

Proportional Throttle Cartridges, Size 5 / SAE 08

$Q_{\max} = 50 \text{ l/min (13 gpm)}$, $p_{\max} = 250 \text{ bar (3600 psi)}$

Two-Stage, with Seat-Valve Shut-Off

Series MVRPSBA-...



- De-energised closed
- Seat-valve shut-off in flow direction (see symbol)
- $Q_N = 20 \text{ l/min (5.3 gpm)}$ at $\Delta p 10 \text{ bar (140 psi)}$
- Compact construction for cavity types:
AL or BH/C0820 – 3/4-16 UNF
- Reliable operation over the whole pressure and flow range (even at high pressure differences)
- Low headloss
- All exposed parts with zinc-nickel plating
- 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
- Can be fitted in a line-mounting body

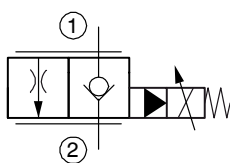
1 Description

Series MVRPSBA-... two-stage proportional throttle cartridges are size 5 / SAE 08, high performance screw-in valves with a 3/4-16 UNF mounting thread. The main and pilot stages are designed on the poppet/seat principle and are therefore virtually leak-free in the flow direction (see symbol). With these proportional throttle cartridges, the flow rate is dependent on the electrical control current, and it can be varied continuously and responsively. When used with a pressure compensator, these cartridges are particularly suitable for precise and load-compensated lifting and

lowering movements, but they can also be used on their own for reliable operation in mobile and industrial applications with large pressure differences. All external parts of the cartridge are zinc-nickel plated to DIN 50 979 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°. If you intend to manufacture your own cavities or are designing a line-mounting installation, please refer to the section "Related data sheets".

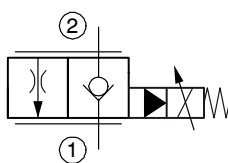
2 Symbol

Cavity type AL



MVRPSBA-LG...

Cavity type BH/C0820



MVRPSBA-HG...

3 Technical data

General characteristics	Description, value, unit
Designation	proportional-throttle cartridge
Design	seat-valve shut-off, two stage
Mounting method	screw-in cartridge 3/4-16 UNF
Tightening torque	40 Nm \pm 10 % (30 ft-lbs \pm 10 %)

General characteristics	Description, value, unit
Size	nominal size 5 for cavity type AL nominal size 5 for cavity type BH/C0820 size SAE 08 for cavity type C0820
Weight	0.40 kg (0.9 lbs)
Mounting attitude	unrestricted (preferably vertical, coil down)
Ambient temperature range	-25 °C ... +50 °C (-13 °F ... +122 °F)
MTTF _D values	150 years, see data sheet 400-P-010101-en

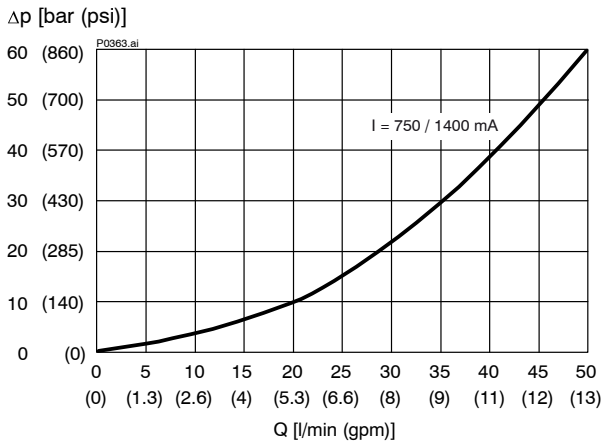
Hydraulic characteristics	Description, value, unit
Maximum operating pressure	250 bar (3600 psi)
Maximum flow rate	50 l/min (13 gpm)
Nominal flow rate	20 l/min at $\Delta p = 10$ bar (5.3 gpm at $\Delta p = 140$ psi)
Leakage flow rate	< 0,2 cm ³ /min (max. 5 drops/min) with oil viscosity 33 mm ² /s (cSt)
Flow direction	see symbol
Hydraulic fluid	HL and HLP mineral oil to DIN 51 524; for other fluids, please contact BUCHER
Hydraulic fluid temperature range	-25 °C ... +70 °C (-13 °F ... +158 °F)
Viscosity range	15...380 mm ² /s (cSt), recommended 20...130 mm ² /s (cSt)
Minimum fluid cleanliness Cleanliness class to ISO 4406 : 1999	class 18/16/13

