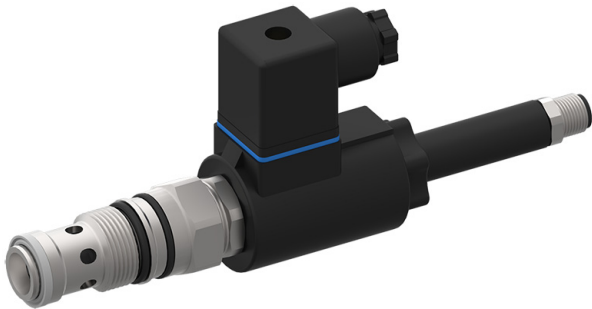


2/2 Solenoid Cartridge Valve, Size 10

$Q_{\max} = 80 \text{ l/min}$, $p_{\max} = 350 \text{ bar}$

Seat-valve shut-off, two-stage, monitored operating position

Series WR22G.DS...



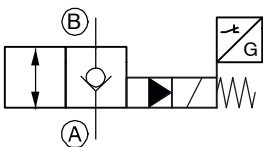
- With integral electronic monitoring of operating position
- With seat-valve shut-off from B → A
- Nominal power consumption 17 W – optionally 27 W
- With return spring for main spool (on request)
- No external pilot drain required
- All exposed parts with zinc-nickel plating
- High pressure wet-armature solenoids
- The slip-on coil can be rotated and replaced without opening the hydraulic envelope or removing the electronics
- Various plug-connector systems and voltages are available
- Can be fitted in a line-mounting body
- Can be fitted in sandwich bodies

1 Description

These 2/2 solenoid-operated directional valves with monitored operating positions are size 10, two stage, high performance screw-in cartridges with an M24x1.5 mounting thread. The main and pilot stages are both designed on the poppet/seat principle, and the B → A flow path is therefore virtually leak-free. The safe operating position is always the closed valve position. To ensure that electrical line interruptions of any kind do not result in unsafe conditions, the sensor's switching output is always at High when it is closed. These screw-in cartridges are predominantly used in certain mobile and industrial applications where leak-tight shut-

off functions are crucially important. Examples are where loads, tensions, or clamping forces must be held without leakage. All external parts of the cartridge are zinc-nickel plated according to DIN EN ISO 19 598 and are thus suitable for use in the harshest operating environments. The slip-on coils can be replaced without opening the hydraulic envelope and without dismantling the electronics (sensor) 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



3 Technical data

General characteristics	Description, value, unit
Designation	2/2 solenoid cartridge valve
Design	seat-valve shut-off, two-stage, monitored operating position
Mounting method	screw-in cartridge M24 x 1.5
Size	nominal size 10, cavity type DD or cavity type DC (option with adapter ring C)
Weight	0.65 kg

General characteristics	Description, value, unit
Mounting attitude	unrestricted
Ambient temperature range	-25 °C ... +50 °C

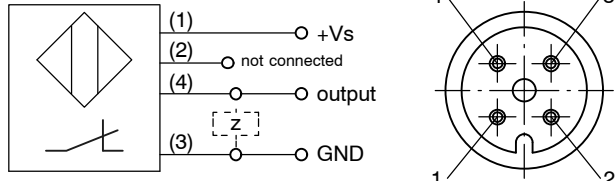
Hydraulic characteristics	Description, value, unit
Maximum operating pressure	350 bar
Maximum flow rate	80 l/min
Flow direction	A → B, B → A, see symbol
Hydraulic fluid	HL and HLP mineral oil to DIN 51 524; for other fluids, please contact BUCHER
Hydraulic fluid temperature range	-25 °C ... +80 °C
Viscosity range	10...500 mm ² /s (cSt), recommended 15...250 mm ² /s (cSt)
Minimum fluid cleanliness Cleanliness class to ISO 4406 : 1999	class 20/18/15

