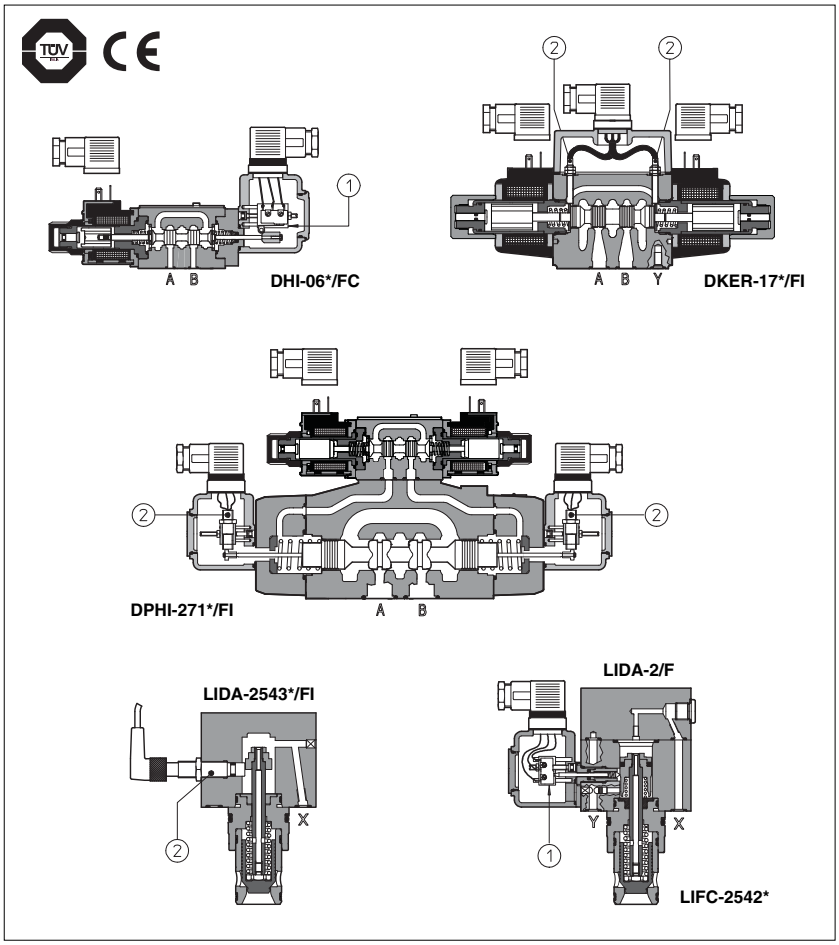
# **Safety valves** direct, pilot operated and cartridge execution
with mechanical microswitches or inductive proximity sensors
conforming to EN 982, EN 201, EN 422, EN 693, EN 12622




These valves are designed to fulfil the safety criteria imposed to machine manufacturers by the European Machine Directive.

In addition to the normal function they supplies an electrical on-off output signal indicating the position of the spool/poppet of the valve.

The safety function performed by the valve is to cut off the hydraulic power line in case of emergency condition, avoiding dangerous movements of the machines actuators. The spool position signal informs the machine controller about the "open" or "intercepted" status of the hydraulic line.

Two versions are provided:
- with mechanical microswitch ①;
- with inductive proximity sensor ②;
  see section [12] for technical characteristics.

These valves are available in direct, piloted and cartridge execution and they keep the same hydraulic and electric characteristics of standard products from which they are derived.

Classic example of application: on presses or on blow moulding machines the safety valves are used to shut off the fluid energy to one or more actuators as a consequence of the opening of a mechanical safety device ("gate") or as a consequence of an "emergency stop" command.

**The components shown on this technical table are CE marked and certified by TÜV,** in accordance with the technical safety requirements provided in the **Machine Directive 98/37/CE** but not included in the safety components of annex IV.

## [1] MODEL CODE OF DIRECTIONAL CONTROL SAFETY SOLENOID VALVES

| DHI | – | 0 | 63 | 1/2 | /A | FI | /NC | - | X | 24DC | ** | /* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

Type of solenoid valve
**DHI, DHU, DHO** = direct, size 06 (see tab. E010)
**DKE, DKER** = direct, size 10 (see tab E025)
**DPHI, DPHU** = piloted, size 16 and 25 (see tab.E080)
size 10 on request

Size ISO 4401
**0** = size 06
**1** = size 10
**2** = size 16
**3** = size 25

Valve configuration, see section [2]
**61** = single solenoid, central plus external position, spring centered
**63** = single solenoid, 2 external positions, spring offset
**67** = single solenoid, external plus central position, spring offset
**71** = double solenoid, 3 positions, spring centered
**75** = double solenoid, 2 external positions, with detent

Spool type, see section [2]

Options (WP not available for safety valves) (1)

Type of sensor
**FC** = mechanical microswitch - DH* and DKE* with mechanical microswitch are available only in single solenoid version
**FI** = inductive proximity sensor
**FIE** = (only for DH* and DKE*) external inductive proximity sensor available only for single solenoid version

Electrical signal (only for /FI and /FIE versions):
**/NC** = electric contact is closed when the valve is de-energized
**/NO** = electric contact is open when the valve is de-energized
For /FC version both the normally open contact and the normally closed contact are already available on the connector.

**X** = without solenoid connector, to be order separately (see tab. K500)

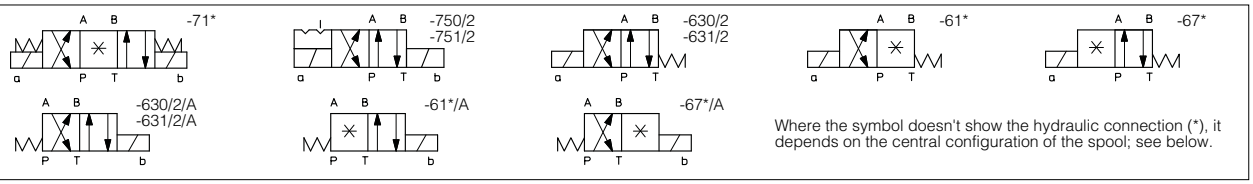
Voltage code, see section [11]

Series number

Synthetic fluids:
**WG** = water glycol
**PE** = phosphate ester

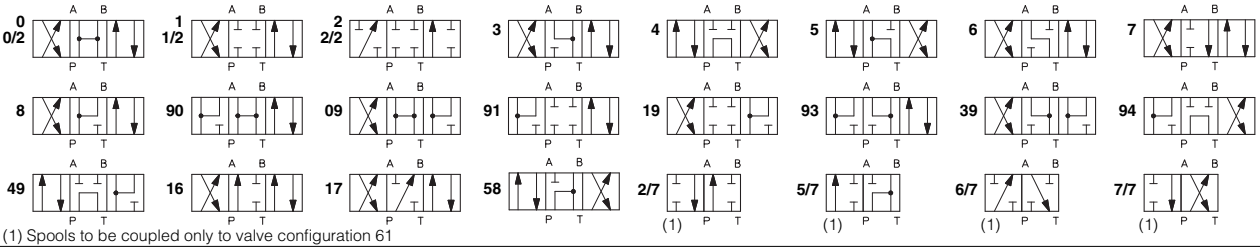
(1) See tab. E010 for DH*, tab. E025 for DKE*, tab. E080 for DPH*.

