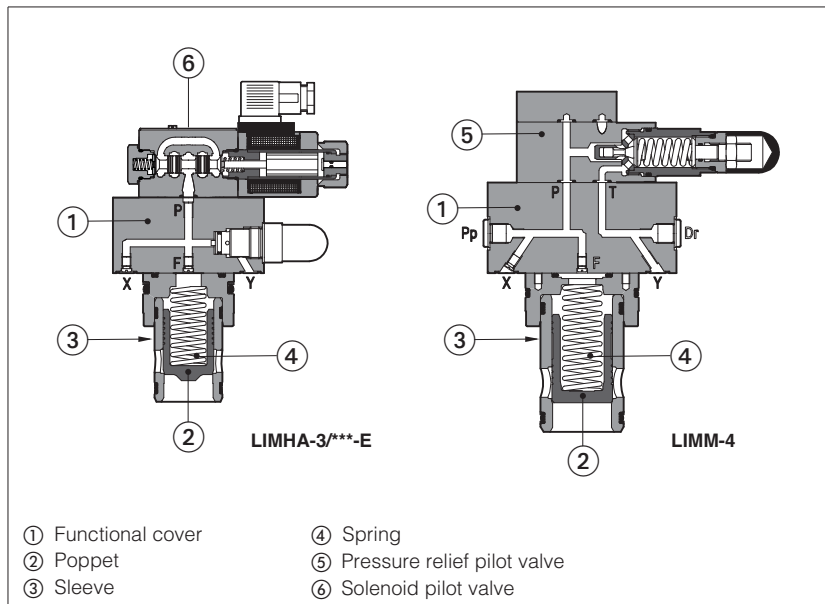


ISO cartridge valves type **LIM***, **LIRA**, **LIC***

Pressure controls: relief, reducing, compensator, ISO 7368 size from 16 to 80 - **Pmax 420 bar**



- ① Functional cover
- ② Poppet
- ③ Sleeve
- ④ Spring
- ⑤ Pressure relief pilot valve
- ⑥ Solenoid pilot valve

Pressure control valves in ISO cartridge design specific for relief, reducing or compensator functions

They are made by a functional cover ① and a 2-way **SC LI** slip-in cartridge.

Depending to the type of control, the cover is equipped with a pilot relief valve ⑤ for the max pressure regulation and a solenoid valve ⑥ for venting.

The SC LI slip-in cartridge is available with different poppet shape to optimize the pressure control, see section ④

It is made by a poppet ② sliding into a sleeve ③ and kept in normally closed position by the spring ④ available with different cracking pressure values.

Size: **16 to 80** (ISO 7368)

