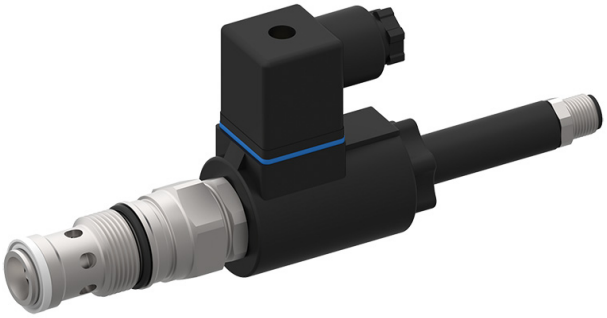
2/2 Solenoid Cartridge Valve, Size 10

Q_{max} = 80 l/min, p_{max} = 350 bar
Bidirectional seat-valve shut-off, two-stage, monitored operating position
Series WS22GNDS…

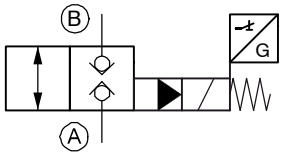


- With integral electronic monitoring of operating position
- With bidirectional seat-valve shut-off
- No external pilot drain required
- All exposed parts with zinc-nickel plating
- High pressure wet-armature solenoids
- The slip-on coil can be rotated and replaced without opening the hydraulic envelope 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 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 without dismanting 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
Ambient temperature range	-25 °C … +50 °C

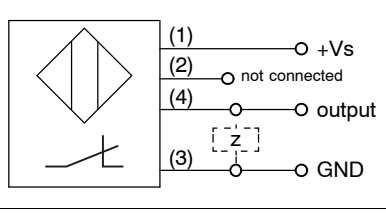
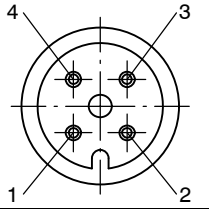
Hydraulic characteristics	Description, value, unit
Maximum operating pressure	350 bar
Maximum flow rate	80 l/min
Flow direction	A → B / B → A, see symbols
Hydraulic fluid	HL and HLP mineral oil to DIN 51 524; for other fluids, please contact BUCHER
Hydraulic fluid temperature range	-25 °C … +80 °C
Viscosity 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	V DC = 27 W
Switching time	100 … 150 ms (energising) 90 … 120 ms (deenergising) 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 %
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	3-pin square plug to ISO 4400 / DIN 43 650 (standard) for other connectors, see “Ordering code”

Sensor

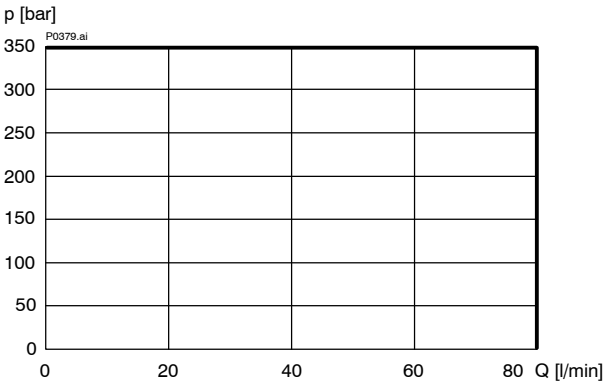
Electrical characteristics	Description, value, unit
Supply voltage ($+V_S$)	10…30 V DC
Outputs	PNP - normally closed for other outputs, please contact BUCHER!
Maximum load current	230 mA
EMC: - immunity to interference - interference emissions	EN 61000-6-2 EN 61000-6-4
Vibration test	EN 60068-2-64 –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

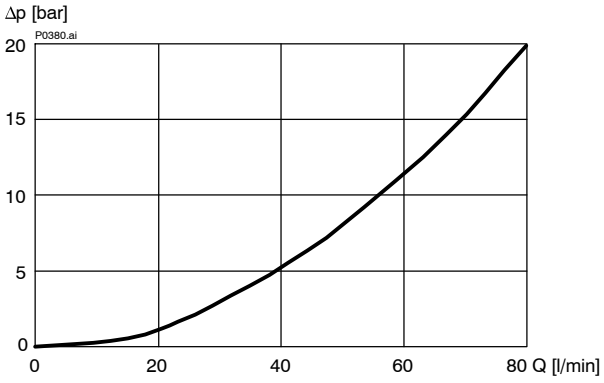
4 Performance graphs

measured with oil viscosity 33 mm^2/s (cSt), coil at steady-state temperature and 10 % undervoltage