## 2 CONFIGURATION



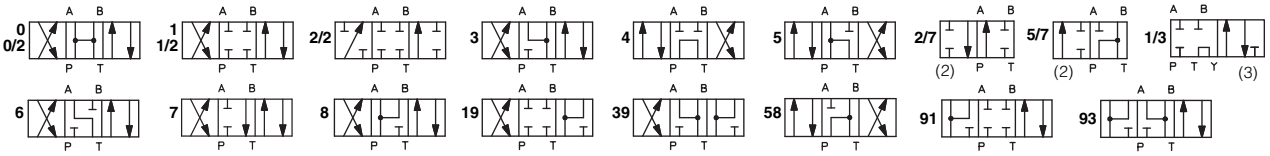

Where the symbol doesn't show the hydraulic connection (*), it depends on the central configuration of the spool; see below.

### Spools for DH* valves



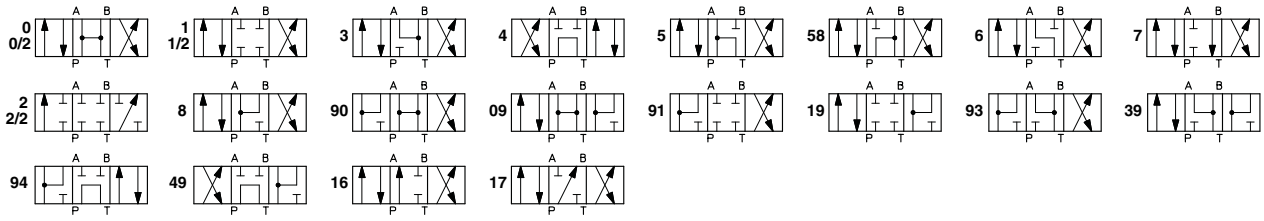

(1) Spools to be coupled only to valve configuration 61

### Spools for DKE* valves

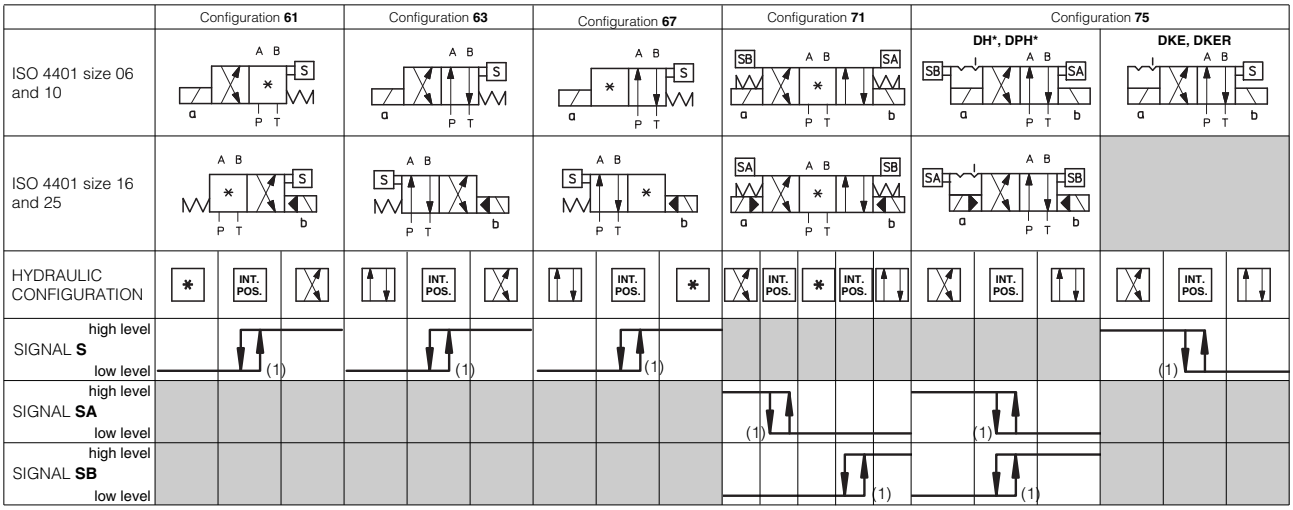



(2) Spools to be coupled only to valve configuration 63
(3) Only for execution DKE(R)-1611/3/A

### Spools for DPH* valves




## 3 STATUS OF OUTPUT SIGNAL FOR DIRECTIONAL VALVES WITH INDUCTIVE SENSORS TYPE /FI




Diagrams show the behaviour of the output signal for FI inductive sensors type NO. For FI inductive sensors type NC the behaviour is opposite (high level signal instead of low level signal and viceversa)

**(1) According the criteria of safety specifications, the spool position signal must change its status during the intermediate position between two hydraulic configurations.**

## 4 OPERATING LIMITS

Max pressure P port: **315 bar** (for DKE, DKER)
**350 bar** (for DH*, DPH*)

Max pressure T port: see next table

P/Q characteristics: DH see tab. E010, section 8
DK see tab. E025, section 8
DPH see tab. E080, section 9

**MAX PRESSURE T PORT** (bar), peaks included:

| | DH* | DKE* | DPH* |
|---|---|---|---|
| **/FC** | 20 | 20 (1) | 250 |
| **/FI** | 5 | 5 (1) | 250 |
| **/FIE** | 20 | 20 (1) | 250 |

(1) 315 bar if the Y drain port is connected to the tank

## 5 SAFETY VALVES IN CARTRIDGE EXECUTION (MADE BY INTERMEDIATE ELEMENT AND COVER)

### 5.1 MODEL CODE FOR INTERMEDIATE ELEMENT INCLUSIVE OF THE CARTRIDGE

**LIF I – 25 42 1 /NC ** /***

Intermediate element (with poppet position detector) including the cartridge

Type of sensor:
**C** = mechanical microswitch
**I** = inductive proximity sensor

Size (ISO 7368), the same of the cover (see section 21)
**16; 25; 32; 40; 50**
Other dimensions available on request

Type of poppet, see tab. H030 for Q/Δp diagrams
**42** = With damping nose, area ratio 1:1,1
**43** = With damping nose, area ratio 1:2 (for size 16 and 25)
1:1,6 (for size 32, 40 and 50)
normally closed, to be coupled with covers type LIDA, LIDB, LIDBH**, LIDEW* see section 5.2

Spring cracking pressure:
**1** = 0,3 bar for poppet 42; 0,6 bar for poppet 43
**2** = 1,5 bar for poppet 42
**3** = 3 bar for all poppets
**6** = 5,5 bar for all poppets

