

Yuken Logic Valves

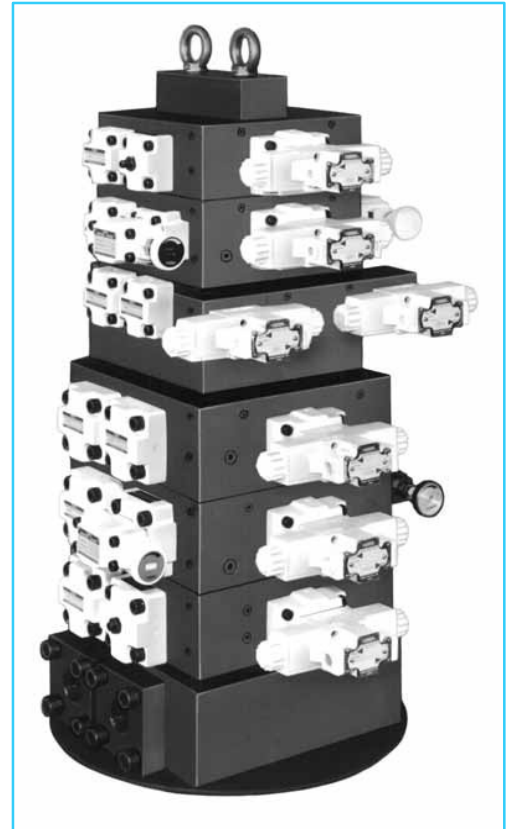
Yuken's Logic Valves comprise cartridge type elements and covers with pilot passages. Various types may be combined for direction, flow rate and pressure control.

Yuken Logic Valves can be incorporated in manifold blocks to form optimum integrated hydraulic circuits and compact hydraulic power units. Being a poppet type, the elements permit high pressure, high flow rates, high speed and shock less shifting with low pressure drop.

Typical applications include steel mill machines, injection molding machines, machine tools and so on. In addition, Yuken Logic Valves cavity specifications confirm to ISO standards.

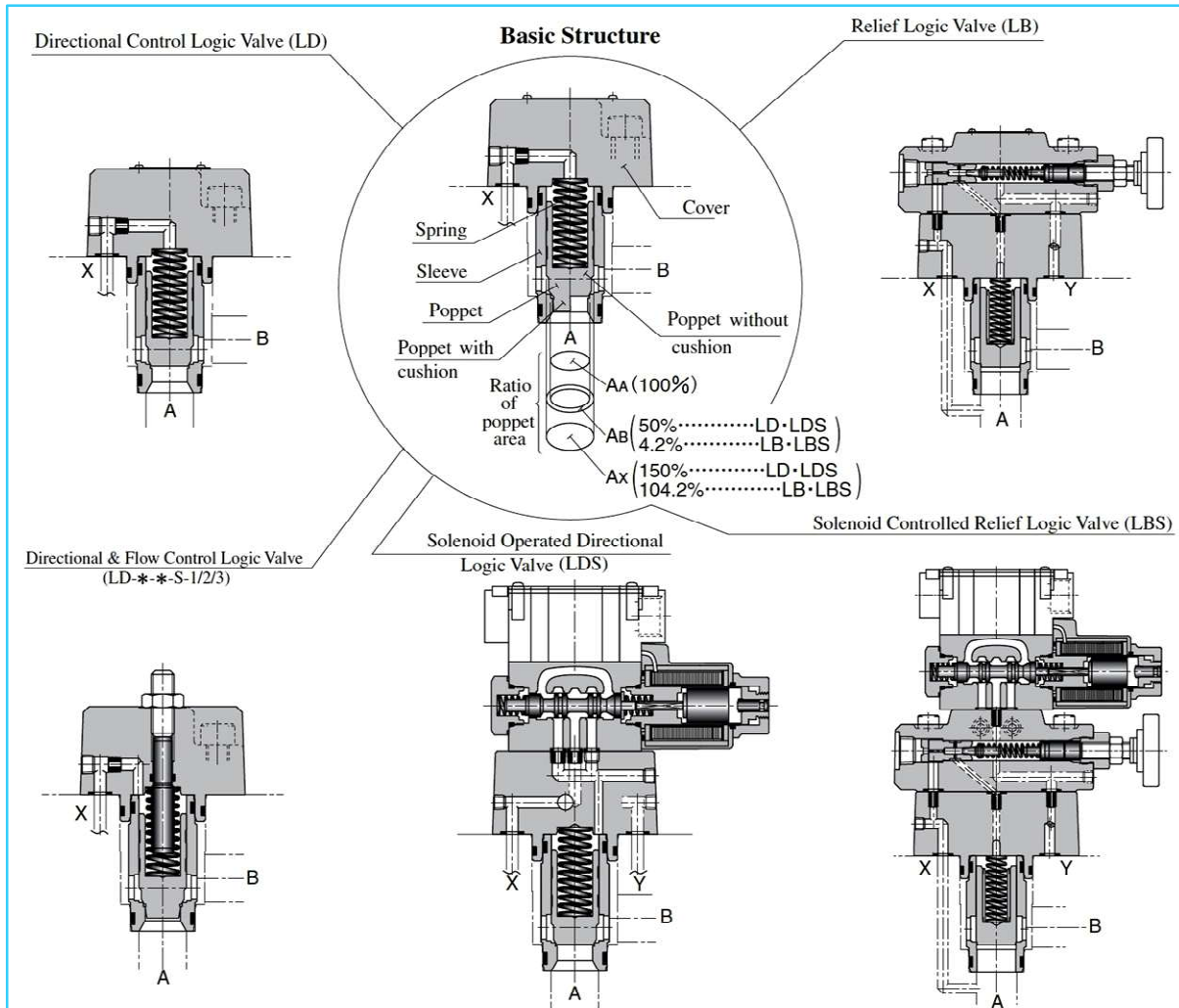
Features

- Multifunction performance in terms of direction, flow and pressure can be obtained by combining elements and covers.
- Poppet-type elements virtually eliminate internal leakage and Hydraulic locking. Because there are no overlaps, response time is very high, permitting high-speed shifting.
- For high pressure, large capacity systems, optimum performance is achieved with low pressure losses.
- Since the logic valves are directly incorporated in cavities provided in blocks, the system is free from problems related to piping such as oil leakage, vibration and noise, and higher reliability is achieved.
- Multifunction logic valves permit compact integrated hydraulic systems which reduce manifold dimensions, mass and achieve lower cost compared to conventional types.



Structure and functions

As shown below, a logic valve consists of a cover, a sleeve, a poppet and a spring incorporated in a block. Although it is a simple 2-port valve designed to open and close the poppets in accordance with the pressure signals from the pilot line, it serves as a multifunctional valve for controlling the direction, flow and pressure by controlling the pressure signals. Standard covers have several pressure signal ports (pilot ports) and control valves for control purpose are available. The covers are spigot mounted. There is no risk of oil leakage.



Functions, Working area ratios and features

Functions	Graphic Symbols	Working area ratio (A _A : A _B)	Features
Direction		(2 : 1)	- Poppet shape - Without cushion (LD/LDS-※-※): high speed shift/ - With cushion (LD/LDS-※-※-※-※): Shockless shift - No leakage between port A and B - Flow A to B and B to A are possible - Response time and shock can be adjusted by orifice Selection.
Direction and Flow			- Poppet shape - With cushion (LD-※-※-※-1/2/3): flow control - No leakage between port A and B - Flow A to B is possible - Response time and shock can be adjusted by orifice Selection.
Relief		(24 : 1)	- Remote and unloading control is possible with vent circuit (LB-※-※). - Two or three pressure controls are possible in Combination of solenoid operated directional valve and Pilot relief valve (LBS-※-※).

Operating Principles

The logic valve poppet is opened or closed by the pilot pressure balance between the pilot port “X” and the poppet force produced by the pressure at A and B ports.

If

A_x : area under pressure at port X

A_A : area under pressure at port A

A_B : area under pressure at port B

P_X : pressure at port X

P_A : pressure at port A

P_B : pressure at port B

F_s : spring force

F_X : pressing force at port X

F_w : push-up force at port A and B

Then

$$(A_x * P_X) + F_s = F_X$$

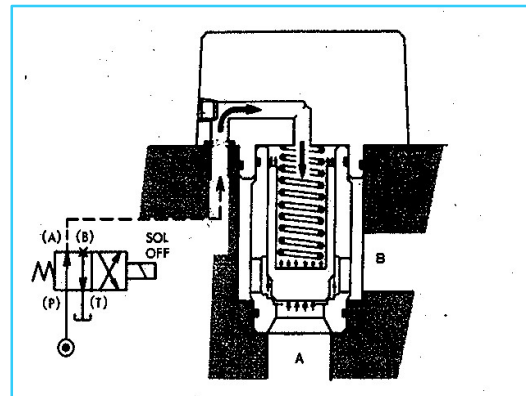
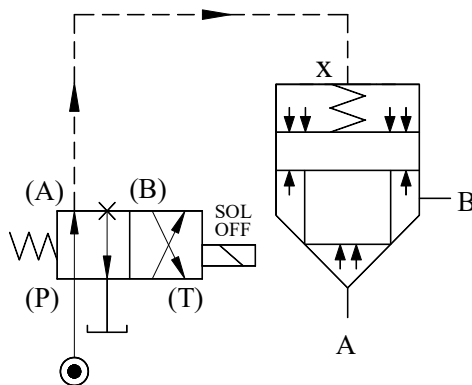
$$(A_A * P_A) + (A_B * P_B) = F_w$$

Closing Operation

If the solenoid operated directional valves (SOL) at pilot port X is “off” in the figure below, there is the following relation:

$$F_X > F_w$$

Here, the poppet is pushed on to the seat and the valve closes.

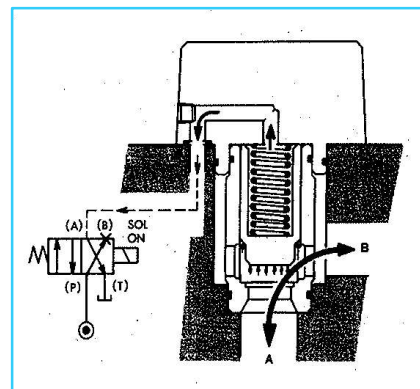
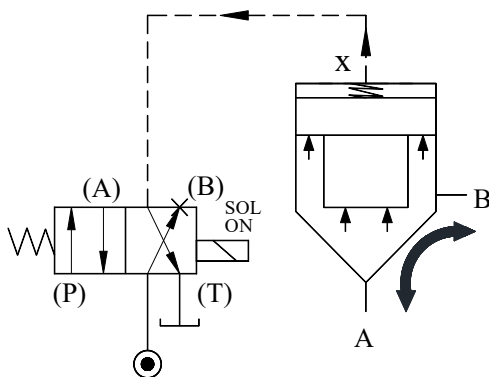


Opening Operation

If the solenoid operated directional valves (SOL) at pilot port X is “on” in the figure below, there is the following relation:

$$F_X < F_w$$

Here, the poppet is pushed up from the seat and the valve opens.



■ Directional Control Logic Valves

■ Directional and Flow Control Logic Valves

The valves mentioned above are 2-way directional valves designed to open and close the circuits in accordance with pressure signals from the pilot lines. They are used as multifunctional valves for controlling flow directions or flow directions and rates.

Standard covers provided with a choice of several control valves are available so that optimum valves can be selected for control purposes.

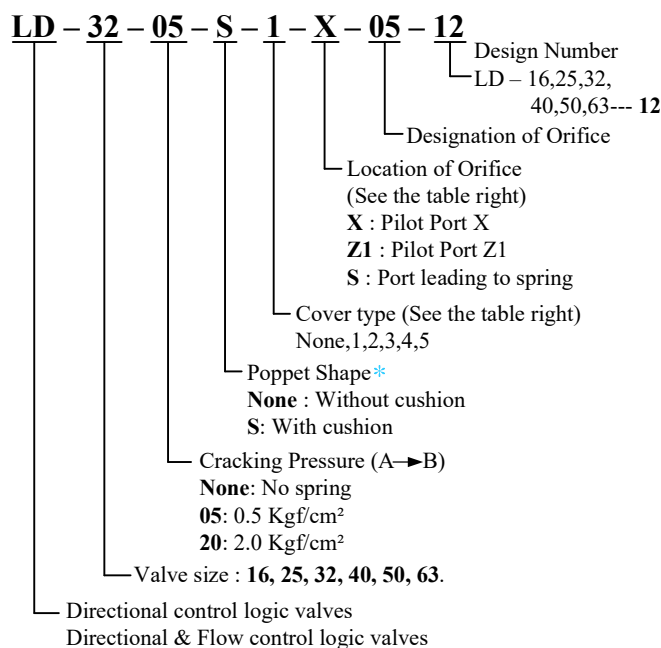


■ Specifications

Model No.	Rated Flow L/min.	Max. operating Pressure Kg _f /cm ²	Cracking Pressure Kg _f /cm ²	Ratio of Poppet area	Mass Kg
LD-16	130	315	None: No Spring 05: 0.5 (A→B) [1 (B→A)] 20: 2 (A→B) [4 (B→A)]	2:1 (Annular area 50%)	1.6
LD-25	350				3.0
LD-32	500				5.3
LD-40	850				9.1
LD-50	1400				14.8
LD-63	2100				29.8

Note: The rated flow is values with pressure drop of 3 Kg_f/cm² [Fluid viscosity 35cSt]

■ Model Number Designation



* Poppet Shapes

The type without a cushion and the type with a cushion are both suitable for high-speed shifting and shock less shifting respectively. For directional and flow control logic valves, be sure to specify "Poppets with cushions".

