ISO cartridge valves type LID*
Check function, high flow, Pmax 420 bar

Directional control valves in ISO cartridge design, specific for check functions. They are made by a functional cover 1 and a 2-way SC LI slip-in cartridge. Covers are available with different check functions:

LIDA, normally closed
LIDO, normally open
LIDB, normally closed with shuttle valve for pilot pressure selection
LIDR, normally closed with pilot operated check valve

The SC LI slip-in cartridge is available with different poppet shape to optimize the check control, see section 6.

It is made by a poppet 2 sliding into a sleeve 3 and kept in normally closed position (open position for type 62 and 63) by the spring 4 available with different cracking pressure values.

Size: 16 to 100 ISO 7368
Max flow up to 9000 l/min at Δp = 5 bar
Max pressure up to 420 bar

Cover according to ISO 7368

D = directional function

Cover configuration see section 2:
A = normally closed;
O = normally open;
B = with shuttle valve for pilot selection;
R = with hydraulically operated pilot check valve;

Size:
1 = 16; 4 = 40; 8 = 80 (only for LIDA)
2 = 25; 5 = 50; 10 = 100 (only for LIDA)
3 = 32; 6 = 63 (not for LIDO)
LIDO is available only in sizes 16 to 50

Seals material:
- = NBR
PE = FKM
BT = HNBR

Series number

Options: see section 3

Table H040-10/E
3 OPTIONS
For LIDA (sizes 16 and 25), for LIDO (all sizes) LIDB (sizes 40 ÷ 63), LIDR (sizes 40 ÷ 63):
/F/ = with external attachments Pp and underneath port X supplied plugged;
For LIDA, LIDO, LIDR:
/PP/ = prearranged for coupling to an intermediate element with position detector for safety valves, see tab. EY120.
For all models:
/SC/ = calibrated plugs different from standard ones reported in section 4. The restrictors configuration (if different from the standard) must be indicated at the end of the model code.

LIDB - 4 /E /* P

Channel where the restrictor has to be provided:
P = channel X, port P Z1 = channel Z1
F = channel F Z2 = channel Z2

06

Size of the throttling hole in tenths of millimeters:
05 = 0.5 mm 10 = 1 mm 17 = 1.7 mm
06 = 0.6 mm 12 = 1.2 mm 20 = 2 mm
08 = 0.8 mm 15 = 1.5 mm

4 STANDARD ORIFICES CONFIGURATION

<table>
<thead>
<tr>
<th>Cover</th>
<th>Port</th>
<th>LIDB-1</th>
<th>LIDB-2</th>
<th>LIDB-3</th>
<th>LIDB-4</th>
<th>LIDB-5</th>
<th>LIDB-6</th>
<th>LIDB-7</th>
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</thead>
<tbody>
<tr>
<td>X</td>
<td>-</td>
<td>-</td>
<td>- M4</td>
<td>- M6</td>
<td>- M6</td>
<td>- M6</td>
<td>- M6</td>
<td>- M6</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>10A</td>
<td>- 12A</td>
<td>- 15F</td>
<td>- 15F</td>
<td>- 15F</td>
<td>- 15F</td>
<td>- 15F</td>
</tr>
<tr>
<td>P</td>
<td>-</td>
<td>- M6</td>
<td>- M6</td>
<td>- M6</td>
<td>- M6</td>
<td>- M6</td>
<td>- M6</td>
<td>- M6</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>12A</td>
<td>- 15A</td>
<td>- 17A</td>
<td>- 20A</td>
<td>- 20A</td>
<td>- 20A</td>
<td>- 20A</td>
</tr>
<tr>
<td>Z2</td>
<td>-</td>
<td>- M4</td>
<td>- M6</td>
<td>- M6</td>
<td>- M6</td>
<td>- M6</td>
<td>- M6</td>
<td>- M6</td>
</tr>
</tbody>
</table>

M4 ÷ M6 = screw size 10A ÷ 300F = calibrated orifices diameters in tenths of mm; A = short calibrated hole, F = long calibrated hole

