

# Hydraulic Double Action Parallel Swing Clamp

Model LHS

Low Pressure (1.5~7MPa)  
Parallel-Rotation • High Power

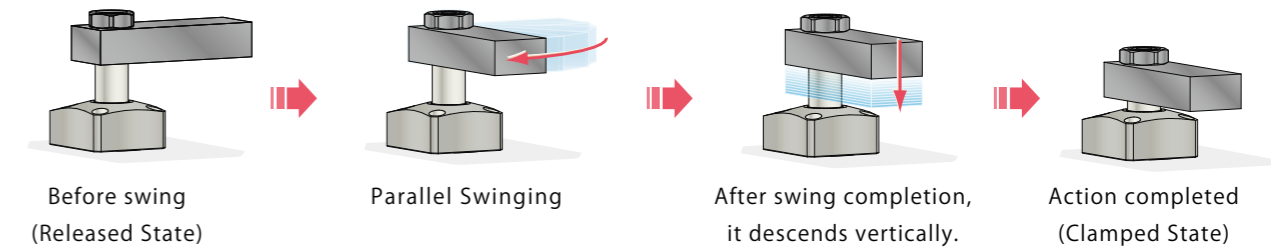
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## Index

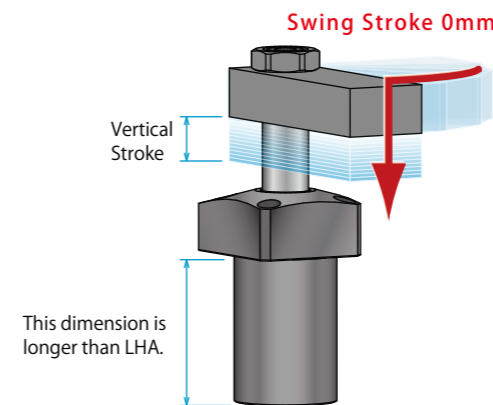
Hydraulic Swing Clamp Digest	P.375
Action Description	P.428
Model No. Indication	P.429
Specifications	P.430
Performance Curve	
• Clamping Force Curve	P.431
• Allowable Swing Time Graph	P.433
External Dimensions	
• Standard Model (LHS)	P.435
• Quick Change Lever Type A (LHS-A)	P.437
• Quick Change Lever Type F (LHS-F)	P.439
• Balance Lever Option (LHS-P)	P.441
• Swing Angle Selectable Option (LHS-Y□)	P.443
Lever Design Dimensions	P.445
Accessories	
• Material Swing Lever for LHS	P.447
• Speed Control Valve•Plug	P.891
• Manifold Block (Common Items of Other Models)	P.1217
Cautions	
• Notes for Hydraulic Swing Clamps	P.553
• Cautions (Common)	P.1237
• Installation Notes • Hydraulic Fluid List • Notes on Hydraulic Cylinder Speed Control Circuit	
• Notes on Handling • Maintenance/Inspection • Warranty	

## Action Description



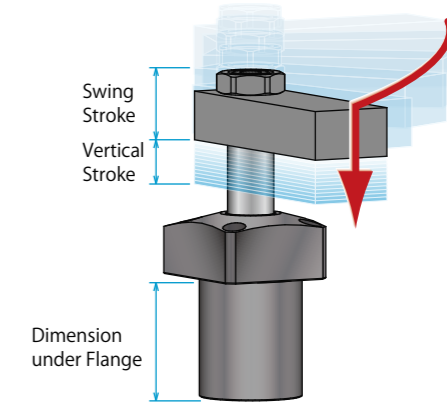
## Features

Clamp piston never goes down, before completing swing movement.  
Lever swings to parallel direction.



Model LHS

Interlock function to avoid wrong movement.



