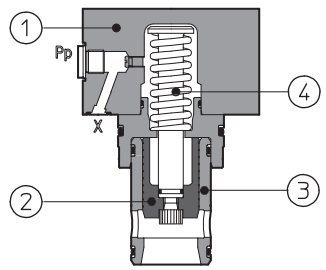
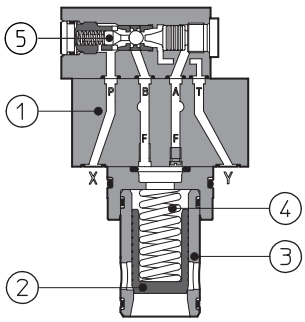
ISO cartridge valves type LID*

Check function, high flow, **Pmax 420 bar**



LIDO-3



LIDR-3

① Functional cover
② Poppet
③ Sleeve
④ Spring
⑤ Pilot operated check valve

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**

1 **MODEL CODE OF FUNCTIONAL COVERS** - for model code of slip-in cartridge, see section 5, 7

LI	D	A	-	1	/	*	**	/	**	*

LI: Cover according to ISO 7368

D = directional function

Cover configuration see section 2:
A = normally closed
O = normally open
B = normally closed, with shuttle valve for pilot selection
R = normally closed, with hydraulically operated pilot check valve for bidirectional flow **(1)**

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

Options: see section 3

Series number

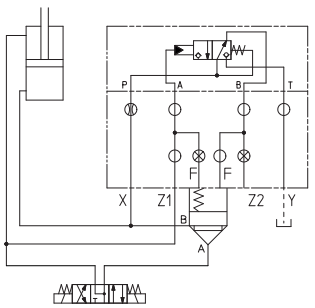
Seals material:
- = NBR
PE = FKM
BT = HNBR

Optional different setting of calibrated plugs in the pilot channels, see section 3, 4

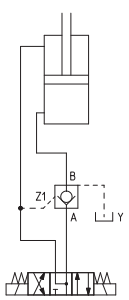
(1) LIDR functional cover operates as normally closed check valve with pilot control for bidirectional flow - see the below functional scheme as reference.
Free flow is normally permitted from A to B and blocked form B to A by the pressure on X pilot port
The flow from B to A is permitted by opening the valve though the pressure on pilot port Z1
Piloting ratio Z1 : X = 1 : 2.75

