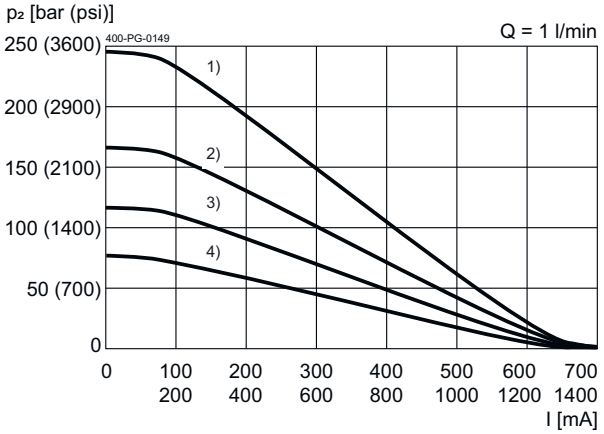
measured with oil viscosity 33.0 mm²/s (cSt)

p = f (I) Pressure adjustment



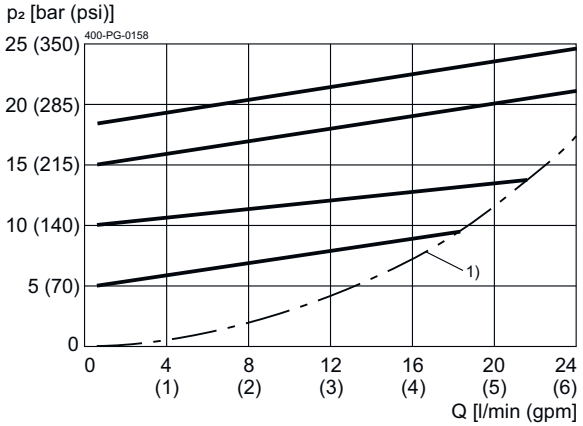
1) = p_N 18 bar
2) = p_N 45 bar

p = f (I) Pressure adjustment



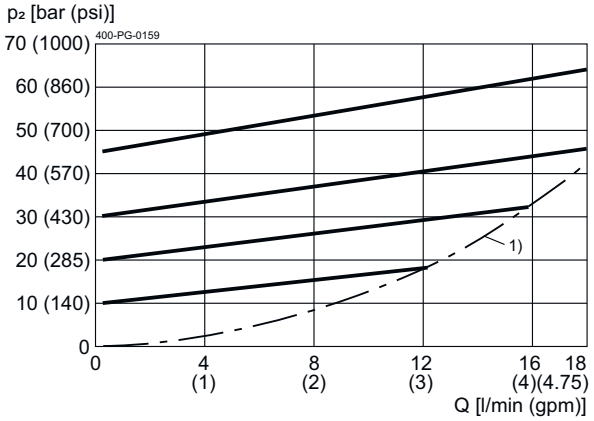
1) = p_N 250 bar
2) = p_N 160 bar
3) = p_N 110 bar
4) = p_N 70 bar

