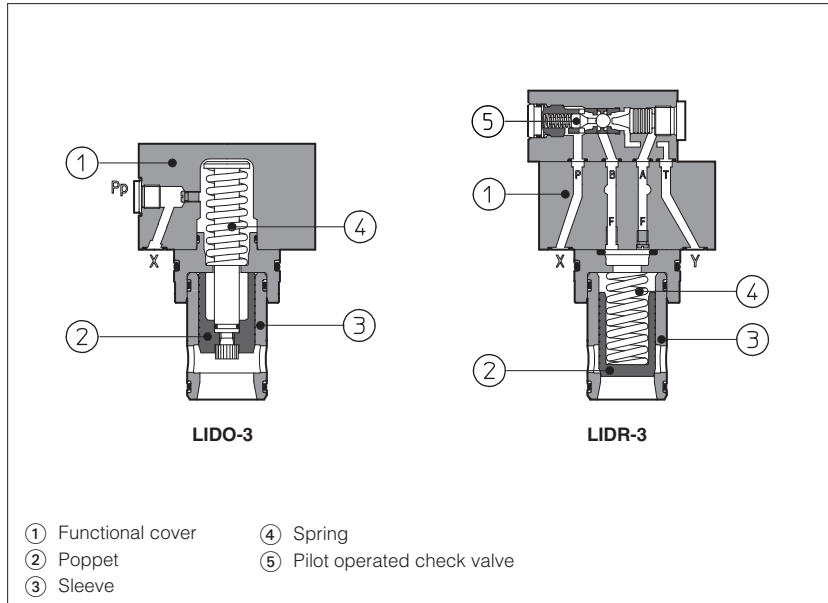


ISO cartridge valves type LID*

Check function, ISO 7368 size from 16 to 100, 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 4.

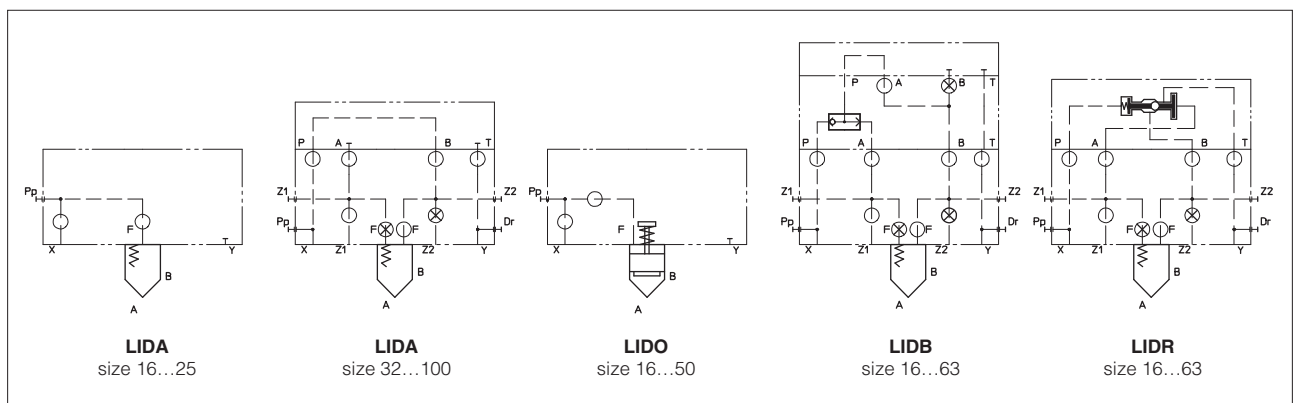
It is made by a poppet ② sliding into a sleeve ③ and kept in normally closed position (open position for type 62 and 63) by the spring ④ available with different cracking pressure values.

Size: **16 to 100** ISO 7368
 Max flow up to **9000 l/min** at $\Delta p = 5$ bar
 Max pressure up to **420 bar**

1 MODEL CODE OF FUNCTIONAL COVERS - for model code of slip-in cartridge, see section 3, 5

LI		D		A		1		*		**		**		*
Cover according to ISO 7368														Optional different setting of calibrated plugs in the pilot channels, see section 9, 10
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 8														

2 HYDRAULIC SYMBOLS (cover configuration)



3 MODEL CODE OF SLIP-IN CARTRIDGES

SC LI	-	16
Cartridge according to ISO 7368		
Size, the same of relevant cover: 16 25 32 40 50 63 80 100		