LIDR functional scheme

Functional scheme

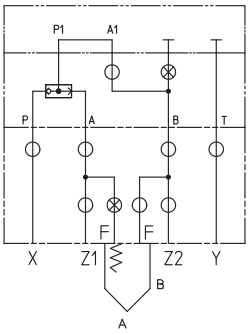


Simplified scheme

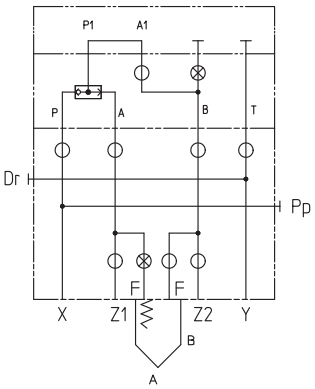


2 HYDRAULIC SYMBOLS (cover configuration)

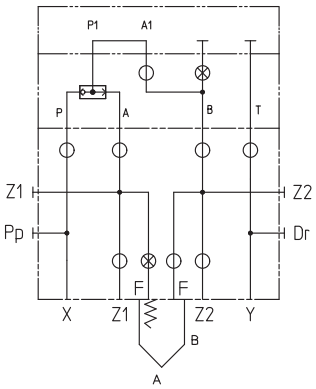
LIDB-1, LIDB-2, LIDB-3



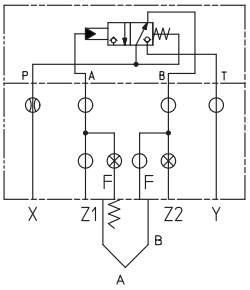
LIDB-4



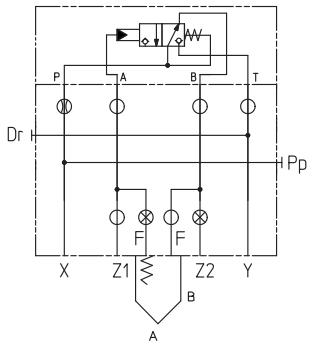
LIDB-5, LIDB-6



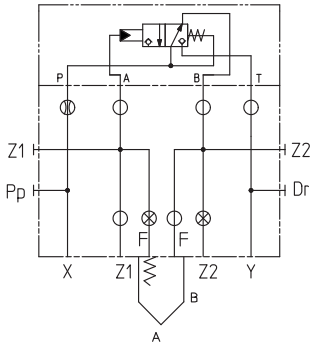
LIDR-1, LIDR-2, LIDR-3



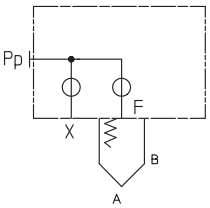
LIDR-4



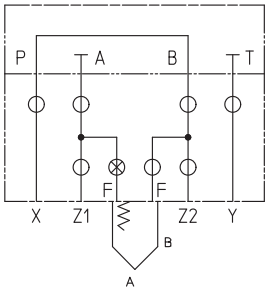
LIDR-5, LIDR-6



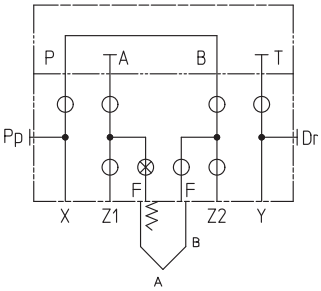
LIDA-1
LIDA-2



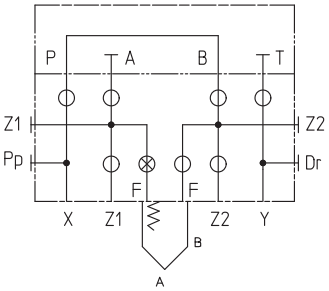
LIDA-3



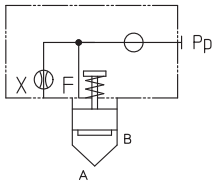
LIDA-4



LIDA-5, LIDA-6,
LIDA-8, LIDA-10



LIDO



3 OPTIONS

For LIDA (sizes 16 and 25), for LIDO (all sizes) LIDB (sizes 40 ÷ 63), LIDR (sizes 40 ÷ 63):
/E = with external attachments Pp and underneath port X supplied plugged;

For LIDA, LIDB, LIDR:
/F = prearranged for coupling to an intermediate element with position detector for safety valves, see tab. EY120.

For all models:
******* = Calibrated plugs different from standard ones reported in section 4. The restrictors configuration (if different from the standard) it 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:
00 = plugged **08** = 0,8 mm **15** = 1,5 mm
05 = 0,5 mm **10** = 1 mm **17** = 1,7 mm
06 = 0,6 mm **12** = 1,2 mm **20** = 2 mm

4 STANDARD ORIFICES CONFIGURATION

Port \ Cover	LIDA-1	LIDO-1	LIDB-1	LIDR-1	LIDA-2	LIDO-2	LIDB-2	LIDR-2	LIDA-3	LIDO-3	LIDB-3	LIDR-3	LIDA-4	LIDO-4	LIDB-4	LIDR-4	LIDA-5	LIDO-5	LIDB-5	LIDR-5	LIDA-6	LIDB-6	LIDR-6	LIDA-8	LIDA-10
X	M4	M4	-	-	M4	M6	-	-	-	M6	-	-	-	M6	-	-	-	M6	-	-	-	-	-	-	-
	-	10A	-	-	-	10A	-	-	-	12A	-	-	-	15F	-	-	-	15F	-	-	-	-	-	-	-
P	-	-	M6	M6	-	-	M6	M6	M6	-	M6	M6	M6	-	M6	M6	M6	-	M6	M6	M6	M6	M6	M8	M8
	-	-	-	12A	-	-	-	12A	15A	-	-	15A	17A	-	-	17A	20A	-	-	20A	20A	-	20A	20A	25A
Z2	-	-	M4	M4	-	-	M6	M6	M6	-	M6	M6	M6	-	M6	M6	M6	-	M6	M6	M6	M6	M6	M8	-
	-	-	-	00F	-	-	-	00F	-	-	-	00F	-	-	-	00F	-	-	-	00F	-	-	00F	-	-

M4 ÷ M6 = screw size; **10A ÷ 00F** = calibrated orifices diameters in tenths of mm; **A** = short calibrated hole, **F** = long calibrated hole;
- = without orifice;