Max flow up to **5000 l/min** at $\Delta p = 5$ bar

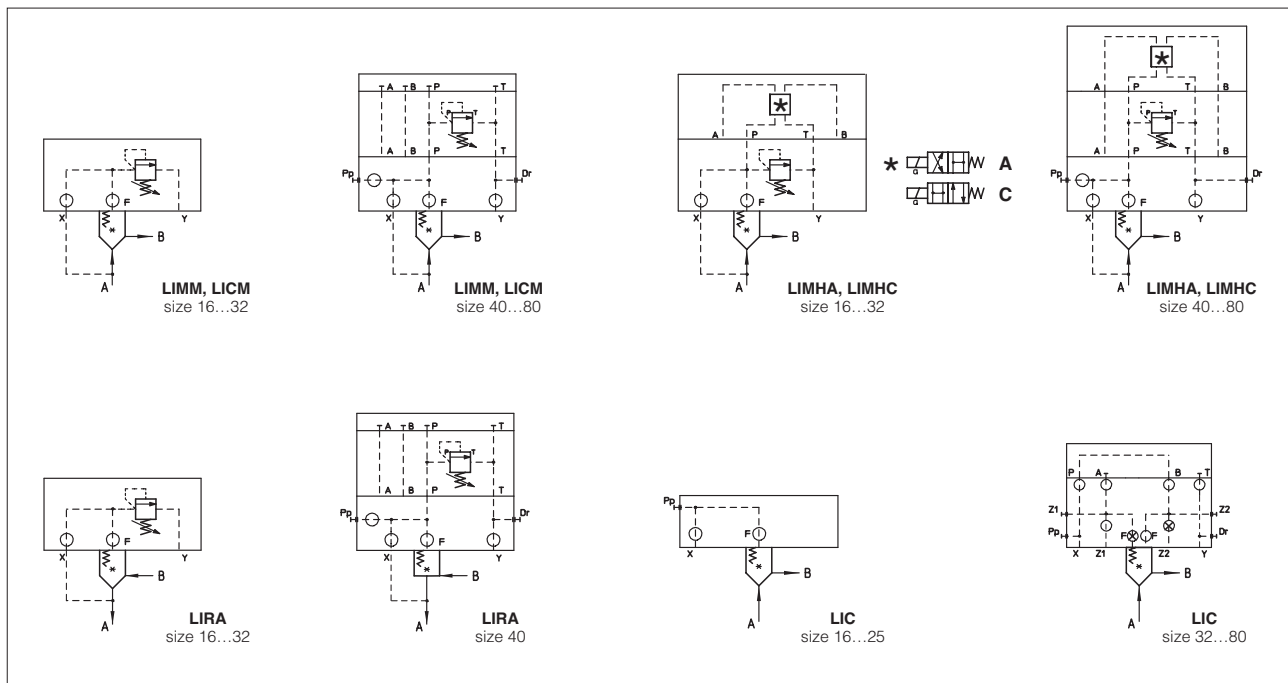
Max pressure: up to **420 bar**

1 MODEL CODE OF FUNCTIONAL COVERS - for model code of slip-in cartridge, see section ⑤

| | | | | | | | | | | | | | | | |
|--|------------|---|----------|---|------------|---|----------|---|----------|----------|--|-----------|---|----------|--|
| LI | MHA | - | 1 | / | 210 | / | V | - | I | X | 24DC | ** | / | * | F** |
| <p>Cover according to ISO 7368</p> <p>Function:</p> <p>MM = pressure relief control with manual setting;</p> <p>MHA = pressure relief control with solenoid valve for venting. Unloading when solenoid is deenergized;</p> <p>MHC = pressure relief control with solenoid valve for venting. Unloading when solenoid is energized;</p> <p>RA = pressure reducing control with manual setting. Open in resting position;</p> <p>C = pressure compensator to be coupled with flow control valves;</p> <p>CM = pressure compensator with mechanical max pressure regulation to be coupled with flow control valves.</p> <p>Size: 1 = 16; 2 = 25; 3 = 32; 4 = 40; 5 = 50; 6 = 63; 8 = 80</p> <p>LIRA is available only in size 16, 25, 32, 40</p> <p>Pressure range: 50 = 6 ÷ 50 bar; 100 = 8 ÷ 100 bar; 350 = 15 ÷ 350 bar; 210 = 10 ÷ 210 bar; 420 = 25 ÷ 420 bar (1)</p> | | | | | | | | | | | | | | | <p>Optional different setting of calibrated plugs in the pilot channels, see section ③, ④</p> <p>Seals material: - = NBR PE = FKM BT = HNBR</p> <p>Series number</p> |
| | | | | | | | | | | | Voltage code only for LIMHA and LIMHC, see section ⑨ | | | | |
| | | | | | | | | | | | Only for LIMHA and LIMHC | | | | |
| | | | | | | | | | | | X = without connector | | | | |
| | | | | | | | | | | | 00 = solenoid valve without coils (for -I) | | | | |
| | | | | | | | | | | | 00-AC = AC solenoid valve without coils (for E and EP) | | | | |
| | | | | | | | | | | | 00-DC = DC solenoid valve without coils (for E and EP) | | | | |
| | | | | | | | | | | | See tech. table K500 for available connectors, to be ordered separately | | | | |
| | | | | | | | | | | | Pilot solenoid valve only for LIMHA and LIMHC: | | | | |
| | | | | | | | | | | | I = DHI, Pmax 350 bar | | | | |
| | | | | | | | | | | | E = DHE, Pmax 350 bar | | | | |
| | | | | | | | | | | | EP = DHEP, Pmax 420 bar (1) | | | | |
| Options: see section ③ | | | | | | | | | | | | | | | |