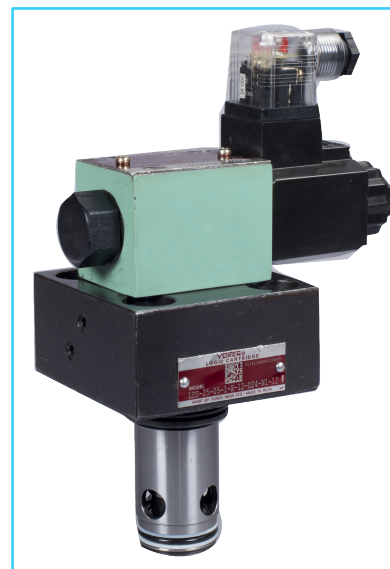
■ List of Cover Types

Cover Type Designation	Graphic Symbols	Valve Size					
		16	25	32	40	50	63
Directional Control	Standard (None)		O	O	O	O	O
	With Check Valve (4)		O	O	O	O	O
	With Shuttle Valve (5)		O	O	O	O	O
Directional & Flow Control	With Stroke Adjuster (1)		O	O	O	O	O
	With Check Valve & Stroke Adjuster (2)		O	O	O	O	O
	With Shuttle Valve & Stroke Adjuster (3)		O	O	O	O	O

Solenoid Operated Directional Control Valves

The solenoid operated directional control logic valves are composed of directional control valves and solenoid operated directional valves combined together. The solenoid operated directional valves serve to switch pilot lines and the directional control valves are used to control the direction of the main circuits.

Covers provided with various control valves are available to provide optimum control.



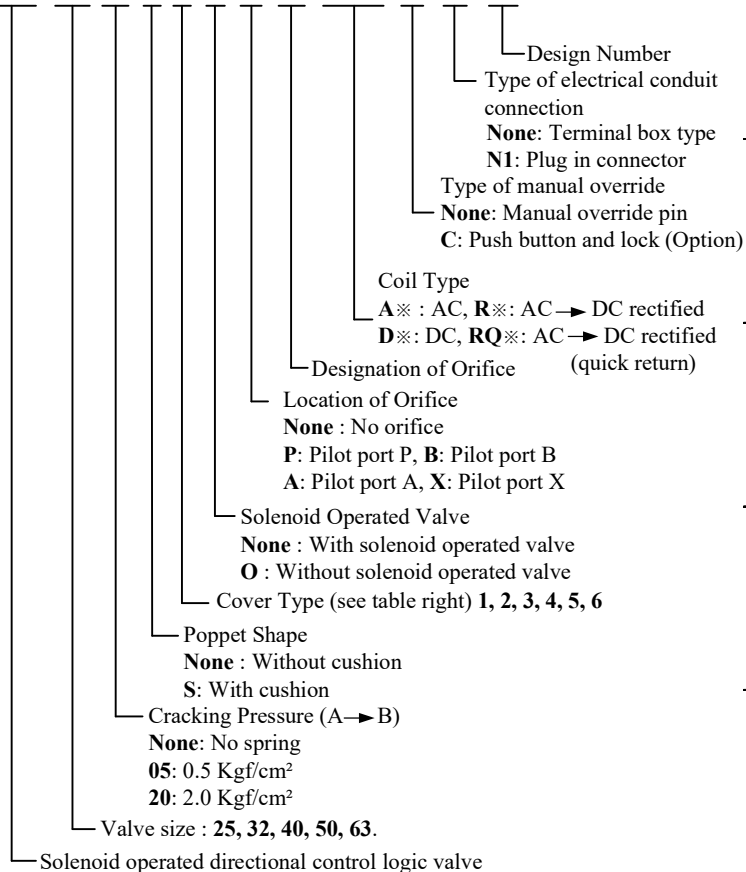
Specifications

Model No.	Rated Flow L/min.	Max. operating Pressure Kg/cm ²	Cracking Pressure Kg/cm ²	Ratio of Poppet area	Mass Kg
LDS-25	350	315	None: No Spring 05: 0.5 (A→B) [1 (B→A)] 20: 2 (A→B) [4 (B→A)]	2:1 (Annular area 50%)	4.4
LDS-32	500				6.7
LDS-40	850				10.5
LDS-50	1400				18.6
LDS-63	2100				33.6

Note: The rated flow is values with pressure drop of 3 Kgf/cm²
[Fluid viscosity 35cSt]

Model Number Designation

LDS-32-05-S-1-O-X-05-A240-C-N1-12



List of Cover Types

Cover Type Designation	Graphic Symbols	Valve Size				
		25	32	40	50	63
Normally Closed (1)		O	O	O	O	O
Normally Open (2)		O	O	O	O	O
Normally Closed with Shuttle Valve (3)		O	O	O	O	O
Normally Open with Shuttle Valve (4)		O	O	O	O	O
Normally Closed with Shuttle Valve (5)		O	O	O	O	O
Normally Open with Shuttle Valve (6)		O	O	O	O	O

Note: In case LDS-※-※-※-※-○ (without solenoid operated valve), the graphic symbol for the solenoid operated valve is excluded.

Orifices

Valve response time and shock level can be adjusted by changing the orifice diameter on the pilot line. Favorable response and shock less effect can be obtained by selecting an optimum orifice diameter.

How to select orifices

An orifice diameter can be obtained by using Figs. 1 & 2 and only if a response time and a pressure differential at the orifice are determined.

Example:

Model No. : LD-40 (poppet without cushion)

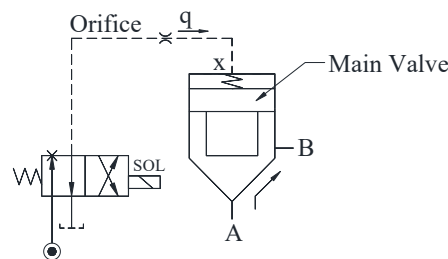
Pressure differential at orifice : 5 Kgf/cm²

Necessary response time : 0.1 s.

Under these conditions, obtain the orifice diameter. Obtain the pilot flow rate by drawing lines in fig. 1 as shown by the dotted lines. In this example it is 14 L/min. Draw lines in Fig 2 as shown by the dotted lines to obtain the cross section. In this example, it is 2.0 mm.

Notes :

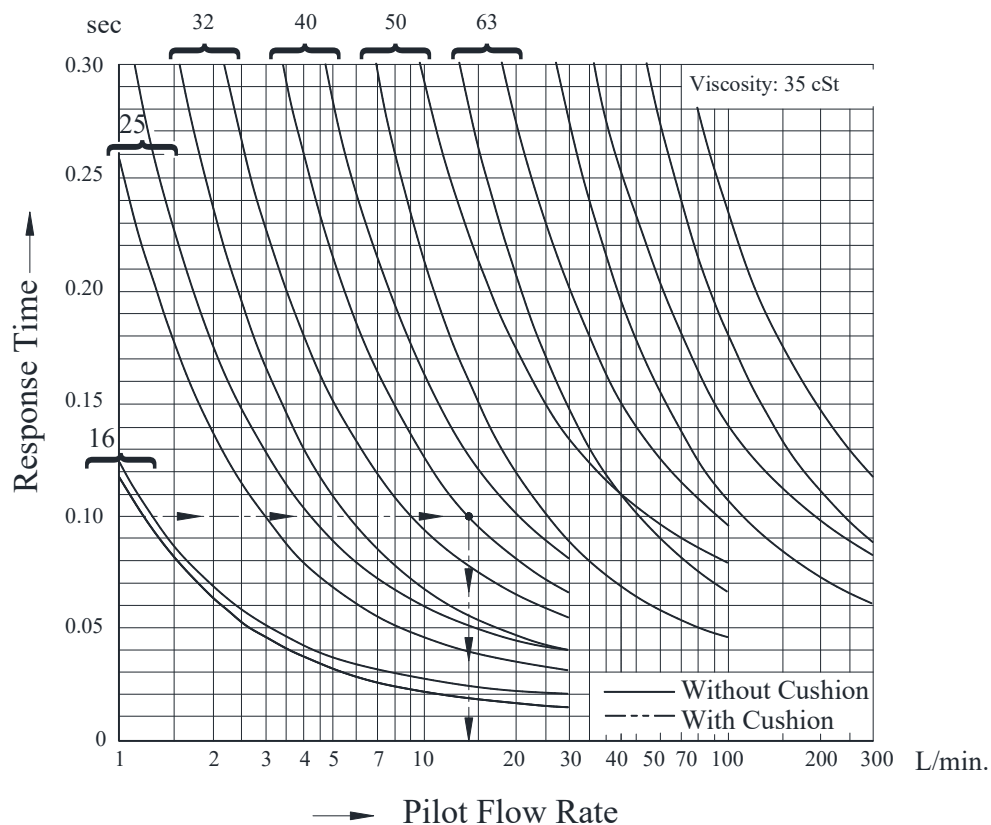
- 1) The response time refers to the times from when the solenoid of the solenoid operated directional valve is energized to when the main valve fully closes after full stroke.



- 2) If logic valves are used at pressure above 200 Kgf/cm² maximum orifice diameters are limited.

Valve Size	16	25	32	40	50	63
Designation of Orifice	12	12	14	16	18	20
Orifice Dia. (ø)	1.2	1.2	1.4	1.6	1.8	2.0

Fig.1 Pilot Flow Rate Vs. Response Time Characteristics Valve size of Logic Valve