Model LHA

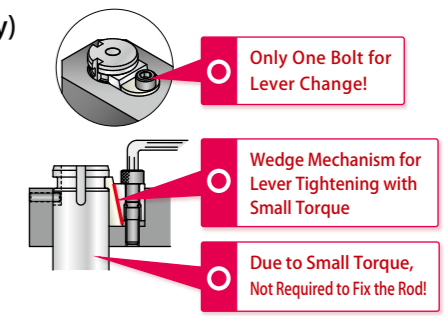
Standard Swing Clamp

## Excellent Coolant Resistance

Our exclusive dust seal is designed to protect against high pressure coolant. It also has high durability against chlorine-based coolant by using a sealing material with excellent chemical resistance.

## Simple Design of Swing Lever (Taper sleeve is standard accessory)

As taper sleeve is standard accessory, tapering process while manufacturing clamp lever is eliminated. Supplied lever sleeve incorporates taper simplifying clamping lever design. Quick change lever type that is available as option is easy to attach and detach the lever with one wrench. (Refer to the drawing on the right.)



Quick Change Lever Type A

## Able to Attach Speed Control Valve Directly

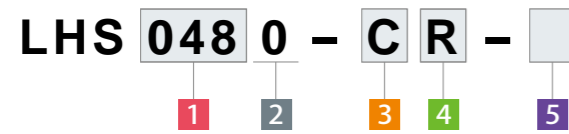
When fitting the gasket (-C option), it is able to attach the speed control valve with air venting function. (Speed control valve is sold separately.)

## LHS / LHA Compatibility

- Clamping Force : Same as LHA
- Vertical Stroke : Same as LHA
- Lever Design Dimensions : Same as LHA
- External Dimensions : Dimension under flange is longer than LHA.
- Swing Angle Accuracy : Different
- Swing Completion Position Repeatability : Different
- Allowable Swing Time : Different (Same as 90° Swing Time of LHA when locking)

High-Power Series
Pneumatic Series
Hydraulic Series
Valve / Coupler Hydraulic Unit
Manual Operation Accessories
Cautions / Others
Hole Clamp
SFA
SFC
Swing Clamp
LHA
LHC
LHS
LHW
LT/LG
TLA-2
TLB-2
TLA-1
Link Clamp
LKA
LKC
LKW
LM/LJ
TMA-2
TMA-1
Work Support
LD
LC
TNC
TC
Air Sensing Lift Cylinder
LLW
Compact Cylinder
LL
LLR
LLU
DP
DR
DS
DT
Block Cylinder
DBA
DBC
Centering Vise
FVA
FVD
FVC
Control Valve
BZL
BZT
BZX/JZG
Pallet Clamp
VS
VT
Expansion Locating Pin
VFL
VFM
VFJ
VFK
Pull Stud Clamp
FP
FQ
Customized Spring Cylinder
DWA/DWB

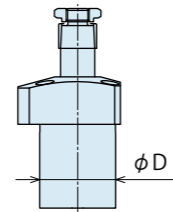
## Model No. Indication



### 1 Body Size

- 036 : φD=36mm      065 : φD=65mm
- 040 : φD=40mm      075 : φD=75mm
- 048 : φD=48mm      090 : φD=90mm
- 055 : φD=55mm      105 : φD=105mm

※ Outer diameter (φD) of body cylinder.



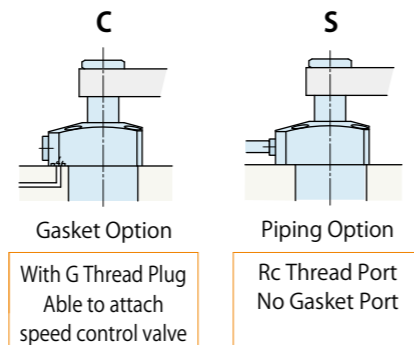
### 2 Design No.

- 0 : Revision Number

### 3 Piping Method

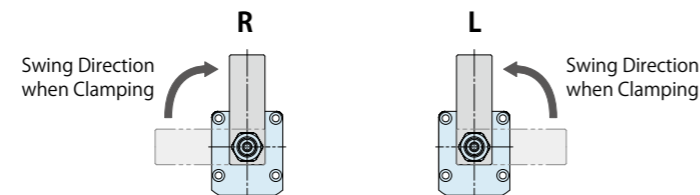
- C : Gasket Option (With G Thread Plug)
- S : Piping Option (Rc Thread Port)

※ Speed control valve (BZL) is sold separately. Refer to P.891.



