Leak-Free Load-Control Valve, Size 25

Qmax = 500 l/min [132 gpm],  pmax = 420 bar [6000 psi]
leak-proof, two-stage hydraulic, manifold mounting
Series CINDY 25-B-P...

1 Description

Whenever large loads are to be precisely moved, placed and held, or work access platforms must maintain their position and withstand high forces, then leak-free load-control valves from the CINDY series are the right solution. Load-control valves in this series prevent hydraulic actuators from running ahead of the available oil supply. In one valve, they combine the functions of load-holding, safety and pipe-rupture protection. Leak-free load-control valves in this series are ideally suited for use in high-pressure applications up to 420 bar (6000 psi). With a variety of optional components, the series can be extended and adapted to the requirements of the system.

2 Symbol

2.1 Manifold-mounting variants

Variant A
Influenced by return-line pressure (pressure in A is additive to opening pilot pressure).

Variant L
Not influenced by return-line pressure (drain line is required).

Reference: 300-P-9050105-EN-00
# Technical data

## General characteristics

<table>
<thead>
<tr>
<th>Description, value, unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Designation</strong></td>
</tr>
<tr>
<td><strong>Design</strong></td>
</tr>
<tr>
<td><strong>Size</strong></td>
</tr>
<tr>
<td><strong>Mounting method</strong></td>
</tr>
</tbody>
</table>
| | (4x hex. socket-head cap screws with secondary pressure relief valve (SV): M14x120)
| | (without secondary pressure relief valve (SV): M14x80 ISO 4762 (DIN 912), – grade 12.9) |
| **Main port A** | 27 mm [1.062 inch] (factory standards) |
| **Main port B** | 30.5 mm [1.181 inch] (factory standards) |
| **Tank port T** | 18 mm [0.708 inch] (factory standards) |
| **Control / drain ports X, L** | 4 mm [0.157 inch] (factory standards) |
| **Test ports MB** | G 1/4", ISO 1179-1 |
| **Weight** | 8.5 … 13.3 kg [18.732…29.32 lbs] |
| **Mounting attitude** | unrestricted |
| **Ambient temperature range** | -25 °C ... +80 °C (-13 °F ... +176 °F) |
| **Surface corrosion protection** | Zinc-nickel coating |
| | Mounting screws zinc-flake coated (e.g. with Geomet® finish) |

## Hydraulic characteristics

<table>
<thead>
<tr>
<th>Description, value, unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maximum operating pressure</strong></td>
</tr>
<tr>
<td><strong>Maximum pressure at the flow- or return port A</strong></td>
</tr>
<tr>
<td><strong>Maximum pressure at the actuator- / load port B</strong></td>
</tr>
<tr>
<td><strong>Maximum pressure at the pilot port X</strong></td>
</tr>
<tr>
<td><strong>Maximum flow rate</strong></td>
</tr>
<tr>
<td><strong>Flow direction</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Operator type</strong></td>
</tr>
<tr>
<td><strong>Opening pilot ratio</strong></td>
</tr>
<tr>
<td><strong>Secondary pressure relief valve SVA / SVT</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Hydraulic fluid</strong></td>
</tr>
<tr>
<td><strong>Hydraulic fluid temperature range</strong></td>
</tr>
</tbody>
</table>
4 Construction and function

The functions of the control assembly are subdivided into the following positions:

4.1 Neutral position

The load pressure and the compression spring act on the control spool in the closing direction. The valve is closed with no leakage.

4.2 Lifting (flow direction from A → B)

The pump pressure at port A opens the valve against the “light” compression spring and the load. The pilot spool and control spool move together in the opening direction. Oil flows from A → B and the valve functions as a check valve.

4.3 Lowering (flow direction from B → A)

The pilot pressure at port X acts on the pilot piston and against the control springs. The pilot spool opens. As a result, the load pressure B is discharged to port A via the metering grooves in the pilot spool. The progressive characteristic of the pre-opening phase ensures that lowering begins smoothly and without jerks.

If the pilot pressure at port X is increased, the pilot spool opens further. The change in the pressure conditions at the control spool means that it follows the pilot spool in the opening direction. The oil flows from B → A.
4.4 Types of pilot control

<table>
<thead>
<tr>
<th>Cover types / applications</th>
<th>Type “G”</th>
<th>Type “D”</th>
<th>Type “K”</th>
<th>Type “H”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder application (external pilot signal)</td>
<td>✓✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Cylinder application (pilot signal from opposite line)</td>
<td></td>
<td>✓✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motors / Winches</td>
<td>✓</td>
<td>✓✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Motors for slewing drives</td>
<td></td>
<td>✓✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Explanation of symbols: ✓✓ = normal ✓ = possible × = not possible

4.4.1 Standard damping cover, type “G”

Pilot control type “G” is recommended for external control, or with low-oscillation applications. This control cover can only be damped with an inlet orifice. Stroke-dependent damping is not possible with this cover.