Electrical characteristics	Description, value, unit
Supply voltage	12 V DC, 24 V DC
Control current	12 V = 0...1400 mA, 24 V = 0...760 mA
Coil resistance R - cold value at 20 °C - max. warm value	12 V = 5.8 Ω / 24 V = 20.9 Ω 12 V = 9.1 Ω / 24 V = 32.7 Ω
Recommended PWM frequency (dither)	200 Hz
Hysteresis with PWM	3...6 % I _N
Reversal error with PWM	3...6 % I _N
Sensitivity with PWM	< 2 % I _N
Reproducibility with PWM	< 3 % p _N
Switching time	see performance graphs
Relative duty cycle	100 %
Protection class 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)
Electrical connection	DIN EN 175301-803, 3-pin 2 P+E (standard) for other connectors, see "Ordering code"

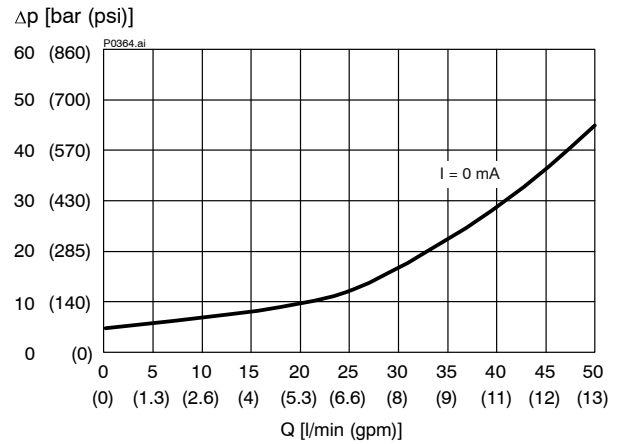
4 Performance graphs

measured with oil viscosity 33 mm²/s (cSt) – for cavity type AL and BH/C0820

$\Delta p = f(Q)$ Pressure drop - Flow rate characteristic
"energized"



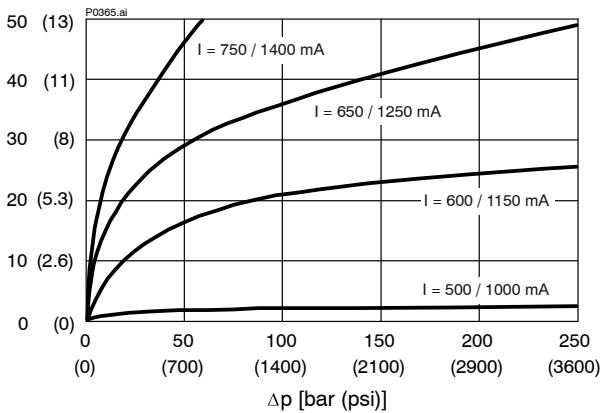
$\Delta p = f(Q)$ Pressure drop - Flow rate characteristic
"de-energized - through check valve"



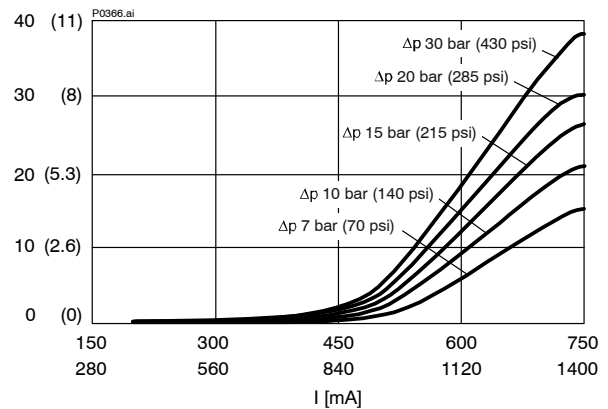
Attention:

When flow passes through the check valve and there is a large pressure difference, the poppet in the main stage can be damaged.