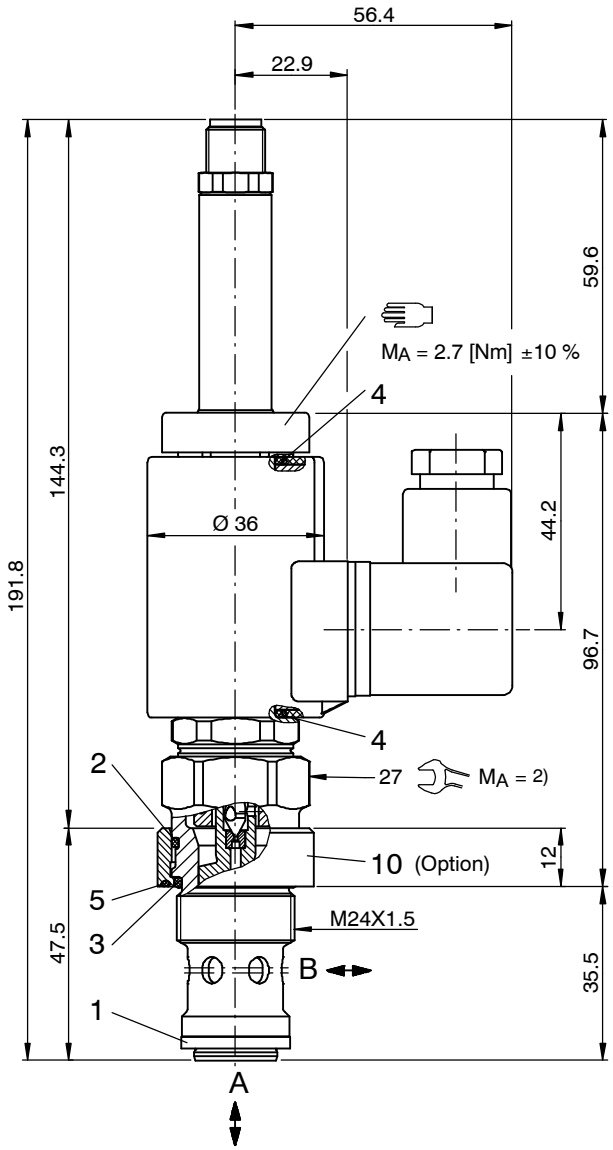
p = f (Q) Performance limits



Δp = f (Q) Pressure drop - Flow rate characteristic



5 Dimensions & sectional view



Option with adapter ring C

Item	Qty.	Description
10	1	Adapter ring C ∅ 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 2) ± 10 %

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

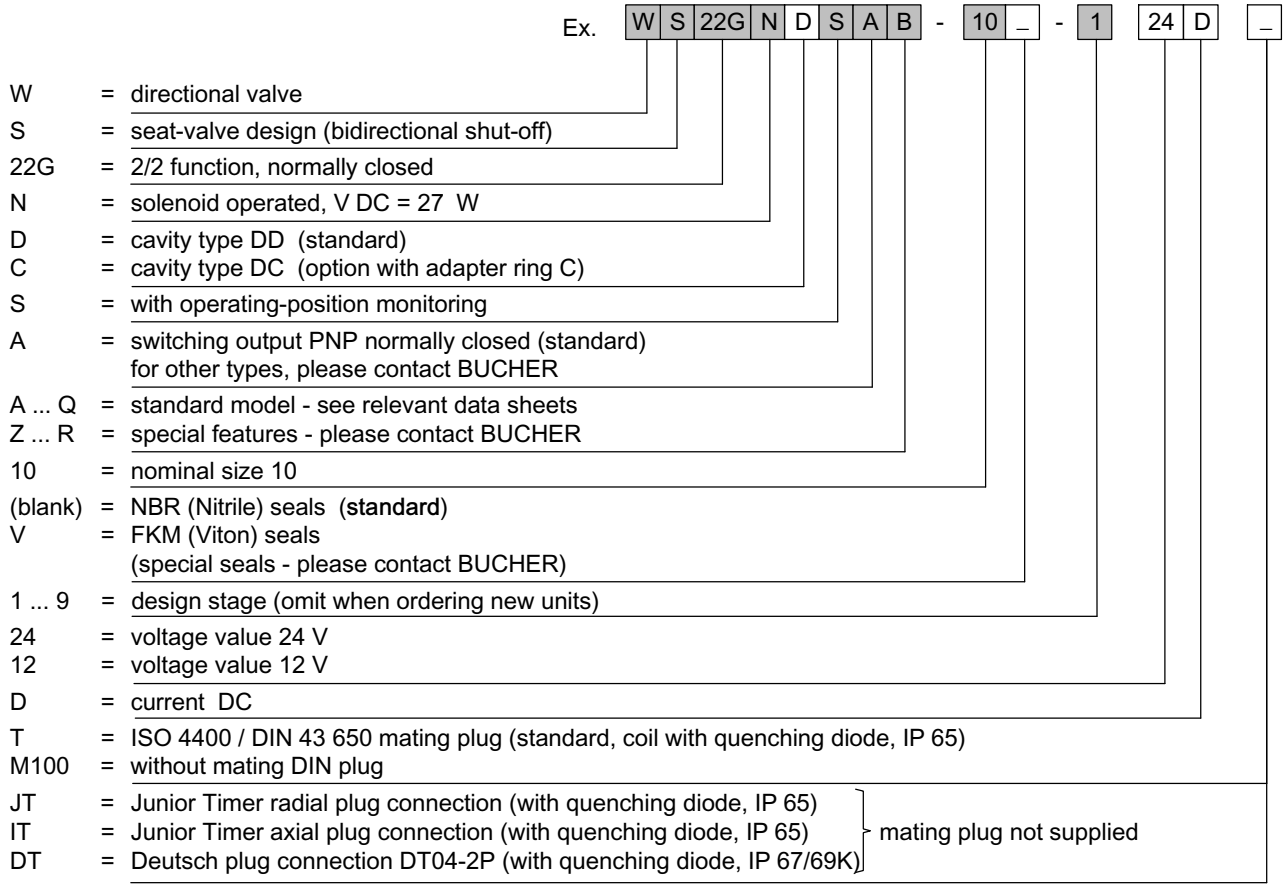
NBR seal kit no. DS-281-N 3)

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

IMPORTANT!

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

7 Ordering code



8 Related data sheets

Reference	(Old no.)	Description
400-P-040011	(i-32)	The form-tool hire programme
400-P-060121	(i-45.2)	Cavity type DD
400-P-060111	(i-45.1)	Cavity type DC (option with adapter ring C)
400-P-120110	(W-2.141)	Coils for screw-in cartridge valves
400-P-740111	(G-24.21)	Line- and manifold-mounting body, type DD-12 (G 1/2")
400-P-740101	(G-24.20)	Line- and manifold-mounting body, type DC-12 (G 1/2")

info.ch@bucherhydraulics.com www.bucherhydraulics.com

Classification: 430.300.-.305.320.300