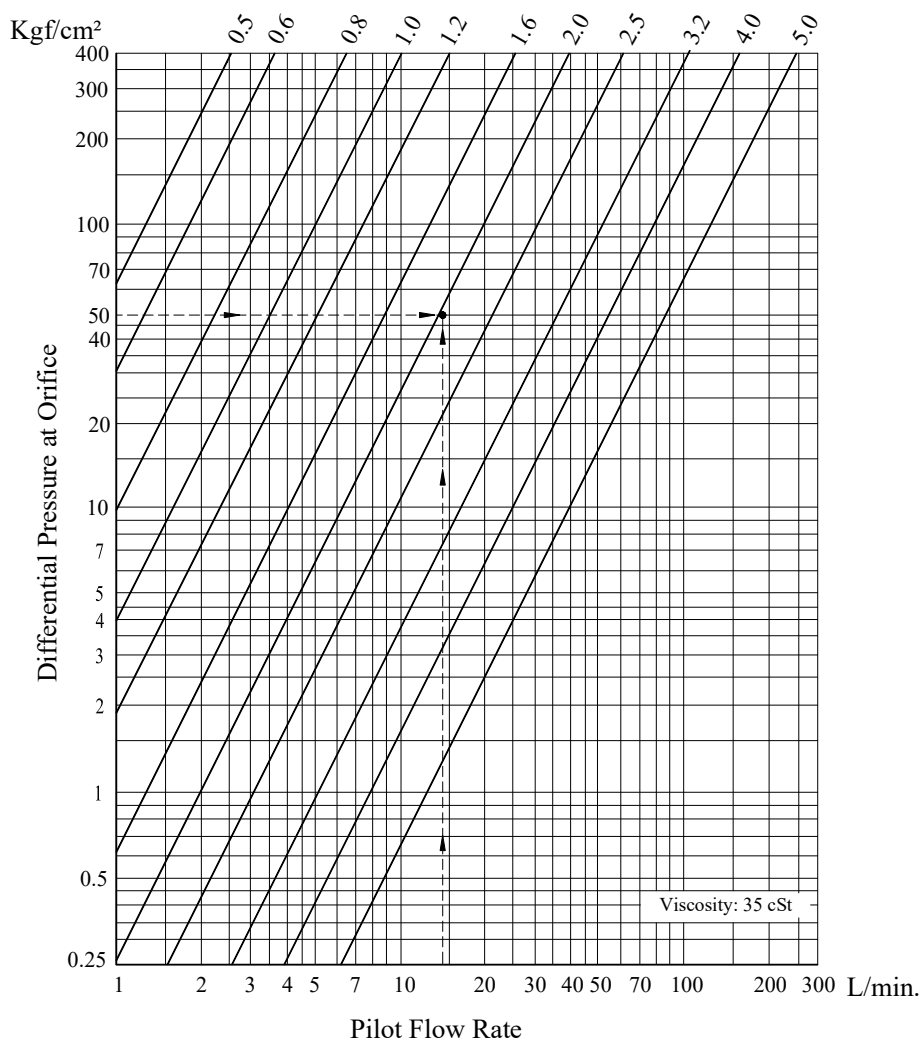


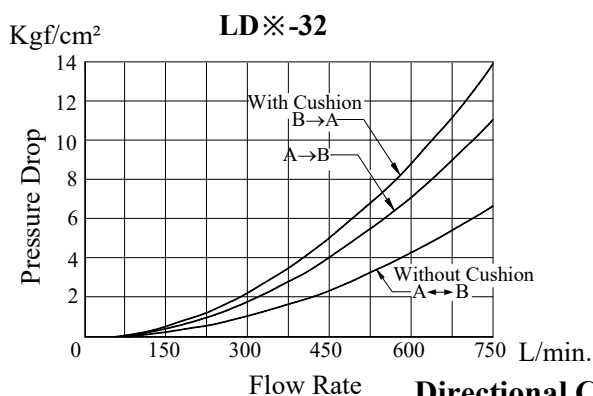
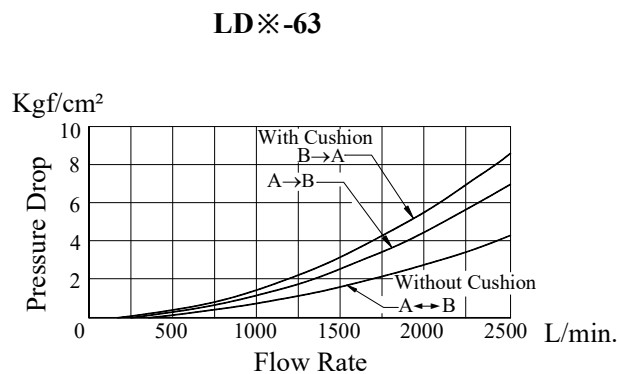
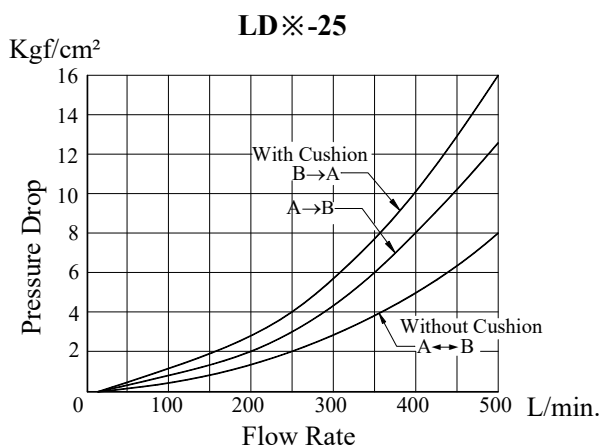
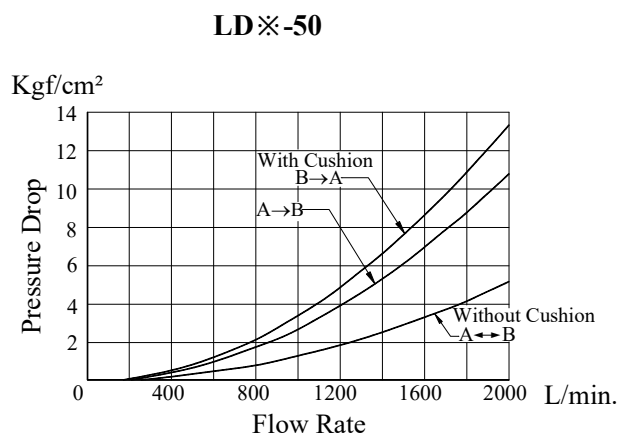
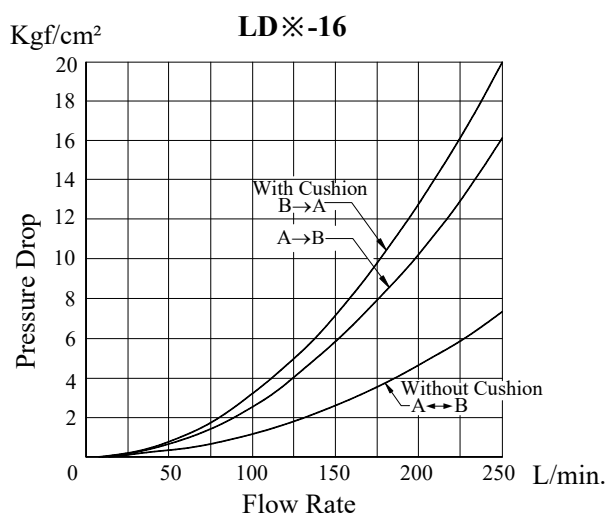
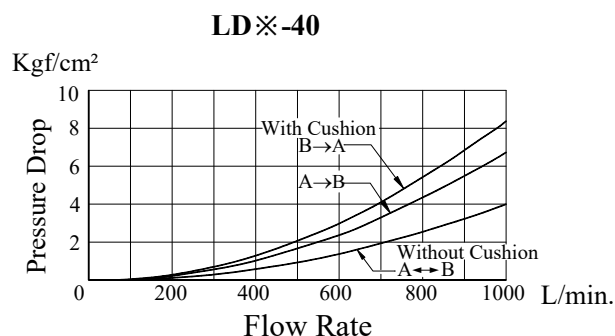
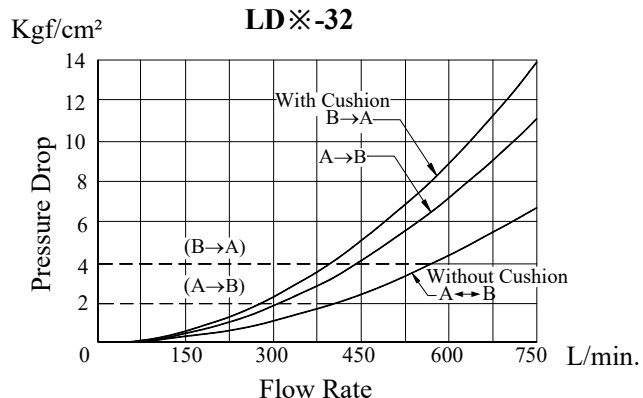
● **Orifice types and standard orifice diameters**

Standard orifice diameters for orifice types are shown below.

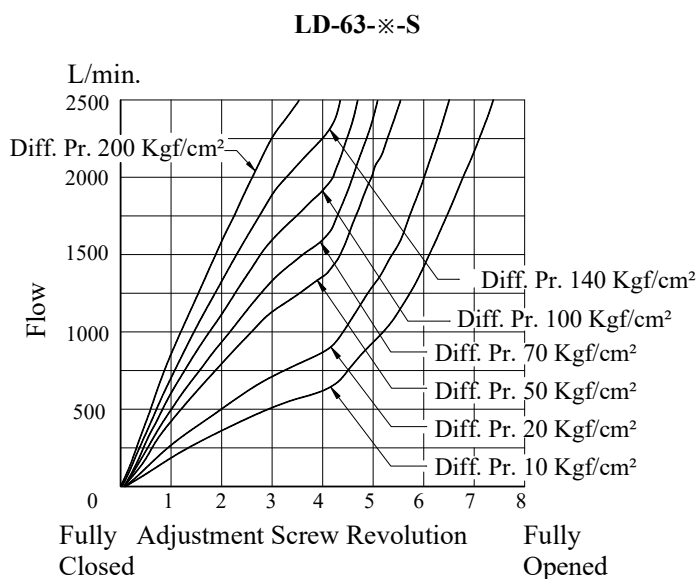
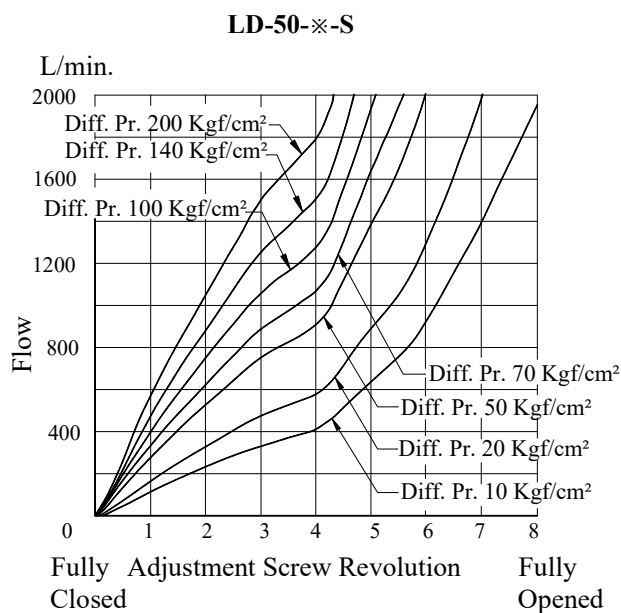
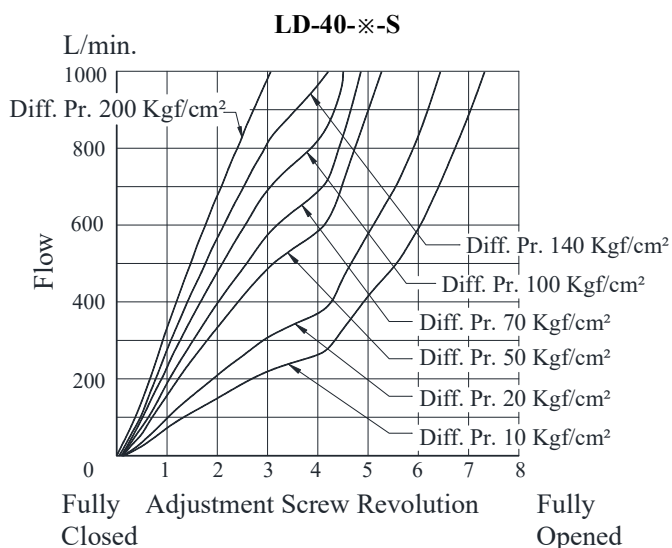
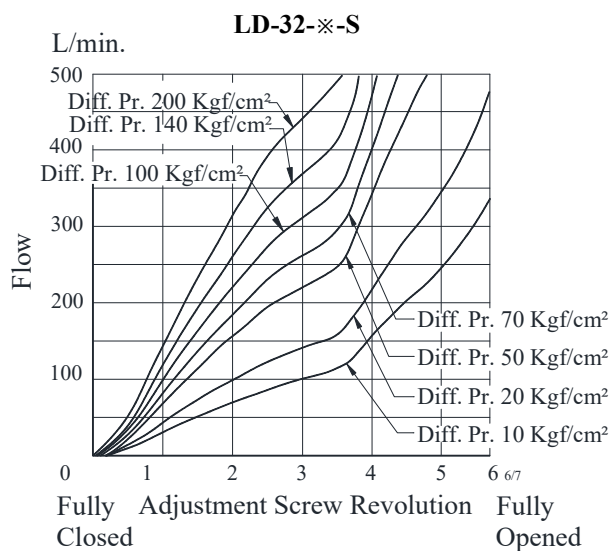
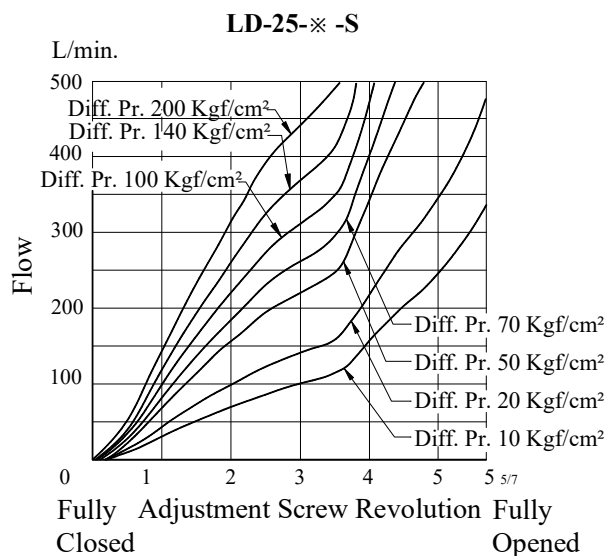
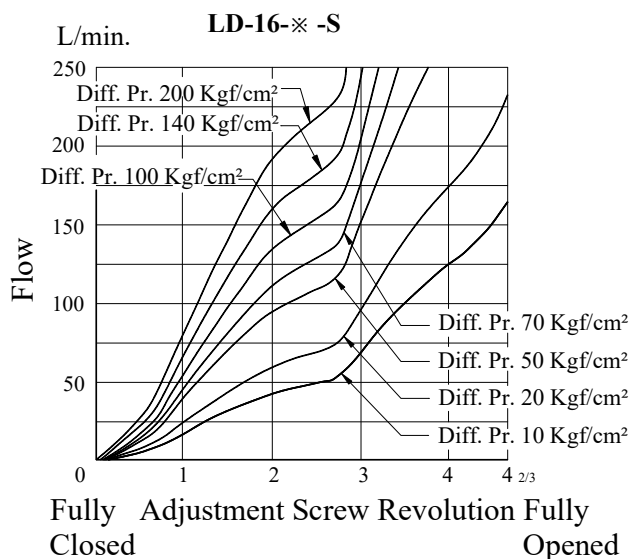
Standard Orifice		Orifice Type			
Designation Of Orifice	Orifice Dia. "d" mm	TP-OPM -4 x d	TP-OPT -1/16 x d	TP-OPT -1/8 x d	TP-OPT -3/8 x d
05	0.5	0	0	0	-
06	0.6	0	0	-	-
08	0.8	0	0	0	-
10	1.0	0	0	0	-
12	1.2	0	0	0	-
14	1.4	0	0	0	-
16	1.6	0	0	0	0
18	1.8	-	0	0	0
20	2.0	-	0	0	0
25	2.5	-	0	0	0
32	3.2	-	-	0	0
40	4.0	-	-	-	0
50	5.0	-	-	-	0
Recommended tightening torque Kgf-cm		17	55	105	500

Fig.2 Pilot Flow Rate Vs. Differential Pressure Characteristics



Typical Valve Characteristics Oil Viscosity 35 cSt [ISO VG 46, Temp 50⁰ C]**Flow rate Vs. Pressure**Ex: Cracking Pressure A→B 2Kgf/cm² is required**Directional Control Logic Valves****Solenoid Operated Directional Control Logic Valves**

Adjustment Screw revolution Vs. Flow Rate



Relief Logic Valve

The relief logic valve is used to protect pumps and control valves from excessive pressure and controls the pressures of their hydraulic lines at constant levels.

With the help of vent lines, they are also capable of remote and unload control.

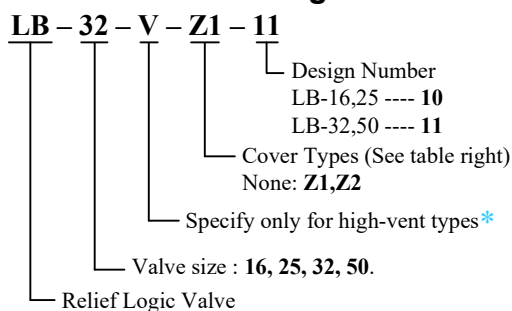


Specifications

Model Numbers	Max. operating Pressure Kgf/cm ²	Pressure Adj. Range Kgf/cm ²	Max. Flow* L/min.	Min. Flow L/min.	Mass Kg.
LB-16-※-※-10	315	4 - 315	125	5	3.6
LB-25-※-※-10			250	5	4.5
LB-32-※-※-11			500	8	6.7
LB-50-※-※-11			1200	10	16.1

* If the pressure is above 250 Kgf/cm², keep the flow rate above 15 L/min. for any model.