(1) Pressure range 420 bar not available for LIMH*-I and LIMH*-E; LIMH*-EP is available only for pressure range 420 bar

2 HYDRAULIC SYMBOLS



3 OPTIONS

Only for LIMM (size 16...32):

/P = predisposed for ISO 4401 size 06 mounting surface

Handwheel for pressure control, only for LIMM, LIMH*, LIRA, LICM (see tech. table K150):

/V = regulating handwheel (available for all the sizes)

/VF = regulating knob (available only for sizes 40...80)

/VS = manual override with safety locking (available only for sizes 40...80)

/WV = prolonged manual override protected by rubber cap for pilot solenoid valve

For all the models:

******* = calibrated plugs different from standard one. The restrictors configuration (if different from the standard) must be indicated at the end of the model code:

LIMHA - **1** / **210** - **IX** **24DC** ******

F

Channel where the orifice has to be provided:
X = channel X
F = channel F

06

Size of the throttling hole in tenths of millimeters:
05 = 0,5 mm **10** = 1 mm
06 = 0,6 mm **12** = 1,2 mm
08 = 0,8 mm **15** = 1,5 mm

4 STANDARD ORIFICES CONFIGURATION

| Port \ Cover | Cover | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | LIM*-1 | LIRA-1 | LICM-1 | LIC-1 | LIM*-2 | LIRA-2 | LICM-2 | LIC-2 | LIM*-3 | LIRA-3 | LICM-3 | LIC-3 | LIM*-4 | LIRA-4 | LICM-4 | LIC-4 | LIM*-5 | LICM-5 | LIC-5 | LIM*-6 | LICM-6 | LIC-6 | LIM*-8 | LICM-8 | LIC-8 |
| X | M4 10A | M4 08A | M4 08A | - | M4 10A | M4 08A | M4 08A | - | M6 10A | M6 08A | M6 12A | M6 10A | M6 10A | M6 12A | M6 10A | M6 10A | M6 10A | M6 10A | M6 10A | M6 10A | M6 10A | M6 10A | M8 10A | M8 10A | M8 10A |
| F | M4 12F | M4 12A | M4 05F | M4 05F | M4 12F | M4 12A | M4 05F | M4 05F | M6 12F | M6 12A | M6 12F | M6 05F | M6 12F | M6 08A | M6 12F | M6 12F | M6 12F | M6 12F | M6 12F | M6 12F | M6 12F | M6 12F | M8 12F | M8 12F | M8 12F |

M4 + M8 = screw size; **10A + 12F** = calibrated orifice diameter in tenths of mm; **A** = short calibrated hole, **F** = long calibrated hole

5 MODEL CODE OF SLIP-IN CARTRIDGES

| | | | | | | |
|--|---|-----------|-----------|----------|---------------|---|
| SC LI | - | 16 | 31 | 2 | ** | /* |
| Cartridge according to ISO 7368 | | | | | Series number | Seals material: - = NBR PE = FKM BT = HNBR |
| Size , the same of relevant cover: 16 = 16; 32 = 32; 50 = 50; 80 = 80 25 = 25; 40 = 40; 63 = 63; | | | | | | |
| Type of poppet 31 = (sizes 16...80) = for LIMM, LIMH*, LIC, LICM 34 = (size 16) = for LIMM, LIMH* 35 = (sizes 16...50) = for LIMM, LIMH* 36 = (sizes 16...80) = for LIC, LICM 37 = (sizes 16...40) = for LIRA | | | | | | |
| Spring cracking pressure: 1 = 0,3 bar for poppet 35; 2 = 1,2 bar for poppet 31, 34, 35; 3 = 3 bar for poppet 31, 34, 35; 4 = 4 bar for poppet 37; 6 = 6 bar for poppet 31, 34, 35, 36; 7 = 7 bar for poppet 37 (not available for size 40); | | | | | | |

