

2/2 Solenoid Cartridge Valve, Size 10

$Q_{\max} = 80 \text{ l/min}$, $p_{\max} = 350 \text{ bar}$
bidirectional seat-valve shut-off, two-stage,
with return spring, monitored operating position
Series WS22GNRS...



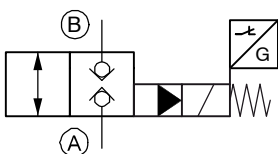
- With integral electronic monitoring of operating position
- With bidirectional seat-valve shut-off
- No external pilot drain required
- All exposed parts with zinc-nickel plating
- High pressure wet-armature solenoids
- The slip-on coil can be rotated and replaced without opening the hydraulic envelope 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 they are therefore virtually leak-free in both directions of flow (bidirectional seat-valve shut-off). 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	bidirectional 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
Mounting attitude	unrestricted

Hydraulic characteristics	Description, value, unit
Maximum operating pressure	350 bar
Maximum flow rate	80 l/min
Flow direction	A → B / B → A, see symbols Switching safety achieved by flow and Δp.
Hydraulic fluid	HL and HLP mineral oil to DIN 51 524; for other fluids, please contact BUCHER
Ambient temperature range ¹⁾	-25 °C ... +80 °C
Hydraulic fluid temperature range ¹⁾	-25 °C ... +80 °C ²⁾
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 %
Ambient temperature range ¹⁾	-25 °C ... +50 °C
Nominal power consumption	V DC = 27 W
Switching time	100 ... 150 ms (energising) 90 ... 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"



IMPORTANT!:

1) The less favourable values from the hydraulic and electrical characteristics determine the temperature range of the whole valve.

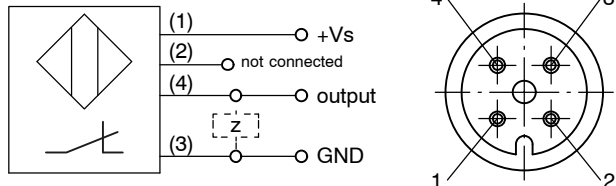


IMPORTANT!:

2) The maximum fluid temperature must not exceed the permissible ambient temperature for the whole valve.

Sensor

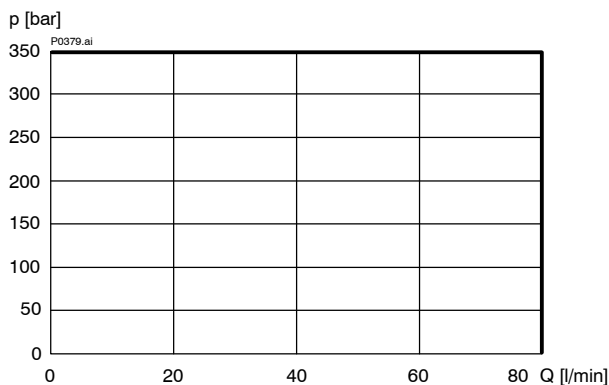
Electrical characteristics	Description, value, unit
Supply voltage (+V _S)	10...30 V DC
Outputs	PNP - normally closed for other outputs, please contact BUCHER!
Maximum load current	230 mA
EMC:	- immunity to interference - interference emissions EN 61000-6-2 EN 61000-6-4
Vibration test	EN 60068-2-64 – 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
Short-circuit protection	sustained resistance to load short-circuit

Electrical characteristics	Description, value, unit
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	