Only for LIFI:
**/NC** = closed contact with poppet in resting position

Series number

Synthetic fluid:
**WG** = water-glycol
**PE** = phosphate ester

**Note: in these safety valves the cartridge and the intermediate element with poppet position detector cannot be separated.**

### 5.2 COVER MODEL CODE

**LID A – 2 / F E -I X 24DC ** /* /***

Cover according to ISO 7368 to be coupled with LIFI or LIFC safety valves

Cover type, see section 6 for hydraulic configuration:
**A** = direct pilot
**B** = with shuttle valve for pilot selection;
**EW*** = with solenoid valve for pilot selection
**BH**** = as EW* but with shuttle valve for pilot selection;

Size
**1** = 16; **2** = 25; **3** = 32; **4** = 40; **5** = 50;
Other sizes available on request

**F** = prearranged for coupling with LIFI or LIFC cover, see section 6

**E** = with external attachment X (1/4" GAS) and underneath port X plugged

Type of pilot solenoid valve (only for LIDBH** and LIDEW*):
**-I** = DHI for AC and DC supply
**-O** = DHO for DC supply

Only for LIDBH** and LIDEW*:
**X** = without connector, to be order separately (See tab. K500)

Voltage code (only for LIDBH** and LIDEW*) see section 11

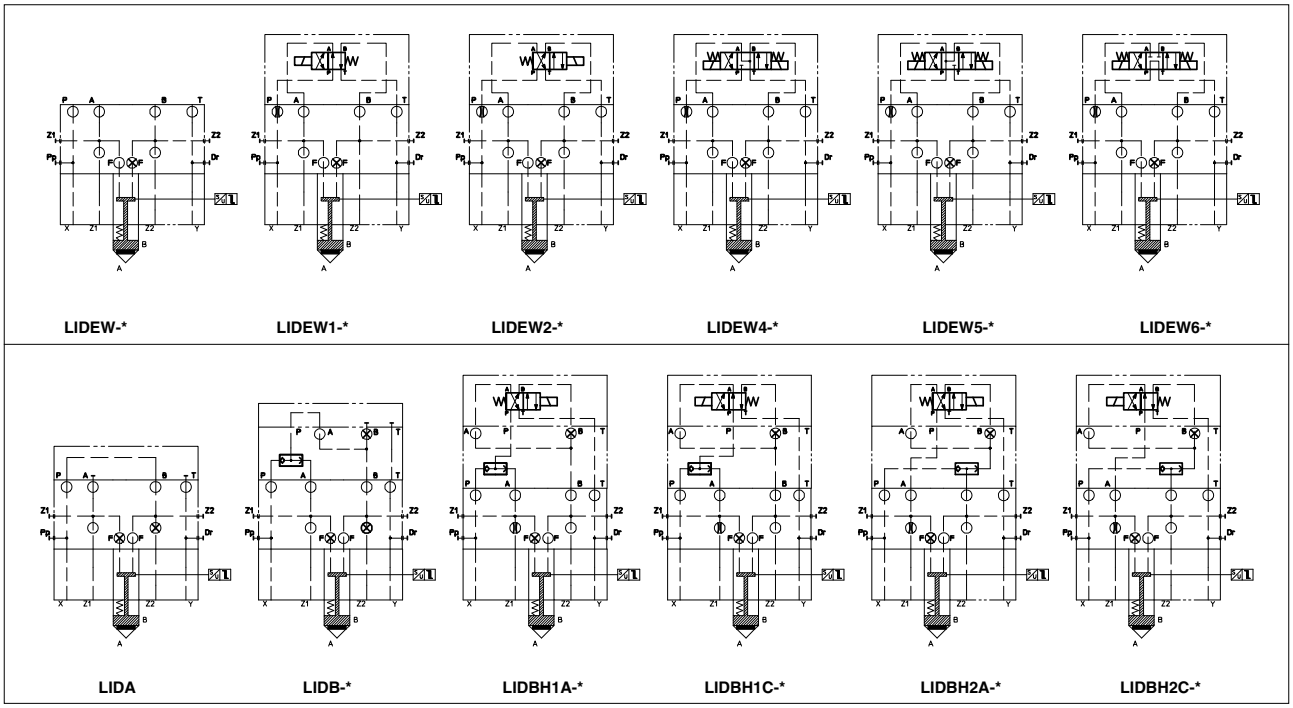
Series number

Synthetic fluid:
**WG** = water-glycol
**PE** = phosphate ester

Special execution of the calibrated plugs in the pilot channels (see tables H030, H040)

According to the machinery safety requirements, in particular applications at least two safety valves (redundancy) will be provided (the first one leak free type). For valve type LIDB, LIDEW (in the configuration with external pilot line) Atos can supply leak free poppet type directional pilot valves type DLOH-3*. Consult our technical office for detailed information.

## 6 HYDRAULIC SYMBOLS (the following symbols shown the covers function coupled with safety valve LIFI or LIFC)



**LIDEW-*** **LIDEW1-*** **LIDEW2-*** **LIDEW4-*** **LIDEW5-*** **LIDEW6-***

**LIDA** **LIDB-*** **LIDBH1A-*** **LIDBH1C-*** **LIDBH2A-*** **LIDBH2C-***

## 7 MODEL CODE OF SAFETY VALVES IN CARTRIDGE EXECUTION (INTEGRAL DESIGN COVER)

**LIDA H – 25 43 3 / FI / NC – IX 24DC ** /***

Safety cartridge valve according to ISO 7368

optional pilot valve :
- **-** = omit if not required
- **H** = with NG 6 pilot valve

size:
**16 25 32 40 50**

poppet type:
**43** = with damping nose, area ratio 1:2 (size 16 and 25)
1:1,6 (size 32,40 and 50)

spring cracking pressure:
- **1** = 0,6 bar
- **3** = 3 bar
- **6** = 5,5 bar

**FI** = inductive proximity sensor

**NC** = normally closed contact

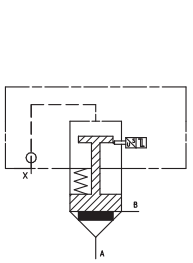
only for LIDAH:
**IX** = without solenoid connectors to be ordered separately
(See tab. K500)

only for LIDAH:
Voltage code see section 11

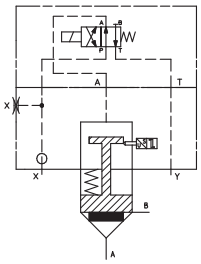
series number

sinthetic fluids:
- **WG** = water glycol
- **PE** = phosphate esters

## 8 HYDRAULIC SYMBOLS



**LIDA-**43/FI/NC**

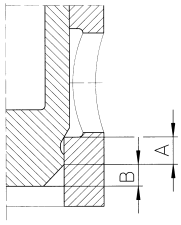


**LIDAH-**43/FI/NC**

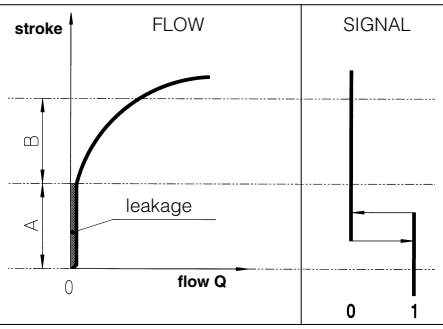
## 9 TECHNICAL CHARACTERISTIC

| Sizes | | 16 | 25 | 32 | 40 | 50 |
|---|---|---|---|---|---|---|
| Max flow (Δp = 6 bar) | [l/min] | 130 | 300 | 480 | 940 | 1500 |
| Max pressure | [bar] | 350 bar at ports A, B and X | | | | |

## 10 STATUS OF OUTPUT SIGNALS for cartridge valves (for LIFI, LIFC and LIDA*/FI)




A: overlapping stroke
B: damping stroke




According the criteria of safety specifications, the poppet position signal must change its status inside the overlapping stroke (before the effective valve opening).