6 TYPE OF POPPET

| Type of poppet | 31 | 34 | 35 | 36 | 37 |
|---|----------------|------------|--------------|------------|------------|
| Operating pressure | 420 bar | | | | |
| Nominal flow Size 16 | 180 | 180 | 180 | 180 | 140 |
| at Δp 5bar | | | | | |
| (l/min) | 25 370 | - | 370 | 370 | 250 |
| see diagrams Q/ Δp at section ⑧ | 32 630 | - | 630 | 630 | 500 |
| | 40 1100 | - | 1100 | 1100 | 750 |
| | 50 1900 | - | 1900 | 1900 | - |
| | 63 3100 | - | - | 3100 | - |
| | 80 4900 | - | - | 4900 | - |
| Functional sketch (Hydraulic symbol) | | | | | |
| Typical section | | | | | |
| Area ratio A: AP | 1:1 | 1:1 | 1:1,1 | 1:1 | 1:1 |

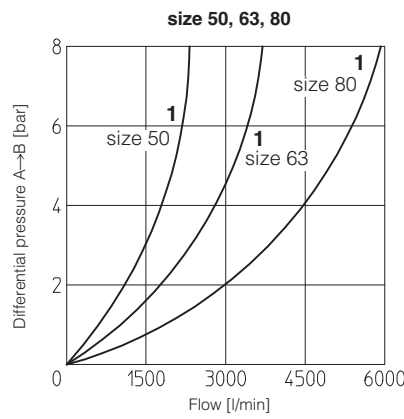
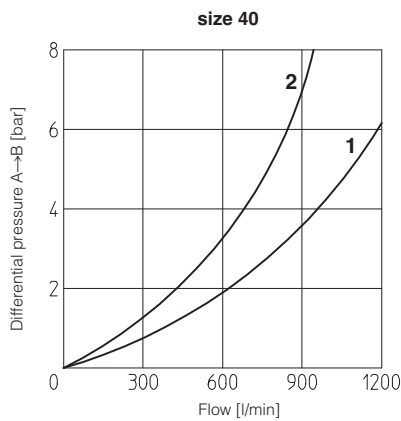
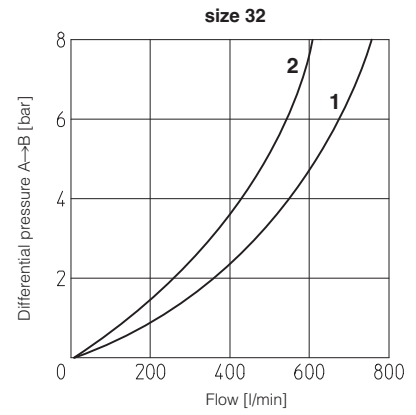
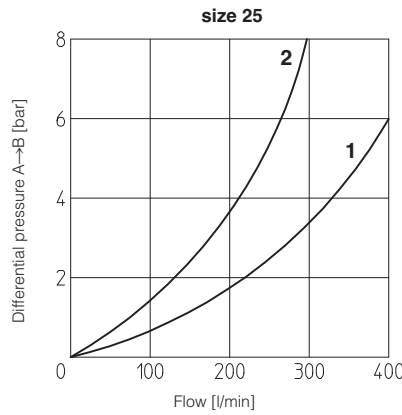
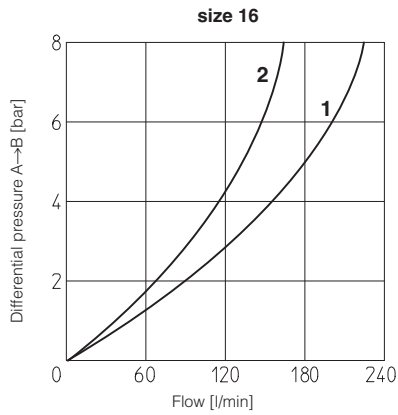
7 MAIN CHARACTERISTICS SEALS AND HYDRAULIC FLUIDS