Model Number Designation



* Use high-vent pressure types if the shifting time from unloading to on-loading is reduced.

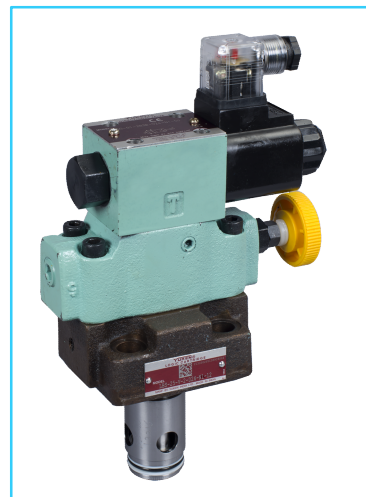
List of Cover Types

Cover Type Designation	Graphic Symbols	Valve Size			
		16	25	32	50
Standard (None)		O	O	O	O
Vent Controlled (Z1)		O	O	O	O
Vent Controlled (Z2)		O	O	O	O

Solenoid Controlled Relief Logic valves

The solenoid controlled relief logic valves are composite control valves having solenoid controlled directional and pilot relief valves and vent restrictors combined together.

This configuration eliminates pipes from the vent circuits of relief logic valves. They are used to put pumps in to unloading operation, with the solenoid controlled directional valves serving to select pilot lines, or to place hydraulic system two or three pressure controls, with the pilot relief valves in action.

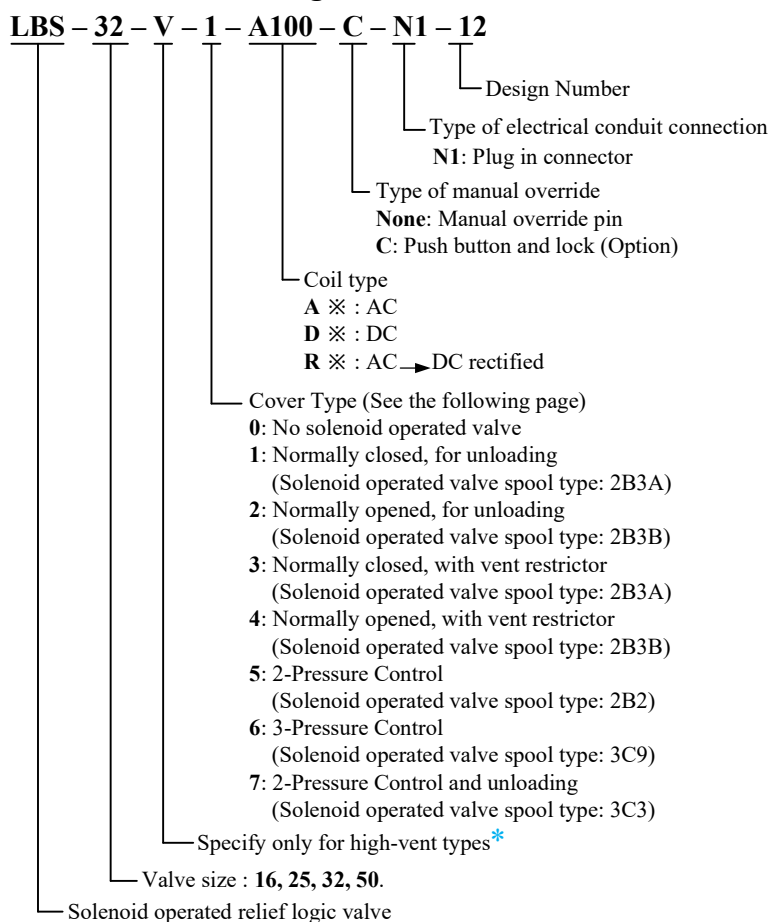


Specifications

Model Numbers	Max. operating Pressure Kgf/cm ²	Pressure Adj. Range Kgf/cm ²	Max. Flow L/min	Min. Flow* L/min	Mass Kg
LBS-16-※-※-12	315	4 - 315	125	5	8.8
LBS-25-※-※-12			250	5	9.7
LBS-32-※-※-12			500	8	11.9
LBS-50-※-※-12			1200	10	21.3

* If the pressure is above 250 Kgf/cm², keep the flow rate above 15 L/min for any model.

Model Number Designation



* Use high-vent pressure types if the shifting time from unloading to on-loading is reduced.

List of Cover Types

Cover Type Designation	Graphic Symbols	Valve Size			
		16	25	32	50
Without Solenoid valve (0)		O	O	O	O
Normally Closed for Unloading (1)		O	O	O	O
Normally Open for Unloading (2)		O	O	O	O
Normally Closed with Vent Restrictor (3)		O	O	O	O
Normally Open with Vent Restrictor (4)		O	O	O	O
Two Pressure control (5)		O	O	O	O
Three Pressure Control (6)		O	O	O	O
Two-Pressure Control and Unloading (7)		O	O	O	O

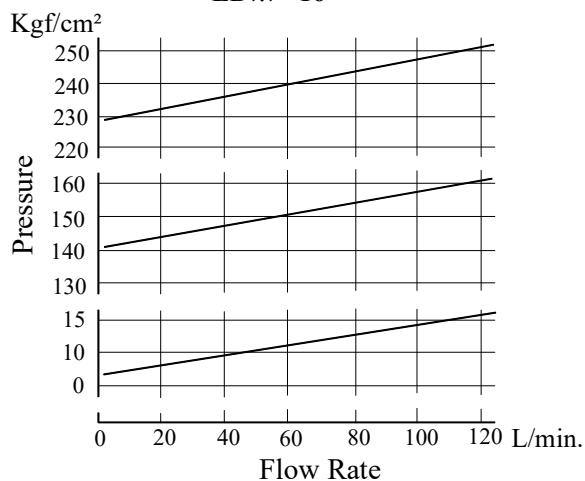
Typical Valve Characteristics Oil Viscosity 35 cSt [ISO VG 46, Temp 50⁰ C]

Flow Rate Vs. Pressure

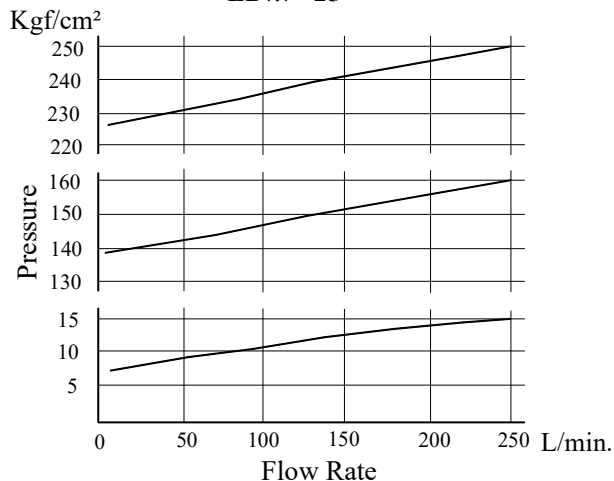
Hydraulic Fluid : ISO VG46 Oils

Viscosity : 35 mm²/s (cSt)

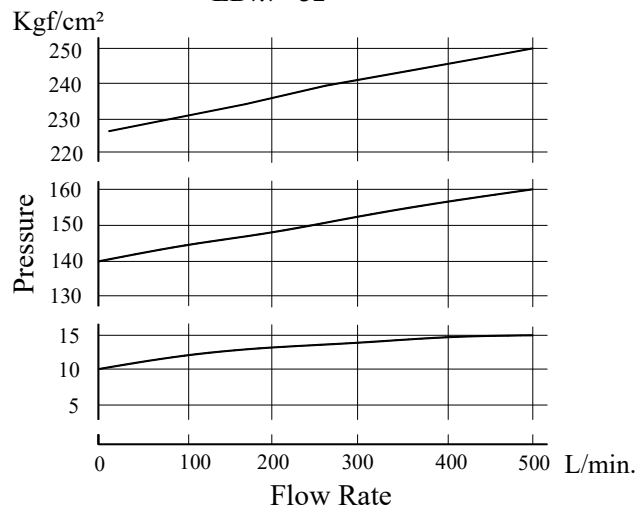
LB※ - 16



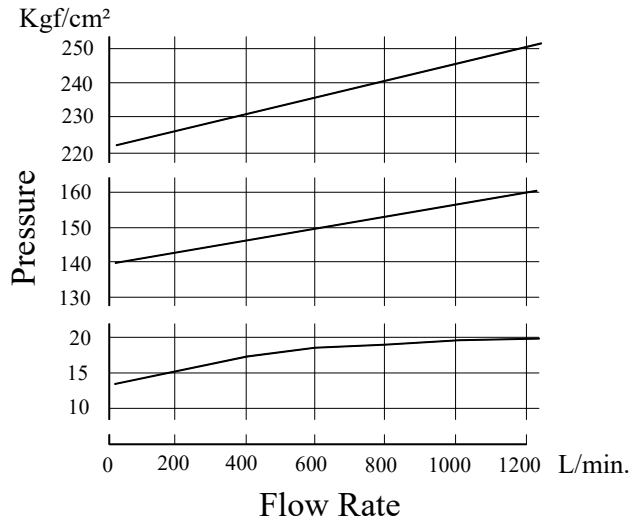
LB※ - 25



LB※ - 32



LB※ - 50



Min. Adjustment Pressure

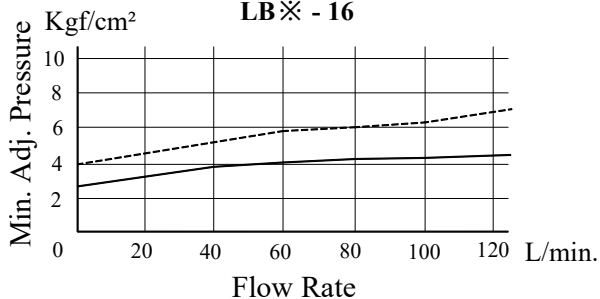
Hydraulic Fluid : ISO VG46 Oils

Viscosity : 35 mm²/s (cSt)

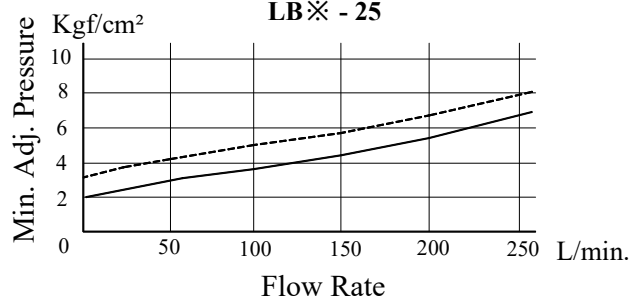
—— Low - Vent

----- High - Vent

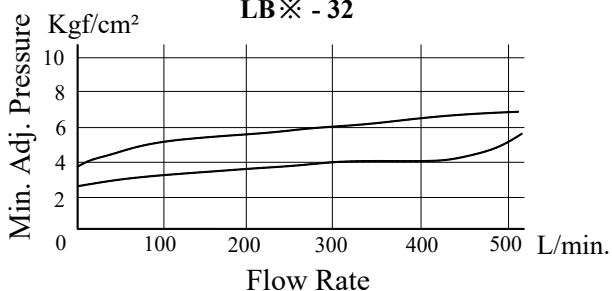
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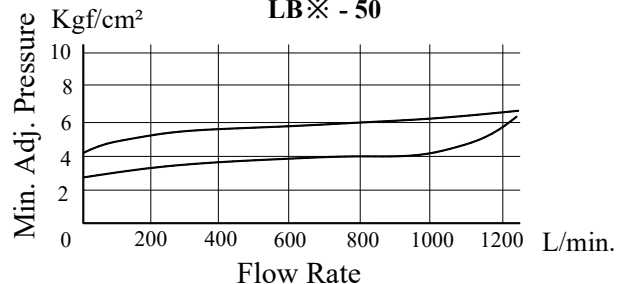
LB※ - 25