5 MODEL CODE OF SLIP-IN CARTRIDGES type 32, 33, 42, 43 for LIDA, LIDB and LIDR

SC LI	-	16	43	1	40	/	*

Cartridge according to ISO 7368

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

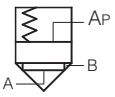
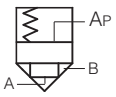
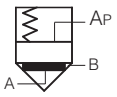
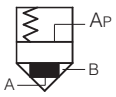
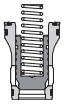
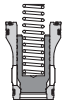
Type of poppet (not for LIDO)
32, 33 (size 16 to 100) = without damping nose
42 (size 16 to 80) = as 32 but with damping nose
43 (size 16 to 100) = as 33 but with damping nose

Series number

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

Spring cracking pressure, see section 6 :
1, **2**, **3**, **6**

6 TYPE OF POPPET

Type of poppet	**32**	**33**	**42**	**43**
Functional sketch (Hydraulic symbol)				
Typical section				
Area ratio A:Ap	**1:1,1**	**1:1,5**	**1:1,1**	**1:1,5**
Operating pressure	**420 bar max**			
Nominal flow at Δp 5 bar (l/min) see diagrams Q/Δp at section 10				
Size **16**	270	270	240	240
Size **25**	550	550	500	500
Size **32**	1000	1000	800	800
Size **40**	1700	1700	1400	1400
Size **50**	2500	2500	2200	2200
Size **63**	4000	4000	3300	3300
Size **80**	5500	5500	4000	4000
Size **100**	9000	9000	-	6300

Cracking pressure (bar)

Spring		**1**	**2**	**3**	**6**	**1**	**2**	**3**	**6**	**1**	**2**	**3**	**6**	**1**	**2**	**3**	**6**
Size **16**	A→B	0.3	1.5	3	5.3	0.6	1.6	2.9	5.1	0.3	1.7	3.3	6.1	0.7	1.9	3.3	5.7
	B→A	3.2	16	30.5	50.3	1.2	3.2	5.8	10	3.6	17.7	34.5	63.4	1.3	3.7	6.5	11.2
Size **25**	A→B	0.3	1.5	3	5	0.6	1.4	3	5	0.3	1.7	3.3	6.1	0.7	1.5	3.3	5.8
	B→A	3.1	15.1	30.5	50.3	1.2	2.8	5.9	9.9	3.5	17.1	33.3	61.4	1.3	3	6.5	11.3
Size **32**	A→B	0.3	1.5	3	5	0.6	1.6	3	5.4	0.3	1.7	3.7	6.3	0.7	1.8	3.4	6.3
	B→A	3.5	17	34.2	56.7	1.2	3.2	6	10.7	3.9	18.8	41.6	71.1	1.4	3.6	6.9	12.7
Size **40**	A→B	0.3	1.5	3	5	0.6	1.5	3	5.5	0.4	1.8	3.5	6.4	0.7	1.8	3.6	7.3
	B→A	2.9	14.7	29.4	48.3	1.2	3	6	11	3.5	17.2	34	62	1.3	3.6	7.2	14.6
Size **50**	A→B	0.3	1.5	3	4.3	0.6	1.6	3	4.8	0.4	1.7	3.4	5.2	0.7	1.9	3.4	5.7
	B→A	3.6	16.9	33.8	48.4	1.4	3.6	6.7	10.8	4.2	18.9	38.1	58.9	1.5	4.4	7.7	12.9
Size **63**	A→B	0.3	1.5	2.9	4.2	0.6	1.5	2.9	5.8	0.4	1.7	3.4	4.7	0.7	1.8	3.3	6.5
	B→A	3.1	15	29.2	42	1.3	3.3	6.4	12.5	3.6	16.6	33.8	47.2	1.5	4	7.2	14.1
Size **80**	A→B	0.3	1.5	3	4.6	0.6	1.5	3	5.3	0.3	1.7	3.3	4.9	0.7	1.8	3.3	5.9
	B→A	3	14.8	29.2	45.2	1.3	3.1	6.3	11.2	3.4	16.6	32.9	48.8	1.4	3.8	7	12.4
Size **100**	A→B	0.3	1.5	3		0.6	1.5	3.1	6					0.7	1.9	3.8	7.4
	B→A	3	15	30.5		1.2	3	6.3	12.2					1.5	3.9	7.8	14.9

