New

Double Piston Hydraulic Swing Clamp

Model LHD

KOSMEK
Harmony in Innovation

Double Piston Hydraulic Swing Clamp

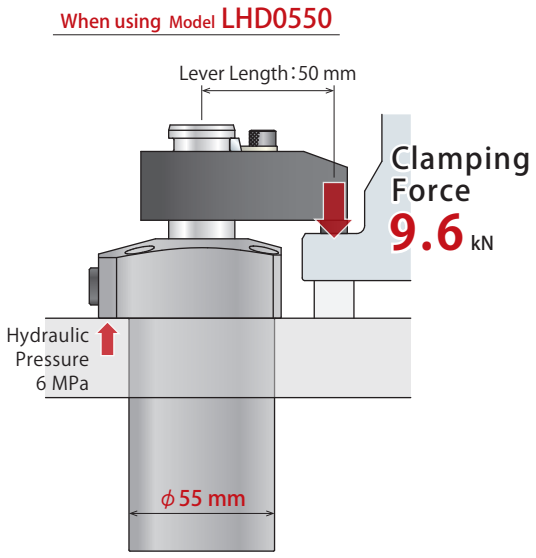
Model LHD

Hydraulic Swing Clamp with Powerful Force exerted by Double Piston Mechanism

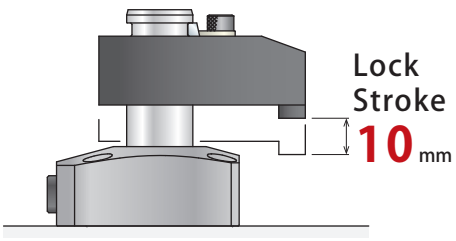
Features

Double Piston Mechanism allows for both higher cylinder force and longer stroke of hydraulic swing clamp.

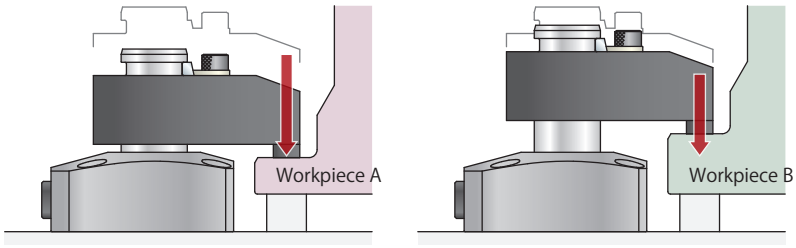
High Cylinder Force



Long Stroke

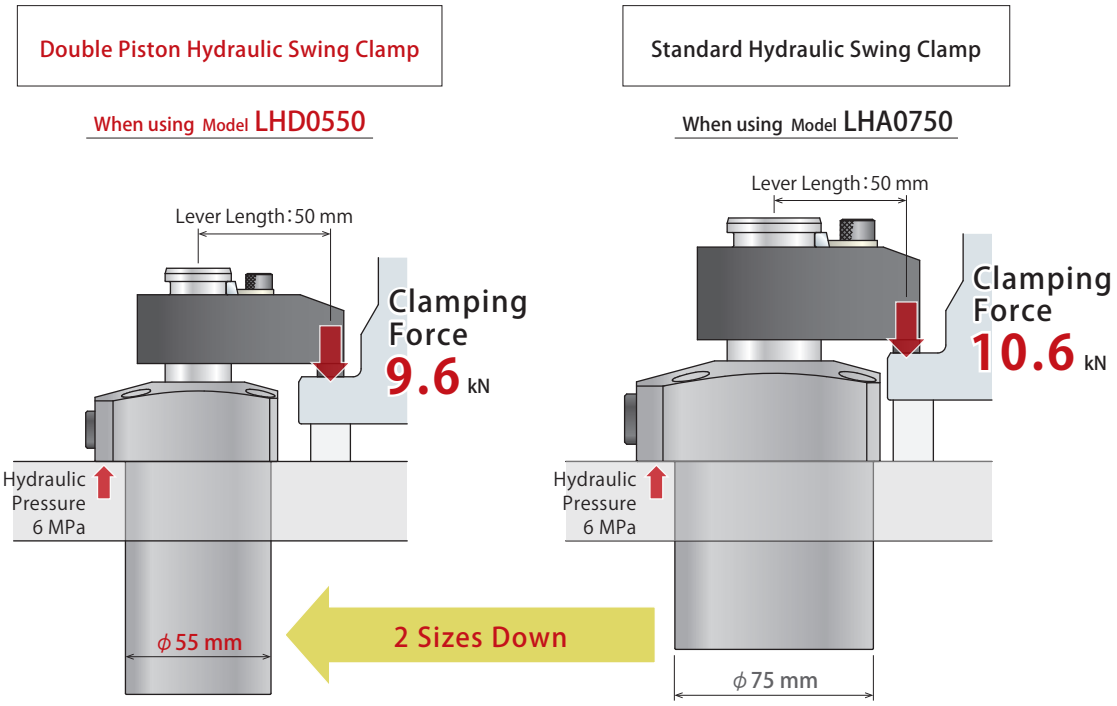


Long Stroke allows for different clamping heights of workpieces on the same application.



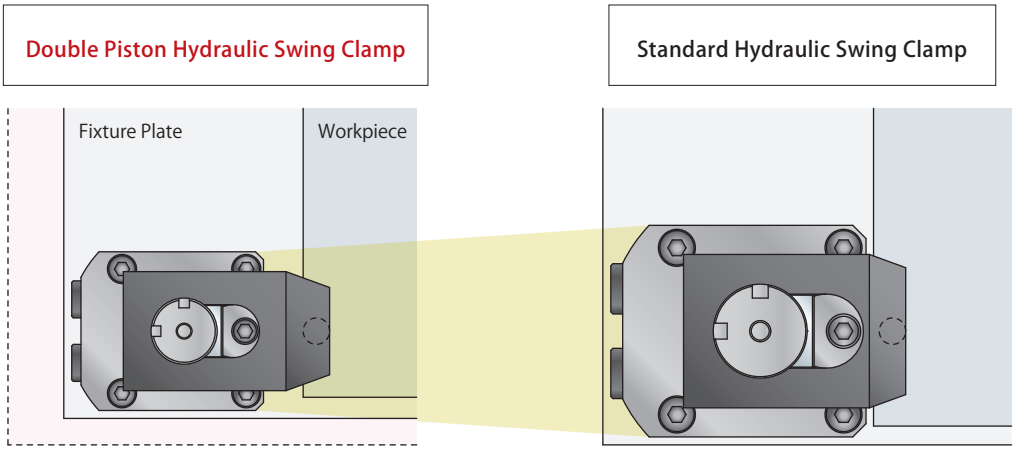
Compared to standard hydraulic swing clamp Model LHA, it exerts equivalent clamping force even with downsized body.

Downsized



Enables smaller footprint and lighter weight of application.

Compact Light



Model No. Indication

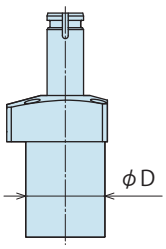
LHD 048 0 - C R - A

1 2 3 4 5

1 Body Size

040 : ϕD=40mm
048 : ϕD=48mm
055 : ϕD=55mm

※ Indicates the cylinder outer diameter (ϕD).



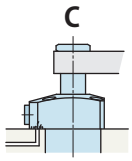
2 Design No.