LB※ - 32



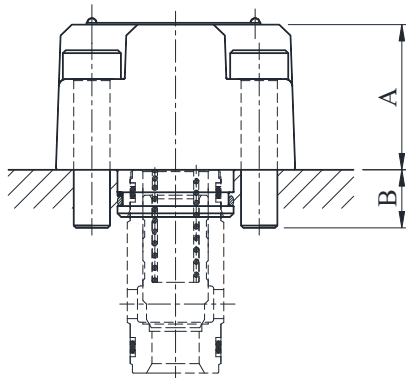
LB※ - 50



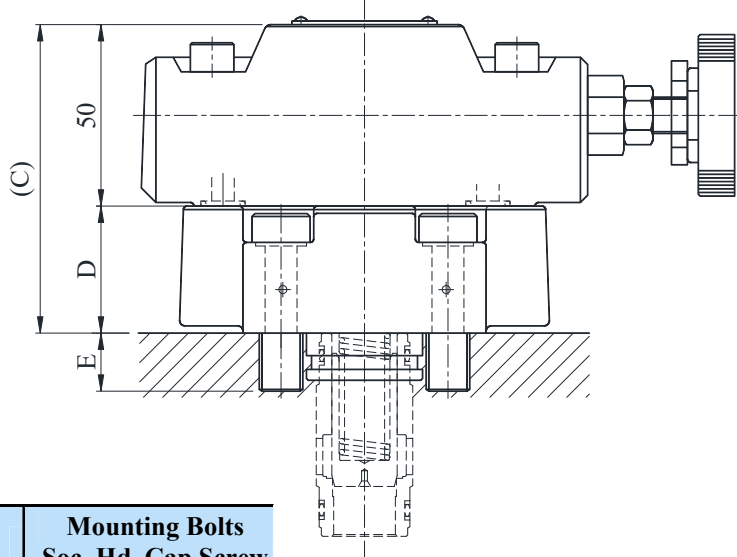
Relief Logic Valves

Solenoid Controlled Relief Logic Valves

■ LD-※-※-※-※-※-※-12

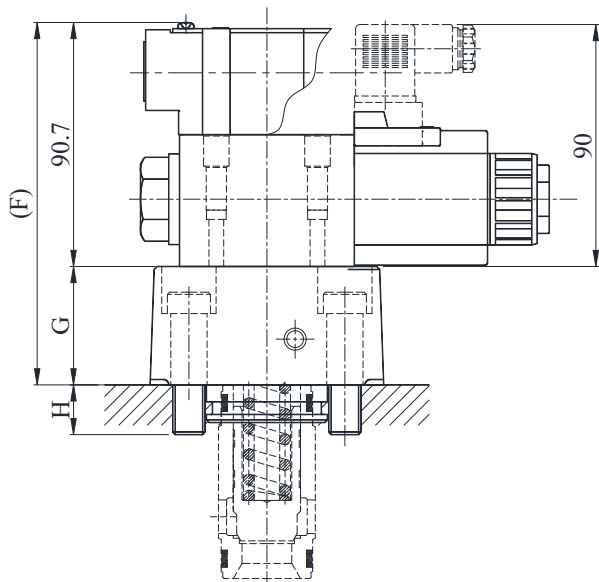


■ LB-※-※-※-※-11

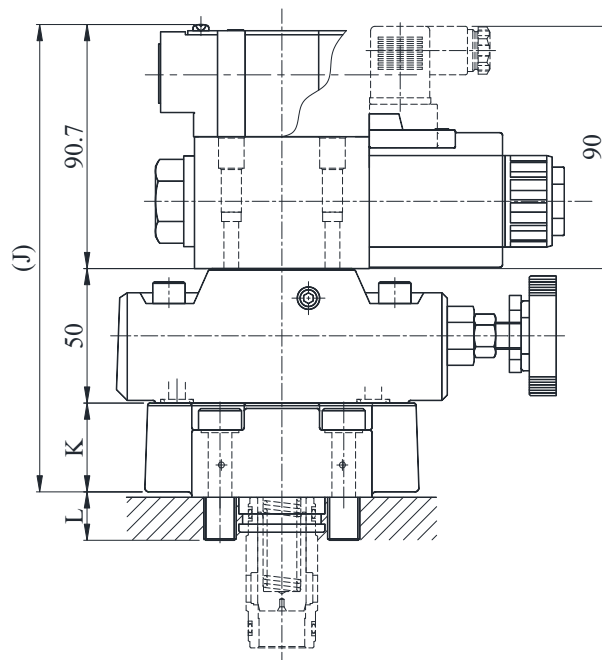


Valve Size	A	B	C	D	E	Mounting Bolts Soc. Hd. Cap Screw
16	40	16	85	35	16	M8 x 40 Lg.
25	46	20	90	40	20	M12 x 45 Lg.
32	57	24	105	55	24	M16 x 55 Lg.
40	67	33	-	-	-	M20 x 70 Lg.
50	84	37	132	82	37	M20 x 90 Lg.
63	100	43	-	-	-	M30 x 100 Lg.

■ LDS-※-※-※-※-※-※-※-※-※-12



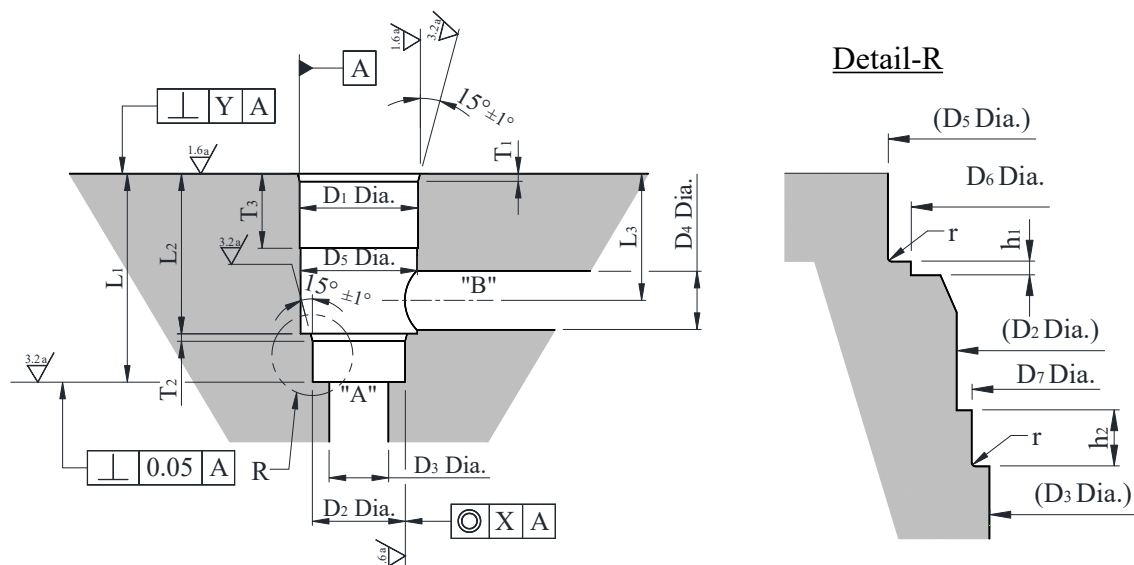
■ LBS-※-※-※-※-※-※-12



Valve Size	F	G	H	J	K	L	Mounting Bolts Soc. Hd. Cap Screw
16	-	-	-	175.7	35	16	M8 x 40 Lg.
25	134.7	44	18.5	180.7	40	20	M12 x 45 Lg.
32	145.7	55	24	195.7	55	24	M16 x 55 Lg.
40	155.7	65	33	-	-	-	M20 x 70 Lg.
50	176.7	82	37	222.7	82	37	M20 x 90 Lg.
63	192.7	98	43	-	-	-	M30 x 100 Lg.

Mounting Dimensions

The mounting dimensions of Yuken Logic valves confirm to the cavity specifications comply with ISO 7368 (TWO-PORT SLIP-IN CARTRIDGE VALVES-CAVITIES).

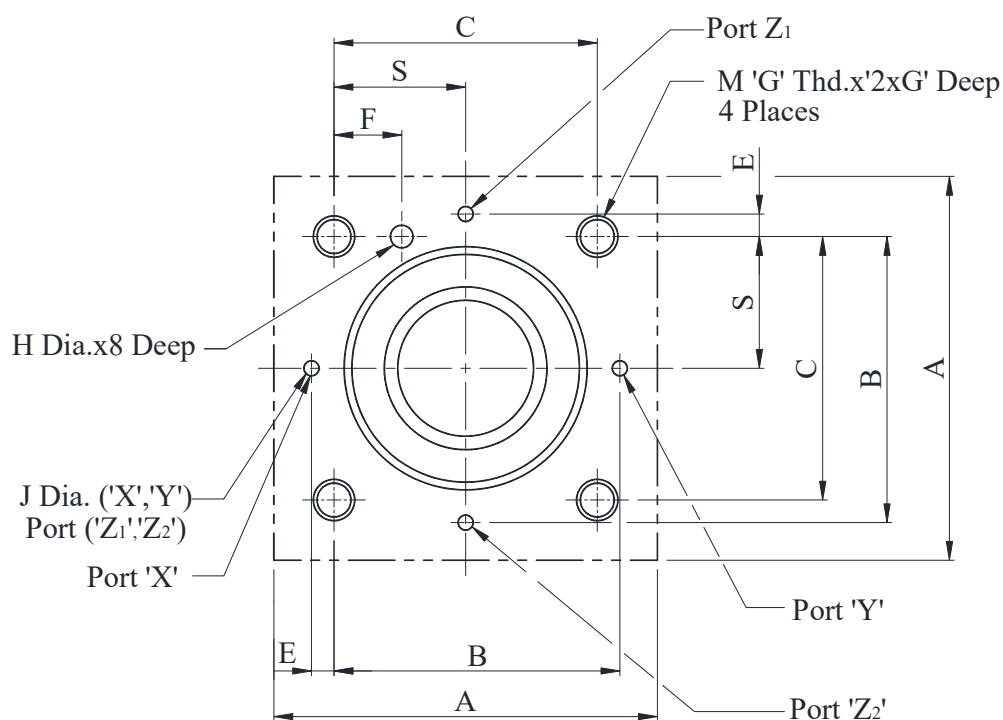


Valve Size	L1		L2		L3 ±0.3	D1		D2		D3	D4	D5 Min.
	Standard Dimensions	Tolerance	Standard Dimensions	Tolerance		Standard Dimensions	Tolerance	Standard Dimensions	Tolerance			
16	56	+ 0.1 0	43	+ 0.1 0	34	32	+ 0.039 0	25	+ 0.033 0	16		31.5
25	72		58		44	45		34	+ 0.039 0	25		44.5
32	85		70		52	60	+ 0.046 0	45	+ 0.046 0	32		59.5
40	105		87		64	75		55		40		74
50	122		100		72	90	+ 0.054 0	68	+ 0.054 0	50		89
63	155		130		95	120		90		63		119

Valve Size	D6	D7 Min.	T1	T2	T3 +0.5 0	h1	h2	r Max.	x	y
16	28.5	24.6	2	2	20	0.2	2	0.8	0.03	0.05
25	39.5	33.6	2.5	2.5	30					
32	52.5	44.6	2.5	2.5	30					
40	65	54.6	3	3	30	0.3	3		0.05	0.1
50	75	67.6	3	3	35					
63	105	89.6	4	4	40	0.4	5			

Cover Mounting Dimensions -

Square Type Flange Cover



Valve Size	A ^{*1} +1 0	B ± 0.2	C ± 0.2	S ± 0.2	E ± 0.2	F ± 0.2	G	H ^{*2} Dia.	J ^{*3} Dia.
16	65	48	46	23	2	12.5	8	4	4
25	85	62	58	29	4	13	12	6	6
32	102	76	70	35	6	18	16	6	8
40	125	92.5	85	42.5	7.5	19.5	20	6	10
50	140	108	100	50	8	20	20	8	10
63	180	137.5	125	62.5	12.5	24.5	30	8	12

- * 1 The tolerances in column A apply to cutting.
- * 2 H Dia. and J Dia. are drilled holes.
- * 3 J Dia. should be drilled appropriately for X,Y,Z1, or Z2

Mounting Bolt Tightening Torques

Sl. No.	Size	Tightening Torque Kgf-cm
1	M8	365.0
2	M12	1235.0
3	M16	3010.0
4	M20	5860.0
5	M30	16800.0

Spare Parts List

List of Seals

Model Numbers	Name of Part	Part Number	Qty.					
			Cover-None	Cover-1	Cover-2	Cover-3	Cover-4	Cover-5
LD-16-※-※-※-※※-12	Back Up Ring	VK4 13071	1	1	1	1	1	1
	Back Up Ring	VK4 13070	4	4	4	4	4	4
	Back Up Ring	VK4 13831	---	1	1	1	---	---
	O-Ring	AS568-024	1	1	1	1	1	1
	O-Ring	AS568-020	2	2	2	2	2	2
	O-Ring	SO-NB-P10	---	---	1	1	1	1
	O-Ring	SO-NB-P9	1	1	2	4	2	4
	O-Ring	SO-NB-P8	---	1	1	1	---	---
LD-25-※-※-※-※※-12	Back Up Ring	VK4 13073	1	1	1	1	1	1
	Back Up Ring	VK4 13072	4	4	4	4	4	4
	Back Up Ring	VK4 13832	---	1	1	1	---	---
	O-Ring	AS568-129	1	1	1	1	1	1
	O-Ring	AS568-122	2	2	2	2	2	2
	O-Ring	SO-NB-P18	---	---	---	---	---	1
	O-Ring	SO-NB-P12	---	---	---	---	---	1
	O-Ring	SO-NB-P10	---	---	1	1	1	1
	O-Ring	SO-NB-P9	1	1	2	4	2	3
	O-Ring	SO-NB-P10	---	1	1	1	---	---
LD-32-※-※-※-※※-12	Back Up Ring	VK4 13074	1	1	1	1	1	1
	Back Up Ring	VK4 13073	4	4	4	4	4	4
	Back Up Ring	VK4 13833	---	1	1	1	---	---
	O-Ring	AS568-139	1	1	1	1	1	1
	O-Ring	AS568-129	2	2	2	2	2	2
	O-Ring	SO-NB-P16	---	1	1	1	---	---
	O-Ring	SO-NB-P18	---	---	1	---	1	1
	O-Ring	SO-NB-P12	---	---	---	---	---	1
	O-Ring	SO-NB-P11	1	1	2	3	2	3
	O-Ring	SO-NB-P10	---	---	---	1	---	1
	O-Ring	SO-NB-P9	---	---	---	1	---	---
LD-40-※-※-※-※※-12	Back Up Ring	VK4 13076	1	1	1	1	1	1
	Back Up Ring	VK4 13075	4	4	4	4	4	4
	Back Up Ring	VK4 13834	---	1	1	1	---	---
	O-Ring	AS568-148	1	1	1	1	1	1
	O-Ring	AS568-136	2	2	2	2	2	2
	O-Ring	SO-NB-P21	---	1	1	1	---	---
	O-Ring	SO-NB-P10	---	---	---	1	---	1
	O-Ring	SO-NB-P12	---	---	---	1	---	1
	O-Ring	SO-NB-P14	1	1	2	3	2	3
	O-Ring	SO-NB-P18	---	---	1	1	1	1