### 4 Swing Direction when Clamping

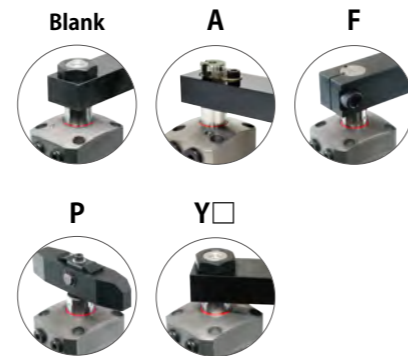
- R : Clockwise
- L : Counter-Clockwise



### 5 Option

- Blank : None (Standard:Taper Lock Lever Option)
- A : Quick Change Lever Type A
- F : Quick Change Lever Type F
- P : Balance Lever Option
- Y□ : Swing Angle Selectable Option (Y30 : 30° / Y45 : 45° / Y60 : 60°)

※ Please contact us for a combination of options.

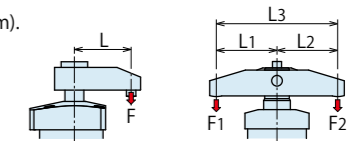


## Specifications

Model No.	LHS0360	LHS0400	LHS0480	LHS0550
Cylinder Area for Locking	cm <sup>2</sup> 3.54	5.00	6.95	10.3
Cylinder Inner Diameter ※1	mm 26	31	37	44
Rod Diameter ※1	mm 15	18	22	25
Clamping Force (Calculation Formula)※2	Option Blank/A/F/Y□	$F = \frac{P(1-0.0021 \times L)}{2.9379+0.0052 \times L}$	$F = \frac{P(1-0.0016 \times L)}{2.0920+0.0040 \times L}$	$F = \frac{P(1-0.0009 \times L)}{1.4892+0.0018 \times L}$
	Option P	$F_1 = (L_2/L_3) \times 0.354 \times P$ $F_2 = (L_1/L_3) \times 0.354 \times P$	$F_1 = (L_2/L_3) \times 0.5 \times P$ $F_2 = (L_1/L_3) \times 0.5 \times P$	$F_1 = (L_2/L_3) \times 0.695 \times P$ $F_2 = (L_1/L_3) \times 0.695 \times P$
Option Blank/A/F/P	Full Stroke (Vertical)	mm 8	8	8
	Swing Angle Accuracy	90° ±2°		
Option Y□	Option	Y30 Y45 Y60	Y30 Y45 Y60	Y30 Y45 Y60
	Full Stroke (Vertical)	mm 8 8 8	8 8 8	10 10 10
Option Y□	Swing Angle Accuracy	30° ±2° 45° ±2° 60° ±2°	30° ±2° 45° ±2° 60° ±2°	30° ±2° 45° ±2° 60° ±2°
	Swing Completion Position Repeatability	±0.75°		
Max. Operating Pressure	MPa 7	7		
Min. Operating Pressure※3	MPa 1.5	1.5		
Withstanding Pressure	MPa 10.5	10.5		
Operating Temperature	°C 0 ~ 70	0 ~ 70		
Usable Fluid	General Hydraulic Oil Equivalent to ISO-VG-32			