0 : Revision Number

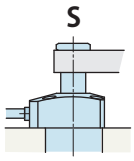
3 Piping Method

C : Gasket Option (With G Thread Plug)
S : Piping Option (Rc Thread)

※ Speed control valve (BZL) is sold separately.
Please refer to P. 13.



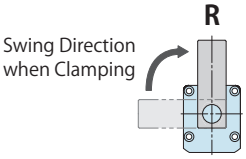
Gasket Option
With G Thread Plug
Speed Control Valve Port

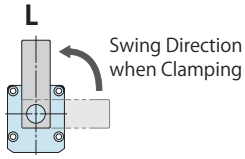


Piping Option
Rc Thread
No Gasket Port

4 Swing Direction when Clamping

R : Clockwise
L : Counter-Clockwise





5 Option

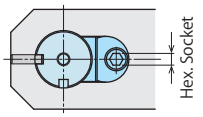
A : Quick Change Lever Type A

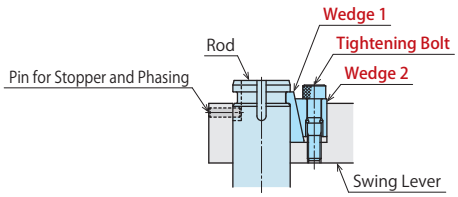
Tightening Kit for Quick Change Lever Type A

Tightening Kit for mounting Quick Change Lever Type A.

Sold separately from clamp body.

【Contents of Tightening Kit】
・Wedge 1 ・Wedge 2 ・Tightening Bolt





LZH 048 0 - W

1 2

1 Corresponding Model No.

040：LHD0400-□□-A

048：LHD0480-□□-A

055：LHD0550-□□-A

2 Design No.

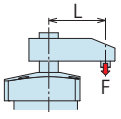
0 ：Revision Number

Specifications

Clamp Body

Model No.		LHD0400-□□-A	LHD0480-□□-A	LHD0550-□□-A
Cylinder Area for Locking	cm^2	8.47	12.05	18.43
Rod Diameter	mm	18	22	25
Clamping Force (Calculation Formula)※1	kN	$F=\frac{P}{1.1811+0.0045\times L}$	$F=\frac{P}{0.8300+0.0029\times L}$	$F=\frac{P}{0.5427+0.0016\times L}$
Full Stroke	mm	14.5	15.5	18.5
Swing Stroke (90°)	mm	6.5	7.5	8.5
Lock Stroke	mm	8	8	10
Swing Angle Accuracy		90° ±3°		
Swing Completion Position Repeatability		±0.5°		
Max. Operating Pressure	MPa	6		
Min. Operating Pressure※2	MPa	1.5		
Withstanding Pressure	MPa	9		
Operating Temperature	℃	0 ~ 70		
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32		

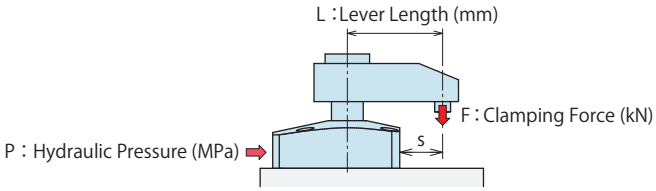
Notes： ※1. F：Clamping Force (kN), P：Supply Air Pressure (MPa), L：Distance between the piston center and the clamping point (mm).
※2. Minimum pressure to operate the clamp without load.



Tightening Kit for Quick Change Lever Type A

Model No.		LZH0400-W	LZH0480-W	LZH0550-W
Corresponding Model No.		LHD0400-□□-A	LHD0480-□□-A	LHD0550-□□-A
Nominal×Pitch of Tightening Bolt		M5×0.8	M5×0.8	M6×1
Hex. Socket	mm	4	4	5
Tightening Torque	N・m	5.0	5.0	8.0

Clamping Force Curve



(Ex.) When using LHD0400,
Supply Hydraulic Pressure 3.0MPa, Lever Length L=40mm,
Clamping Force is about 2.2kN.

Notes:

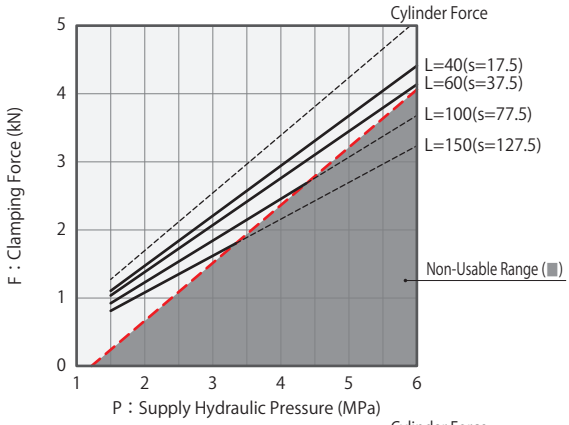
※1. F: Clamping Force (kN), P: Supply Hydraulic Pressure (MPa), L: Lever Length (mm)

1. The tables and graphs shown are the relationships between the clamping force (kN) and supply hydraulic pressure (MPa).
2. Cylinder output (when L=0) cannot be calculated from the calculation formula of clamping force.
3. There may be no lever swing action with large inertia depending on supply hydraulic pressure or mounting position.
4. Clamping force indicates the value when the lever locks a workpiece in horizontal position.
5. Using in the non-usable range may damage the clamp and lead to fluid leakage.

LHD0400

Clamping Force Calculation Formula ※1 (kN) $F = P / (1.1811 + 0.0045 \times L)$

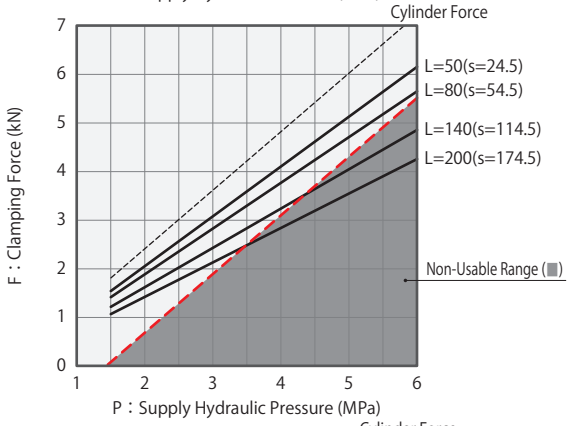
Hydraulic Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Lever Length L (mm) L=40	L=50	L=60	L=70	L=80	L=100	L=120	L=150	Max. Lever Length (L) (mm)
6	5.1	4.4	4.3	4.1						66
5.5	4.7	4.0	3.9	3.8	3.7					74
5	4.2	3.7	3.6	3.4	3.3	3.2				83
4.5	3.8	3.3	3.2	3.1	3.0	2.9				96
4	3.4	2.9	2.8	2.8	2.7	2.6	2.5			114
3.5	3.0	2.6	2.5	2.4	2.3	2.3	2.1	2.0		139
3	2.5	2.2	2.1	2.1	2.0	1.9	1.8	1.7	1.6	178
2.5	2.1	1.8	1.8	1.7	1.7	1.6	1.5	1.5	1.3	210
2	1.7	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.1	210
1.5	1.3	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.8	210
Max. Operating Pressure (MPa)		6.0	6.0	6.0	5.7	5.1	4.3	3.8	3.3	