Spare Parts List

List of Seals

Model Numbers	Name of Part	Part Number	Qty.					
			Cover-None	Cover-1	Cover-2	Cover-3	Cover-4	Cover-5
LD-50-※-※-※-※-12	Back Up Ring	VK4 13191	1	1	1	1	1	1
	Back Up Ring	VK4 13077	4	4	4	4	4	4
	Back Up Ring	SO-BB-P26	---	1	1	1	---	---
	O-Ring	AS568-144	2	2	2	2	2	2
	O-Ring	SO-NB-G85	1	1	1	1	1	1
	O-Ring	SO-NB-P26	---	1	1	1	---	---
	O-Ring	SO-NB-P21	---	---	1	1	1	1
	O-Ring	SO-NB-P16	---	---	---	1	---	1
	O-Ring	SO-NB-P14	1	1	2	4	2	4
LD-63-※-※-※-※-12	Back Up Ring	VK4 13192	1	1	1	1	1	1
	Back Up Ring	VK4 13191	4	4	4	4	4	4
	Back Up Ring	VK4 13836	---	1	1	1	---	---
	O-Ring	SO-NB-G115	1	1	1	1	1	1
	O-Ring	SO-NB-G85	2	2	2	2	2	2
	O-Ring	SO-NB-P34	---	1	1	1	---	---
	O-Ring	SO-NB-P21	---	---	1	1	1	1
	O-Ring	SO-NB-P16	---	---	---	1	---	1
	O-Ring	SO-NB-P15	1	1	2	3	2	3
	O-Ring	SO-NB-P14	---	---	---	1	---	1

Note: When ordering the seals, please specify the seal kit number as shown.

List of Seal kits

Valve Model Numbers	Seal Kit Numbers			
	Cover-None	Cover-1	Cover-2	Cover-3
LD-16-※-※-※-※-12	KS-LD-16-12	KS-LD-16-1-12	KS-LD-16-2-12	KS-LD-16-3-12
LD-25-※-※-※-※-12	KS-LD-25-12	KS-LD-25-1-12	KS-LD-25-2-12	KS-LD-25-3-12
LD-32-※-※-※-※-12	KS-LD-32-12	KS-LD-32-1-12	KS-LD-32-2-12	KS-LD-32-3-12
LD-40-※-※-※-※-12	KS-LD-40-12	KS-LD-40-1-12	KS-LD-40-2-12	KS-LD-40-3-12
LD-50-※-※-※-※-12	KS-LD-50-12	KS-LD-50-1-12	KS-LD-50-2-12	KS-LD-50-3-12
LD-63-※-※-※-※-12	KS-LD-63-12	KS-LD-63-1-12	KS-LD-63-2-12	KS-LD-63-3-12

List of Seal kits

Valve Model Numbers	Seal Kit Numbers	
	Cover-4	Cover-5
LD-16-※-※-※-※-12	KS-LD-16-4-12	KS-LD-16-5-12
LD-25-※-※-※-※-12	KS-LD-25-4-12	KS-LD-25-5-12
LD-32-※-※-※-※-12	KS-LD-32-4-12	KS-LD-32-5-12
LD-40-※-※-※-※-12	KS-LD-40-4-12	KS-LD-40-5-12
LD-50-※-※-※-※-12	KS-LD-50-4-12	KS-LD-50-5-12
LD-63-※-※-※-※-12	KS-LD-63-4-12	KS-LD-63-5-12

Spare Parts List

List of Seals

Model Numbers	Name of Part	Part Number	Qty.					
			Cover-1	Cover-2	Cover-3	Cover-4	Cover-5	Cover-6
LDS-16-※-※-※-12H01	Back Up Ring	VK4 13071	1	1	---	---	---	---
	Back Up Ring	VK4 13070	4	4	---	---	---	---
	O-Ring	AS568-024	1	1	---	---	---	---
	O-Ring	AS568-020	2	2	---	---	---	---
	O-Ring	SO-NB-P9	5	5	---	---	---	---
	O-Ring	SO-NB-P18	1	1	---	---	---	---
LDS-25-※-※-※-12	Back Up Ring	VK4 13073	1	1	1	1	1	1
	Back Up Ring	VK4 13072	4	4	4	4	4	4
	O-Ring	AS568-129	1	1	1	1	1	1
	O-Ring	AS568-122	2	2	2	2	2	2
	O-Ring	SO-NB-P18	---	---	1	1	1	1
	O-Ring	SO-NB-P12	---	---	1	1	1	1
	O-Ring	SO-NB-P10	---	---	1	1	1	1
	O-Ring	SO-NB-P9	6	6	7	7	7	7
LDS-32-※-※-※-12	O-Ring	SO-NB-P18	1	1	1	1	1	1
	Back Up Ring	VK4 13074	1	1	1	1	1	1
	Back Up Ring	VK4 13073	4	4	4	4	4	4
	O-Ring	AS568-139	1	1	1	1	1	1
	O-Ring	AS568-129	2	2	2	2	2	2
	O-Ring	SO-NB-P18	1	1	2	2	2	2
	O-Ring	SO-NB-P12	---	---	1	1	1	1
	O-Ring	SO-NB-P11	2	2	3	3	3	3
	O-Ring	SO-NB-P10	---	---	1	1	1	1
LDS-40-※-※-※-12	O-Ring	SO-NB-P9	4	4	4	4	4	4
	Back Up Ring	VK4 13076	1	1	1	1	1	1
	Back Up Ring	VK4 13075	4	4	4	4	4	4
	O-Ring	AS568-148	1	1	1	1	1	1
	O-Ring	AS568-136	2	2	2	2	2	2
	O-Ring	SO-NB-P10	---	---	1	1	1	1
	O-Ring	SO-NB-P12	---	---	1	1	1	1
	O-Ring	SO-NB-P14	2	2	3	3	3	3
	O-Ring	SO-NB-P18	1	1	2	2	2	2
LDS-50-※-※-※-12	O-Ring	SO-NB-P9	4	4	4	4	4	4
	Back Up Ring	VK4 13191	1	1	1	1	1	1
	Back Up Ring	VK4 13077	4	4	4	4	4	4
	O-Ring	AS568-144	2	2	2	2	2	2
	O-Ring	SO-NB-G85	1	1	1	1	1	1
	O-Ring	SO-NB-P21	2	2	3	3	3	3
	O-Ring	SO-NB-P16	---	---	1	1	1	1
	O-Ring	SO-NB-P14	2	2	4	4	4	4
LDS-50-※-※-※-12	O-Ring	AS568-A014	5	5	5	5	5	5

Spare Parts List

● List of Seals

Model Numbers	Name of Part	Part Number	Qty.					
			Cover-1	Cover-2	Cover-3	Cover-4	Cover-5	Cover-6
LDS-63-※-※-※- N1-12	Back Up Ring	VK4 13192	1	1	1	1	1	1
	Back Up Ring	VK4 13191	4	4	4	4	4	4
	O-Ring	SO-NB-G115	1	1	1	1	1	1
	O-Ring	SO-NB-G85	2	2	2	2	2	2
	O-Ring	SO-NB-P21	2	2	3	3	3	3
	O-Ring	SO-NB-P16	---	---	1	1	1	1
	O-Ring	SO-NB-P15	2	2	3	3	3	3
	O-Ring	SO-NB-P14	---	---	1	1	1	1
	O-Ring	AS568-A014	5	5	5	5	5	5

Note: When ordering the seals, please specify the seal kit number as shown.

- **List of Seal kits**

Valve Model Numbers	Seal Kit Numbers		
	Cover-1	Cover-2	Cover-3
LDS-16-※-※-※-N1-12H01	KS-LDS-16-1-N1-12H01	KS-LDS-16-2-N1-12H01	---
LDS-25-※-※-※-N1-12	KS-LDS-25-1-N1-12	KS-LDS-25-2-N1-12	KS-LDS-25-3-N1-12
LDS-32-※-※-※-N1-12	KS-LDS-32-1-N1-12	KS-LDS-32-2-N1-12	KS-LDS-32-3-N1-12
LDS-40-※-※-※-N1-12	KS-LDS-40-1-N1-12	KS-LDS-40-2-N1-12	KS-LDS-40-3-N1-12
LDS-50-※-※-※-N1-12	KS-LDS-50-1-N1-12	KS-LDS-50-2-N1-12	KS-LDS-50-3-N1-12
LDS-63-※-※-※-N1-12	KS-LDS-63-1-N1-12	KS-LDS-63-2-N1-12	KS-LDS-63-3-N1-12

- **List of Seal kits**

Valve Model Numbers	Seal Kit Numbers		
	Cover-4	Cover-5	Cover-6
LDS-16-※-※-※- N1-12H01	---	---	---
LDS-25-※-※-※- N1-12	KS-LDS-25-4-N1-12	KS-LDS-25-5-N1-12	KS-LDS-25-6-N1-12
LDS-32-※-※-※- N1-12	KS-LDS-32-4-N1-12	KS-LDS-32-5-N1-12	KS-LDS-32-6-N1-12
LDS-40-※-※-※- N1-12	KS-LDS-40-4-N1-12	KS-LDS-40-5-N1-12	KS-LDS-40-6-N1-12
LDS-50-※-※-※- N1-12	KS-LDS-50-4-N1-12	KS-LDS-50-5-N1-12	KS-LDS-50-6-N1-12
LDS-63-※-※-※- N1-12	KS-LDS-63-4-N1-12	KS-LDS-63-5-N1-12	KS-LDS-63-6-N1-12

Spare Parts List

List of Seals

Model Numbers	Name of Part	Part Number	Qty.		
			Cover-None	Cover-Z1	Cover-Z2
LB-16-※-※-10	Back Up Ring	VK4 13071	1	1	1
	Back Up Ring	VK4 13070	4	4	4
	O-Ring	AS568-024	1	1	1
	O-Ring	AS568-020	2	2	2
	O-Ring	SO-NB-P7	2	3	3
	O-Ring	SO-NB-P9	3	3	3
	O-Ring	SO-NA-P9	1	1	1
LB-25-※-※-10	Back Up Ring	VK4 13073	1	1	1
	Back Up Ring	VK4 13072	4	4	4
	O-Ring	AS568-129	1	1	1
	O-Ring	AS568-122	2	2	2
	O-Ring	SO-NB-P9	3	3	4
	O-Ring	SO-NA-P9	1	1	1
LB-32-※-※-11	Back Up Ring	VK4 13074	1	1	1
	Back Up Ring	VK4 13073	4	4	4
	O-Ring	AS568-139	1	1	1
	O-Ring	AS568-129	2	2	2
	O-Ring	SO-NB-P11	2	3	3
	O-Ring	SO-NA-P9	1	1	1
	O-Ring	SO-NB-P9	3	3	3
LB-50-※-※-11	Back Up Ring	VK4 13191	1	1	1
	Back Up Ring	VK4 13077	4	4	4
	O-Ring	AS568-144	2	2	2
	O-Ring	SO-NB-P9	3	3	3
	O-Ring	SO-NB-G85	1	1	1
	O-Ring	SO-NB-P14	2	3	3
	O-Ring	SO-NA-P9	1	1	1

Note: When ordering the seals, please specify the seal kit number as shown.

List of Seal kits

Valve Model Numbers	Seal Kit Numbers		
	Cover-None	Cover-Z1	Cover-Z2
LB-16-※-※-10	KS-LB-16-10	KS-LB-16-Z1-10	KS-LB-16-Z2-10
LB-25-※-※-10	KS-LB-25-10	KS-LB-25-Z1-10	KS-LB-25-Z2-10
LB-32-※-※-11	KS-LB-32-11	KS-LB-32-Z1-11	KS-LB-32-Z2-11
LB-50-※-※-11	KS-LB-50-11	KS-LB-50-Z1-11	KS-LB-50-Z2-11

Spare Parts List

List of Seal kits

Valve Model Numbers	Seal Kit Numbers		
	Cover-0	Cover-1	Cover-2
LBS-16-※-※-※-※-※-※-※-※-※-12	KS-LBS-16-0-N1-12	KS-LBS-16-1-N1-12	KS-LBS-16-2-N1-12
LBS-25-※-※-※-※-※-※-※-※-※-12	KS-LBS-25-0-N1-12	KS-LBS-25-1-N1-12	KS-LBS-25-2-N1-12
LBS-32-※-※-※-※-※-※-※-※-※-12	KS-LBS-32-0-N1-12	KS-LBS-32-1-N1-12	KS-LBS-32-2-N1-12
LBS-50-※-※-※-※-※-※-※-※-※-12	KS-LBS-50-0-N1-12	KS-LBS-50-1-N1-12	KS-LBS-50-2-N1-12

Valve Model Numbers	Seal Kit Numbers		
	Cover-3	Cover-4	Cover-5
LBS-16-※-※-※-※-※-※-※-※-※-12	KS-LBS-16-3-N1-12	KS-LBS-16-4-N1-12	KS-LBS-16-5-N1-12
LBS-25-※-※-※-※-※-※-※-※-※-12	KS-LBS-25-3-N1-12	KS-LBS-25-4-N1-12	KS-LBS-25-5-N1-12
LBS-32-※-※-※-※-※-※-※-※-※-12	KS-LBS-32-3-N1-12	KS-LBS-32-4-N1-12	KS-LBS-32-5-N1-12
LBS-50-※-※-※-※-※-※-※-※-※-12	KS-LBS-50-3-N1-12	KS-LBS-50-4-N1-12	KS-LBS-50-5-N1-12