4.4.2 Stroke-dependent damping cover, type “D”

The type “D” cover is recommended for handling pilot signals that come from the opposite actuator line and for applications that are susceptible to oscillations. Thanks to the pilot piston’s stroke-dependent damping system, oscillation-prone applications can be started in a very stable manner. The starting pressure peak is reduced because in the starting zone the valve responds quickly to the pilot signal.

4.4.3 Stroke-dependent damping cover with metering grooves, type “K”

The stroke-dependent damping cover with metering grooves, type “K”, is recommended for applications that are susceptible to oscillations, such as hydraulic motors (e.g. winches).

4.4.4 Hydromechanical stroke-limiting cover, type “H”

With the type “H” pilot control, the stroke is limited in order to achieve a particular flow rate or speed. This reduces the valve resolution.

General:
The series-connection of the orifices allows the opening time, the closing time, the start of opening, and the full extent of opening to be matched to the requirements of the application.
4.5 Secondary pressure relief valve (SV)

To protect the actuator from overload, a version that includes a secondary pressure relief valve is available. A direct-acting pressure relief valve, type SVT or SVA, for the whole rated flow.

**IMPORTANT!** With open-centre directional valves, make sure that the valve has an adequate flow rating. If the security seals or other security elements are removed, all Bucher Hydraulics' liabilities become null and void.

4.5.1 Direct-acting secondary pressure relief valve

**Variant: SVA (B → A)**

The SVA direct-acting secondary pressure relief valve is connected directly to the load port B. When the pressure setting is reached, the relief spool opens a flow path to port A, the return line connection. The relief setting is locked and sealed with a special lock nut.

Circuit example for SVA (B → A) for directional valves with open-centre spool

4.5.2 Direct-acting secondary pressure relief valve

**Variant: SVT (B → T)**

The SVT direct-acting secondary pressure relief valve is connected to the load port B. When the pressure setting is reached, the relief spool opens and creates a connection to the tank port T. The relief setting is locked and sealed with a special lock nut. This model is used when the open-centre spool cannot handle the full flow rate, or when the application causes the load to move.

Circuit example for SVT (B → T) for directional valves with closed-centre spool

**ATTENTION!:** With body variant A, the return-line pressure is additive 1:1 to the pressure setting (see Fig. at left)! With body variant L, the spring chamber in the pressure relief valve is drained to tank, so the return-line pressure does not affect the pressure setting.

**ATTENTION!:** In the case of a tank-line preload, the pressure is additive 1:1 to the pressure setting!
4.5.3 Overview table for secondary pressure relief valves

**IMPORTANT!** Please refer to the technical design sheets 300-D-9050101 for cylinder applications and 300-D-9050102 for motor applications.

<table>
<thead>
<tr>
<th>SV variants / spool variants</th>
<th>SVA ** Back-pressure dependent (CINDY 25-B-P__-S___-A)</th>
<th>SVA Back-pressure independent (CINDY 25-B-P__-S___-L)</th>
<th>SVT Back-pressure dependent (CINDY 25-B-P__-S___-A)</th>
<th>SVT *** Back-pressure independent (CINDY 25-B-P__-S___-L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cylinder applications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directional valve spool with open centre</td>
<td>✓</td>
<td>✓✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directional valve spool with closed centre</td>
<td>x</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Motor applications *</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directional valve spool with open centre</td>
<td>✓</td>
<td>✓✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directional valve spool with closed centre</td>
<td>x</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Explanation of symbols: ✓✓ = normal ✓ = possible x = not possible

Supplements / Notes:

* In motor applications, to prevent cavitation at the hydraulic motor it is essential to ensure that sufficient oil is always available at the supply side under all operating conditions!

** Return-line pressure from line A is additive to the secondary pressure relief valve's pressure setting!

*** Leakage/drain gallery (L) is internally connected within the body to the tank gallery (T)!
5 Performance graphs

measured with oil viscosity 33 mm²/s (cSt)

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

Lifting A → B

\[ \Delta p \text{ [bar (psi)]} \]

\[ Q \text{ [l/min (gpm)]]} \]

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

Secondary pressure relief valve SVA / SVT

\[ p_B \text{ [bar (psi)]} \]

\[ Q \text{ [l/min (gpm)]]} \]

6 Available modules

Available modules

Ansteuervarianten

Control versions

Deckel Typ "K" + "D"
Cover type "K" + "D"

"K" + "D" 型盖

Deckel Typ "H"
Cover type "H"

"H" 型盖

Deckel Typ "G"
Cover type "G"

"G" 型盖

Plattenbau-Varianten
Plate assembly versions

ohne SV without SV

mit SV with SV

Einstellung Setting

300 bar (4300 psi)