43
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

1
Spring cracking pressure: 1 = 0,3 bar for poppet 32, 42 1 = 0,6 bar for poppet 33, 43

40	/	*
Series number (1) High flow: 40 = all sizes Standard flow: 31 = size 16 to 50 11 = size 63 and 80 10 = size 100		
Seals material: - = NBR PE = FKM BT = HNBR		
2 = 1,5 bar for poppet 32, 42 3 = 3 bar for all poppets 6 = 5,5 bar for all poppets		

(1) New high flow series 40 is mechanically interchangeable with standard flow series 31, 11 and 10 - cavity according to ISO 7368

4 TYPE OF POPPET

Type of poppet	32	33	42	43
Functional sketch (Hydraulic symbol)				

4.1 new high flow series 40

Operating pressure	420 bar max				
Nominal flow Size 16	270	270	240	240	
at Δp 5bar	25 550	550	500	500	
(l/min)	32 1000	1000	800	800	
see	40 1700	1700	1400	1400	
diagrams Q/ Δp	50 2500	2500	2200	2200	
at section [10]	63 4000	4000	3300	3300	
	80 5500	5500	4000	4000	
	100 9000	9000	-	6300	
Typical section					
Area ratio A:Ap	1:1,1	1:1,5	1:1,1	1:1,5	
Cracking pressure A→B	Spring 1	0,3 bar	0,6 bar	0,3 bar	0,6 bar
	2	1,5 bar	-	1,5 bar	-
	3	3 bar	2,5 bar	3 bar	2,5 bar
	6	6 bar	6 bar	6 bar	6 bar
Cracking pressure B→A	Spring 1	3 bar	0,9 bar	3 bar	0,9 bar
	2	12,8 bar	-	12,8 bar	-
	3	32,5 bar	3,8 bar	32,5 bar	3,8 bar
	6	59,4 bar	9 bar	59,4 bar	9 bar

4.2 standard flow series 31, 11, 10

Operating pressure	420 bar max					
Nominal flow Size 16	170	150	140	120		
at Δp 5bar	25 400	300	350	280		
(l/min)	32 610	450	480	430		
see	40 1300	1000	1100	850		
diagrams Q/ Δp	50 1700	1500	1350	1300		
at section [10]	63 2800	2400	2400	1800		
	80 4200	3600	3600	3000		
	100 7200	6200	-	5000		
Typical section						
Area ratio A:Ap	1:1,1	1:2 for size 16, 25	1:1,6 for size 32÷100	1:1,1	1:2 for size 16, 25	1:1,6 for size 32÷100
Cracking pressure A→B	Spring 1	0,3 bar	0,6 bar	0,4 bar	0,3 bar	0,6 bar
	2	1,5 bar	-	-	1,3 bar	-
	3	3 bar	2,5 bar	2,1 bar	3,2 bar	2,7 bar
	6	6 bar	6 bar	4,3 bar	6 bar	4,3 bar
Cracking pressure B→A	Spring 1	3 bar	0,5 bar	0,7 bar	3 bar	0,5 bar
	2	12,8 bar	-	-	12,8 bar	-
	3	32,5 bar	2,5 bar	3,7 bar	32,5 bar	2,4 bar
	6	59,4 bar	6 bar	7,5 bar	59,4 bar	6 bar

5 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 = 5,5 bar for all poppets						

6 TYPICAL FUNCTIONS OF POPPETS

Type of poppet	52	62	63
Operating pressure	420 bar		
Nominal flow Size 16	160		
at Δp 5bar (l/min)	25	400	600
see diagrams Q/ Δp	32	600	1200
at section 8	40	1200	1800
	50	1800	-
Functional sketch (Hydraulic symbol)			
Typical section			
Area ratio A:AP	1 : 1,1	1 : 1,1	1 : 1,1
Cracking pressure	0,3 bar	-	-
Spring	1	-	-
A→B	2	-	-
(1)	3	-	-
	6	-	-

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

7 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		
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	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		

8 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 9. The restrictors configuration (if different from the standard) it must be indicated at the end of the model code:

LIDB	-	4	/E	**	P	06
					Channel where the restrictor has to be provided: P = channel X, port P Z1 = channel Z1 F = channel F Z2 = channel Z2	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