Model No.	LHS0650	LHS0750	LHS0900	LHS1050
Cylinder Area for Locking	cm <sup>2</sup> 13.4	20.3	29.5	41.3
Cylinder Inner Diameter ※1	mm 51	62	76	91
Rod Diameter ※1	mm 30	35.5	45	55
Clamping Force (Calculation Formula)※2	Option Blank/A/F/Y□	$F = \frac{P(1-0.0009 \times L)}{0.7822+0.0010 \times L}$	$F = \frac{P(1-0.0007 \times L)}{0.5175+0.0006 \times L}$	$F = \frac{P(1-0.0009 \times L)}{0.3547+0.0004 \times L}$
	Option P	$F_1 = (L_2/L_3) \times 1.34 \times P$ $F_2 = (L_1/L_3) \times 1.34 \times P$	$F_1 = (L_2/L_3) \times 2.03 \times P$ $F_2 = (L_1/L_3) \times 2.03 \times P$	$F_1 = (L_2/L_3) \times 2.95 \times P$ $F_2 = (L_1/L_3) \times 2.95 \times P$
Option Blank/A/F/P	Full Stroke (Vertical)	mm 10	12	12
	Swing Angle Accuracy	90° ±2°		
Option Y□	Option	Y30 Y45 Y60	Y30 Y45 Y60	Y30 Y45 Y60
	Full Stroke (Vertical)	mm 10 10 10	12 12 12	12 12 12
Option Y□	Swing Angle Accuracy	30° ±2° 45° ±2° 60° ±2°	30° ±2° 45° ±2° 60° ±2°	30° ±2° 45° ±2° 60° ±2°
	Swing Completion Position Repeatability	±0.75°		
Max. Operating Pressure	MPa 7	7		
Min. Operating Pressure※3	MPa 1.5	1.5		
Withstanding Pressure	MPa 10.5	10.5		
Operating Temperature	°C 0 ~ 70	0 ~ 70		
Usable Fluid	General Hydraulic Oil Equivalent to ISO-VG-32			

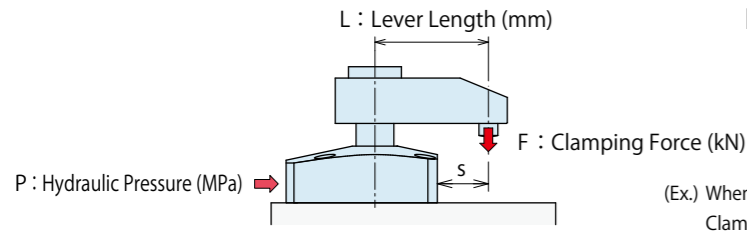
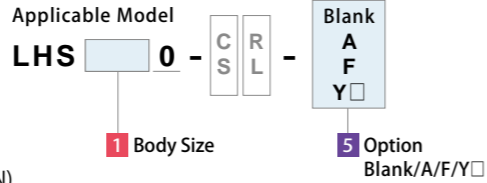
- Notes:
- ※1. Clamping force cannot be calculated from the cylinder inner diameter and rod diameter. Please refer to the clamping force curve.
  - ※2. F, F<sub>1</sub>, F<sub>2</sub> : Clamping Force (kN), P : Supply Hydraulic Pressure (MPa)  
L, L<sub>1</sub>, L<sub>2</sub> : Distance between the piston center and the clamping point (mm), L<sub>3</sub> : (mm).
  - ※3. Minimum pressure to operate the clamp without load.  
1. Please refer to External Dimensions for cylinder capacity and mass.



High-Power Series
Pneumatic Series
Hydraulic Series
Valve / Coupler Hydraulic Unit
Manual Operation Accessories
Cautions / Others
Hole Clamp
SFA
SFC
Swing Clamp
LHA
LHC
LHS
LHW
LT/LG
TLA-2
TLB-2
TLA-1
Link Clamp
LKA
LKC
LKW
LM/LJ
TMA-2
TMA-1
Work Support
LD
LC
TNC
TC
Air Sensing Lift Cylinder
LLW
Compact Cylinder
LL
LLR
LLU
DP
DR
DS
DT
Block Cylinder
DBA
DBC
Centering Vise
FVA
FVD
FVC
Control Valve
BZL
BZT
BZX/JZG
Pallet Clamp
VS
VT
Expansion Locating Pin
VFL
VFM
VFJ
VFK
Pull Stud Clamp
FP
FQ
Customized Spring Cylinder
DWA/DWB