LHD0480

Clamping Force Calculation Formula ※1 (kN) $F = P / (0.8300 + 0.0029 \times L)$

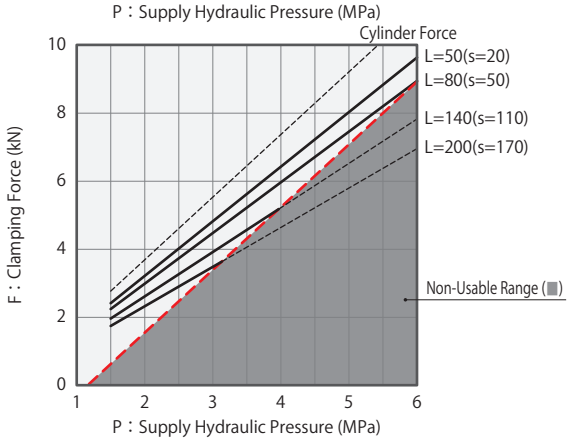
Hydraulic Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Lever Length L (mm) L=50	L=60	L=80	L=100	L=120	L=140	L=160	L=200	Max. Lever Length (L) (mm)
6	7.2	6.2	6.0	5.6						89
5.5	6.6	5.6	5.5	5.2	4.9					100
5	6.0	5.1	5.0	4.7	4.5					114
4.5	5.4	4.6	4.5	4.2	4.0	3.8				132
4	4.8	4.1	4.0	3.8	3.6	3.4	3.2			158
3.5	4.2	3.6	3.5	3.3	3.1	3.0	2.8	2.7		196
3	3.6	3.1	3.0	2.8	2.7	2.5	2.4	2.3	2.1	230
2.5	3.0	2.6	2.5	2.4	2.2	2.1	2.0	1.9	1.8	230
2	2.4	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	230
1.5	1.8	1.5	1.5	1.4	1.3	1.3	1.2	1.2	1.1	230
Max. Operating Pressure (MPa)		6.0	6.0	6.0	5.5	4.8	4.3	3.9	3.4	



LHD0550

Clamping Force Calculation Formula ※1 (kN) $F = P / (0.5427 + 0.0016 \times L)$

Hydraulic Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Lever Length L (mm) L=50	L=60	L=80	L=100	L=120	L=140	L=160	L=200	Max. Lever Length (L) (mm)
6	11.1	9.6	9.4	8.9						81
5.5	10.1	8.8	8.6	8.2						90
5	9.2	8.0	7.8	7.5	7.1					102
4.5	8.3	7.2	7.0	6.7	6.4					117
4	7.4	6.4	6.3	6.0	5.7	5.4				138
3.5	6.4	5.6	5.5	5.2	5.0	4.8	4.6	4.4		168
3	5.5	4.8	4.7	4.5	4.3	4.1	3.9	3.8	3.5	213
2.5	4.6	4.0	3.9	3.7	3.6	3.4	3.3	3.1	2.9	245
2	3.7	3.2	3.1	3.0	2.8	2.7	2.6	2.5	2.3	245
1.5	2.8	2.4	2.3	2.2	2.1	2.0	2.0	1.9	1.7	245
Max. Operating Pressure (MPa)		6.0	6.0	6.0	5.0	4.4	3.9	3.6	3.1	



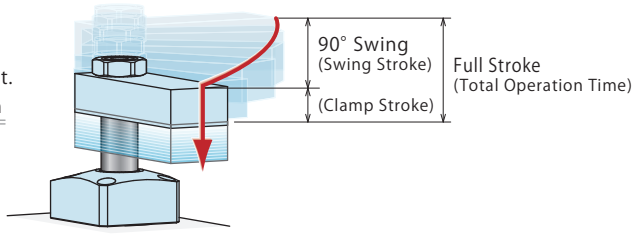
MEMO

Allowable Swing Time Graph

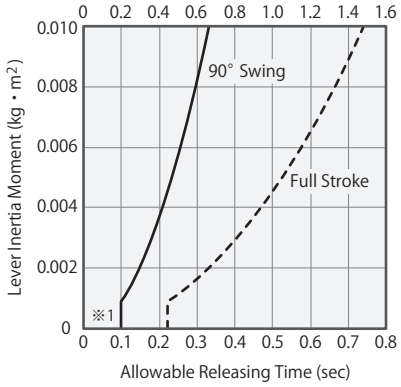
Adjustment of Swing Time

The graph shows allowable swing time against lever inertia moment. Please make sure that an operation time is more than the operation time shown in the graph.

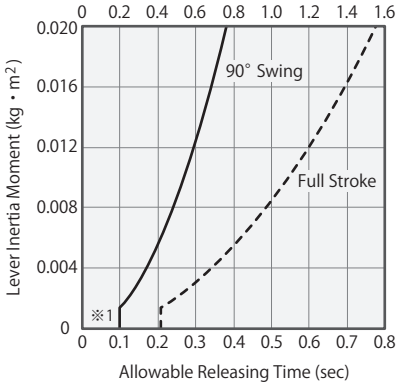
Excessive action speed can reduce stopping accuracy and damage internal components.



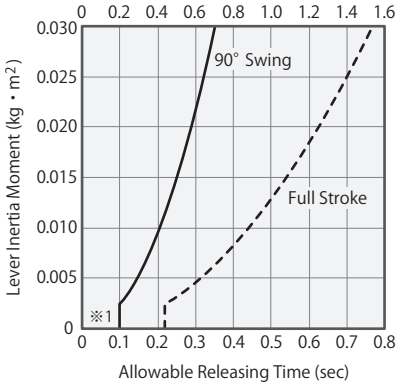
LHD0400 Allowable Locking Time (sec)



LHD0480 Allowable Locking Time (sec)



LHD0550 Allowable Locking Time (sec)



Notes :

※1. For any lever inertia moment, minimum 90° swing time should be 0.2 sec for locking and 0.1 sec for releasing or more.

1. The graph shows the allowable action time in regard to the lever inertia moment when the piston rod operates at constant speed.
2. There may be no lever swing action with large inertia depending on supply hydraulic pressure, oil flow and lever mounting position.
3. For speed adjustment of clamp lever, please use meter-out flow control valve.
   In case of meter-in control, the clamp lever may be accelerated by its own weight during swinging motion (clamp mounted horizontally) or the piston rod may be moving too fast. (Please refer to P.17 for speed control of the hydraulic cylinder.)
4. Excessive swing speed can reduce stopping accuracy and damage the internal components.
5. Please contact us if operational conditions differ from those shown on the graphs.

(How to read the allowable swing time graph)

When using LHD0480

Lever Inertia Moment : 0.0068kg・m²

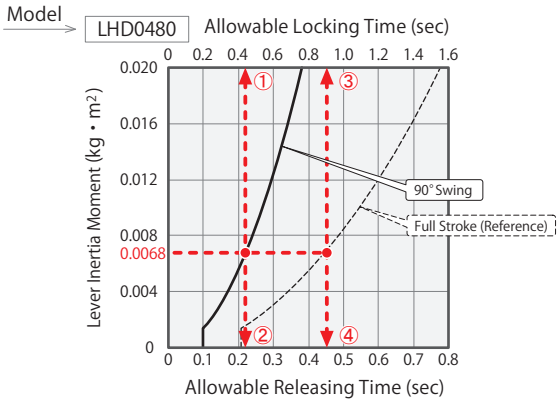
①90° Swing Time when Locking : About 0.44 sec or more

②90° Swing Time when Releasing : About 0.22 sec or more

③Total Locking Operation Time : About 0.9 sec or more

④Total Releasing Operation Time : About 0.45 sec or more

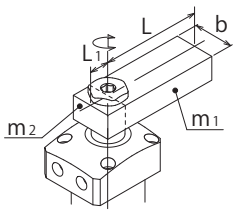
1. The total operation time on the graph represents the allowable operation time when fully stroked.