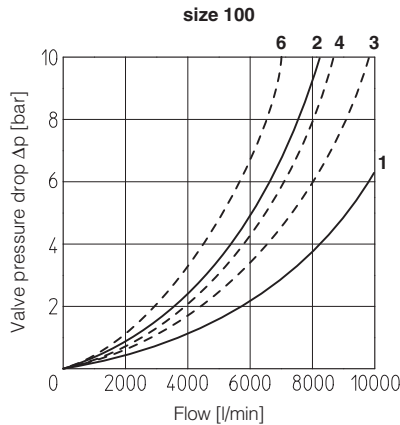
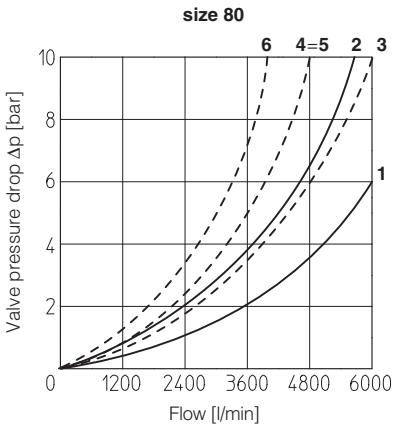
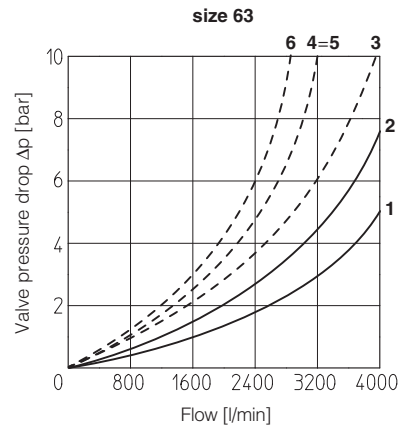
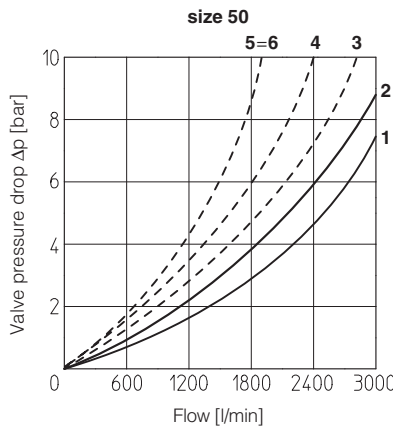
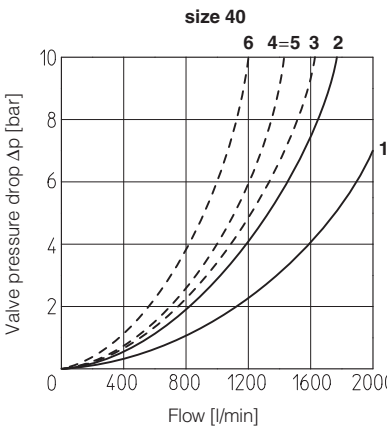
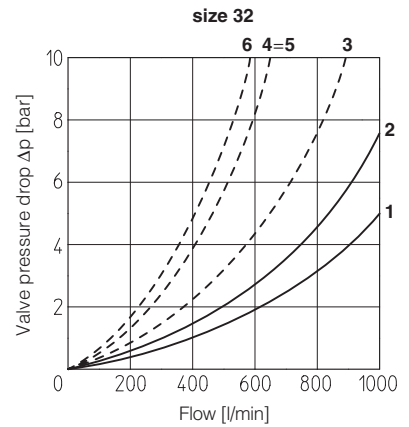
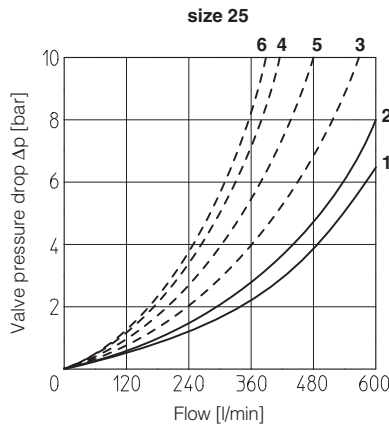
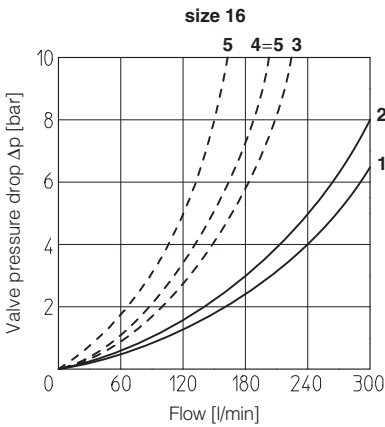
9 STANDARD ORIFICES CONFIGURATION