## Clamping Force Curve

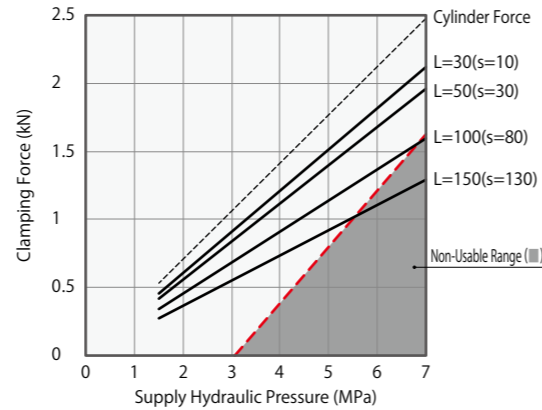
※ LHS□0-□□-P : For balance lever option, the clamping force curve is different from the graph. Please calculate it with the specification's formula.



(Ex.) When using LHS0480, Supply Hydraulic Pressure 5.0 MPa, Lever Length L=50mm, Clamping force is about 3.1 kN.

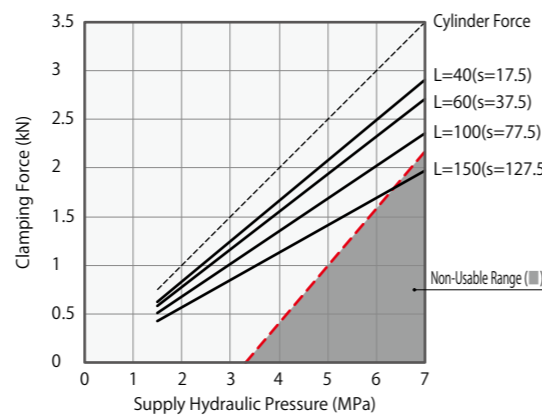
**LHS0360** Clamping Force Calculation Formula  $F = P(1-0.0021 \times L) / (2.9379+0.0052 \times L)$

Hydraulic Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Lever Length L (mm)								Non-Usable Range (mm)	Max. Lever Length (mm)
		L=30	L=40	L=50	L=60	L=80	L=100	L=120	L=150		
7	2.48	2.2	2.1	2.0	1.9	1.8	1.7	1.5	1.3	1.1	96
6.5	2.30	2.0	1.9	1.9	1.8	1.7	1.5	1.3	1.1	0.9	110
6	2.13	1.9	1.8	1.7	1.7	1.5	1.4	1.3	1.1	0.8	129
5.5	1.95	1.7	1.6	1.6	1.5	1.4	1.3	1.2	1.1	0.7	150
5	1.77	1.6	1.5	1.4	1.4	1.3	1.2	1.1	1.0	0.6	150
4.5	1.59	1.4	1.4	1.3	1.3	1.2	1.1	1.0	0.9	0.5	150
4	1.42	1.3	1.2	1.2	1.1	1.0	1.0	0.9	0.8	0.4	150
3.5	1.24	1.1	1.1	1.0	1.0	0.9	0.8	0.8	0.7	0.3	150
3	1.06	1.0	0.9	0.9	0.9	0.8	0.7	0.7	0.6	0.2	150
2.5	0.89	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.5	0.1	150
2	0.71	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.0	150
1.5	0.53	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.0	150
Max. Operating Pressure (MPa)	7.0	7.0	7.0	7.0	7.0	6.9	6.3	5.6			



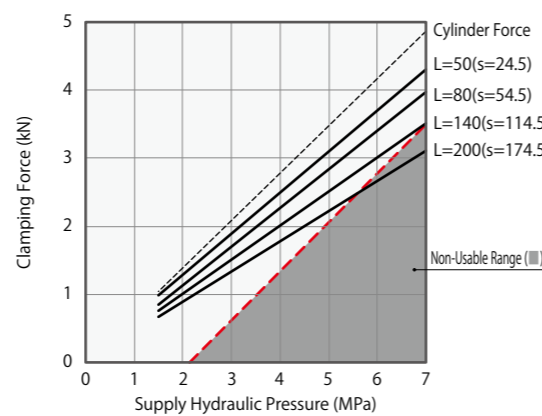
**LHS0400** Clamping Force Calculation Formula  $F = P(1-0.0016 \times L) / (2.0920+0.0040 \times L)$