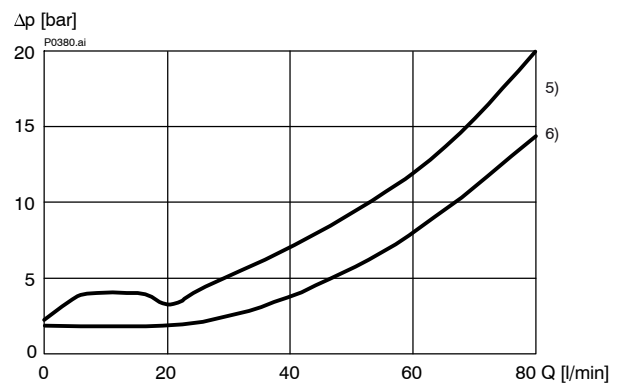
4 Performance graphs

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

$p = f(Q)$ Performance limits

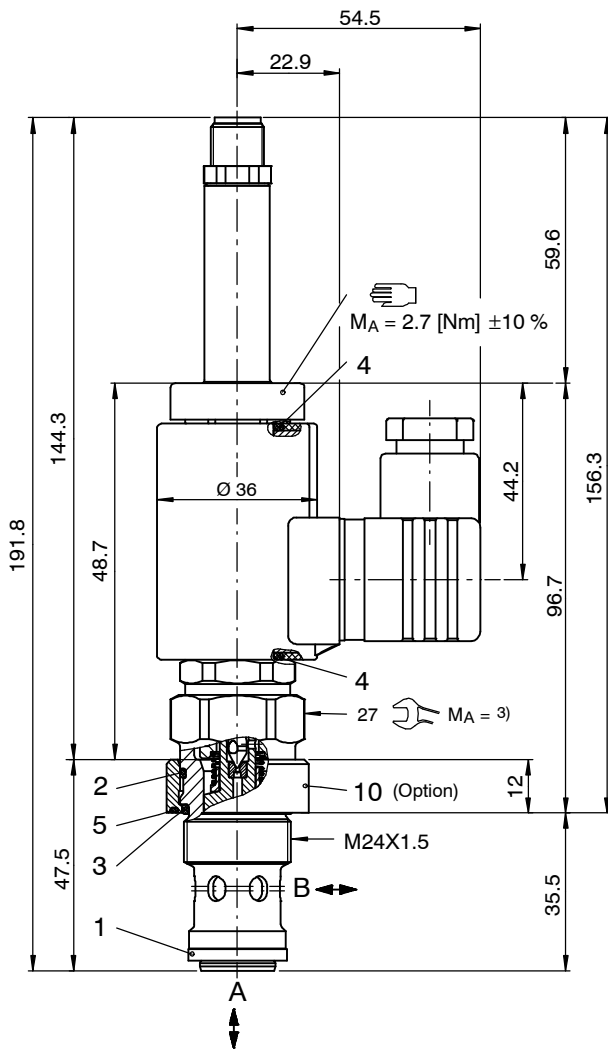


$\Delta p = f(Q)$ Pressure drop - Flow rate characteristic



- 5) A → B, solenoid energising
- 6) B → A, solenoid energising

5 Dimensions & sectional view



Option with adapter ring C

Item	Qty.	Description
10	1	Adapter ring C Ø 32.00 x 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 $M_A^{3)} \pm 10\%$

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

NBR seal kit no. DS-281-N⁴⁾

Item	Qty.	Description
1	1	Seal ring Ø 22,10 / 16,50 x 2,50
2	1	O-ring no. 020 Ø 21.95 x 1.78 N90
3	1	O-ring Ø 21.00 x 2.00 N75
4	2	O-ring Ø 16.00 x 2.00 Viton
5	1	O-ring Ø 27.00 x 1.50 N75



IMPORTANT!

⁴⁾ Seal kit with FKM (Viton) seals, no. DS-281-V

7 Ordering code

Ex. **W S 22G N R S A D B** - **10** - **1** **24 D** -

W	=	directional valve	
S	=	seat-valve design (bidirectional shut-off)	
22G	=	2/2 function, normally closed	
N	=	solenoid operated, V DC = 27 W	
R	=	return spring for main spool (standard)	
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 ... S	=	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 175301 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)	} mating plug not supplied
IT	=	Junior Timer axial plug connection (with quenching diode, IP 65)	
DT	=	Deutsch plug connection DT04-2P (with quenching diode, IP 67/69K)	

8 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 series D36
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")

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