Solenoid coil

Electrical characteristics	Description, value, unit
Supply voltage	12 V DC, 24 V DC
Supply voltage tolerance	± 10 %
Nominal power consumption - version "E" - version "N"	V DC = 17 W V DC = 27 W
Switching time - version W22GEDS... - version W22GNDS...	70 ... 120 ms (energising) 90 ... 110 ms (deenergising) 80 ... 120 ms (energising) 100 ... 120 ms (deenergising) <small>These times are strongly influenced by fluid pressure, flow rate and viscosity, as well as by the dwell time under pressure.</small>
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"

Sensor

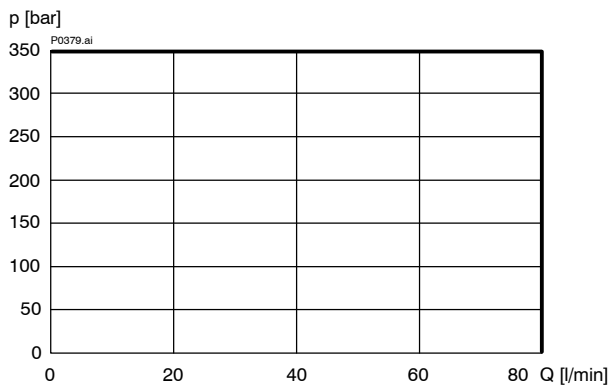
Electrical characteristics	Description, value, unit
Supply voltage (+V _S)	10...30 V DC
Outputs	PNP - normally closed for other outputs, please contact BUCHER!
Maximum load current	230 mA
EMC: - immunity to interference - interference emissions	EN 61000-6-2 EN 61000-6-4
Vibration test	EN 60068-2-64 – category 1, according to table A.5
Shock test	EN 60068-2-27 – 5 g, 6 ms half-sine wave to table 1, in all directions

Electrical characteristics	Description, value, unit
Short-circuit protection	sustained resistance to load short-circuit
Protection class to ISO 20 653 / EN 60 529	IP 67 / IP 69K (with appropriate mating connectors – solenoid and sensor – and proper fitting and sealing)
Electrical connection	Plug base M12x1, 4-pin (male), A-coding At maximum ambient temperature and high duty cycles, the mating connector must be temperature-resistant up to 120 °C.
Pin configuration	

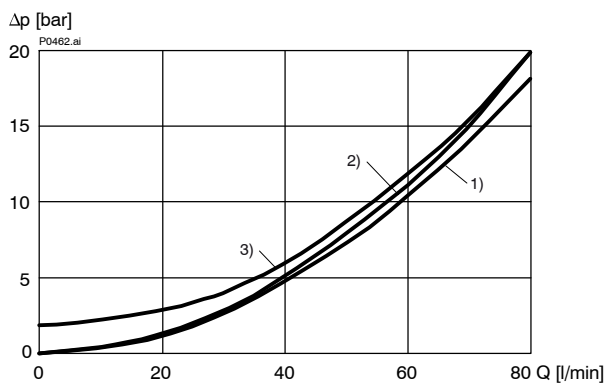
4 Performance graphs

measured with oil viscosity 33 mm²/s (cSt), coil at steady-state temperature and 10 % undervoltage

$p = f(Q)$ Performance limits

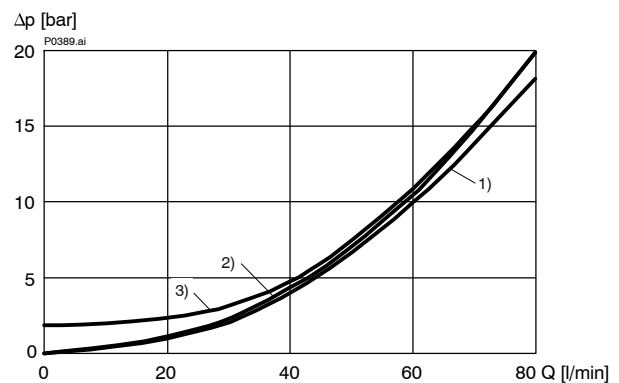


$\Delta p = f(Q)$ Pressure drop - Flow rate characteristic [WR22GN...]