How to calculate inertia moment (Estimated)

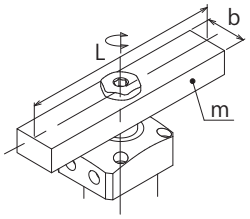
I : Inertia Moment (kg・m²) L, L_1, L_2, K, b : Length (m) m, m_1, m_2, m_3 : Mass (kg)

① For a rectangular plate (cuboid), the rotating shaft is vertically on one side of the plate.



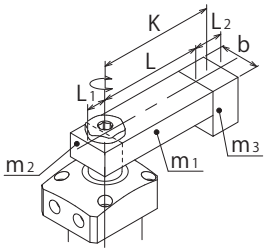
$$I = m_1 \frac{4L^2+b^2}{12} + m_2 \frac{4L_1^2+b^2}{12}$$

② For a rectangular plate (cuboid), the rotating shaft is vertically on the gravity center of the plate.



$$I = m \frac{L^2+b^2}{12}$$

③ Load is applied on the lever front end.



$$I = m_1 \frac{4L^2+b^2}{12} + m_2 \frac{4L_1^2+b^2}{12} + m_3K^2 + m_3 \frac{L_2^2+b^2}{12}$$

Calculation Formula of Total Operation Time

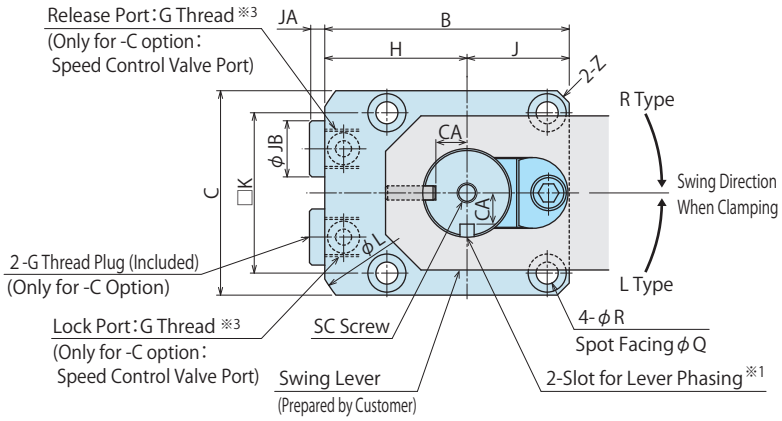
$$\text{Total Locking Operation Time (sec)} = \text{90° Swing Time when Locking (sec)} \times \frac{\text{Full Stroke (mm)}}{\text{Swing Stroke (mm)}}$$

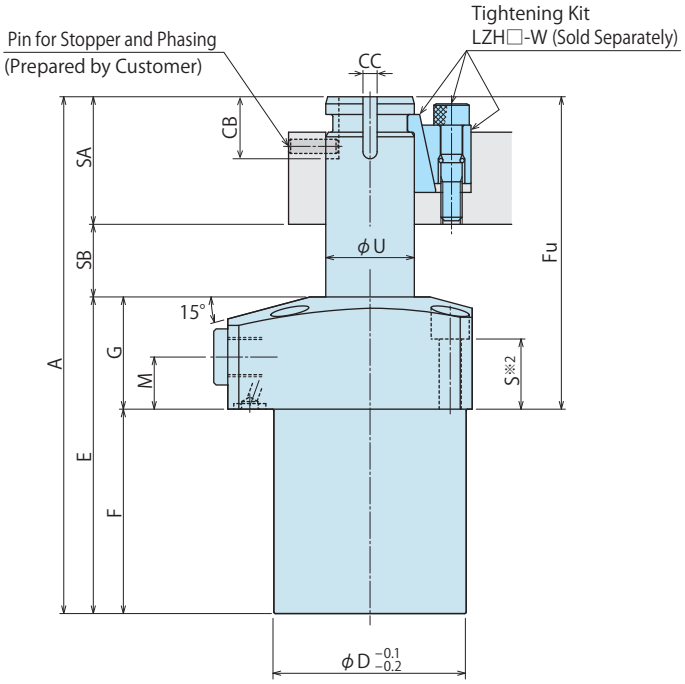
$$\text{Total Releasing Operation Time (sec)} = \text{90° Swing Time when Releasing (sec)} \times \frac{\text{Full Stroke (mm)}}{\text{Swing Stroke (mm)}}$$

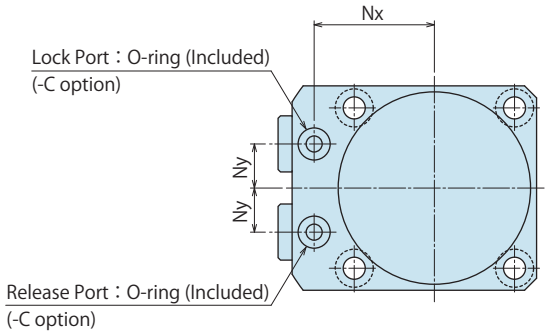
External Dimensions

C：Gasket Option (With G Thread Plug)

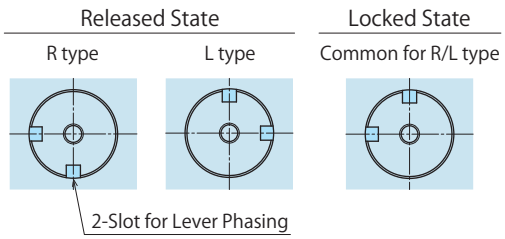
※ The drawing shows the released state of LHD-CR-A.



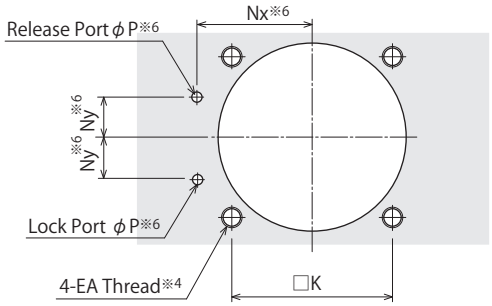


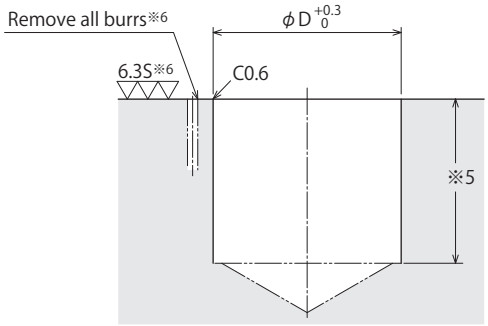


※1. Slot for Lever Phasing



Machining Dimensions of Mounting Area





Notes：

※4. EA tapping depth of the mounting bolt should be decided according to the mounting height referring to dimension 'S'.

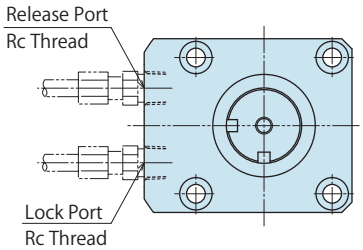
※5. The depth of the body mounting hole ϕD should be decided according to the mounting height referring to dimension 'F'.