$Q = f(\Delta p; I)$ Flow rate adjustment characteristic

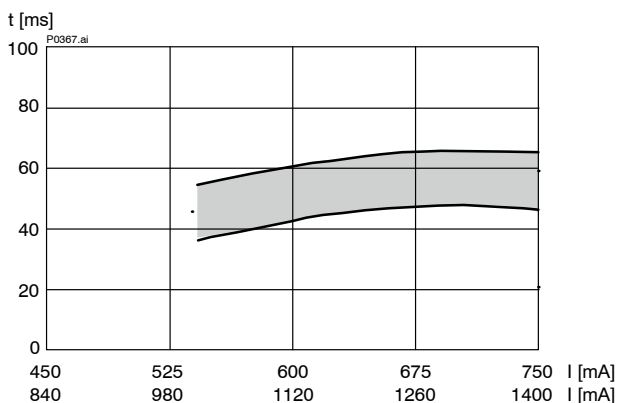


$Q = f(I; \Delta p)$ Flow rate adjustment characteristic

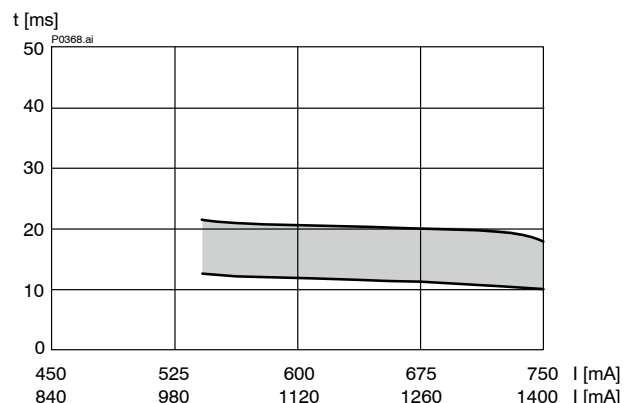


Switching time measured up to 80 % change in the pressure difference. Electrical operation with DC power supply.

$t = f(I; \Delta p)$ Switching time characteristic Opening
at $\Delta p = 10 \dots 50$ bar (140 ... 700 psi)



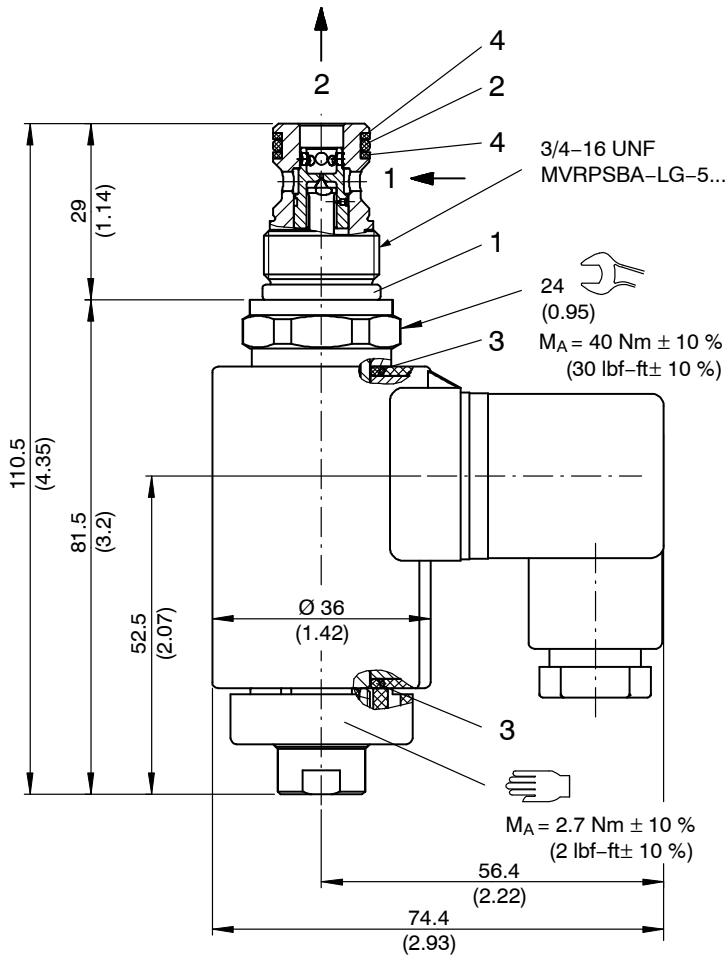
$t = f(I; \Delta p)$ Switching time characteristic Closing
at $\Delta p = 10 \dots 50$ bar (140 ... 700 psi)