250 bar (3600 psi)

380 bar (5400 psi)

300 bar (4300 psi)

250 bar (3600 psi)

380 bar (5400 psi)
7 Dimensions & sectional view

Example for the dimensional units:

- millimeter: 0.79 = 0.79 mm
- inch: 0.031 = 0.031"

Standard damping cover type “G”
Standard damping cover type “G”

Hub-dependent damping cover type “D”
Hub-dependent damping cover with metering grooves type “K”

Hydromechanical stroke-limiting cover type “H”

* = factory setting

With secondary pressure relief valve (SVA / SVT)

Without secondary pressure relief valve (SVA / SVT)

Example for the dimensional units:

<table>
<thead>
<tr>
<th>Unit</th>
<th>0.79 mm</th>
<th>0.031 inch</th>
</tr>
</thead>
</table>

Required surface of the counterpart:

- Rz max 10
- 0.02/100

Connections T and L are depend on the variant selection

<table>
<thead>
<tr>
<th>Connection size</th>
<th>O-Ring on the valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø 23 mm</td>
<td>23.47 x 2.62</td>
</tr>
<tr>
<td>Ø 15 mm</td>
<td>5.28 x 1.78</td>
</tr>
</tbody>
</table>

Tolerances according to DIN ISO 2768-mK

A
max. Ø 30.5 [Ø 1.20] 37.69 x 3.53
B
max. Ø 30.5 [Ø 1.20] 37.69 x 3.53
T
max. Ø 18 [Ø 0.70] 23.47 x 2.62
X
max. Ø 4 [Ø 0.15] 5.28 x 1.78
L
max. Ø 4 [Ø 0.15] 5.28 x 1.78

Required surface of the counterpart:

<table>
<thead>
<tr>
<th>Unit</th>
<th>0.02/100</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>0.0010</td>
</tr>
<tr>
<td>inch</td>
<td>0.0004</td>
</tr>
</tbody>
</table>

7.1 Body and control versions

7.2 Interface drawing for mating face
8 Safety instructions

IMPORTANT! Designing load-control valves requires specialist technical knowledge and product knowledge. Safety applications must be verified by adequate tests to ensure safety in actual use.

8.1 Assembly / disassembly

IMPORTANT!
The valve may only be used for its intended purpose within its nominal rating. If you plan to use it outside the nominal rating, you must contact the valve manufacturer. The ultimate responsibility for safety in the installation and use rests with the end-machine manufacturer of the mobile application.

IMPORTANT!
Seal kit with the external seals is available on application.

IMPORTANT!
The port threads conform to DIN 3852 T1. Use screws to DIN 912, grade 12.9, to mount the valve. Tightening torques as per the manufacturer's instructions.

IMPORTANT!
Protect seals and flange faces from damage. The mating flange face must be of the quality specified in the data sheet! Pay attention to the port designations.

9 Application examples

9.1 Cylinder application
CINDY 25-B-P with the control version type "G"

9.2 Motor application
CINDY 25-B-P with the control version type "K"
10 Ordering code

CINDY = series
25 = size 25
B = model / version
P = manifold mounting
N = NBR (Nitrile) seals (standard)
V = FKM (Viton) seals
T = MIL (low temperature) seals
O = without mounting screws (standard)
D = incl. mtg. screws Geomet (ZL) 12.9 DIN 912
S250 = standard spool, B → A 250 l/min [66 gpm] *
S320 = standard spool, B → A 320 l/min [84.53 gpm] *
S400 = standard spool, B → A 400 l/min [105.65 gpm] *
S500 = standard spool, B → A 500 l/min [132 gpm] *
A = influenced by return-line pressure in A
L = not influenced by return-line pressure
G… = standard damping cover
D… = stroke-dependent damping cover
K… = stroke-dependent damping cover with metering grooves
H… = hydromechanical stroke-limiting cover
... = orifice combination (is factory-defined)
(Blank) = without secondary pressure relief
SVA = secondary pressure relief valve B → A
SVT = secondary pressure relief valve B → T
... = setting of the secondary pressure relief valve
SVA 120…420 bar [1700…6000 psi]
SVT 120…420 bar [1700…6000 psi]

*) measured at 33 bar [478 psi] Δp from B → A.

11 Related data sheets

<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>300-D-9050101</td>
<td>Technical design sheet for CINDY load-control valves in motor applications</td>
</tr>
<tr>
<td>300-D-9050102</td>
<td>Technical design sheet for CINDY load-control valves in cylinder applications</td>
</tr>
</tbody>
</table>

**IMPORTANT!**
Additional documentation and 3D models (.stp or .igs format) can be downloaded from [www.bucherhydraulics.com](http://www.bucherhydraulics.com)
(LOGintern area; registration is necessary)

We also offer customised solutions. Please talk to our sales team.

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