※6. The machining dimension is for -C：Gasket Option.

Piping Method

S：Piping Option (Rc Thread)

※ The drawing shows the released state of LHD-SR-A.



Notes：

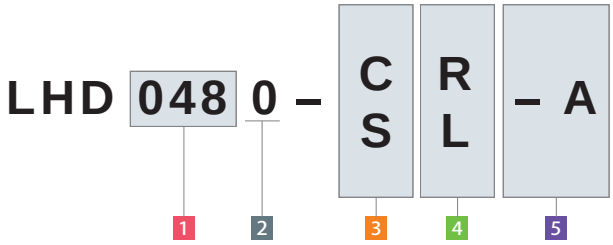
※2. Mounting bolts are not provided. Please prepare them according to the mounting height referring to dimension 'S'.

※3. Speed control valve is sold separately. Please refer to P.13.

1. Please contact us if it has a combination with other detection methods and/or options.

Model No. Indication

(Format Example：LHD0400-CR-A, LHD0550-SL-A)



1 Body Size
2 Design No.
3 Piping Method
4 Swing Direction When Clamping
5 Option (When selecting A)

External Dimensions and Machining Dimensions for Mounting

(mm)

Model No.		LHD0400-□□-A	LHD0480-□□-A	LHD0550-□□-A
Full Stroke		14.5	15.5	18.5
Swing Stroke (90°)		6.5	7.5	8.5
Vertical Stroke		8	8	10
A		135	151	174.5
B		54	61	69
C		45	51	60
D		40	48	55
E		91.5	101.5	118
F		66.5	73.5	88
Fu		68.5	77.5	86.5
G		25	28	30
H		31.5	35.5	39
J		22.5	25.5	30
K		34	40	47
L		73	83	88
M		11	13	12
Nx		26	30	33.5
Ny		9	11	12
P		3	3	3
Q		9	9	11
R		5.5	5.5	6.8
S		15	17.5	17
U		18	22	25
Z (Chamfer)		C3	C3	C3
CA		5.8	7.8	8.8
CB		15	16	17.5
CC		$4^{+0.038}_{+0.020}$	$4^{+0.038}_{+0.020}$	$4^{+0.038}_{+0.020}$
EA (Nominal×Pitch)		M5×0.8	M5×0.8	M6×1
SA		27	32	36
SB		16.5	17.5	20.5
SC (Nominal×Pitch×Depth)		M5×0.8×8	M5×0.8×8	M6×1×11
JA		3.5	3.5	3.5
JB		14	14	14
Lock Port/ Release Port	-C option	G1/8	G1/8	G1/8
	-S option	Rc1/8	Rc1/8	Rc1/8
O-ring (-C option)		1BP5	1BP5	1BP5
Pin for Stopper and Phasing		ϕ4(m6)×10	ϕ4(m6)×12	ϕ4(m6)×14
Cylinder Capacity cm³	Lock	12.5	19	34.6
	Release	16.2	24.9	43.6
Mass ※7	kg	1.0	1.5	2.2

Note：※7. Mass of single swing clamp without the tightening kit and swing lever.

Quick Change Lever Type A Design Dimensions

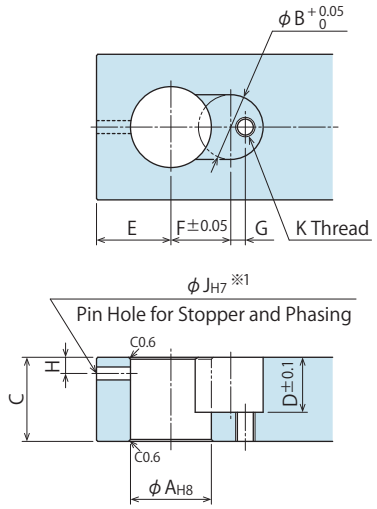
※ Reference for designing Quick Change Swing Lever Type A.

Corresponding Model No.

LHD □ 0 - C S R L - A

1 Body Size

5 Option When selecting A



(mm)

Corresponding Model No.	LHD0400 -□□-A	LHD0480 -□□-A	LHD0550 -□□-A
A	18 +0.027 0	22 +0.033 0	25 +0.033 0
B	15	18	20
C	19	23	26
D	13	15.5	17
E	16	20	23
F	15	16.5	18.5
G	2.5	4	4.5
H	4	4	4
J	4 +0.012 0	4 +0.012 0	4 +0.012 0
K	M5×0.8	M5×0.8	M6×1
Pin for Stopper and Phasing ※1	ϕ4(m6) ×10	ϕ4(m6) ×12	ϕ4(m6) ×14

Notes：

1. Swing lever should be designed with its length according to performance curve on P.5.
2. If the swing lever is not in accordance with the dimension shown above, performance may be degraded and damage can occur.
3. Tightening Kit (LZH□-W) for Quick Change Lever Type A is sold separately.

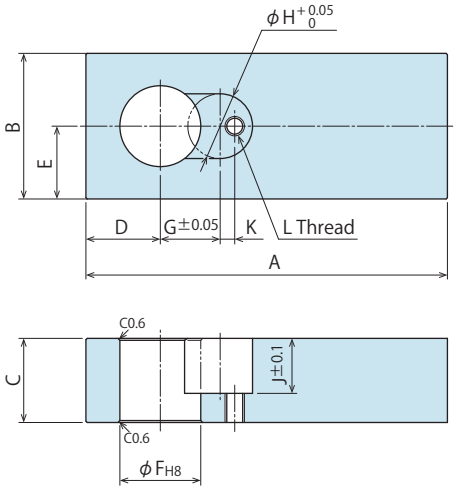
※1. The pin hole for stopper and phasing (ϕJ) should be appropriately machined according to the slot for lever phasing on the clamp body. Pin for stopper and phasing (prepared by customer) is used as phasing when mounting the lever and as stopper when removing the lever. If you are not using a pin for stopper and phasing, a stopper is required to remove the lever.

Accessory：Material Swing Lever for Quick Change Lever Type A

Model No. Indication

LZH 048 0 – A

- 048: Size (Refer to the table.)
- 0: Design No. (Revision Number)



(mm)

Model No.	LZH0400 -A	LZH0480 -A	LZH0550 -A
Corresponding Model No.	LHD0400 -□□-A	LHD0480 -□□-A	LHD0550 -□□-A
A	145	160	170
B	32	40	45
C	19	23	26
D	16	20	23
E	16	20	22.5
F	18 +0.027 0	22 +0.033 0	25 +0.033 0
G	15	16.5	18.5
H	15	18	20
J	13	15.5	17
K	2.5	4	4.5
L	M5×0.8	M5×0.8	M6×1

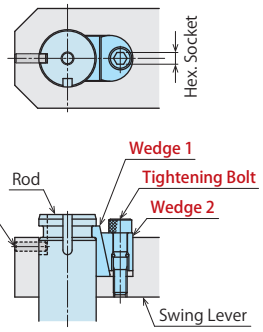
Notes：

1. Material : S50CH　Surface Finishing：Alkaline Blackening
2. If necessary, the front end should be additionally machined.
3. The pin hole for stopper and lever phasing should be additionally machined by referring to Quick Change Lever Type A Design Dimensions.
4. Tightening Kit (LZH□-W) for Quick Change Lever Type A is sold separately.