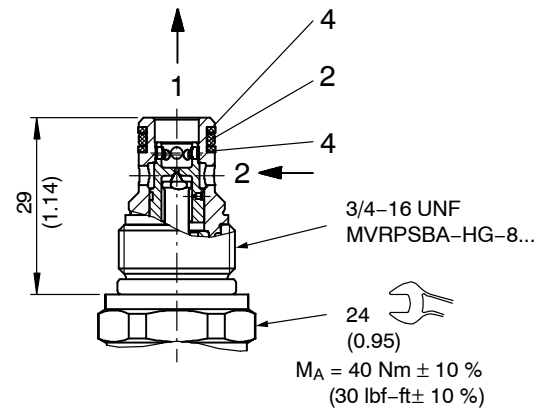
5 Dimensions & sectional view

Dimensions in millimeters (inches)

5.1 Insertion in cavity type "AL"



5.2 Insertion in cavity type "BH/C0820"



6 Installation information



IMPORTANT!

To achieve the maximum performance rating, fit the solenoid coil as shown (with the plug pins at the bottom) and install the valve in a steel body. When fitting the cartridges, note the mounting attitude (preferably vertical, with coil down → automatic air bleed) and use the specified tightening torque. No adjustments are necessary, since the cartridges are set in the factory.



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.

Seal kit NBR no. DS-447-N (cavity type AL) ¹⁾

Item	Qty.	Description
1	1	O-ring no. 017 $\varnothing 17.17 \times 1.78$ N90
2	1	O-ring no. 014 $\varnothing 12.42 \times 1.78$ N90
3	2	O-ring $\varnothing 16.00 \times 2.00$ FKM
4	2	Backup ring $\varnothing 10.70 \times 1.45 \times 1.00$ FI0751



IMPORTANT!