| | | | |
|--|---|--|----------------------|
| 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 | | |
| 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 ÷ +60°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 mm ² /s - max allowed range 2.8 ÷ 500 mm ² /s | | |
| Fluid contamination class | ISO 4406 class 21/19/16 NAS 1638 class 10, in line filters of 25 µm (β ₂₅ ≥ 75 recommended) | | |
| Hydraulic fluid | Suitable seals type | Classification | Ref. Standard |
| Mineral oils | NBR, FKM, HNBR | HL, HLP, HLPD, HVLP, HVLPD | DIN 51524 |
| Flame resistant without water | FKM | HFDR, HFDR | ISO 12922 |
| Flame resistant with water | NBR, HNBR | HFC | |
| Flow direction | As shown in the symbols of table ② | | |
| Functional cover | all models except LIMH* | | |
| operating pressure | LIMH*-I | Ports A, B, X: 420 bar; Port T 120 bar | |
| | LIMH*-E | Ports A, B, X: 350 bar; Port T 210 bar for DC version; 160 bar for AC version | |
| | LIMH*-EP | Ports A, B, X: 420 bar; Port T 210 bar for DC version; 160 bar for AC version | |

7.1 Coils characteristics

| | |
|-----------------------------------|---|
| Insulation class | Pilot valve E, EP: H (180°C) for DC coils F (155°C) for AC coils Pilot valve I: H (180°C) for DC or AC coils Due to the occurring surface temperatures of the solenoid coils, the European standards EN ISO 13732-1 and EN ISO 4413 must be taken into account |
| Protection degree to DIN EN 60529 | IP 65 (with connectors 666, 667, 669 correctly assembled) |
| Relative duty factor | 100% |
| Supply voltage and frequency | See electric feature ⑧ |
| Supply voltage tolerance | ± 10% |
| Certification | cURus North American Standard |

8 FLOW / Δp DIAGRAMS based on mineral oil ISO VG 46 at 50 °C



1 = poppet type 31, 34, 35, 36
2 = poppet type 37

Note:

poppet type 34 only for size 16
poppet type 37 for size 16 to 50

9 ELECTRIC FEATURES

| Solenoid valve type | External supply nominal voltage $\pm 10\%$ (1) | | Voltage code | Type of connector | Power consumption (3) | Code of spare coil DHI | Colour of coil label DHI | Code of spare coil DHE, DHEP |
|---------------------|--|---|--|-------------------|---|---|--|---|
| DHI DHE DHEP | DC | 12 DC 24 DC 110 DC 220 DC | 12 DC 24 DC 110 DC 220 DC | 666 or 667 | 33 W (DHI) 30 W (DHE, DHEP) | COU-12DC COU-24DC COU-110DC COU-220DC | green red black black | COE-12DC COE-24DC COE-110DC COE-220DC |
| | AC | 110/50 AC (2) 115/60 AC 120/60 AC 230/50 AC (2) 230/60 AC | 110/50/60 AC 115/60 AC (5) 120/60 AC (6) 230/50/60 AC 230/60 AC | 666 or 667 | 60 VA (DHI) 58 VA (DHE, DHEP) (4) | COI-110/50/60AC - COI-120/60AC COI-230/50/60AC COI-230/60AC | yellow - white light blue silver | COE-110/50/60AC COE-115/60AC - COE-230/50/60AC COE-230/60AC |

(1) For other supply voltages available on request see technical tables E010, E015, TE030.