Valve Model Numbers	Seal Kit Numbers	
	Cover-6	Cover-7
LBS-16-※-※-※-※-※-※-※-※-※-12	KS-LBS-16-6-N1-12	KS-LBS-16-7-N1-12
LBS-25-※-※-※-※-※-※-※-※-※-12	KS-LBS-25-6-N1-12	KS-LBS-25-7-N1-12
LBS-32-※-※-※-※-※-※-※-※-※-12	KS-LBS-32-6-N1-12	KS-LBS-32-7-N1-12
LBS-50-※-※-※-※-※-※-※-※-※-12	KS-LBS-50-6-N1-12	KS-LBS-50-7-N1-12

Spare Parts List

List of Items for Cover Assembly

Valve Model Number	Name of Part	Part Number	Qty.					
			Cover-None	Cover-1	Cover-2	Cover-3	Cover-4	Cover-5
LD-16-※-※-※-※-※-※-※-※-※-12	Cover -None	VK3 12456	1	---	---	---	---	---
	Cover -1	VK3 12457	---	1	---	---	---	---
	Cover -2	VK2 10699	---	---	1	---	---	---
	Cover -3	VK2 10700	---	---	---	1	---	---
	Cover -4	VK2 10701	---	---	---	---	1	---
	Cover -5	VK2 10702	---	---	---	---	---	1
	O-Ring	SO-NB-P9	1	1	2	4	2	4
	PT Plug	FP-SA-1/8	1	1	2	---	2	---
		FP-SB-1/16	---	---	---	3	1	4
	Adaptor	VK4 14609	---	---	1	---	1	---
		VK4 13142	---	---	---	1	---	1
	Seat	VK4 14610	---	---	1	---	1	---
		VK4 13140	---	---	---	1	---	1
	Spring	VK4 14611	---	---	1	---	1	---
	Snap Ring	SR-R-13	---	---	1	1	1	1
	O-Ring	SO-NB-P10	---	---	1	1	1	1
	Steel Ball	SB-7/32	---	---	1	---	1	---
		SB-15/64	---	---	---	1	---	1
	Spring Pin	PN-RA-3x8	1	1	1	1	1	1
	O-Ring	AS568-024	1	1	1	1	1	1
	Back Up Ring	VK4 13071	1	1	1	1	1	1

Spare Parts List

List of Items for Cover Assembly

Valve Model Number	Name of Part	Part Number	Qty.					
			Cover-None	Cover-1	Cover-2	Cover-3	Cover-4	Cover-5
LD-25-※-※-※-※※-12	Cover -None	VK2 10690	1	---	---	---	---	---
	Cover -1	VK2 10691	---	1	---	---	---	---
	Cover -2	VK2 10692	---	---	1	---	---	---
	Cover -3	VK2 10693	---	---	---	1	---	---
	Cover -4	VK2 10694	---	---	---	---	1	---
	Cover -5	VK2 10695	---	---	---	---	---	1
	O-Ring	SO-NB-P9	1	1	2	4	2	3
	PT Plug	FP-SA-1/8	1	1	2	---	2	---
		FP-SA-1/16	---	---	---	3	---	2
	Adaptor	VK4 14609	---	---	1	---	1	---
		VK4 13142	---	---	---	1	---	---
		VK4 14603	---	---	---	---	---	1
	Seat	VK4 14610	---	---	1	---	1	---
		VK4 13140	---	---	---	1	---	---
		VK4 13145	---	---	---	---	---	1
	Spring	VK4 14611	---	---	1	---	1	---
	Snap Ring	SR-R-13	---	---	1	1	1	---
	O-Ring	SO-NB-P10	---	---	1	1	1	1
	Steel Ball	SB-5/16	---	---	---	---	---	1
		SB-7/32	---	---	1	---	1	---
		SB-15/64	---	---	---	1	---	---
	O-Ring	SO-NB-P18	---	---	---	---	---	1
	O-Ring	SO-NB-P12	---	---	---	---	---	1
	Spring Pin	PN-RA-5x14	1	1	1	1	1	1
	O-Ring	AS568-129	1	1	1	1	1	1
	Back Up Ring	VK4 13073	1	1	1	1	1	1

■ Spare Parts List

● List of Items for Cover Assembly

Valve Model Number	Name of Part	Part Number	Qty.					
			Cover-None	Cover-1	Cover-2	Cover-3	Cover-4	Cover-5
LD-32-※-※-※-※※-12	Cover -None	VK2 10688	1	---	---	---	---	---
	Cover -1	VK2 10689	---	1	---	---	---	---
	Cover -2	VK1 10752	---	---	1	---	---	---
	Cover -3	VK1 10589	---	---	---	1	---	---
	Cover -4	VK1 10753	---	---	---	---	1	---
	Cover -5	VK1 10591	---	---	---	---	---	1
	O-Ring	SO-NB-P9	---	---	---	1	---	---
	PT Plug	FP-SA-1/8	1	1	2	1	2	2
		FP-SB-1/16	---	---	---	2	---	---
	Adaptor	VK4 14612	---	---	1	---	1	---
		VK4 13142	---	---	---	1	---	---
		VK4 14603	---	---	---	---	---	1
	Seat	VK4 14613	---	---	1	---	1	---
		VK4 13140	---	---	---	1	---	---
		VK4 13145	---	---	---	---	---	1
	Spring	VK4 14614	---	---	1	---	1	---
	Snap Ring	SR-R-13	---	---	---	1	---	---
	O-Ring	SO-NB-P10	---	---	---	1	---	1
	Steel Ball	SB-5/16	---	---	---	---	---	1
		SB-9/32	---	---	1	---	1	---
		SB-15/64	---	---	---	1	---	---
	O-Ring	SO-NB-P18	---	---	1	---	1	1
	O-Ring	SO-NB-P12	---	---	---	---	---	1
	Spring Pin	PN-RA-5x14	1	1	1	1	1	1
	O-Ring	SO-NB-P11	1	1	2	3	2	3
	O-Ring	AS568-139	1	1	1	1	1	1
	Back Up Ring	VK4 13074	1	1	1	1	1	1

Spare Parts List

List of Items for Cover Assembly

Valve Model Number	Name of Part	Part Number	Qty.					
			Cover-None	Cover-1	Cover-2	Cover-3	Cover-4	Cover-5
LD-40-※-※-※-※※-12	Cover -None	VK2 10667	1	---	---	---	---	---
	Cover -1	VK2 10668	---	1	---	---	---	---
	Cover -2	VK1 10754	---	---	1	---	---	---
	Cover -3	VK1 10577	---	---	---	1	---	---
	Cover -4	VK1 10755	---	---	---	---	1	---
	Cover -5	VK1 10579	---	---	---	---	---	1
	PT Plug	FP-SA-1/8	1	1	2	2	2	2
		FP-SB-1/16	---	---	---	1	---	---
	Adaptor	VK4 14612	---	---	1	---	1	---
		VK4 14603	---	---	---	1	---	1
	Seat	VK4 14613	---	---	1	---	1	---
		VK4 13146	---	---	---	1	---	---
		VK4 13145	---	---	---	---	---	1
	Spring	VK4 14614	---	---	1	---	1	---
	O-Ring	SO-NB-P10	---	---	---	1	---	1
	Steel Ball	SB-5/16	---	---	---	1	---	1
		SB-9/32	---	---	1	---	1	---
	O-Ring	SO-NB-P18	---	---	1	1	1	1
	O-Ring	SO-NB-P12	---	---	---	1	---	1
	Spring Pin	PN-RA-5x14	1	1	1	1	1	1
	O-Ring	SO-NB-P14	1	1	2	3	2	3
	O-Ring	AS568-148	1	1	1	1	1	1
	Back Up Ring	VK4 13076	1	1	1	1	1	1

Valve Model Number	Name of Part	Part Number	Qty.					
			Cover-None	Cover-1	Cover-2	Cover-3	Cover-4	Cover-5
LD-50-※-※-※-※※-12	Cover -None	VK2 10670	1	---	---	---	---	---
	Cover -1	VK2 10671	---	1	---	---	---	---
	Cover -2	VK1 10756	---	---	1	---	---	---
	Cover -3	VK1 10581	---	---	---	1	---	---
	Cover -4	VK1 10757	---	---	---	---	1	---
	Cover -5	VK1 10583	---	---	---	---	---	1
	PT Plug	FP-SA-1/4	1	1	2	3	2	3
	Adaptor	VK4 14615	---	---	1	---	1	---
		VK3 13483	---	---	---	1	---	1
	Seat	VK4 14616	---	---	1	---	1	---
		VK4 13147	---	---	---	1	---	1
	Spring	VK4 14617	---	---	1	---	1	---
	Steel Ball	SB-7/16	---	---	1	---	1	1
		SB-15/32	---	---	---	1	---	1
	O-Ring	SO-NB-P21	---	---	1	1	1	1
	O-Ring	SO-NB-P16	---	---	---	1	---	1
	Spring Pin	PN-RA-6x18	1	1	1	1	1	1
	O-Ring	SO-NB-P14	1	1	2	4	2	4
	O-Ring	SO-NB-G85	1	1	1	1	1	1
	Back Up Ring	VK4 13191	1	1	1	1	1	1

Spare Parts List

List of Items for Cover Assembly

Valve Model Number	Name of Part	Part Number	Qty.					
			Cover-None	Cover-1	Cover-2	Cover-3	Cover-4	Cover-5
LD-63-※-※-※-※-12	Cover -None	VK2 10673	1	---	---	---	---	---
	Cover -1	VK2 10674	---	1	---	---	---	---
	Cover -2	VK1 10758	---	---	1	---	---	---
	Cover -3	VK1 10585	---	---	---	1	---	---
	Cover -4	VK1 10759	---	---	---	---	1	---
	Cover -5	VK1 10587	---	---	---	---	---	1
	PT Plug	FP-SA-1/4	1	1	3	4	3	3
	Adaptor	VK4 14615	---	---	1	---	1	---
		VK3 13483	---	---	---	1	---	1
	Seat	VK4 14616	---	---	1	---	1	---
		VK4 13147	---	---	---	1	---	1
	Spring	VK4 14617	---	---	1	---	1	---
	Steel Ball	SB-7/16	---	---	1	---	1	1
		SB-15/32	---	---	---	1	---	1
	O-Ring	SO-NB-P21	---	---	1	1	1	1
	O-Ring	SO-NB-P16	---	---	---	1	---	1
	Spring Pin	PN-RA-6x18	1	1	1	1	1	1
	O-Ring	SO-NB-P15	1	1	2	3	2	3
	O-Ring	SO-NB-P14	---	---	---	1	---	1
	O-Ring	SO-NB-G115	1	1	1	1	1	1
	Back Up Ring	VK4 13192	1	1	1	1	1	1

Note: When ordering the Cover Assemblies, please specify the Cover Assembly number as shown.

List of Cover Assemblies

Valve Model Numbers	Cover Assembly Numbers			
	Cover-None	Cover-1	Cover-2	Cover-3
LD-16-※-※-※-※-12	CA-LD-16-12	CA-LD-16-1-12	CA-LD-16-2-12	CA-LD-16-3-12
LD-25-※-※-※-※-12	CA-LD-25-12	CA-LD-25-1-12	CA-LD-25-2-12	CA-LD-25-3-12
LD-32-※-※-※-※-12	CA-LD-32-12	CA-LD-32-1-12	CA-LD-32-2-12	CA-LD-32-3-12
LD-40-※-※-※-※-12	CA-LD-40-12	CA-LD-40-1-12	CA-LD-40-2-12	CA-LD-40-3-12
LD-50-※-※-※-※-12	CA-LD-50-12	CA-LD-50-1-12	CA-LD-50-2-12	CA-LD-50-3-12
LD-63-※-※-※-※-12	CA-LD-63-12	CA-LD-63-1-12	CA-LD-63-2-12	CA-LD-63-3-12

List of Cover Assemblies

Valve Model Numbers	Cover Assembly Numbers	
	Cover-4	Cover-5
LD-16-※-※-※-※-12	CA-LD-16-4-12	CA-LD-16-5-12
LD-25-※-※-※-※-12	CA-LD-25-4-12	CA-LD-25-5-12
LD-32-※-※-※-※-12	CA-LD-32-4-12	CA-LD-32-5-12
LD-40-※-※-※-※-12	CA-LD-40-4-12	CA-LD-40-5-12
LD-50-※-※-※-※-12	CA-LD-50-4-12	CA-LD-50-5-12
LD-63-※-※-※-※-12	CA-LD-63-4-12	CA-LD-63-5-12

■ Spare Parts List

- **List of items for Cover Assembly**

Valve Model Number	Name of Part	Part Number	Qty.	
			Cover-1	Cover-2
LDS-16-※-※-※-12H01	Cover -1	VKH2 0194	1	---
	Cover -2		---	1
	O-Ring	SO-NB-P9	1	1
	PT Plug	FP-SB-1/16	4	4
	Spring Pin	PN-RA-3x8	1	1
	O-Ring	AS568-024	1	1
	Back Up Ring	VK4 13071	1	1

