2/2 Logic Cartridge Valve, Size 10

$Q_{\text{max}} = 150 \text{ l/min}$, $p_{\text{max}} = 420 \text{ bar}$

Active Control, Seated Design

Series WL22SD...

- Active control
- Area ratio 2 : 1
- High flow rates with low $\Delta p$
- Seat-valve shut-off from $A \rightarrow B$ and $B \rightarrow A$
- No pilot oil consumption at $Z$
- With or without seal on the seated valve spool
- Various opening pressures
- With integral orifice for pilot port
- All external parts zinc plated, chromited (CrVI-free)
- Can be fitted in a line-mounting body

9 Description

Series WL22SD... actively controlled 2/2 logic valves are size 10, high performance screw-in cartridges with an M27 x 2 mounting thread. The conical-seat design ensures that the cartridges are leak-tight from $A \rightarrow B$ and from $B \rightarrow A$. When the same pressure exists at ports $A$, $B$ and $Z$, the valve spool is held in its closed position by the $\geq 2$ bar compression spring. The $A \rightarrow B$ and $B \rightarrow A$ connection is opened or closed by relieving or pressurising the pilot port $Z$, bearing in mind the corresponding area- and pressure-ratios. 2/2 logic cartridge valves can be used in both mobile and industrial applications. All external parts are zinc plated and chromited (CrVI-free) and are thus suitable for use in the harshest operating environments. If you intend to manufacture your own cavities or are designing a line-mounting installation, please refer to the section “Related data sheets”.

10 Symbol

![Symbol](image)

WL22SD ...

11 Technical data

<table>
<thead>
<tr>
<th>General characteristics</th>
<th>Description, value, unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designation</td>
<td>2/2 logic cartridge valve</td>
</tr>
<tr>
<td>Design</td>
<td>actively controlled, conical-seat type</td>
</tr>
<tr>
<td>Mounting method</td>
<td>screw-in cartridge M27 x 2</td>
</tr>
<tr>
<td>Tightening torque</td>
<td>150 Nm $\pm$ 10 %</td>
</tr>
<tr>
<td>Size</td>
<td>nominal 10 mm, cavity type DJ</td>
</tr>
<tr>
<td>Weight</td>
<td>0.21 kg</td>
</tr>
<tr>
<td>Mounting attitude</td>
<td>unrestricted</td>
</tr>
<tr>
<td>Ambient temperature range</td>
<td>-25 °C ... +80 °C</td>
</tr>
</tbody>
</table>
General characteristics | Description, value, unit
--- | ---
Flow direction | A → B / B → A, see symbol
MTTF\(_D\) values | 150 years, see data sheet 400-P-010101-en

Hydraulic characteristics | Description, value, unit
--- | ---
Maximum operating pressure | 420 bar
Maximum flow rate | 150 l/min
Pressure drop | \(\Delta p < 5\) bar at 100 l/min
Opening pressure: - standard - optional | 2.0 bar 0.4 \(^{1)} / 1.0 \(^{1)} / 3.0 / 6.0 / 7.5 / 13\) bar
Hydraulic fluid | HL and HLP hydraulic oils to DIN 51 524; for other fluids, please consult Bucher
Hydraulic fluid temperature range | \(-25\ ^\circ\mathrm{C} ... +80\ ^\circ\mathrm{C}\)
Viscosity range | 10 ... 650 mm\(^2\)/s (cSt), recommended 15...250 mm\(^2\)/s (cSt)
Minimum fluid cleanliness level | Cleanliness class to ISO 4406: 1999 class 20/18/15

1) only recommended for use when the seated valve spool is not fitted with a seal.

12 Performance graphs

measured with oil viscosity 33 mm\(^2\)/s (cSt)

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

\[\Delta p \text{ [bar]} = f(Q) \text{ [l/min]}\]

1 = cavity type DJ with annular groove  
2 = cavity type DJ without annular groove

Attention: The \(\Delta p\) characteristic is valid when the load pressure in the A → B / B → A connection is higher than the opening pressure. If the load pressure is lower than the opening pressure, the load pressure must first rise to overcome the opening pressure before flow can occur.
13 Dimensions, sectional view

### Important

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 needed is to check and possibly replace the seals. When changing seals, oil or grease the new seals thoroughly before fitting them.