5 MODEL CODE OF SLIP-IN CARTRIDGES

SC LI - 16 43 40 / F

Cartridge according to ISO 7368

Size, the same of relevant cover:
16 25 32 40 50 63 80 100

Type of poppet (not for LIDO)
32, 33 (size 16 to 100) = without damping nose
42 (size 16 to 80) = as 32 but with damping nose
43 (size 16 to 100) = as 33 but with damping nose

Spring cracking pressure:
1 = 0.3 bar for poppet 32, 42
1 = 0.6 bar for poppet 33, 43
2 = 1.5 bar for poppet 32, 42
3 = 3 bar for all poppets
6 = 5.5 bar for all poppets

6 TYPE OF POPPET

<table>
<thead>
<tr>
<th>Type of poppet</th>
<th>32</th>
<th>33</th>
<th>42</th>
<th>43</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional sketch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operating pressure</th>
<th>420 bar max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal flow at Δp 5 bar (l/min) see diagrams Q/Δp at section 3</td>
<td>270</td>
</tr>
<tr>
<td>Size 16</td>
<td>25</td>
</tr>
<tr>
<td>270</td>
<td>550</td>
</tr>
<tr>
<td>550</td>
<td>1000</td>
</tr>
<tr>
<td>600</td>
<td>1400</td>
</tr>
<tr>
<td>Typical section</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Area ratio A/Δp</th>
<th>1:1.1</th>
<th>1:1.5</th>
<th>1:1.1</th>
<th>1:1.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cracking pressure A→B</td>
<td>0.3 bar</td>
<td>0.6 bar</td>
<td>0.3 bar</td>
<td>0.6 bar</td>
</tr>
<tr>
<td>2</td>
<td>1.5 bar</td>
<td>-</td>
<td>1.5 bar</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>3 bar</td>
<td>2.5 bar</td>
<td>3 bar</td>
<td>2.5 bar</td>
</tr>
<tr>
<td>6</td>
<td>6 bar</td>
<td>6 bar</td>
<td>6 bar</td>
<td>6 bar</td>
</tr>
<tr>
<td>Cracking pressure B→A</td>
<td>3 bar</td>
<td>0.9 bar</td>
<td>3 bar</td>
<td>0.9 bar</td>
</tr>
<tr>
<td>2</td>
<td>12.8 bar</td>
<td>-</td>
<td>12.8 bar</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>32.5 bar</td>
<td>3.8 bar</td>
<td>32.5 bar</td>
<td>3.8 bar</td>
</tr>
<tr>
<td>6</td>
<td>59.4 bar</td>
<td>9 bar</td>
<td>59.4 bar</td>
<td>9 bar</td>
</tr>
</tbody>
</table>

Seals material:
- = NBR
PE = FKM
BT = HNBR
### Ports P, A, B, X, Z1, Z2:
420 bar

### Mineral oils
- Hydraulic fluid
- NBR, FKM, HNBR

### DIN 51524
- ISO 12922
- HL, HLP, HLPD, HVLP, HVLPD
- HFDU, HFDR
- HFC

### Suitable seals type
- Classification
- Ref. Standard

### NBR seals (standard)
- -20°C ÷ +80°C
- -20°C ÷ +50°C
- -20°C ÷ +80°C

### FKM seals (/PE option)
- -20°C ÷ +80°C
- -40°C ÷ +50°C

### HNBR seals (/BT option)
- -40°C ÷ +60°C
- -40°C ÷ +50°C

### Recommended viscosity
- 15÷100 mm²/s - max allowed range 2.8 ÷ 500 mm²/s

### Max fluid contamination level
- ISO4406 class 20/18/15 NAS1638 class 9, see also filter section at www.atos.com or KTF catalog

### Functional cover operating pressure
- Ports P, A, B, X, Z1, Z2: 420 bar

### MAIN CHARACTERISTICS, SEALS AND HYDRAULIC FLUID

#### Type of poppet:
- **52** = normally closed, only for LIDA;
- **62** = normally open without damping nose, only for LIDO;
- **63** = normally open with damping nose, only for LIDO