p = f (Q) Pressure-flow rate



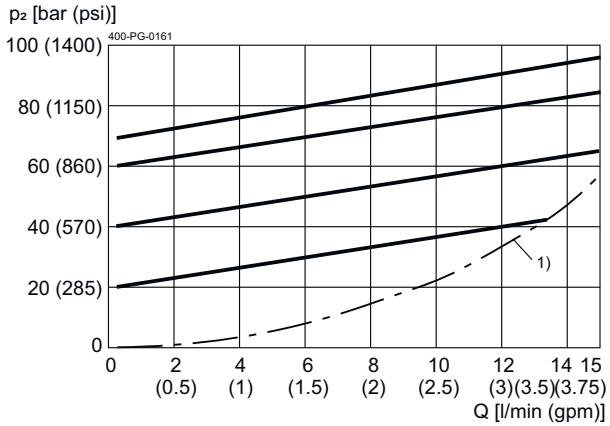
p_N = 18 bar
1) = Application limit

p = f (Q) Pressure-flow rate



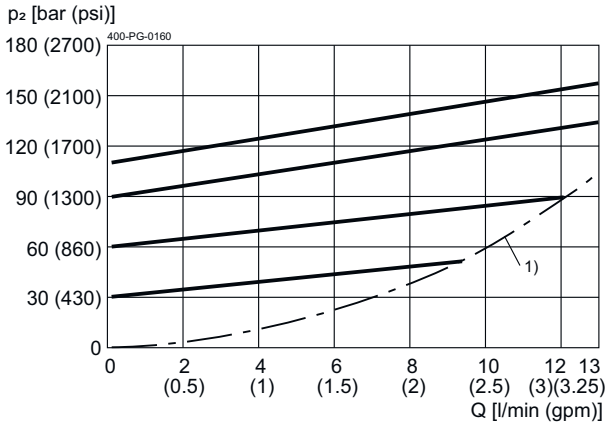
p_N = 45 bar
1) = Application limit

p = f (Q) Pressure-flow rate



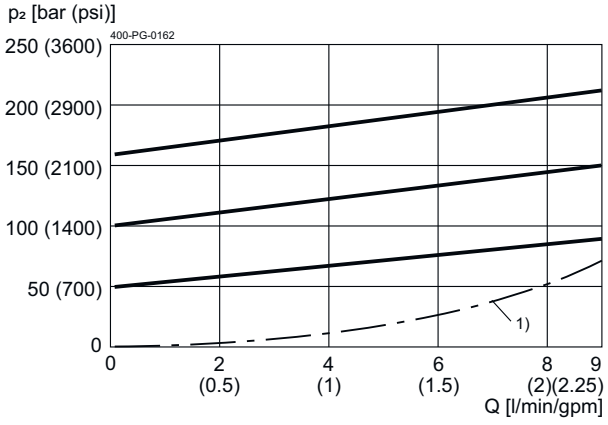
p_N = 70 bar
1) = Application limit

p = f (Q) Pressure-flow rate



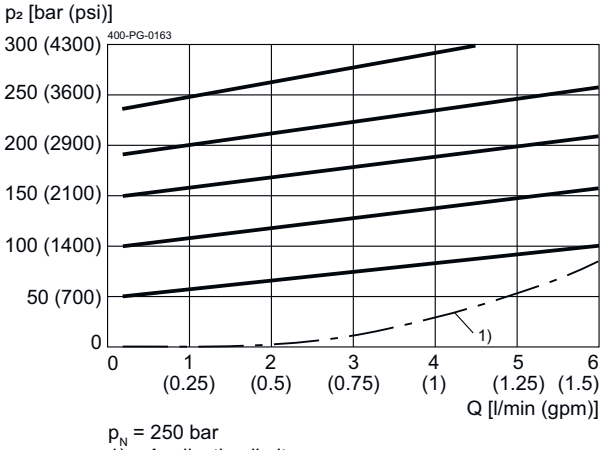
p_N = 110 bar
1) = Application limit

p = f (Q) Pressure-flow rate



p_N = 160 bar
1) = Application limit

p = f (Q) Pressure-flow rate

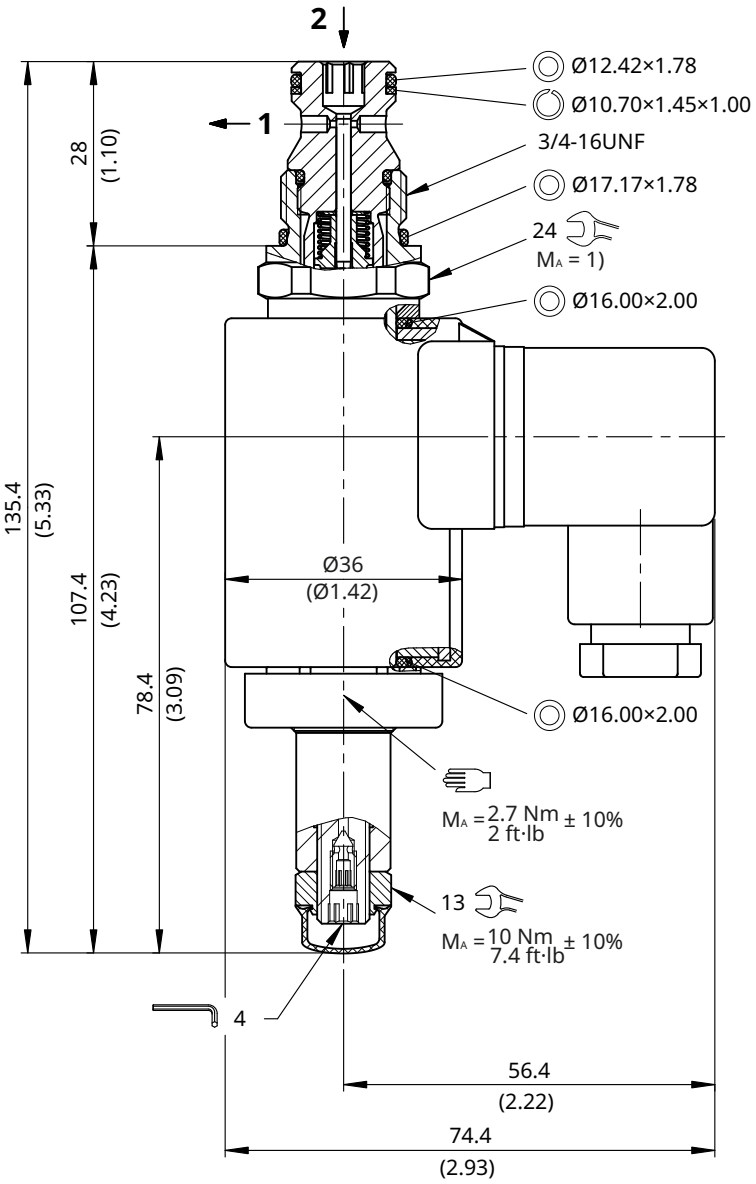


p_N = 250 bar
1) = Application limit

Installation

Beispiel für die Masseinheit:
Example 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".

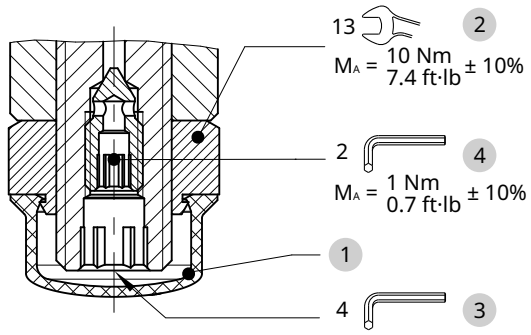
IMPORTANT!
To achieve the screw-in valve's maximum performance rating, fit the solenoid coil as shown (with the plug pins nearest the valve body).

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

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.

Emergency 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.

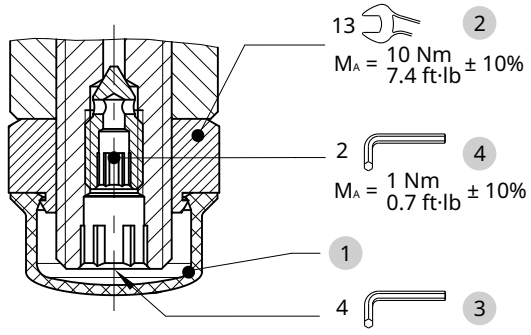


1. Remove the protective cap 1
2. Loosen the lock nut 2
3. Screw-in (turn to right) the adjusting spindle 3 until the required pressure is set.
4. Tighten the lock nut 2 to the specified torque.
5. Fit the protective cap 1

NOTE!
Any changes to the emergency pressure setting have a direct impact on the factory setting.