## 11 VOLTAGE CODE

| Valve | External supply nominal voltage ± 10% | **Voltage code** | Type of connector | Power consumption |
|---|---|---|---|---|
| DHI<br>DHU<br>DPHI | 6 DC | **6 DC** | SP-666 or SP-667 | 33 W |
| | 9 DC | **9 DC** | | |
| | 12 DC | **12 DC** | | |
| | 14 DC | **14 DC** | | |
| | 18 DC | **18 DC** | | |
| | 24 DC | **24 DC** | | |
| | 28 DC | **28 DC** | | |
| | 48 DC | **48 DC** | | |
| | 110 DC | **110 DC** | | |
| | 125 DC | **125 DC** | | |
| | 220 DC | **220 DC** | | |
| DPHU<br>LIDAH<br>LIDEW<br>LIDBH | 24/50 AC<br>24/60 AC | **24/50/60 AC** | | 60 VA |
| | 48/50 AC<br>48/60 AC | **48/50/60 AC** | | |
| | 110/50 AC<br>120/60 AC | **110/50/60 AC**<br>**120/60 AC** | | |
| | 230/50 AC<br>230/60 AC | **230/50/60 AC**<br>**230/60 AC** | | |
| | 12 DC<br>24 DC | **6 DC**<br>**12 DC** | E-SE | 7 W |
| | 110/50 AC<br>120/60 AC | **110RC** | SP-669 | 40 VA<br>35 VA |
| | 230/50 AC<br>230/60 AC | **230RC** | | 40 VA<br>35 VA |

| Valve | External supply nominal voltage ± 10% | **Voltage code** | Type of connector | Power consumption |
|---|---|---|---|---|
| DHO | 12 DC | **12 DC** | SP-666 or SP-667 | 32 W |
| | 24 DC | **24 DC** | | |
| | 110 DC | **110 DC** | | 40W |
| | 220 DC | **220 DC** | | |

| Valve | External supply nominal voltage ± 10% | **Voltage code** | Type of connector | Power consumption |
|---|---|---|---|---|
| DKE<br>DKER | 12 DC | **12 DC** | SP-666 or SP-667 | 36 W (DKE)<br>39W (DKER) |
| | 24 DC | **24 DC** | | |
| | 110 DC | **110 DC** | | |
| | 220 DC | **220 DC** | | |
| | 110/50/60 AC | **110/50/60 AC** | | 85 VA (DKE)<br>105 VA (DKER) |
| | 230/50/60 AC | **230/50/60 AC** | | |
| | 110/50/60 AC | **110/50/60 AC** | SP-669 | 36 W (DKE)<br>39 W (DKER) |
| | 230/50/60 AC | **230/50/60 AC** | | |

## 12 TECHNICAL CHARACTERISTICS OF INDUCTIVE PROXIMITY SENSORS AND MECHANICAL MICROSWITCHES

| INDUCTIVE PROXIMITY SENSORS (/FI, /FIE) | | | | | |
|---|---|---|---|---|---|
| Type of valves | | DH* | DKE* | DPH* | LIFI |
| Supply voltage | [V] | 10÷30 | | 10÷30 | 10÷30 |
| Ripple max | [%] | 10 | | 10 | 15 |
| Max current | [mA] | 100 | | 100 | 100 |
| Power consumption | [mA] | 10 | | 8 | 8 |
| Voltage drop | [V] | 1,8 | | 3 | 3 |
| Max switching frequency | [Hz] | 1500 | | 1500 | 1000 |
| Max peak pressure | [bar] | 20 | | 8 | 350 |
| Mechanical life | | infinite | | | |

| MECHANICAL MICROSWITCHES (/FC) | | | | |
|---|---|---|---|---|
| | | | With resistive load | With inductive load |
| Max switching power | AC | 125 V | 5 A | 5 A |
| | | 250 V | 5 A | 5 A |
| | DC | 30 V | 5 A | 3 A |
| | | 50 V | 1 A | 1 A |
| | | 125 V | 0,5 A | 0,03 A |
| | | 250V | 0,25 A | 0,03 A |
| Mechanical life | Min 100 millions cicles | | | |

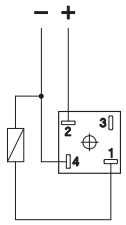
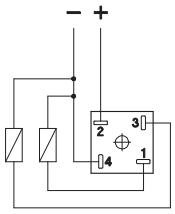
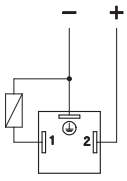
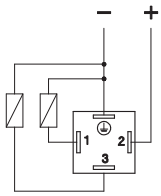
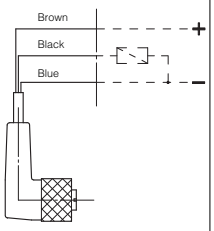
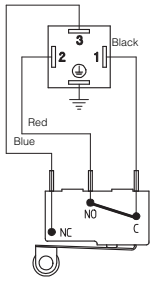
## 13 CONNECTORS FOR INDUCTIVE PROXIMITY SENSORS AND MECHANICAL MICROSWITCHES

The connector for proximity sensor and mechanical microswitches are always supplied with the valves

| VALVE TYPE | CONNECTOR TYPE | VALVE TYPE | CONNECTOR TYPE |
|---|---|---|---|
| **DH*/FI** | **SP-345** | **DKE*/FC** | **SP-666** |
| **DH*/FIE** | **SP-666** | **DPH*/FI** | **SP-666** |
| **DH*/FC** | **SP-666** | **DPH*/FC** | **SP-666** |
| **DKE*/FI** | **SP-666** (single solenoid) **SP-664** (double solenoid) | **LIFI, LIDA*/FI** | Special connector with 3m molded cable (included) |
| **DKE*/FIE** | **SP-666** | **LIFC** | **SP-666** |