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Valve Model Number	Name of Part	Part Number	Qty.					
			Cover-1	Cover-2	Cover-3	Cover-4	Cover-5	Cover-6
LDS-32-※-※-※-№1-12	Cover -1	VK1 10592	1	---	---	---	---	---
	Cover -2		---	1	---	---	---	---
	Cover -3	VK1 10593	---	---	1	---	---	---
	Cover -4		---	---	---	1	---	---
	Cover -5	VK1 10594	---	---	---	---	1	---
	Cover -6		---	---	---	---	---	1
	O-Ring	SO-NB-P11	2	2	3	3	3	3
	PT Plug	FP-SB-1/16	5	5	4	4	4	4
	Adaptor	VK4 14603	---	---	1	1	1	1
	Seat	VK4 13145	---	---	1	1	1	1
	O-Ring	SO-NB-P10	---	---	1	1	1	1
	Steel Ball	SB-5/16	---	---	1	1	1	1
	O-Ring	SO-NB-P18	---	---	1	1	1	1
	O-Ring	SO-NB-P12	---	---	1	1	1	1
	Spring Pin	PN-RA-5x14	1	1	1	1	1	1
	O-Ring	AS568-139	1	1	1	1	1	1
	Back Up Ring	VK4 13074	1	1	1	1	1	1

Spare Parts List

List of items for Cover Assembly

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■ Spare Parts List

● List of items for Cover Assembly

Valve Model Number	Name of Part	Part Number	Qty.					
			Cover-1	Cover-2	Cover-3	Cover-4	Cover-5	Cover-6
LDS-63-※-※-※- N1-12	Cover -1	VK1 10601	1	---	---	---	---	---
	Cover -2		---	1	---	---	---	---
	Cover -3	VK1 10602	---	---	1	---	---	---
	Cover -4		---	---	---	1	---	---
	Cover -5	VK1 10603	---	---	---	---	1	---
	Cover -6		---	---	---	---	---	1
	O-Ring	SO-NB-P15	2	2	3	3	3	3
	PT Plug	FP-SA-1/4	2	2	5	5	3	3
		FP-SA-1/8	1	1	2	2	1	1
	Adaptor	VK4 13483	---	---	1	1	1	1
	Seat	VK4 13147	---	---	1	1	1	1
	O-Ring	SO-NB-P14	---	---	1	1	1	1
	Steel Ball	SB-15/32	---	---	1	1	1	1
	O-Ring	SO-NB-P21	---	---	1	1	1	1
	O-Ring	SO-NB-P16	---	---	1	1	1	1
	Spring Pin	PN-RA-6x18	1	1	1	1	1	1
	O-Ring	SO-NB-G115	1	1	1	1	1	1
	Back Up Ring	VK4 13192	1	1	1	1	1	1

Note: When ordering the Cover Assemblies, please specify the Cover Assembly number as shown.

● List of Cover Assemblies

Valve Model Numbers	Cover Assembly Numbers					
	Cover-1	Cover-2	Cover-3	Cover-4	Cover-5	Cover-6
LDS-16-※-※-※-12H01	CA-LDS-16-1-12H01		---		---	
LDS-25-※-※-※-12	CA-LDS-25-1-12		CA-LDS-25-3-12		CA-LDS-25-5-12	
LDS-32-※-※-※-12	CA-LDS-32-1-12		CA-LDS-32-3-12		CA-LDS-32-5-12	
LDS-40-※-※-※-12	CA-LDS-40-1-12		CA-LDS-40-3-12		CA-LDS-40-5-12	
LDS-50-※-※-※-12	CA-LDS-50-1-12		CA-LDS-50-3-12		CA-LDS-50-5-12	
LDS-63-※-※-※-12	CA-LDS-63-1-12		CA-LDS-63-3-12		CA-LDS-63-5-12	

■ Spare Parts List

● List of items for Cover Assembly

Model Numbers	Name of Part	Part Number	Qty.		
			Cover-None	Cover-Z1	Cover-Z2
LB-16-※-※-10	Cover	VK2 10565	1	---	---
	Cover-Z1	VK2 10566	---	1	---
	Cover-Z2	VK2 10567	---	---	1
	Orifice	VK4 12966	1	1	1
	Back Up Ring	VK4 13071	1	1	1
	O-Ring	SO-NB-P7	2	3	3
	O-Ring	SO-NB-P9	1	1	1
	O-Ring	AS568-024	1	1	1
	Orifice	TP-OPM-5x1.4	1	2	2
	Orifice	TP-OPM-5x1.6	1	1	1
	Spring Pin	PN-RA-3x8	1	1	1
	Plug	FP-SB-1/16	2	3	3

Spare Parts List

List of items for Cover Assembly

Model Numbers	Name of Part	Part Number	Qty.		
			Cover-None	Cover-Z1	Cover-Z2
LB-25-※-※-10	Cover	VK2 10568	1	---	---
	Cover-Z1	VK2 10569	---	1	---
	Cover-Z2	VK2 10570	---	---	1
	Orifice	VK4 12966	1	1	1
	Back Up Ring	VK4 13073	1	1	1
	O-Ring	SO-NB-P9	1	1	1
	O-Ring	AS568-129	1	1	1
	Orifice	TP-OPM-5x1.4	1	2	2
	Spring Pin	PN-RA-5x14	1	1	1
	Plug	FP-SB-1/16	1	2	2
LB-32-※-※-11	Cover	VK2 10682	1	---	---
	Cover-Z1	VK2 10683	---	1	---
	Cover-Z2	VK2 10684	---	---	1
	Orifice	VK4 13088	1	1	1
	Back Up Ring	VK4 13074	1	1	1
	O-Ring	SO-NB-P9	1	1	1
	O-Ring	SO-NB-P11	2	3	3
	O-Ring	AS568-139	1	1	1
	Orifice	TP-OPM-5x1.4	1	2	2
	Spring Pin	PN-RA-5x14	1	1	1
	Plug	FP-SB-1/16	1	2	2
LB-50-※-※-11	Cover	VK2 10685	1	---	---
	Cover-Z1	VK2 10686	---	1	---
	Cover-Z2	VK2 10687	---	---	1
	Orifice	VK4 13083	1	1	1
	Back Up Ring	VK4 13191	1	1	1
	O-Ring	SO-NB-P9	1	1	1
	O-Ring	SO-NB-P14	2	3	3
	O-Ring	SO-NB-G85	1	1	1
	Orifice	TP-OPM-5x1.4	---	1	1
	Orifice	TP-OPM-5x1.6	1	1	1
	Spring Pin	PN-RA-6x18	1	1	1
	Plug	FP-SA-1/4	2	3	3

Note: When ordering the Cover Assemblies, please specify the Cover Assembly number as shown.

List of Cover Assemblies

Valve Model Numbers	Cover Assembly Numbers		
	Cover-None	Cover-Z1	Cover-Z2
LB-16-※-※-10	CA-LB-16-10	CA-LB-16-Z1-10	CA-LB-16-Z2-10
LB-25-※-※-10	CA-LB-25-10	CA-LB-25-Z1-10	CA-LB-25-Z2-10
LB-32-※-※-11	CA-LB-32-11	CA-LB-32-Z1-11	CA-LB-32-Z2-11
LB-50-※-※-11	CA-LB-50-11	CA-LB-50-Z1-11	CA-LB-50-Z2-11

■ Spare Parts List

● List of items for Cover Assembly

Model Numbers	Name of Part	Part Number	Qty.
			Cover-0,1,2,3,4,5,6,7
LBS-16-※-※-※-※-12	Cover	VK2 10565	1
	Orifice	VK4 12966	1
	Back Up Ring	VK4 13071	1
	O-Ring	SO-NB-P7	2
	O-Ring	SO-NB-P9	1
	O-Ring	AS568-024	1
	Orifice	TP-OPM-5x1.4	1
	Orifice	TP-OPM-5x1.6	1
	Spring Pin	PN-RA-3x8	1
	Plug	FP-SB-1/16	2
LBS-25-※-※-※-※-12	Cover	VK2 10568	1
	Orifice	VK4 12966	1
	Back Up Ring	VK4 13073	1
	O-Ring	SO-NB-P9	1
	O-Ring	AS568-129	1
	Orifice	TP-OPM-5x1.4	1
	Spring Pin	PN-RA-5x14	1
	Plug	FP-SB-1/16	1
LBS-32-※-※-※-※-12	Cover	VK2 10682	1
	Orifice	VK4 13088	1
	Back Up Ring	VK4 13074	1
	O-Ring	SO-NB-P9	1
	O-Ring	SO-NB-P11	2
	O-Ring	AS568-139	1
	Orifice	TP-OPM-5x1.4	1
	Spring Pin	PN-RA-5x14	1
	Plug	FP-SB-1/16	1
LBS-50-※-※-※-※-12	Cover	VK2 10685	1
	Orifice	VK4 13083	1
	Back Up Ring	VK4 13191	1
	O-Ring	SO-NB-P9	1
	O-Ring	SO-NB-P14	2
	O-Ring	SO-NB-G85	1
	Orifice	TP-OPM-5x1.6	1
	Spring Pin	PN-RA-6x18	1
	Plug	FP-SA-1/4	2

Note: When ordering the Cover Assemblies, please specify the Cover Assembly number as shown.

● List of Cover Assemblies

Valve Model Numbers	Cover Assembly Numbers
	Cover-0,1,2,3,4,5,6,7
LBS-16-※-※-※-※-12	CA-LBS-16-12
LBS-25-※-※-※-※-12	CA-LBS-25-12
LBS-32-※-※-※-※-12	CA-LBS-32-12
LBS-50-※-※-※-※-12	CA-LBS-50-12

Spare Parts List

List of items for Sleeve & Poppet Assembly

Model Numbers	Name of Part	Part Number	Qty.	
			Poppet	Poppet (S)
LD-16-※-※-※-※※-12 LDS-16-※-※-※-※※-12H01	Sleeve	VK3 12240	1	1
	Poppet	VK4 13114	1	---
	Poppet (S)	VK4 13115	---	1
	O-Ring	AS568-020	2	2
	Back Up Ring	VK4 13070	4	4
LD-25-※-※-※-※※-12 LDS-25-※-※-※-※※-12	Sleeve	VK3 12241	1	1
	Poppet	VK4 13119	1	---
	Poppet (S)	VK4 13120	---	1
	O-Ring	AS568-122	2	2
	Back Up Ring	VK4 13072	4	4
LD-32-※-※-※-※※-12 LDS-32-※-※-※-※※-12	Sleeve	VK3 12242	1	1
	Poppet	VK4 12243	1	---
	Poppet (S)	VK4 1224	---	1
	O-Ring	AS568-129	2	2
	Back Up Ring	VK4 13073	4	4
LD-40-※-※-※-※※-12 LDS-40-※-※-※-※※-12	Sleeve	VK3 12245	1	1
	Poppet	VK4 12246	1	---
	Poppet (S)	VK4 12247	---	1
	O-Ring	AS568-136	2	2
	Back Up Ring	VK4 13075	4	4
LD-50-※-※-※-※※-12 LDS-50-※-※-※-※※-12	Sleeve	VK3 12248	1	1
	Poppet	VK4 12249	1	---
	Poppet (S)	VK4 12250	---	1
	O-Ring	AS568-144	2	2
	Back Up Ring	VK4 13077	4	4
LD-63-※-※-※-※※-12 LDS-63-※-※-※-※※-12	Sleeve	VK3 12251	1	1
	Poppet	VK4 12252	1	---
	Poppet (S)	VK4 12253	---	1
	O-Ring	SO-NB-G85	2	2
	Back Up Ring	VK4 13191	4	4

Note: When ordering the Sleeve & Poppet Assemblies, please specify the Sleeve & Poppet Assembly number as shown.

List of Sleeve & Poppet Assemblies

Valve Model Numbers	Sleeve & Poppet Assembly Numbers	
	Poppet	Poppet (S)
LD※-16-※-※-※-※※-12※※※	SP-LD-16-12	SP-LD-16-S-12
LD※-25-※-※-※-※※-12	SP-LD-25-12	SP-LD-25-S-12
LD※-32-※-※-※-※※-12	SP-LD-32-12	SP-LD-32-S-12
LD※-40-※-※-※-※※-12	SP-LD-40-12	SP-LD-40-S-12
LD※-50-※-※-※-※※-12	SP-LD-50-12	SP-LD-50-S-12
LD※-63-※-※-※-※※-12	SP-LD-63-12	SP-LD-63-S-12

■ Spare Parts List

● List of items for Sleeve & Poppet Assembly

Model Numbers	Name of Part	Part Number	Qty.
LB-16-※-※-10 LBS-16-※-※-※-※-※-12	Sleeve	VK3 12211	1
	Poppet	VK3 12215	1
	O-Ring	AS568-020	2
	Back Up Ring	VK4 13070	4
LB-25-※-※-10 LBS-25-※-※-※-※-※-12	Sleeve	VK3 12212	1
	Poppet	VK3 12216	1
	O-Ring	AS568-122	2
	Back Up Ring	VK4 13072	4
LB-32-※-※-11 LBS-32-※-※-※-※-※-12	Sleeve	VK3 12213	1
	Poppet	VK3 12217	1
	O-Ring	AS568-129	2
	Back Up Ring	VK4 13073	4
LB-50-※-※-11 LBS-50-※-※-※-※-※-12	Sleeve	VK3 12214	1
	Poppet	VK3 12218	1
	O-Ring	AS568-144	2
	Back Up Ring	VK4 13077	4

Note: When ordering the Sleeve & Poppet Assemblies, please specify the Sleeve & Poppet Assembly number as shown.

● List of Sleeve & Poppet Assemblies

Valve Model Numbers	Sleeve & Poppet Assembly Numbers
LB-16-※-※-10 LBS-16-※-※-※-※-※-12	SP-LB-16-125
LB-25-※-※-10 LBS-25-※-※-※-※-※-12	SP-LB-16-10
LB-32-※-※-11 LBS-32-※-※-※-※-※-12	SP-LB-32-11
LB-50-※-※-11 LBS-50-※-※-※-※-※-12	SP-LB-50-11