Reset to factory settings

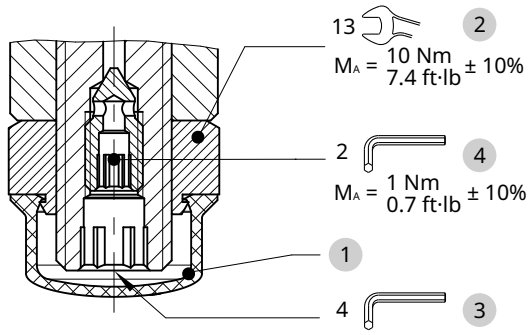
To reset the proportional pressure-relief cartridges to their initial position (the factory setting), a constant flow rate and a pressure gauge that measures the pressure in the input port are needed. The pressure setting must not exceed the nominal pressure of the spring range in use. The following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

Ordering code

Ex. D B D S B - 1 L G - 018 - 2 _ - 3 24 D _

D	=	pressure-control valve
B	=	pressure relief valve
D	=	direct acting
S	=	electrically operated, D36
A ... Q	=	standard model according to valid data sheet
Z ... R	=	special model (on request)
1	=	pressure relief (with internal control oil outlet)
L	=	cavity type AL
G	=	proportional solenoid, inverse type (pulling)
018	=	pressure range ... 18 bar
045	=	pressure range ... 45 bar
070	=	pressure range ... 70 bar
110	=	pressure range ... 110 bar
160	=	pressure range ... 160 bar
250	=	pressure range ... 250 bar [1]
2	=	nominal size 2 for pressure ranges 250 und 160
3	=	nominal size 3 for pressure ranges 110 und 70
4	=	nominal size 4 for pressure ranges 45 und 18
(ohne)	=	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.			

[1] for higher pressure to 350 bar can be used the valve DBDTC.

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

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