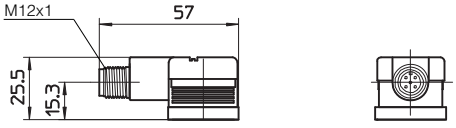
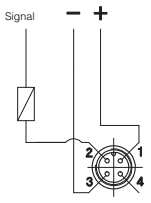
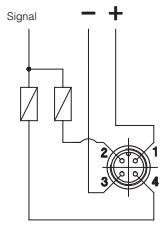
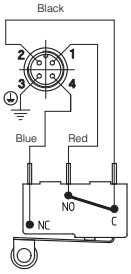
**NOTE:** valve type DKE*/FI double solenoid, configuration 75, use connector **SP-666**

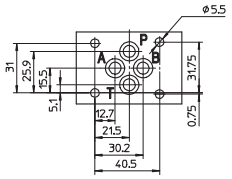
## 14 CONNECTING SCHEMES OF INDUCTIVE PROXIMITY SENSORS AND MECHANICAL MICROSWITCHES

| VERSIONS WITH INDUCTIVE PROXIMITY (/FI, /FIE) | | | | | ALL VALVES WITH MECHANICAL MICROSWITCH (/FC) |
|---|---|---|---|---|---|
| **DH*/FI** single solenoid | **DH*/FI** double solenoid | **DH*/FIE; DKE*/FIE** **DKE*/FI** single solenoid **DPH*-2/FI** **DPH*-3/FI** single and double solenoid | **DKE*/FI** double solenoid | **LIFI** **LIDA*/FI** | |
| Connector type **SP-345** | Connector type **SP-345** | Connector type **SP-666** | Connector type **SP-664** | | Connector type **SP-664** The drawing shows the switch in closed position |
|  |  |  |  |  |  |
| 1 = output signal S<br>2 = supply +24 Vdc<br>3 = not connected<br>4 = GND | 1 = output signal SA<br>2 = supply +24 Vdc<br>3 = output signal SB<br>4 = GND | 1 = output signal S<br>2 = supply +24 Vdc<br>⊕ = GND | 1 = output signal SA<br>2 = supply +24 Vdc<br>3 = output signal SB<br>⊕ = GND | black = output signal<br>brown = supply +24 Vdc<br>blue = GND<br>CABLE LENGHT = 3 m | 1 = common (C)<br>2 = normally open contact (NO)<br>3 = normally closed contact (NC)<br>⊕ = EARTH |

For the signal status see section 3 and section 10

## 15 OPTIONAL CONNECTOR TYPE SP-666/M12 the connector has to be ordered separately

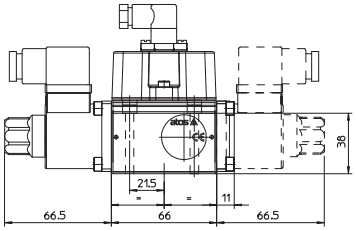
| Optional connector type **SP-666/M12** | CONNECTING SCHEMES | | |
|---|---|---|---|
| | VERSIONS WITH INDUCTIVE PROXIMITY (/FI, /FIE) | | ALL VALVES WITH MECHANICAL MICROSWITCH (/FC) |
| | **DH*/FIE** **DKE*/FI** single solenoid **DPH*-2/FI** **DPH*-3/FI** single and double solenoid | **DKE*/FI** double solenoid | |
| The optional connector type SP-666/M12 provides the standard interface DIN 43650 for connection to sensor type /FI, FC or FIE and the M12 standard interface to the user side. | | | The drawing shows the switch in closed position |
|  |  |  |  |
| | 1 = supply +24 Vdc<br>2 = output signal S<br>3 = supply GND<br>4 = not connected | 1 = supply +24 Vdc<br>2 = output signal SA<br>3 = supply GND<br>4 = output signal SB | 1 = normally open contact (NO)<br>2 = common (C)<br>3 = EARTH<br>4 = normally closed contact (NC) |




**ISO 4401: 2005**
**Mounting surface: 4401-03-02-0-05**
Fastening bolts:
4 socket head screws M5x50 class 12.9
Tightening torque = 8 Nm
Seals: 4 OR 108
Ports P,A,B,T: Ø = 7.5 mm (max).

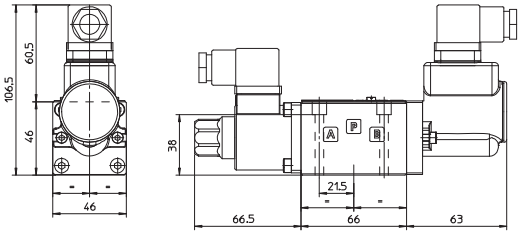
**P** = PRESSURE PORT
**A, B** = USE PORT
**T** = TANK PORT
For the max pressures on ports, see section 4

**DHI-*/FI**



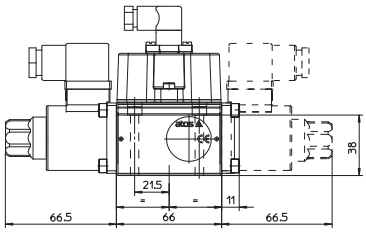

Mass:
kg 1,6 (one solenoid)
kg 1,9 (two solenoids)

**DHI-*/FC**
**DHI-*/FIE**



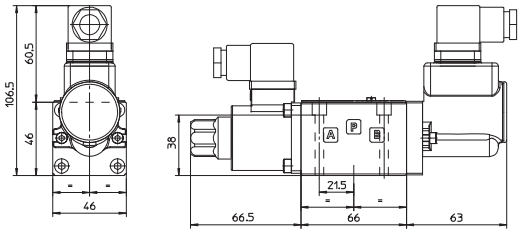

Mass: kg 1,6

**DHU-*/FI**



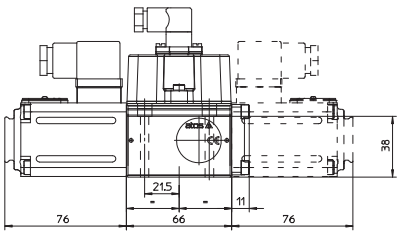

Mass:
kg 1,6 (one solenoid)
kg 1,9 (two solenoids)

**DHU-*/FC**
**DHU-*/FIE**



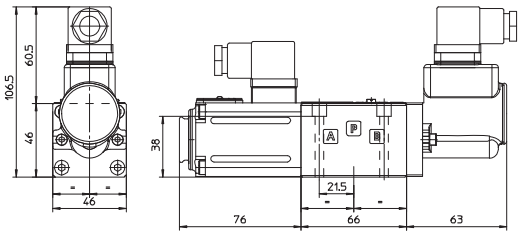

Mass: kg 1,6

**DHO-*/FI**



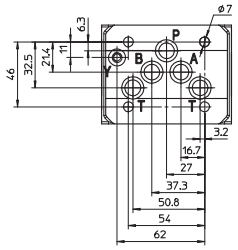

Mass:
kg 2 (one solenoid)
kg 2,7 (two solenoids)