Accessory：Tightening Kit for Quick Change Lever Type A

Tightening Kit for mounting Quick Change Lever Type A.
Sold separately from clamp body.

【Contents of Tightening Kit】
・Wedge 1　・Wedge 2　・Tightening Bolt



LZH 048 0 - W

1 2

1 Corresponding Model No.

040：LHD0400-□□-A
048：LHD0480-□□-A
055：LHD0550-□□-A

2 Design No.

0：Revision Number

Model No.	LZH0400-W	LZH0480-W	LZH0550-W
Corresponding Model No.	LHD0400-□□-A	LHD0480-□□-A	LHD0550-□□-A
Nominal×Pitch of Tightening Bolt	M5×0.8	M5×0.8	M6×1
Hex. Socket mm	4	4	5
Tightening Torque N·m	5.0	5.0	8.0

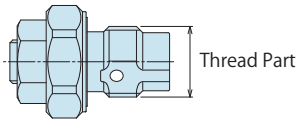
Model No. Indication (Speed Control Valve for Low Pressure)

BZL 0 10 1 - B

1 2 3

1 G Thread Size

10 : Thread Part G1/8A Thread



2 Design No.

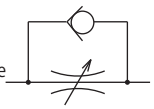
1 : Revision Number

3 Control Method

B : Meter-out

B

Circuit Symbol : Meter-out



Specifications

Model No.		BZL0101-B
Max. Operating Pressure	MPa	7
Withstanding Pressure	MPa	10.5
Control Method		Meter-out
G Thread Size		G1/8A
Cracking Pressure	MPa	0.12
Max. Passage Area	mm^2	2.6
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32
Operating Temperature	℃	0 ~ 70
Tightening Torque for Main Body	N·m	10

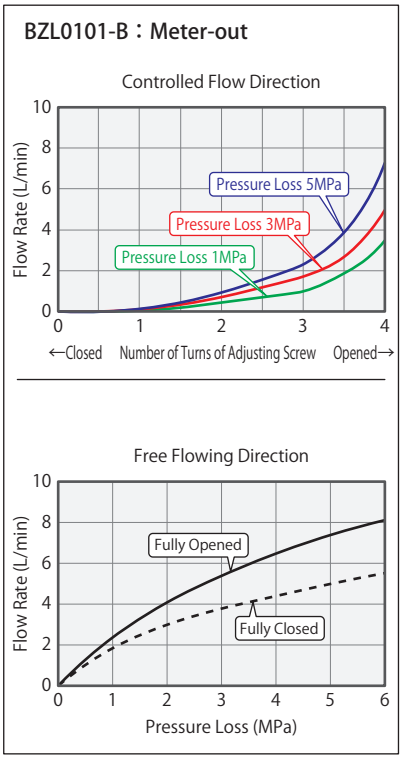
Notes : 1. It must be mounted with recommended torque. Because of the structure of the metal seal, if mounting torque is insufficient, the flow control valve may not be able to adjust the flow rate.
2. Do not attach a used BZL to other cylinders. Flow control may not be done because the bottom depth difference of G thread makes metal sealing insufficient.

Applicable Products

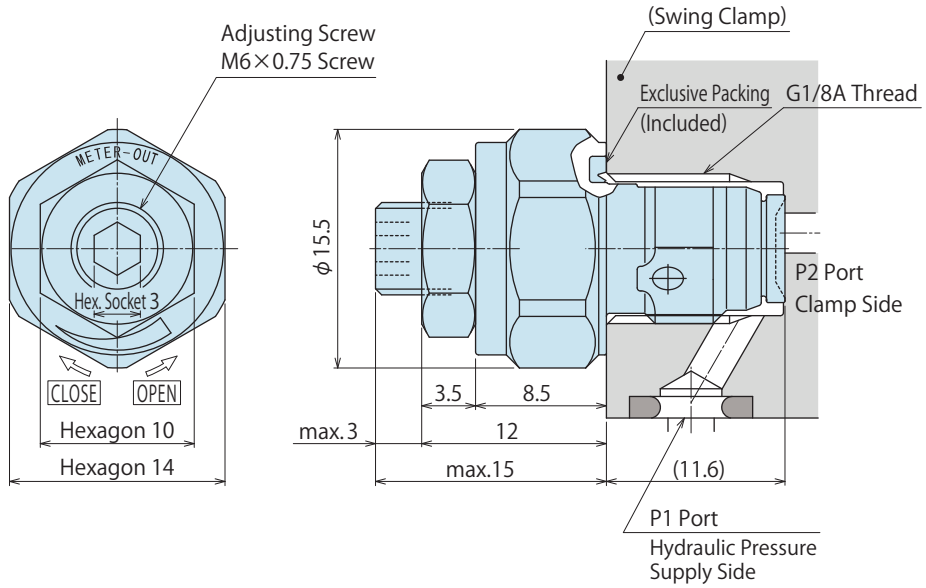
Model No.	**LHD** (Double Action) Double Piston Hydraulic Swing Clamp
BZL0101-B	LHD0400-C□-□
	LHD0480-C□-□
	LHD0550-C□-□

Note : 1. Flow control circuit for double acting cylinder should have meter-out circuits for both the lock and release sides. Meter-in control can have adverse effect by presence of air in the system.

Flow Rate Graph ＜Hydraulic Fluids ISO-VG32 (25～35℃)>



External Dimensions



Notes

1. Please read "Notes on Hydraulic Cylinder Speed Control Circuit" to assist with proper hydraulic circuit design.
   If there is something wrong with the circuit design, it leads to the applications malfunction and damage. (Refer to P.17)
2. It is dangerous to bleed air under high pressure. It must be done under low pressure.
   (For reference: the minimum operating range of the product within the circuit.)

Cautions

Notes for Design

1) Check Specifications

- Please use each product according to the specifications.

2) Notes for Circuit Design

- Please read "Notes on Hydraulic Cylinder Speed Control Unit" to assist with proper hydraulic circuit designing. Improper circuit design may lead to malfunctions and damages. (Refer to P.17)
- Ensure there is no possibility of supplying hydraulic pressure to the lock and release ports simultaneously.

3) Swing lever should be designed so that the moment of inertia is small.

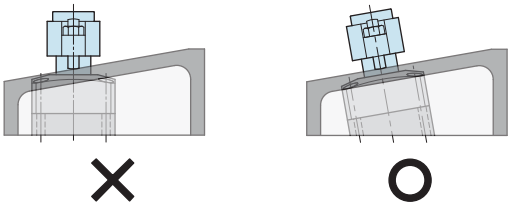
- Large moment of inertia will degrade the lever's stopping accuracy and cause undue wear to the clamp.
  Additionally, the clamp may not function, depending on supplied hydraulic pressure and lever mounting position.
- Please set the allowable operating time after the moment of inertia calculated. Please make sure that the clamps work within allowable operating time referring to the allowable operating time graph.

4) When using on a welding fixture, the exposed area of piston rod should be protected.

- If spatter gets onto the sliding surface it could lead to malfunction and fluid leakage.