<table>
<thead>
<tr>
<th>Type of poppet</th>
<th>52</th>
<th>62</th>
<th>63</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating pressure</td>
<td>420 bar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal flow at Δp 5 bar (l/min)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Size 16</td>
<td>25</td>
<td>32</td>
</tr>
<tr>
<td>Functional sketch (Hydraulic symbol)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical section</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area ratio A:AP</td>
<td>1:1,1</td>
<td>1:1,1</td>
<td>1:1,1</td>
</tr>
<tr>
<td>Cracking pressure</td>
<td>Spring 1</td>
<td>0,3 bar</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1,5 bar</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>3 (1)</td>
<td>3 bar</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>6 bar</td>
<td>-</td>
</tr>
</tbody>
</table>

(1) Depending on the spring cracking pressure and the area ratio of the poppet

#### Assembly position / location
- Any position

#### Subplate surface finishing
- Roughness index Ra 0,4 - flatness ratio 0,01/100 (ISO 1101)

#### MTTFd values according to EN ISO 13849
- 150 years, for further details see technical table P007

#### Compliance
- RoHS Directive 2011/65/EU as last update by 2015/65/EU
- REACH Regulation (EC) n°1907/2006

#### Ambient temperature
- Standard execution = -30°C ÷ +70°C
- PE option = -20°C ÷ +70°C
- BT option = -40°C ÷ +70°C

#### Seals, recommended fluid temperature
- NBR seals (standard) = -20°C ÷ +80°C, with HFC hydraulic fluids = -20°C ÷ +50°C
- FKM seals (PE option) = -20°C ÷ +80°C
- HNBR seals (BT option) = -40°C ÷ +60°C, with HFC hydraulic fluids = -40°C ÷ +50°C

#### Recommended viscosity
- 15÷100 mm²/s - max allowed range 2.8 ÷ 500 mm²/s

#### Max fluid contamination level
- ISO4406 class 20/18/15 NAS1638 class 9, see also filter section at www.atos.com or KTF catalog

#### Hydraulic fluid
- Suitable seals type
- Classification
- Ref. Standard

<table>
<thead>
<tr>
<th>Mineral oils</th>
<th>NBR, FKM, HNBR</th>
<th>HL, HLP, HLPD, HVLP, HVLPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flame resistant without water</td>
<td>FKM</td>
<td>HFDU, HFDR</td>
</tr>
<tr>
<td>Flame resistant with water</td>
<td>NBR, HNBR</td>
<td>HFC</td>
</tr>
</tbody>
</table>

#### Flow direction
- As shown in the symbols of table 8

#### Functional cover operating pressure
- Ports P, A, B, X, Z1, Z2: 420 bar
10 QΔp DIAGRAMS based on mineral oil ISO VG 46 at 50°C

10.1 SC LI slip-in cartridges, poppet type 32, 33, 42, 43

size 16

size 25

size 32

size 40

size 50

size 63

size 80

size 100

High flow - series 40
1 = poppet type 32 and 33
2 = poppet type 42 and 43
10.2 SC LI slip-in cartridges, poppet type 52, 62, 63

Differential pressure A/B [bar] vs Flow [l/min]