**DHO-*/FC**
**DHO-*/FIE**




Mass: kg 2

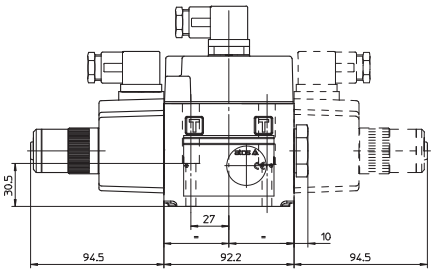
## 17 DKE*-*/FI, /FC and /FIE DIMENSIONS [mm]

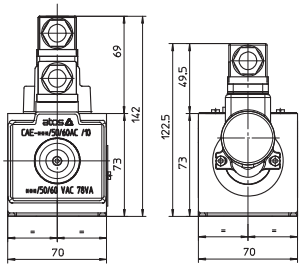



**ISO 4401: 2005**
**Mounting surface: 4401-05-05-0-05**
**(without port X)**
Fastening bolts:
4 socket head screws M6x40 class 12.9
Tightening torque = 15 Nm
Seals: 5 OR 2050. 1 OR 108
Ports P,A,B,T: Ø = 11.5 mm (max)
Ports Y: Ø = 5 mm

**P** = PRESSURE PORT
**A, B** = USE PORT
**T** = TANK PORT
**Y** = DRAIN PORT
For the max pressures on ports, see section 4

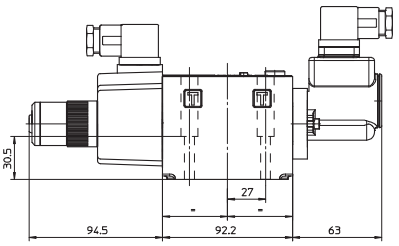
**DKE-*/FI-AC**



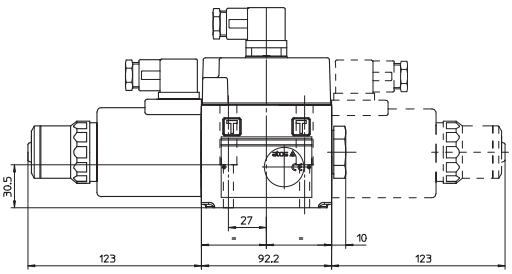

Mass:
kg 3,7 (one solenoid)
kg 4,4 (two solenoids)

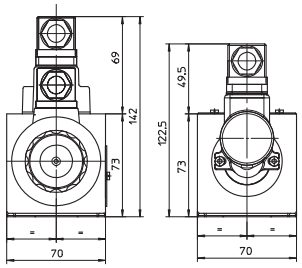
**DKE-*/FC-AC**
**DKE-*/FIE-AC**




Mass: kg 3,9

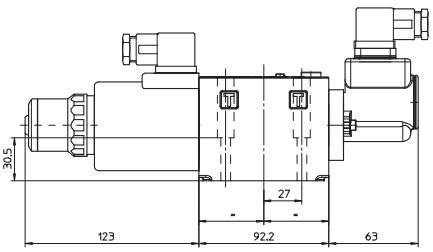
**DKE-*/FI-DC**



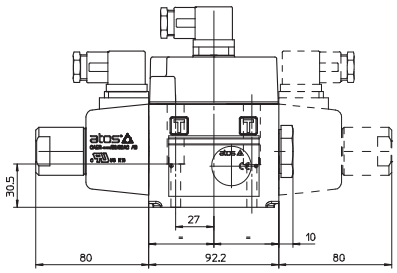

Mass:
kg 4,3 (one solenoid)
kg 5,8 (two solenoids)

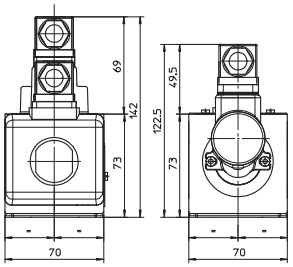
**DKE-*/FC-DC**
**DKE-*/FIE-DC**




Mass: kg 4,3

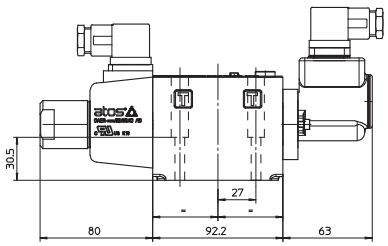
**DKER-*/FI-AC**



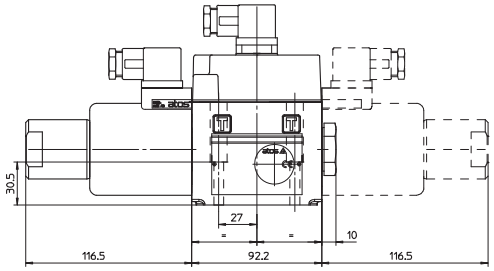

Mass:
kg 3,7 (one solenoid)
kg 4,4 (two solenoids)

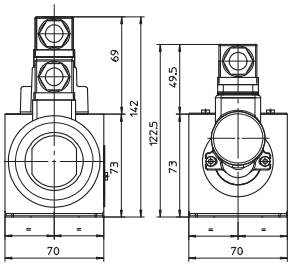
**DKER-*/FC-AC**
**DKER-*/FIE-AC**




Mass: kg 3,7

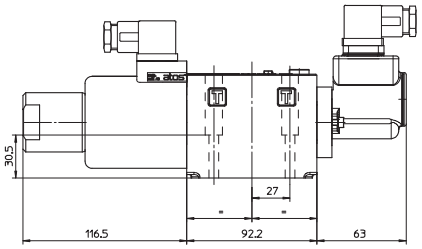
**DKER-*/FI-DC**



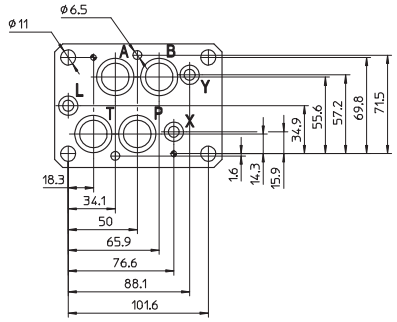




Mass:
kg 4,5 (one solenoid)
kg 6,0 (two solenoids)

**DKER-*/FC-DC**
**DKER-*/FIE-DC**




Mass: kg 4,5

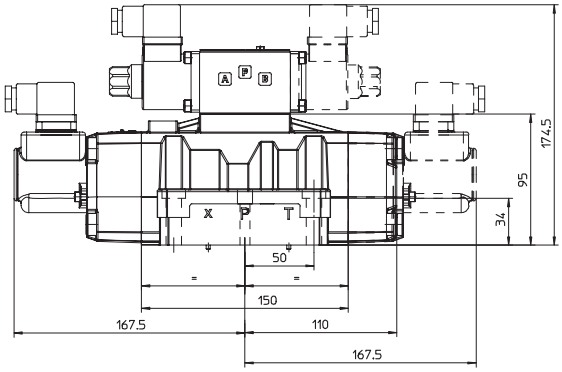


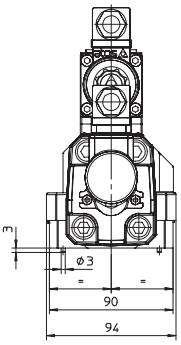

**DPH*-2***
**ISO 4401: 2005**
**Mounting surface: 4401-07-07-0-05**

Fastening bolts:
4 socket head screws M10x50 class 12.9
Tightening torque = 70 Nm
2 socket head screws M6x40 class 12.9
Tightening torque = 15 Nm
Diameter of ports A, B, P, T: Ø = 20 mm;
Diameter of ports X, Y: Ø = 7 mm;
Diameter of ports L: Ø = 5 mm;
Seals: 4 OR 130, 3 OR 109/70