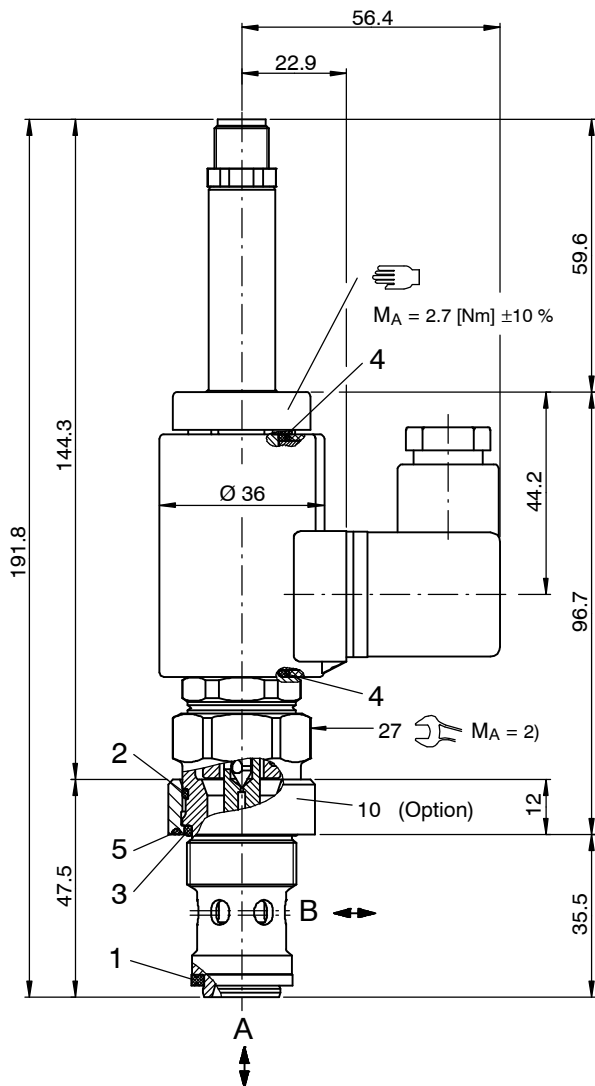
- 1) B → A, solenoid energised
- 2) A → B, solenoid energised
- 3) A → B, solenoid de-energised

$\Delta p = f(Q)$ Pressure drop - Flow rate characteristic [WR22GE...]



- 1) B → A, solenoid energised
- 2) A → B, solenoid energised
- 3) A → B, solenoid de-energised

5 Dimensions & sectional view



Option with adapter ring C

Item	Qty.	Description
10	1	Adapter ring C $\varnothing 32.00 \times 12.00$

6 Installation information



ATTENTION!

Using valves and components with operating-position monitoring:

The signal from the position switch must not be used to directly activate a safety-related control function.

Furthermore, only solenoid coils with a protection diode may be used.



ATTENTION!

The safe operating position is the closed position. In accordance with the criteria for proven safety principles, the status of the position signal change during the overlap stroke (before the valve actually opens).



IMPORTANT!

When connecting the sensor (for monitoring the operating position), note the information regarding pin assignment in this data sheet. The sensor cable must not be subjected to any pulling forces. Note also that opening the valve as well as removing the electronics (sensor) is not permitted!



IMPORTANT!

When fitting the cartridges, 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.