Size 16

Size 25

Size 32

Size 40

Size 50

Note: For LIDA-80 and LIDA-100 the cover has round shape.
### LIDB

<table>
<thead>
<tr>
<th>Covers</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>J</th>
<th>K</th>
<th>Port Pp-Dr</th>
<th>Port Z1-Z2</th>
<th>Seals</th>
<th>Fastening bolts (2)</th>
<th>Tightening torque (Nm)</th>
<th>Mass (Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIDB-1</td>
<td>70</td>
<td>65</td>
<td>40</td>
<td>4</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4 OR-108</td>
<td>Nr. 4 M8x45</td>
<td>35</td>
<td>2.2</td>
</tr>
<tr>
<td>LIDB-2</td>
<td>85</td>
<td>85</td>
<td>40</td>
<td>6</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4 OR-108</td>
<td>Nr. 4 M12x45</td>
<td>125</td>
<td>2.6</td>
</tr>
<tr>
<td>LIDB-3</td>
<td>100</td>
<td>100</td>
<td>60</td>
<td>6</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4 OR-2043</td>
<td>Nr. 4 M16x55</td>
<td>300</td>
<td>3.1</td>
</tr>
<tr>
<td>LIDB-4</td>
<td>125</td>
<td>125</td>
<td>60</td>
<td>3.5</td>
<td>3.5</td>
<td>G 1/4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4 OR-3043</td>
<td>Nr. 4 M20x70</td>
<td>600</td>
<td>7</td>
</tr>
<tr>
<td>LIDB-5</td>
<td>140</td>
<td>140</td>
<td>70</td>
<td>3.5</td>
<td>3.5</td>
<td>G 1/4</td>
<td>G 1/4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4 OR-3043</td>
<td>Nr. 4 M20x80</td>
<td>600</td>
<td>10.1</td>
</tr>
<tr>
<td>LIDB-6</td>
<td>180</td>
<td>180</td>
<td>80</td>
<td>3.5</td>
<td>3.5</td>
<td>G 1/4</td>
<td>G 3/8</td>
<td>G 3/8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4 OR-3050</td>
<td>Nr. 4 M30x60</td>
<td>2100</td>
<td>17.9</td>
</tr>
</tbody>
</table>

(1) The position of external attachments Pp, Dr, Z1 and Z2 are inverted each others respect to the showed sketch
(2) Hexagon socket head screw according to DIN 912 class 12.9

### LIDR

<table>
<thead>
<tr>
<th>Covers</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>J</th>
<th>K</th>
<th>Port Pp-Dr</th>
<th>Port Z1-Z2</th>
<th>Seals</th>
<th>Fastening bolts (2)</th>
<th>Tightening torque (Nm)</th>
<th>Mass (Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIDR-1</td>
<td>70</td>
<td>65</td>
<td>40</td>
<td>3.3</td>
<td>4</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4 OR-108</td>
<td>Nr. 4 M8x45</td>
<td>35</td>
<td>2.5</td>
</tr>
<tr>
<td>LIDR-2</td>
<td>85</td>
<td>85</td>
<td>40</td>
<td>8</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4 OR-108</td>
<td>Nr. 4 M12x45</td>
<td>125</td>
<td>2.9</td>
</tr>
<tr>
<td>LIDR-3</td>
<td>100</td>
<td>100</td>
<td>50</td>
<td>6</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4 OR-2043</td>
<td>Nr. 4 M16x55</td>
<td>300</td>
<td>3.4</td>
</tr>
<tr>
<td>LIDR-4</td>
<td>125</td>
<td>125</td>
<td>60</td>
<td>3.5</td>
<td>3.5</td>
<td>G 1/4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4 OR-3043</td>
<td>Nr. 4 M20x70</td>
<td>600</td>
<td>7.3</td>
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<tr>
<td>LIDR-5</td>
<td>140</td>
<td>140</td>
<td>70</td>
<td>3.5</td>
<td>3.5</td>
<td>G 1/4</td>
<td>G 1/4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4 OR-3043</td>
<td>Nr. 4 M20x80</td>
<td>600</td>
<td>10.4</td>
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<tr>
<td>LIDR-6</td>
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<td>180</td>
<td>80</td>
<td>3.5</td>
<td>3.5</td>
<td>G 1/4</td>
<td>G 3/8</td>
<td>G 3/8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4 OR-3050</td>
<td>Nr. 4 M30x60</td>
<td>2100</td>
<td>18.3</td>
</tr>
</tbody>
</table>

(1) The position of external attachments Pp, Dr, Z1 and Z2 are inverted each others respect to the showed sketch
(2) Hexagon socket head screw according to DIN 912 class 12.9