(2) Coil can be supplied also with 60 Hz of voltage frequency: in this case the performances are reduced by 10 ÷ 15% and the power consumption is 55 VA (DHI)

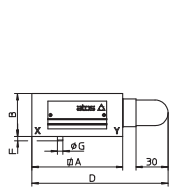
(3) Average values based on tests performed at nominal hydraulic condition and ambient/coil temperature of 20°C.

(4) When solenoid is energized, the inrush current is approx 3 times the holding current. Inrush current values correspond to a power consumption of about 150 VA.

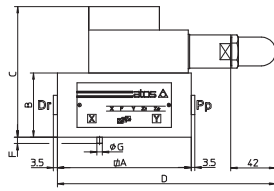
(5) Only for DHE, DHEP

(6) Only for DHI

10 COVER DIMENSIONS [mm] - for mounting interface and cavity dimensions see tech. table P006

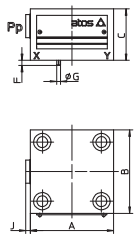


LIMM (size 16...32)
LIRA (size 16...32)
LICM (size 16...32)

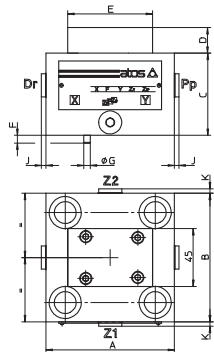


LIMM (size 40...80)
LIRA (size 40)
LICM (size 40...80)

| Covers | A | B | C | D | F | G | Port Pp-Dr | Seals | Fastening bolts (2) | Tightening torque [Nm] | Mass [Kg] |
|----------------------------|------|----|-----|-------|---|---|------------|-----------|---------------------|------------------------|-----------|
| LIMM-1 LIRA-1 LICM-1 | 65 | 40 | - | 107,5 | 4 | 3 | - | 2 OR 108 | Nr. 4 M8x45 | 35 | 1,7 |
| LIMM-2 LIRA-2 LICM-2 | 85 | 40 | - | 127,5 | 6 | 5 | - | 2 OR 108 | Nr. 4 M12x45 | 125 | 2,2 |
| LIMM-3 LIRA-3 LICM-3 | 100 | 50 | - | 142,5 | 6 | 5 | - | 2 OR 2043 | Nr. 4 M16x55 | 300 | 3,5 |
| LIMM-4 LIRA-4 LICM-4 | 125 | 60 | 122 | 195 | 6 | 5 | G 1/4 | 2 OR 3043 | Nr. 4 M20x70 | 600 | 8,9 |
| LIMM-5 LICM-5 | 140 | 70 | 132 | 202,5 | 4 | 6 | G 1/4 | 2 OR 3043 | Nr. 4 M20x80 | 600 | 12,4 |
| LIMM-6 LICM-6 | 180 | 80 | 142 | 222,5 | 4 | 6 | G 3/8 | 2 OR 3050 | Nr. 4 M30x90 | 2100 | 21,6 |
| LIMM-8 LICM-8 | Ø250 | 80 | 172 | 257,5 | 6 | 8 | G 3/8 | 2 OR 4075 | Nr. 8 M24x90 | 1000 | 30,5 |

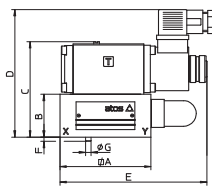


LIC (size 16 ÷ 25)