7 MODEL CODE OF SLIP-IN CARTRIDGES type 52, 62, 63 for LIDA and LIDO

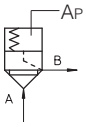
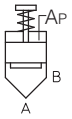
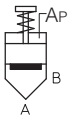
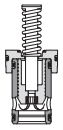
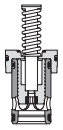
SC LI	-	16	52	1	**	/*
Cartridge according to ISO 7368					Series number	Seals material: **-** = NBR **PE** = FKM **BT** = HNBR

Size, the same of relevant cover:
16 **25** **32** **40** **50**

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

Spring cracking pressure:
1 = 0,3 bar for poppet 52; **3** = 3 bar for all poppets
2 = 1,5 bar for poppet 52; **6** = 6 bar for all poppets

8 TYPICAL FUNCTIONS OF POPPETS

Type of poppet		**52**				**62**	**63**
Functional sketch (Hydraulic symbol)							
Typical section							
Area ratio A:Ap		**1:1,1**				**1:1,1**	**1:1,1**
Operating pressure		**420 bar max**					
Nominal flow at Δp 5 bar (l/min) see diagrams Q/Δp at section 10							
Size **16**		160				160	160
Size **25**		400				400	400
Size **32**		600				600	600
Size **40**		1200				1200	1200
Size **50**		1800				1800	1800
Cracking pressure (bar)							
Spring		**1**	**2**	**3**	**6**	**3**	**6**
Size **16**	A→B	0.3	1.5	3	6	Normally open	Normally open
Size **25**	A→B	0.3	1.5	3	6		
Size **32**	A→B	0.3	1.5	3	6		
Size **40**	A→B	0.3	1.5	3	6		
Size **50**	A→B	0.3	1.5	3	6		

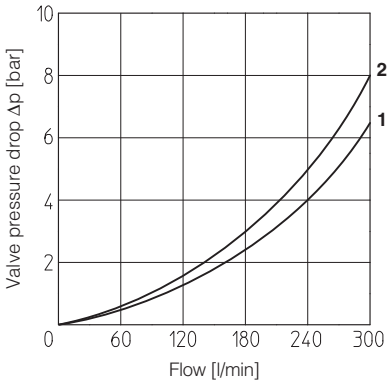
9 MAIN CHARACTERISTICS, SEALS AND HYDRAULIC FLUID

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 2015/863/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**
Mineral oils	NBR, FKM, HNBR	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524
Flame resistant without water	FKM	HFDU, HFDR	ISO 12922
Flame resistant with water	NBR, HNBR	HFC	
Flow direction	As shown in the symbols of table 2		
Functional cover operating pressure	Ports P, A, B, X, Z1, Z2: **420** bar		

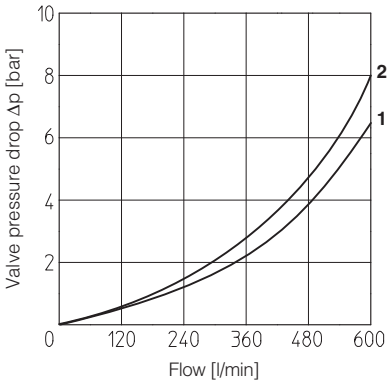
10 **Q/ΔP DIAGRAMS** based on mineral oil ISO VG 46 at 50°C