Tightening torque $M_A^{2)} \pm 10\%$

Cavity type	DD	DC
Fitted in steel	65 [Nm]	100 [Nm]
Fitted in aluminium	50 [Nm]	100 [Nm]

NBR seal kit no. DS-281-N³⁾

Item	Qty.	Description
1	1	Seal ring $\varnothing 22,10 / 16,50 \times 2,50$
2	1	O-ring no. 020 $\varnothing 21,95 \times 1,78$ N90
3	1	O-ring $\varnothing 21,00 \times 2,00$ N75
4	2	O-ring $\varnothing 16,00 \times 2,00$ Viton
5	1	O-ring $\varnothing 27,00 \times 1,50$ N75

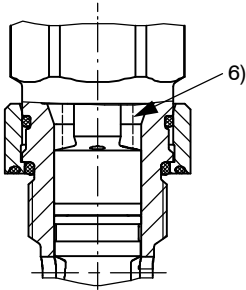


IMPORTANT!

³⁾ Seal kit with FKM (Viton) seals, no. DS-281-V

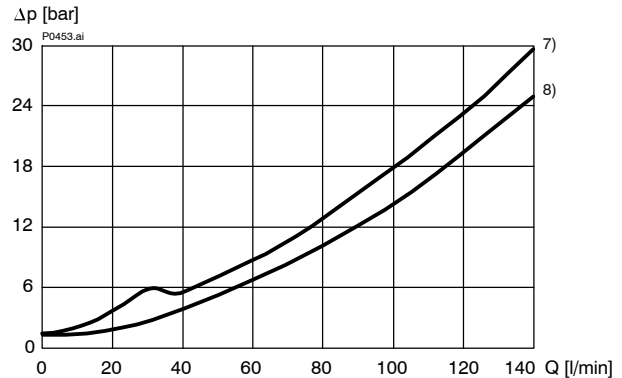
7 Return spring for main spool (on request)

Additional return spring for main spool to assist the closing force. This results in a higher Δp when opening. Available on request, if a certain minimum order quantity is achieved.



6) additional return spring for main spool

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



7) A → B, solenoid energising

8) B → A, solenoid energising

8 Ordering code

Ex. **W R 22G E _ S A D A - 10 _ - 1 24 D _**

- W = directional valve
 - R = check valve function, seated design, two stage
 - 22G = 2/2 function, normally closed
 - E = electrically operated, V DC = 17 W (standard)
 - N = electrically operated, V DC = 27 W
 - (blank) = without return spring for main piston (standard)
 - R = return spring for main piston "WR22G" pl. consult BUCHER
 - S = with operating-position monitoring
 - A = switching output PNP normally closed (standard)
for other types, please contact BUCHER
 - D = cavity type DD (standard)
 - C = cavity type DC (option with adapter ring C)
 - A ... Q = standard model - see relevant data sheets
 - Z ... R = special features - please contact BUCHER
 - 10 = nominal size 10
 - (blank) = NBR (Nitrile) seals (standard)
 - V = FKM (Viton) seals
(special seals - please contact BUCHER)
 - 1 ... 9 = design stage (omit when ordering new units)
 - 24 = voltage value 24 V
 - 12 = voltage value 12 V
 - D = current DC
 - T = ISO 4400 / DIN 43 650 mating plug (standard, coil with quenching diode, IP 65)
 - M100 = without mating DIN plug
 - JT = Junior Timer radial plug connection (with quenching diode, IP 65)
 - IT = Junior Timer axial plug connection (with quenching diode, IP 65)
 - DT = Deutsch plug connection DT04-2P (with quenching diode, IP 67/69K)
- } mating plug not supplied

9 Related data sheets

Reference	Description
400-P-040011	The form-tool hire programme
400-P-060121	Cavity type DD
400-P-060111	Cavity type DC (option with adapter ring C)
400-P-120110	Coils for screw-in cartridge valves
400-P-740111	Line- and manifold-mounting body, type DD-12 (G 1/2")
400-P-740101	Line- and manifold-mounting body, type DC-12 (G 1/2")
400-D-9010001	Technical Hints and Tips Pilot Operated Solenoid Valves with a Return Spring

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