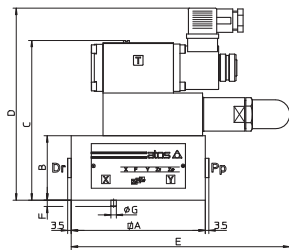


LIC (size 32...80)

| Covers | A | B | C | D | E | F | G | K | J | Port Pp-Dr | Port Z1-Z2 | Seals | Fastening bolts (2) | Tightening torque [Nm] | Mass [Kg] |
|--------|-------|-----|----|----|----|---|---|-----|-----|------------|------------|-----------|---------------------|------------------------|-----------|
| LIC-1 | 65 | 65 | 40 | - | - | 4 | 3 | - | 3,5 | G 1/4 | - | 2 OR 108 | Nr. 4 M8x45 | 35 | 1,4 |
| LIC-2 | 85 | 85 | 40 | - | - | 6 | 5 | - | 3,5 | G 1/4 | - | 2 OR 108 | Nr. 4 M12x45 | 125 | 1,8 |
| LIC-3 | 100 | 100 | 50 | 20 | 66 | 6 | 5 | - | 3,5 | G 1/4 | - | 4 OR 2043 | Nr. 4 M16x55 | 300 | 2,3 |
| LIC-4 | 125 | 125 | 60 | 20 | 66 | 6 | 5 | - | 3,5 | G 1/4 | - | 4 OR 3043 | Nr. 4 M20x70 | 600 | 6,2 |
| LIC-5 | 140 | 140 | 70 | 20 | 66 | 4 | 6 | 3,5 | 3,5 | G 1/4 | G 1/4 | 4 OR 3043 | Nr. 4 M20x80 | 600 | 9,3 |
| LIC-6 | 180 | 180 | 80 | 20 | 66 | 4 | 6 | 3,5 | 3,5 | G 3/8 | G 3/8 | 4 OR 3050 | Nr. 4 M30x90 | 2100 | 17,1 |
| LIC-8 | Ø 250 | - | 80 | 30 | 73 | 6 | 8 | - | 3,5 | G 3/8 | - | 4 OR 4075 | Nr. 8 M24x90 | 1000 | 27 |



LIMH* (size 16...32)



LIMH* (size 40...80)

| Covers | A | B | C max | D max | E | F | G | Port Pp-Dr | Seals | Fastening bolts (2) | Tightening torque [Nm] | Mass [Kg] |
|--------------------|--------|----|-------|-------|-------|---|---|------------|-----------|---------------------|------------------------|-----------|
| LIMHA-1 LIMHC-1 | 65 (1) | 40 | 87,5 | 123,5 | 124,5 | 4 | 3 | - | 2 OR 108 | Nr. 4 M8x45 | 35 | 3 |
| LIMHA-2 LIMHC-2 | 85 | 40 | 87,5 | 123,5 | 134,5 | 6 | 5 | - | 2 OR 108 | Nr. 4 M12x45 | 125 | 3,3 |
| LIMHA-3 LIMHC-3 | 100 | 50 | 130,5 | 153,5 | 142,5 | 6 | 5 | - | 2 OR 2043 | Nr. 4 M16x55 | 300 | 5 |
| LIMHA-4 LIMHC-4 | 125 | 60 | 150,5 | 183,5 | 195 | 6 | 5 | G 1/4 | 2 OR 3043 | Nr. 4 M20x70 | 600 | 9,2 |
| LIMHA-5 LIMHC-5 | 140 | 70 | 160,5 | 193,5 | 202,5 | 4 | 6 | G 1/4 | 2 OR 3043 | Nr. 4 M20x80 | 600 | 13,2 |
| LIMHA-6 LIMHC-6 | 180 | 80 | 170,5 | 203,5 | 222,5 | 4 | 6 | G 3/8 | 2 OR 3050 | Nr. 4 M30x90 | 2100 | 22,5 |
| LIMHA-8 LIMHC-8 | Ø 250 | 80 | 200,5 | 233,5 | 257,5 | 6 | 8 | G 3/8 | 2 OR 4075 | Nr. 8 M24x90 | 1000 | 31,3 |

(1) Cover is not squared: 65x80

(2) Hexagon socket head screw according to DIN 912 class 12.9

Overall dimensions refer to the pilot valves with connectors type 666