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

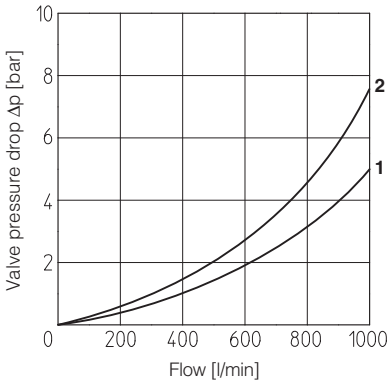
size 16



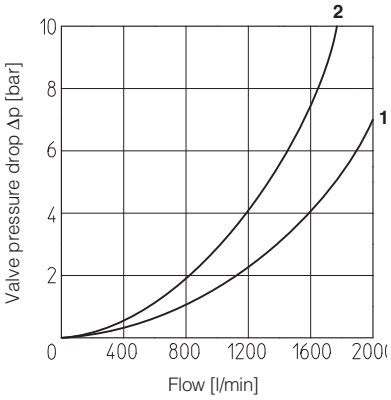
size 25



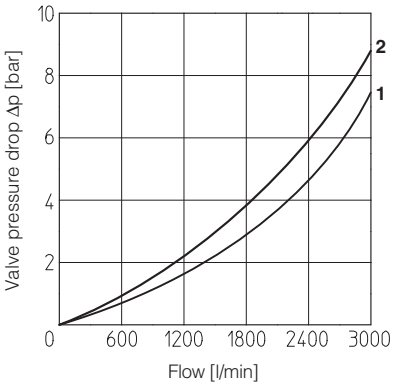
size 32



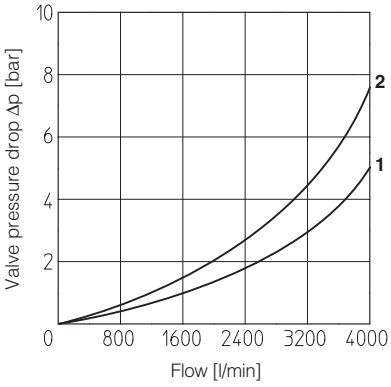
size 40



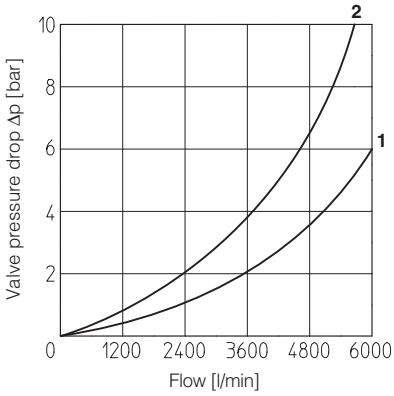
size 50



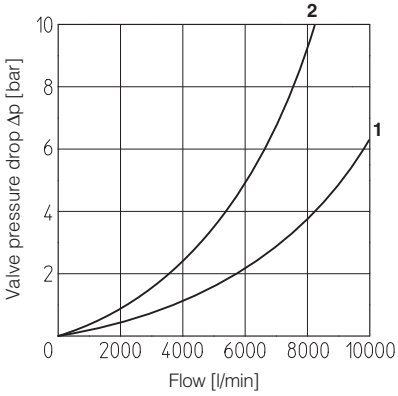
size 63



size 80



size 100

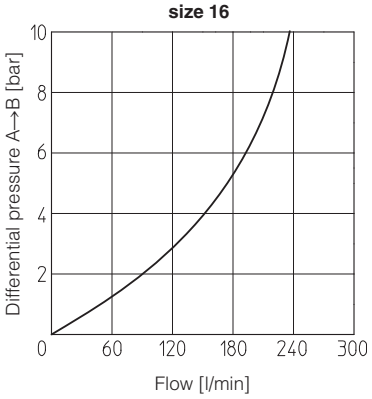


High flow - series 40

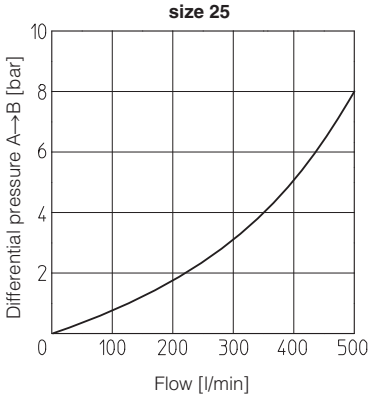
1 = poppet type 32 and 33
2 = poppet type 42 and 43