Port \ Cover	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 10A	-	-	-	M6 12A	-	-	-	M6 15F	-	-	-	M6 15F	-	-	-	-	-	-	-
P	-	-	-	M6 12A	-	-	M6 12A	-	-	M6 15A	-	-	-	M6 17A	-	-	M6 20A	-	-	M6 20A	-	-	M6 20A	-	-
Z2	-	-	-	M4 100F	-	-	M6 300F	-	-	M6 300F	-	-	-	M6 300F	-	-	M6 300F	-	-	M6 300F	-	-	M6 300F	-	-

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

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



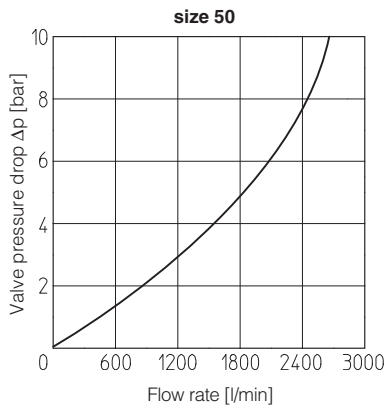
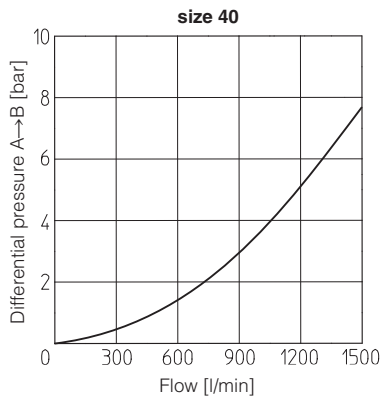
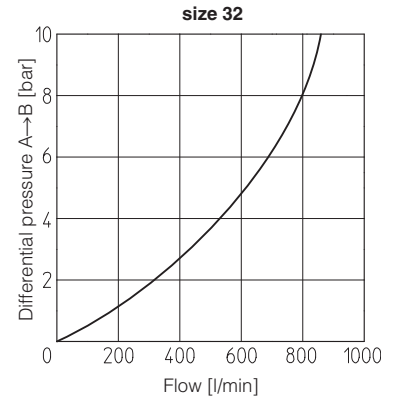
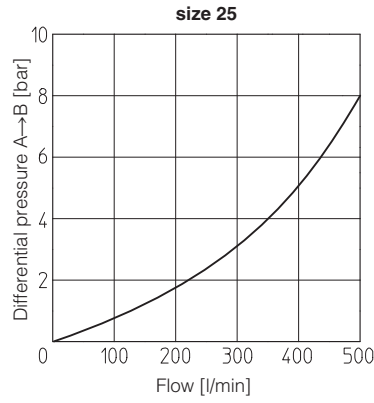
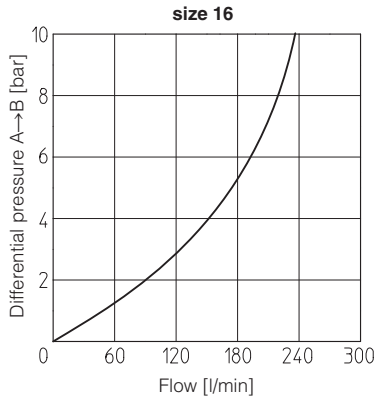
High flow - series 40

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

Standard flow - series 31 (size 16 to 50), 11 (size 63 and 80), 10 (size 100)

- 3 = poppet type 32
- 4 = poppet type 33
- 5 = poppet type 42
- 6 = poppet type 43