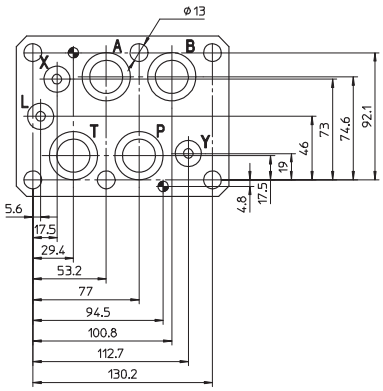
**P** = PRESSURE PORT
**A, B** = USE PORT
**T** = TANK PORT
**X** = EXTERNAL OIL PILOT PORT
**Y** = DRAIN PORT
For the max pressures on ports, see section 4

**DPH*-2*/FI**
**DPH*-2/FC**




Mass:
kg 9,6 (one solenoid)
kg 10,3 (two solenoids)

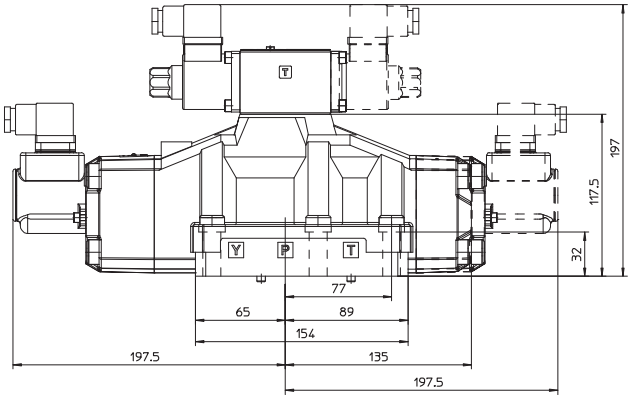


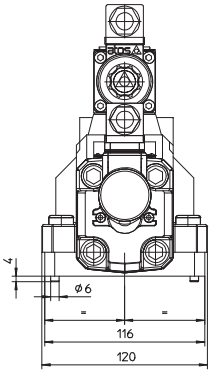

**DPH*-3***
**ISO 4401: 2005**
**Mounting surface: 4401-08-08-0-05**

Fastening bolts:
6 socket head screws M12x50 class 12.9
Tightening torque = 125 Nm
Diameter of ports A, B, P, T: Ø = 24 mm;
Diameter of ports X, Y: Ø = 7 mm;
Diameter of port L: Ø = 5 mm;
Seals: 4 OR 4112, 3 OR 3056

**P** = PRESSURE PORT
**A, B** = USE PORT
**T** = TANK PORT
**X** = EXTERNAL OIL PILOT PORT
**Y** = DRAIN PORT
**L** = NOT USED
For the max pressures on ports, see section 4

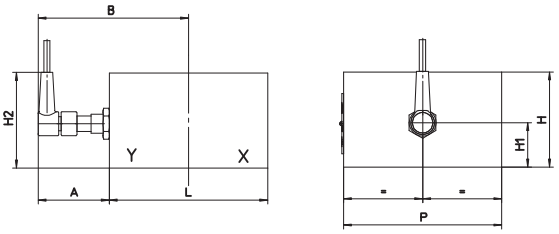
**DPH*-3/FI**
**DPH*-3/FC**



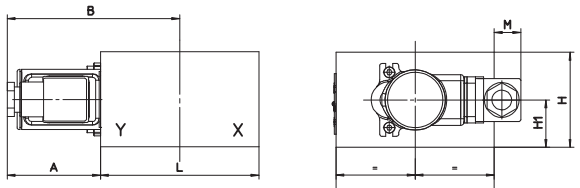

Mass:
kg 14,6 (one solenoid)
kg 15,3 (two solenoids)

## 19 LIFI AND LIFC DIMENSIONS [mm]



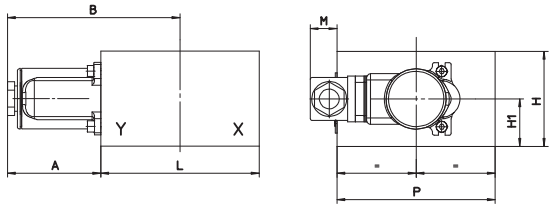

**LIFI-16**
**LIFI-25**
**LIFI-32**
**LIFI-40**
**LIFI-50**

| | A | B | H | H1 | H2 | L | P |
|---|---|---|---|---|---|---|---|
| **LIFI-16** | 54,5 | 94 | 50 | 25 | 56 | 72 | 65 |
| **LIFI-25** | 54,5 | 97 | 55 | 28 | 59 | 85 | 85 |
| **LIFI-32** | 47 | 97 | 60 | 28 | 59 | 100 | 100 |
| **LIFI-40** | 41 | 103,5 | 60 | 30 | 61 | 125 | 125 |
| **LIFI-50** | 44 | 114 | 70 | 30 | 61 | 140 | 140 |