10.2 SC LI slip-in cartridges, poppet type 52, 62, 63

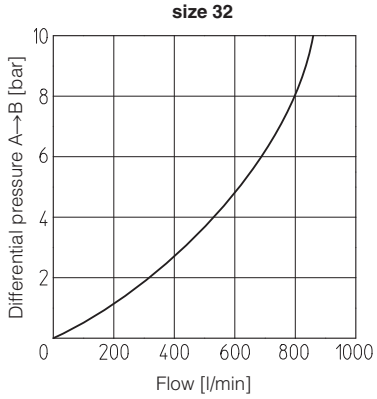
size 16



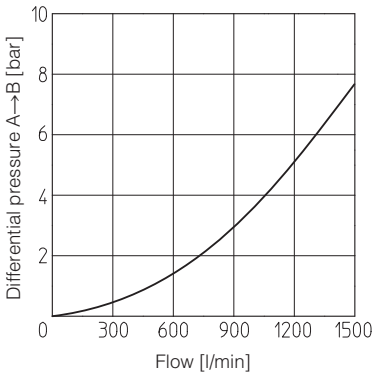
size 25



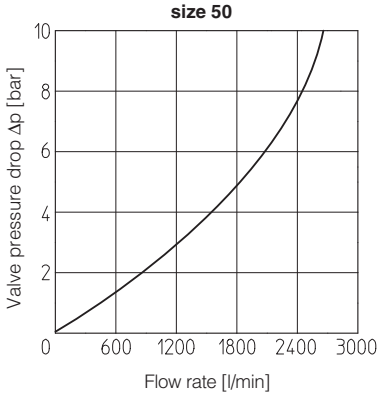
size 32



size 40

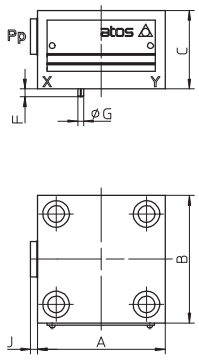


size 50

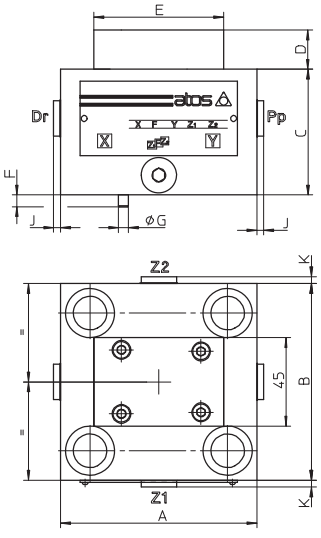


11 COVER DIMENSIONS [mm] - for mounting interface and cavity dimensions, see tech. table P006

LIDA (size 16 ÷ 25)
LIDO (size 16…50)



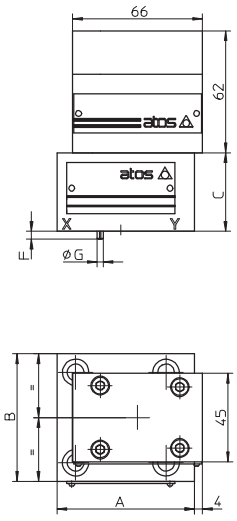
LIDA (size 32…100)



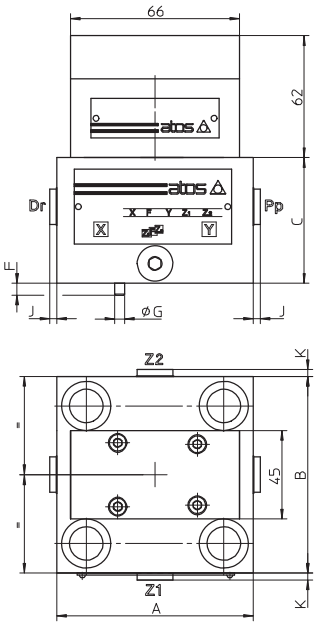
Note:
For **LIDO-2**: the external attachment Pp is located at Y port side of the cover;
For **LIDA-80** and **LIDA-100** the cover has round shape

Covers **(1)**	A	B	C	D	E	F	G	J	K	Port Pp-Dr	Port Z1-Z2	Seals	Fastening bolts DIN 912 class 12.9	Tightening torque [Nm]	Mass [Kg]
LIDA-1 **LIDO-1**	65	65	40	-	-	4	3	3.5	-	G 1/4”	-	2 OR-108 1 OR-108	N°4 M8x45	35	1.4
LIDA-2 **LIDO-2**	85	85	40	-	-	6	5	3.5	-	G 1/4”	-	2 OR-108 1 OR-108	N°4 M12x45 N°4 M12x50	125	1.8
LIDA-3 **LIDO-3**	100	100	50 60	20	66	6	5	- 3.5	-	G 1/4”	-	4 OR-2043 1 OR-2043	N°4 M16x55 N°4 M16x60	300	2.3
LIDA-4 **LIDO-4**	125	125	60 100	20	66	6	5	3.5	-	G 1/4”	-	4 OR-3043 1 OR-3043	N°4 M20x70 N°4 M20x100	600	6.2
LIDA-5 **LIDO-5**	140	140	70 110	20	66	4	6	3.5	3.5	G 1/4”	G 1/4”	4 OR-3043 1 OR-3043	N°4 M20x80 N°4 M20x110	600	9.3
LIDA-6	180	180	80	20	66	4	6	3.5	3.5	G 3/8”	G 3/8”	4 OR-3050	N°4 M30x90	2100	17.1
LIDA-8	Ø250	-	80	30	73	6	8	3.5	3.5	G 3/8”	G 3/8”	2 OR-4075	N°4 M24x90	1000	27
LIDA-10	Ø250	-	80	30	73	6	10	3.5	3.5	G 1/2”	G 3/8”	2 OR-4075	N°4 M30x120	2100	54