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



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

LIDA

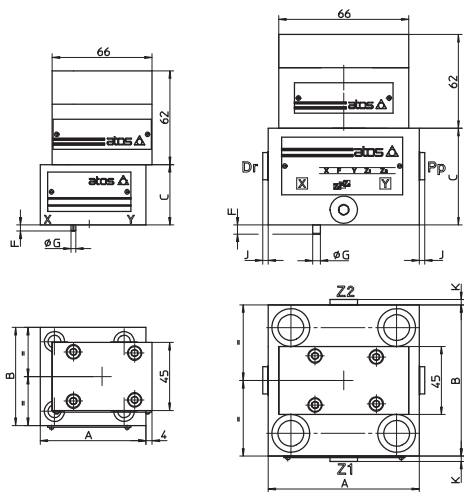
Covers (1)	A	B	C	D	E	F	G	K	J	Port Pp-Dr	Port Z1-Z2	Seals	Fastening bolts (3)	Tightening torque [Nm]	Mass [Kg]
LIDA-1 LIDO-1	65	65	40	-	-	4	3	-	3,5	G 1/4	-	2 OR-108 1 OR-108 (2)	Nr. 4 M8x45	35	1,4
LIDA-2 LIDO-2	85	85	40	-	-	6	5	-	3,5	G 1/4	-	2 OR-108 1 OR-108 (2)	Nr. 4 M12x45 (4)	125	1,8
LIDA-3 LIDO-3	100	100	50 60 (2)	20	66	6	5	-	3,5	G 1/4	-	4 OR-2043 1 OR-2043 (2)	Nr. 4 M16x55 (5)	300	2,3
LIDA-4 LIDO-4	125	125	60 100	20	66	6	5	-	3,5 3,5	G 1/4	-	4 OR-3043 1 OR-3043	Nr. 4 M20x70 (6)	600	6,2
LIDA-5 LIDO-5	140	140	70 110 (2)	20	66	4	6	3,5	3,5	G 1/4	G 1/4	4 OR-3043 1 OR-3043 (2)	Nr. 4 M20x80 (7)	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	Nr. 4 M30x90	2100	17,1
LIDA-8	∅ 250	-	80	30	73	6	8	3,5	3,5	G 3/8	G 3/8	4 OR-4075	Nr. 8 M24x90	1000	27
LIDA-10	∅ 300	-	150	30	73	8	10	3,5	3,5	G 1/2	G 1/2	4 OR-4093	Nr. 8 M30x120	2100	54

**LIDA (size 16 ÷ 25)
LIDO (size 16...50)**

LIDA (size 32...100)
Note: for LIDA-80 and LIDA-100 the cover has round shape

(1) For LIDO-2: the external attachment Pp is located at Y port side of the cover;
 (2) Only for LIDO;
 (3) Hexagon socket head screw according to DIN 912 class 12.9
 (4) M12x50 for LIDO-2;
 (5) M16x60 for LIDO-3;
 (6) M20x100 for LIDO-4;
 (7) M20x110 for LIDO-5;

LIDB



LIDB (size 16)

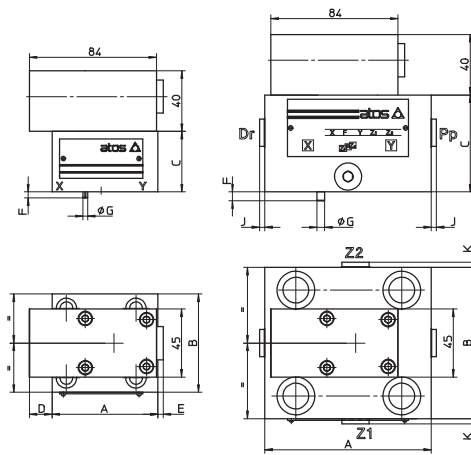
LIDB (size 25...63)

Covers	A	B	C	F	G	J	K	Port Pp-Dr	Port Z1-Z2	Seals	Fastening bolts (2)	Tightening torque [Nm]	Mass [Kg]
LIDB-1	70	65	40	4	3	-	-	-	-	4 OR-108	Nr. 4 M8x45	35	2,2
LIDB-2	85	85	40	6	5	-	-	-	-	4 OR-108	Nr. 4 M12x45	125	2,6
LIDB-3	100	100	50	6	5	-	-	-	-	4 OR-2043	Nr. 4 M16x55	300	3,1
LIDB-4	125	125	60	6	5	3,5	-	G 1/4	-	4 OR-3043	Nr. 4 M20x70	600	7
LIDB-5	140	140	70	4	6	3,5	3,5	G 1/4	G 1/4	4 OR-3043	Nr. 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	Nr. 4 M30x90	2100	17,9

(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



LIDR (size 16...32)

LIDR (size 40...63)

Covers	A	B	C	D	E	F	G	J	K	Port Pp-Dr	Port Z1-Z2	Seals	Fastening bolts (2)	Tightening torque [Nm]	Mass [Kg]
LIDR-1	70	65	40	4	3,5	4	3	-	-	-	-	4 OR-108	Nr. 4 M8x45	35	2,5
LIDR-2	85	85	40	13,5	-	6	5	-	-	-	-	4 OR-108	Nr. 4 M12x45	125	2,9
LIDR-3	100	100	50	6	-	6	5	-	-	-	-	4 OR-2043	Nr. 4 M16x55	300	3,4
LIDR-4	125	125	60	-	-	6	5	3,5	-	G 1/4	-	4 OR-3043	Nr. 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	Nr. 4 M20x80	600	10,4
LIDR-6 (1)	180	180	80	-	-	4	6	3,5	3,5	G 3/8	G 3/8	4 OR-3050	Nr. 4 M30x90	2100	18,3

(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