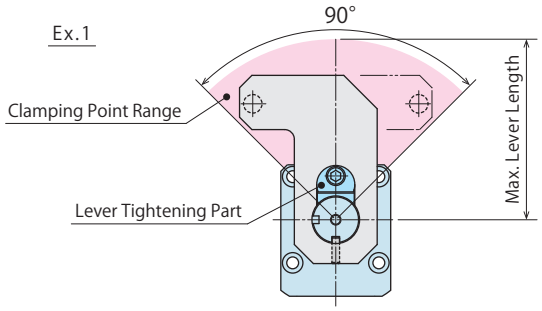
5) When clamping on a sloped surface of the workpiece

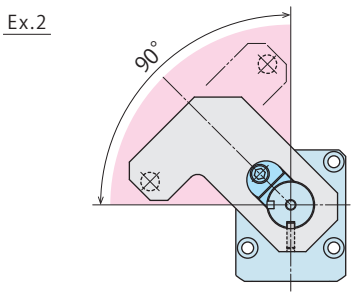
- Make sure the clamp surface and mounting surface of the clamp are parallel.



6) When using an offset lever for LHD-A (Quick Change Lever Type A)

- Clamping point should be in the range of 90° towards lever tightening part.





Installation Notes

1) Check the Usable Fluid

- Please use the appropriate fluid by referring to the Hydraulic Fluid List.

2) Procedure before Piping

- The pipeline, piping connector and fixture circuits should be cleaned by thorough flushing.
- The dust and cutting chips in the circuit may lead to fluid leakage and malfunction.
- There is no filter provided with Kosmek's product except for a part of valves which prevent foreign materials and contaminants from getting into the circuit.

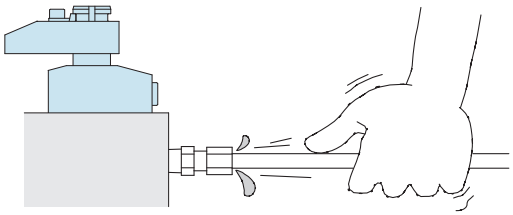
3) Applying Sealing Tape

- Wrap with tape 1 to 2 times following the screw direction.
- Pieces of the sealing tape can lead to oil leakage and malfunction.
- In order to prevent a foreign substance from going into the product during the piping work, it should be carefully cleaned before working.

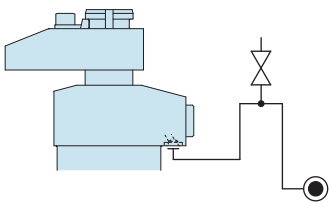
4) Air Bleeding of the Hydraulic Circuit

- If the hydraulic circuit has excessive air, the action time may become very long. If air enters the circuit after connecting the hydraulic port or under the condition of no air in the oil tank, please perform the following steps.

① Reduce hydraulic pressure to less than 2MPa.
② Loosen the cap nut of pipe fitting closest to the clamp by one full turn.
③ Wiggle the pipeline to loosen the outlet of pipe fitting.
Hydraulic fluid mixed with air comes out.



④ Tighten the cap nut after bleeding.
⑤ It is more effective to bleed air at the highest point inside the circuit or at the end of the circuit.
(Set an air bleeding valve at the highest point inside the circuit.)



5) Installation of the Product

- Use four hexagon socket bolts (with tensile strength of 12.9) and tighten them with the torque shown in the table below. Installation failure leads to oil leak and deformation and damage of the cylinder.

Model No.	Tightening Bolt Size	Tightening Torque (N·m)
LHD0400	M5×0.8	8.0
LHD0480	M5×0.8	8.0
LHD0550	M6×1	14

6) Installation / Removal of the Swing Lever

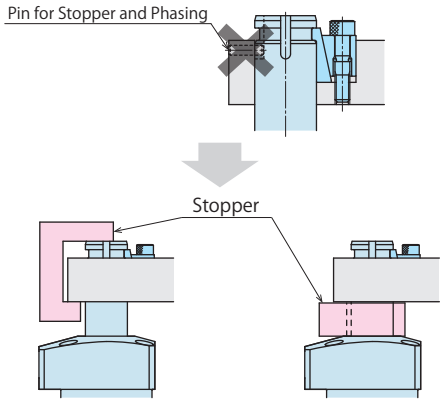
- Oil or debris on the mating surfaces of the lever or piston rod may cause the rod to loosen.
  Please clean them thoroughly before assembly.
- Tighten the tightening bolt of swing lever with the torque shown below.
  Tightening with greater torque than recommended can damage the bolt and lever tightening function.

LHD-A : Quick Change Lever Type A

Model No.	Tightening Bolt Size	Tightening Torque (N·m)
LHD0400-□□-A	M5×0.8	5.0
LHD0480-□□-A	M5×0.8	5.0
LHD0550-□□-A	M6×1	8.0

- When using Quick Change Lever Type A
  Pin for stopper and phasing (prepared by customer) is used as phasing when mounting the lever and as stopper when removing the lever. If you are not using a pin for stopper and phasing, a stopper is required to remove the lever.

Stopper example for lever removal when not using pin for stopper and phasing.

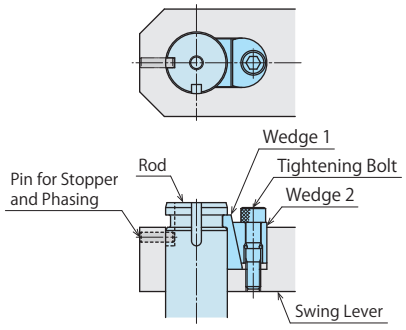


Installation Procedure

① Install in order of swing lever, wedge 1, wedge 2 to the rod.
② Pull the lever towards the wedge side and tighten the tightening bolt with the specified torque.

Removal Procedure

① By loosening tightening bolt, wedge function is released and the lever can be removed.



7) Swing Speed Adjustment

- Adjust the speed following "Allowable Swing Time Graph".
  If the clamp operates too fast the parts will wear out leading to premature damage and ultimately complete equipment failure.
- Please make sure to release air from the circuit before adjusting speed. It will be difficult to adjust the speed accurately with air mixed in the circuit.
- Turn the speed control valve gradually from the low-speed side (small flow) to the high-speed side (large flow) to adjust the speed.

8) Checking Looseness and Retightening

- At the beginning of the product installation, the bolt and lever mounting nut may be tightened lightly. Check the looseness and re-tighten as required.

Hydraulic Fluid List

ISO Viscosity Grade ISO-VG-32

Maker	Anti-Wear Hydraulic Oil	Multi-Purpose Hydraulic Oil
Showa Shell Sekiyu	Tellus S2 M 32	Morlina S2 B 32
Idemitsu Kosan	Daphne Hydraulic Fluid 32	Daphne Super Multi Oil 32
JX Nippon Oil & Energy	Super Hyrando 32	Super Mulpus DX 32
Cosmo Oil	Cosmo Hydro AW32	Cosmo New Mighty Super 32
ExxonMobil	Mobil DTE 24	Mobil DTE 24 Light
Matsumura Oil	Hydol AW-32	
Castrol	Hyspin AWS 32	

Note As it may be difficult to purchase the products as shown in the table from overseas, please contact the respective manufacturer.

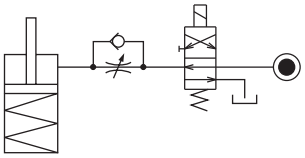
Cautions

Notes on Hydraulic Cylinder Speed Control Unit

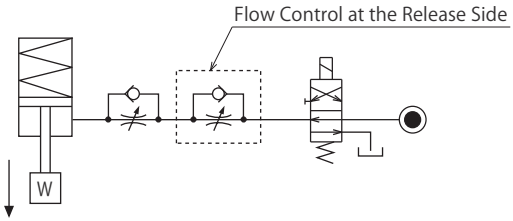
Please pay attention to the cautions below. Design the hydraulic circuit for controlling the action speed of hydraulic cylinder. Improper circuit design may lead to malfunctions and damages. Please review the circuit design in advance.