LIDB (size 16)



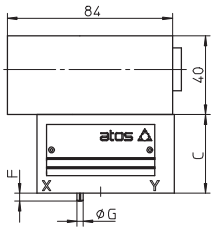
LIDB (size 25…63)

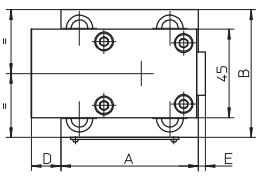


Note:
For **LIDB-6** the external attachments Pp, Dr, Z1 and Z2 are inverted each others respect to the showed sketch

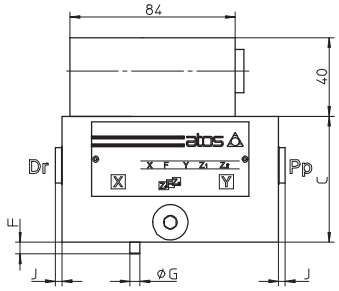
Covers	A	B	C	F	G	J	K	Port Pp-Dr	Port Z1-Z2	Seals	Fastening bolts DIN 912 class 12.9	Tightening torque [Nm]	Mass [Kg]
LIDB-1	70	65	40	4	3	-	-	-	-	4 OR-108	N°4 M8x45	35	2.2
LIDB-2	85	85	40	6	5	-	-	-	-	4 OR-108	N°4 M12x45	125	2.6
LIDB-3	100	100	50	6	5	-	-	-	-	4 OR-2043	N°4 M16x55	300	3.1
LIDB-4	125	125	60	6	5	3.5	-	G 1/4”	-	4 OR-3043	N°4 M20x70	600	7
LIDB-5	140	140	70	4	6	3.5	3.5	G 1/4”	G 1/4”	4 OR-3043	N°4 M20x80	600	10.1
LIDB-6 (1)	180	180	80	4	6	3.5	3.5	G 3/8”	G 3/8”	4 OR-3050	N°4 M30x90	2100	17.9

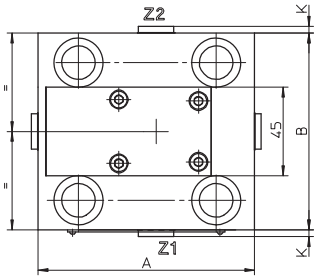
LIDR (size 16…32)





LIDR (size 40…63)





Note:
For **LIDR-6** the position of external attachments Pp, Dr, Z1 and Z2 are inverted each others respect to the showed sketch

Covers	A	B	C	D	E	F	G	J	K	Port Pp-Dr	Port Z1-Z2	Seals	Fastening bolts DIN 912 class 12.9	Tightening torque [Nm]	Mass [Kg]
LIDR-1	70	65	40	4	3.5	4	3	-	-	-	-	4 OR-108	N°4 M8x45	35	2.5
LIDR-2	85	85	40	13.5	-	6	5	-	-	-	-	4 OR-108	N°4 M12x45	125	2.9
LIDR-3	100	100	50	6	-	6	5	-	-	-	-	4 OR-2043	N°4 M16x55	300	3.4
LIDR-4	125	125	60	-	-	6	5	3.5	-	G 1/4”	-	4 OR-3043	N°4 M20x70	600	7.3
LIDR-5	140	140	70	-	-	4	6	3.5	3.5	G 1/4”	G 1/4”	4 OR-3043	N°4 M20x80	600	10.4
LIDR-6	180	180	80	-	-	4	6	3.5	3.5	G 3/8”	G 3/8”	4 OR-3050	N°4 M30x90	2100	18.3