**NBR seal kit no. DS-296-N**

<table>
<thead>
<tr>
<th>Item</th>
<th>Qty.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>O-ring No. 119 Ø 23.47 x 2.62 N90</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>O-ring No. 116 Ø 18.72 x 2.62 N90</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>O-ring No. 114 Ø 15.54 x 2.62 N90</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>O-ring No. 016 Ø 15.60 x 1.78 N90</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>Backup ring Ø 17.1 x 2.0 x 1.4 FI0751</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>Backup ring Ø 15.3 x 2.0 x 1.4 FI0751</td>
</tr>
</tbody>
</table>

**IMPORTANT!**

1) Seal kit with FKM (Viton) seals, no. DS-296-V

15 Area- and pressure-ratios

### Important

Area $A_Z : Area A_A = 2 : 1$

Area $A_Z : Area A_B = 2 : 1$

Area $A_A : Area A_B = 1 : 1$
16 Adjuster types (optional)

Type "E" adjuster (WL22S.E2D...)

Important
Can be used to limit the opening stroke, for example, or to block the valve spool in the closed position.

"E" adjuster with "P" tamper-proof cap (WL22S.P2D...)

Important
Valve settings can be sealed by fitting the tamper-proof cap. To fit the cap, the snap ring 2) has to be removed. Subsequent adjustment is only possible by destroying the tamper-proof cap.

2) Snap ring (remove for "P" model)

17 Application examples (active control)

Simplified symbol

Application with seat valve

Logic valve application for lowest possible vented pressure with a proportional throttle and bypass compensator

Advantage
When the logic cartridge valve is open (flow A → B / B → A), there is no continuous flow of pilot oil to Z.

V1 = logic cartridge valve
V2 = 3/2 seat valve
V3 = shuttle valve
V4 = proportional throttle cartridge
V5 = logic cartridge valve
V6 = bypass pressure compensator cartridge
18 Ordering code

WL22 = 2/2 logic cartridge valve
SD = seat valve with spool seal (standard)
S (∗) = seat valve without spool seal
(blank) = non-adjustable (standard)
E = adjustable
P = adjustable; adjuster is sealed
2 = area ratio (main spool : seat = 2 : 1)
D1 = fixed orifice in port Z Ø 0.8 (standard)
D2 = orifice Ø 0.6
D3 = orifice Ø 1.5
D4 = orifice Ø 1.4
D5 = orifice Ø 1.3
D6 = orifice Ø 1.2
D7 = orifice Ø 1.1
D8 = orifice Ø 1.0
D9 = orifice Ø 0.9
D0 = orifice Ø 0.7
(blank) = no orifice
1 (∗) = opening pressure 0.4 bar
2 (∗) = opening pressure 1.0 bar
3 = opening pressure 2.0 bar (standard)
4 = opening pressure 3.0 bar
5 = opening pressure 6.0 bar
6 = opening pressure 7.5 bar
7 = opening pressure 13 bar
B ... Q = standard model - see relevant data sheets
Z ... R = special features - please consult Bucher
10 = nominal size 10 mm
(blank) = Nitrile seals (standard)
V = Viton seals
(∗) In applications with an opening pressure of less than 2 bar, valve type WL22S2 ... must be used.
   i.e. the seal on the spool is omitted, and the valve is not leak-tight from A → B.

19 Related data sheets

<table>
<thead>
<tr>
<th>Reference no.</th>
<th>(Old no.)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>400-P-040011</td>
<td>(i-32)</td>
<td>The form-tool hire programme</td>
</tr>
<tr>
<td>400-P-060181</td>
<td>(i-45.11)</td>
<td>Cavity type DJ</td>
</tr>
<tr>
<td>400-P-740131</td>
<td>(G-24.31)</td>
<td>Line-mounting body, type GADJA (G 3/4&quot;)</td>
</tr>
<tr>
<td>400-P-010101</td>
<td></td>
<td>MTTF₂ values for hydraulic valves</td>
</tr>
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Classification: 430.300.- 305.320.335