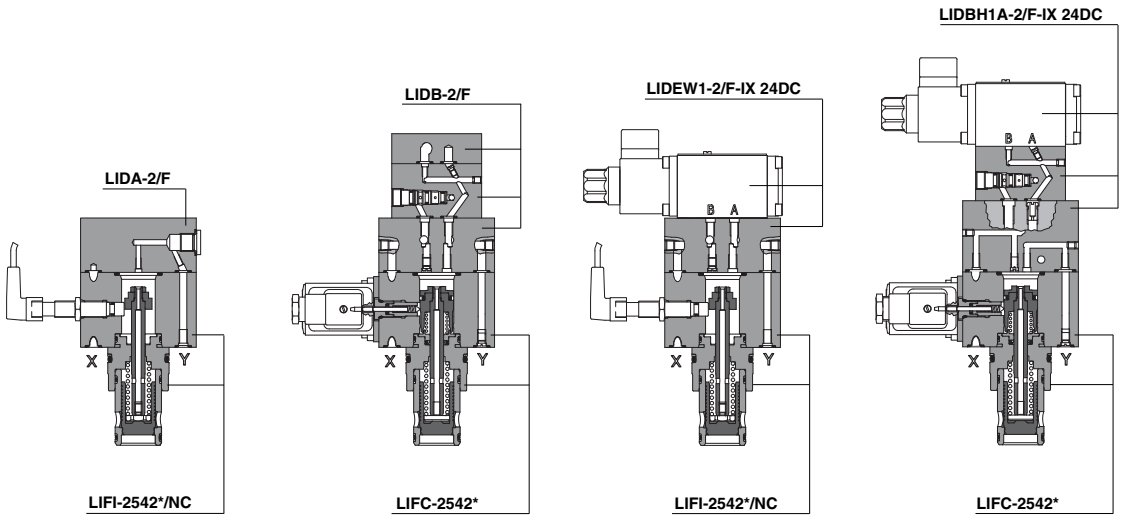

**LIFC-16**
**LIFC-25**

| | A | B | H | H1 | L | M | P |
|---|---|---|---|---|---|---|---|
| **LIFC-16** | 64 | 103,5 | 50 | 25 | 72 | 37 | 65 |
| **LIFC-25** | 64 | 106,5 | 55 | 28 | 85 | 27 | 85 |
| **LIFC-32** | 64 | 114 | 60 | 28 | 100 | 19 | 100 |
| **LIFC-40** | 64 | 126,5 | 60 | 30 | 125 | 6,5 | 125 |
| **LIFC-50** | 64 | 134 | 70 | 30 | 140 | / | 140 |

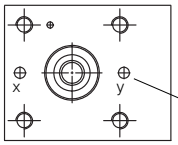



**LIFC-32**
**LIFC-40**
**LIFC-50**

## 20 EXEMPLES OF LIFI AND LIFC COUPLED WITH OTHER COVERS (examples with cartridges size 25)

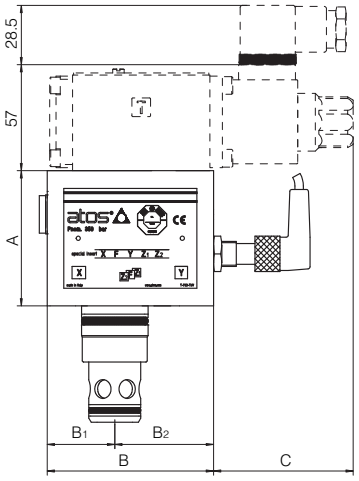


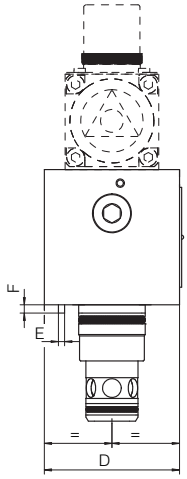
## 21 LIDA*/FI DIMENSIONS [mm]




Cover interface of LIDA-*/FI and LIDAH-*/FI
**UNI ISO 7368**
For dimensions of cover interface and cartridge recess, see section 22

Y port only for LIDAH-*/FI



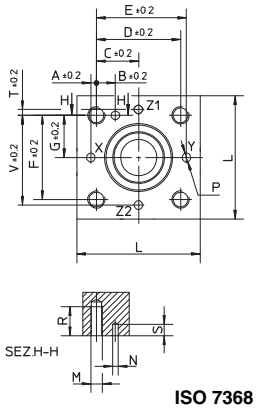




**LIDA-*/FI**

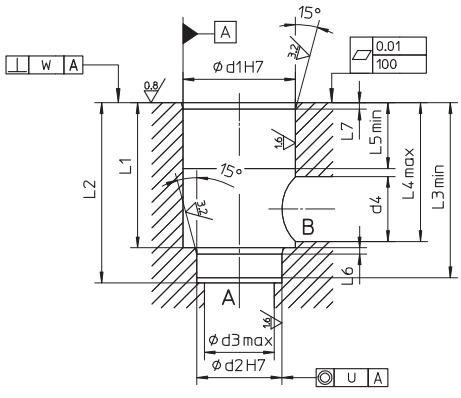
**LIDAH-*/FI** (dotted line)

| Size | A | B | B1 | B2 | C | D | E | F | Seal (for LIDA) | Seal (for LIDAH) | Fastening bolts | Tightening torque (Nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **16** | 65 | 80 | 32.5 | 47.5 | 54.5 | 65 | 3 | 4 | 1 OR 108 | 2 OR 108 | 4 M8x60 | 35 |
| **25** | 70 | 85 | 42.5 | 42.5 | 62.5 | 85 | 5 | 4 | 1 OR 108 | 2 OR 108 | 4 M12x60 | 125 |
| **32** | 75 | 100 | 50 | 50 | 55 | 100 | 5 | 6 | 1 OR 2043 | 2 OR 2043 | 4 M16x70 | 300 |
| **40** | 75 | 125 | 62.5 | 62.5 | 49 | 125 | 5 | 6 | 1 OR 2050 | 2 OR 2050 | 4 M20x80 | 600 |
| **50** | 80 | 140 | 70 | 70 | 52 | 140 | 6 | 4 | 1 OR 2050 | 2 OR 2050 | 4 M20x90 | 600 |

## 22 COVER INTERFACE AND RECESS DIMENSIONS [mm]




**ISO 7368**




**ISO 7368**

| COVER INTERFACE | | | | | | | | | | | | | | RECESS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Size** | A | B | C | D | E | F | G | L | M | Ø N | $P_{max}$ | R | S min | ød1 | ød2 | ød3 | ød4 | L1 | L2 | L3 | L4 | L5 | L6 | L7 | U | W |
| **16** | 2 | 12.5 | 23 | 46 | 48 | 46 | 23 | 65 | M8 | 4 | 4 | 20 | 6 | 32 | 25 | 16 | 16 | $43^{+0.1}_{0}$ | $56^{+0.1}_{0}$ | 54 | 42,5 | 20 | 2 | 2 | 0,03 | 0,05 |
| **25** | 4 | 13 | 29 | 58 | 62 | 58 | 29 | 85 | M12 | 6 | 6 | 30 | 8 | 45 | 34 | 25 | 25 | $58^{+0.1}_{0}$ | $72^{+0.1}_{0}$ | 70 | 57 | 30 | 2,5 | 2,5 | 0,03 | 0,05 |
| **32** | 6 | 18 | 35 | 70 | 76 | 70 | 35 | 102 | M16 | 6 | 8 | 38 | 8 | 60 | 45 | 32 | 32 | $70^{+0.1}_{0}$ | $85^{+0.1}_{0}$ | 83 | 68,5 | 30 | 2,5 | 2,5 | 0,03 | 0,1 |
| **40** | 7,5 | 19.5 | 42.5 | 85 | 92.5 | 85 | 42,5 | 125 | M20 | 6 | 10 | 46 | 8 | 75 | 55 | 40 | 40 | $87^{+0.1}_{0}$ | $105^{+0.1}_{0}$ | 102 | 84,5 | 30 | 3 | 3 | 0,05 | 0,1 |
| **50** | 8 | 20 | 50 | 100 | 108 | 100 | 50 | 140 | M20 | 8 | 10 | 46 | 8 | 90 | 68 | 50 | 50 | $100^{+0.1}_{0}$ | $122^{+0.1}_{0}$ | 117 | 97,5 | 35 | 3 | 4 | 0,05 | 0,1 |