¹⁾ Seal kit with FKM (Viton) seals, no. DS-447-V

Seal kit NBR no. DS-448-N (cavity type BH/C0820) ²⁾

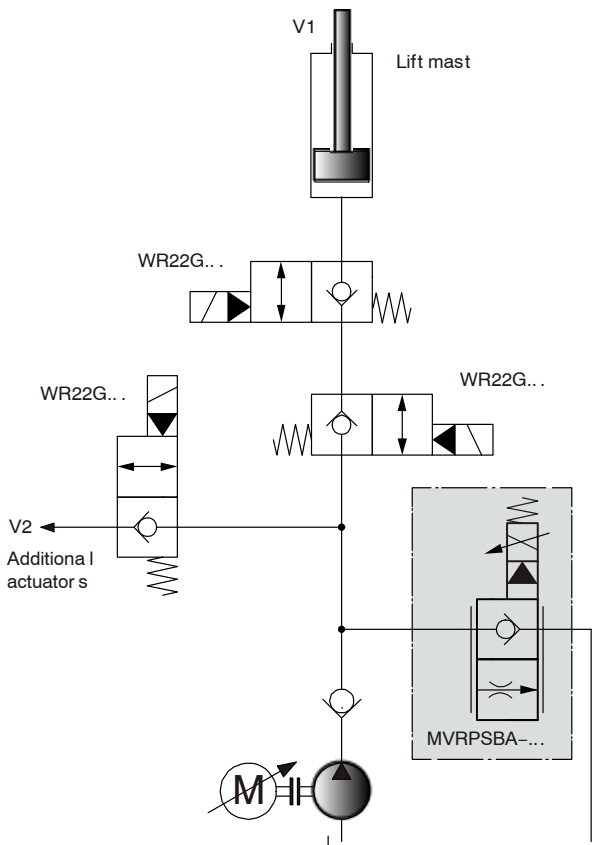
Item	Qty.	Description
1	1	O-ring no. 017 \varnothing 17.17 x 1.78 N90
2	1	O-ring no. 012 \varnothing 9.25 x 1.78 N90
3	2	O-ring \varnothing 16.00 x 2.00 FKM
4	2	Backup ring \varnothing 7.80 x 1.45 x 1.00 FI0751



IMPORTANT!

²⁾ Seal kit with FKM (Viton) seals, no. DS-448-V

7 Application examples



Potential applications

- Lifting and lowering movements on industrial trucks
- In agricultural machines, e.g. proportional scraper-floor controls in self-loading trailers
- In all applications where a load-independent function is required, in combination with our in-line or bypass pressure compensators

8 Ordering code

	MV	R	P	S	B	A	-	-	G	-	5	-	20	-	1	24	D	-
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MV	=	throttle valve, two-stage
R	=	proportional-solenoid operated
P	=	cartridge design
S	=	seat-valve design
B	=	pressurised oil enters at the side
A ... Q	=	standard model - see relevant data sheets
Z ... R	=	special features - please consult BUCHER
L	=	cavity type AL
H	=	cavity type BH/C0820 and C0820
G	=	normally closed
5	=	nominal size 5 / SAE 08
20	=	nominal flow rate 20 l/min at $\Delta p = 10$ bar (5.3 l/min bei $\Delta p = 140$ psi)
(blank)	=	NBR (Nitrile) seals (standard)
V	=	FKM (Viton) seals (special seals - please contact BUCHER)
1 ... 9	=	design stage (omit when ordering new units)
...	=	voltage e.g. 24 (24 V)
D	=	current DC
(blank)	=	DIN EN 175301-803 connection with mating plug (standard, IP 65)
M100	=	DIN EN 175301-803 connection without mating plug
C	=	Kostal plug connection (IP 65)
JT	=	Junior Timer radial plug connection (with protection diode, IP65)
IT	=	Junior Timer axial plug connection (with protection diode, IP65)
D	=	Deutsch plug connection 45° DT04-2P (IP67/69K)
DT	=	Deutsch plug connection 45° DT04-2P (with protection diode, IP67/69K)
S	=	AMP Superseal 1.5 (IP67) / Metri-Pack 150 (IP65) plug connection
F	=	flying leads (500 mm)

} mating plug not supplied

9 Related data sheets

Reference	(Old no.)	Description
400-P-040011	(i-32)	The form-tool hire programme
400-P-040171		Cavity type AL
400-P-040401		Cavity type BH/C0820
520-P-000110		Cavity type C0820
400-P-120110	(W-2.141)	Coils for screw-in cartridge valves
400-P-510101		Amplifier unit for proportional valves (1-channel) PBS - 3A
400-P-720101		Line-mounting body, type GALA (G 3/8")
520-P-000111		Line-mounting body, size SAE 08 (G 3/8")
400-P-010101		MTTF _D values for hydraulic valves

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Classification: 430.310.325.305.310.310