Speed Control Circuit for Single Acting Cylinder

For spring return single acting cylinders, restricting flow during release can extremely slow down or disturb release action. The preferred method is to control the flow during the lock action only. It is also preferred to provide a flow control valve at each actuator which has limited action speed (swing clamp, hydraulic compact cylinder, etc.)



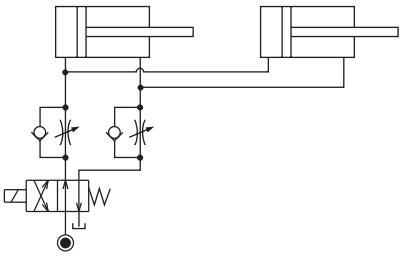
If the cylinder may be damaged by the load from the releasing action direction, provide the flow control valve to the releasing side as well. (Provide the flow control valve to the releasing side if the lever weight is applied during release action.)



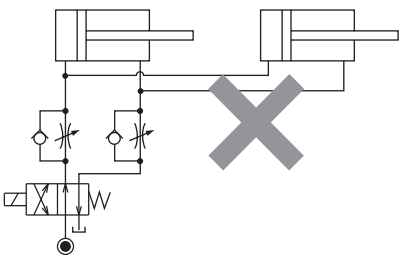
Speed Control Circuit for Double Acting Cylinder

Speed control circuit for double action cylinder should have meter-out circuits for both the lock and release sides.
Meter-in circuits can be adversely affected by any air in the system.

【Meter-out Circuit】

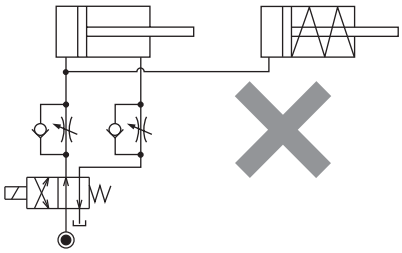


【Meter-in Circuit】



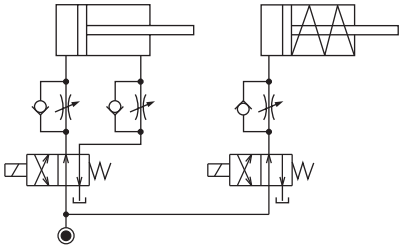
In the case of meter-out circuit, the hydraulic circuit should be designed with the following points.

① Single acting components should not be used in the same flow control circuit as the double acting components.
The release action of the single acting cylinders may become erratic or very slow.

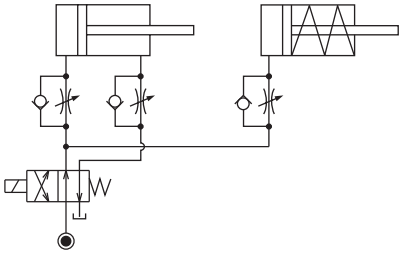


Refer to the following circuit when both the single acting cylinder and double acting cylinder are used together.

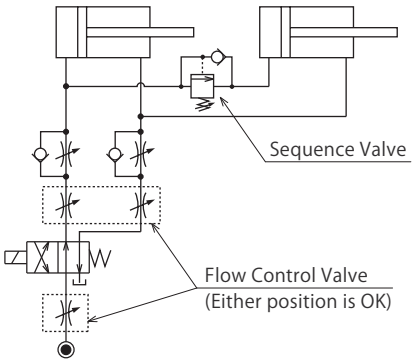
○ Separate the control circuit.



○ Reduce the influence of double acting cylinder control unit.
However, due to the back pressure in tank line, single acting cylinder is activated after double acting cylinder works.



② In the case of meter-out circuit, the inner circuit pressure may increase during the cylinder action because of the fluid supply. The increase of the inner circuit pressure can be prevented by reducing the supplied fluid beforehand via the flow control valve. Especially when using sequence valve or pressure switches for clamping detection. If the back pressure is more than the set pressure then the system will not work as it is designed to.

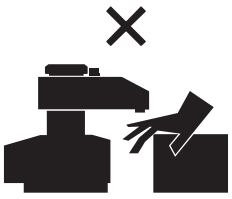


Notes on Handling

1) It should be handled by qualified personnel.
- The hydraulic machine and air compressor should be handled and maintained by qualified personnel.

2) Do not handle or remove the product unless the safety protocols are ensured.
① The machine and equipment can only be inspected or prepared when it is confirmed that the preventive devices are in place.
② Before the product is removed, make sure that the above-mentioned safety measures are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.
③ After stopping the product, do not remove until the temperature cools down.
④ Make sure there is no abnormality in the bolts and respective parts before restarting the machine or equipment.

3) Do not touch clamp (cylinder) while clamp (cylinder) is working. Otherwise, your hands may be injured due to clinching.

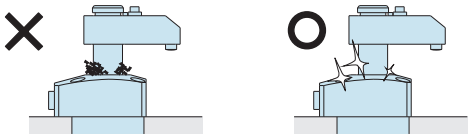


4) Do not disassemble or modify.
- If the equipment is taken apart or modified, the warranty will be voided even within the warranty period.

Maintenance and Inspection

1) Removal of the Product and Shut-off of Pressure Source
- Before the product is removed, make sure that safety measures and preventive devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.
- Make sure there is no abnormality in the bolts and respective parts before restarting.

2) Regularly clean the area around the piston rod.
- If it is used when the surface is contaminated with dirt, it may lead to packing seal damage, malfunctioning, fluid leakage and air leaks.



3) If disconnecting by couplers, air bleeding should be carried out on a regular basis to avoid air mixed in the circuit.

4) Regularly tighten piping, mounting bolts, and etc., to ensure proper use.

5) Make sure the hydraulic fluid has not deteriorated.

6) Make sure there is smooth action and no abnormal noise.
- Especially when it is restarted after left unused for a long period, make sure it can be operated correctly.

7) The products should be stored in the cool and dark place without direct sunshine or moisture.

8) Please contact us for overhaul and repair.

Warranty

1) Warranty Period
- The product warranty period is 18 months from shipment from our factory or 12 months from initial use, whichever is earlier.

2) Warranty Scope
- If the product is damaged or malfunctions during the warranty period due to faulty design, materials or workmanship, we will replace or repair the defective part at our expense.
  Defects or failures caused by the following are not covered.

① If the stipulated maintenance and inspection are not carried out.
② If the product is used while it is not suitable for use based on the operator's judgment, resulting in defect.
③ If it is used or handled in inappropriate way by the operator. (Including damage caused by the misconduct of the third party.)
④ If the defect is caused by reasons other than our responsibility.
⑤ If repair or modifications are carried out by anyone other than Kosmek, or without our approval and confirmation, it will void warranty.
⑥ Other caused by natural disasters or calamities not attributable to our company.
⑦ Parts or replacement expenses due to parts consumption and deterioration. (Such as rubber, plastic, seal material and some electric components.)

Damages excluding from direct result of a product defect shall be excluded from the warranty.

KOSMEK
Harmony in Innovation

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- For Further Information on Unlisted Specifications and Sizes, Please call us.
- Specifications in this Leaflet are Subject to Change without Notice.

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