Hydraulic Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Lever Length L (mm)								Non-Usable Range (mm)	Max. Lever Length (mm)
		L=40	L=50	L=60	L=70	L=80	L=100	L=120	L=150		
7	3.50	3.0	2.9	2.8	2.7	2.6	2.4	2.2	2.1	1.9	124
6.5	3.25	2.7	2.7	2.6	2.5	2.4	2.2	2.1	2.0	1.8	144
6	3.00	2.5	2.5	2.4	2.3	2.2	2.1	1.9	1.7	1.6	171
5.5	2.75	2.3	2.3	2.2	2.1	2.0	1.9	1.8	1.6	1.5	210
5	2.50	2.1	2.1	2.0	1.9	1.9	1.7	1.6	1.5	1.4	210
4.5	2.25	1.9	1.9	1.8	1.7	1.7	1.6	1.5	1.3	1.2	210
4	2.00	1.7	1.7	1.6	1.5	1.5	1.4	1.3	1.2	1.1	210
3.5	1.75	1.5	1.4	1.4	1.4	1.3	1.2	1.1	1.0	0.9	210
3	1.50	1.3	1.2	1.2	1.2	1.1	1.1	1.0	0.9	0.8	210
2.5	1.25	1.1	1.0	1.0	1.0	0.9	0.9	0.8	0.8	0.7	210
2	1.00	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.6	0.6	210
1.5	0.75	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.4	210
Max. Operating Pressure (MPa)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.4			



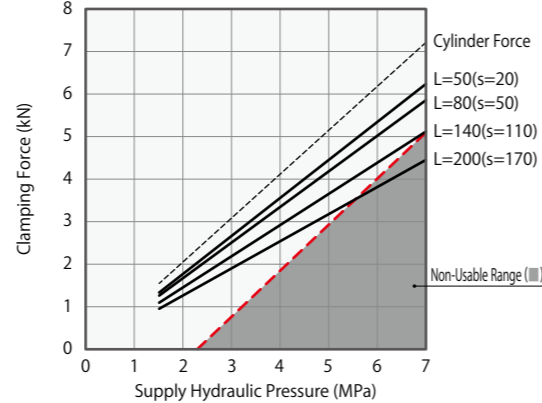
**LHS0480** Clamping Force Calculation Formula  $F = P(1-0.0009 \times L) / (1.4892+0.0018 \times L)$

Hydraulic Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Lever Length L (mm)								Non-Usable Range (mm)	Max. Lever Length (mm)
		L=50	L=60	L=80	L=100	L=120	L=140	L=160	L=200		
7	4.87	4.3	4.2	4.0	3.9	3.7	3.6	3.3	3.1	2.9	141
6.5	4.52	4.0	3.9	3.7	3.6	3.4	3.3	3.0	2.8	2.7	157
6	4.17	3.7	3.6	3.5	3.3	3.2	3.1	2.9	2.7	2.5	178
5.5	3.82	3.4	3.3	3.2	3.0	2.9	2.8	2.7	2.5	2.3	204
5	3.48	3.1	3.0	2.9	2.8	2.7	2.6	2.5	2.3	2.1	230
4.5	3.13	2.8	2.7	2.6	2.5	2.4	2.3	2.2	2.0	1.8	230
4	2.78	2.5	2.4	2.3	2.2	2.1	2.0	1.9	1.7	1.6	230
3.5	2.43	2.2	2.1	2.0	2.0	1.9	1.8	1.7	1.6	1.5	230
3	2.09	1.9	1.8	1.7	1.7	1.6	1.5	1.4	1.3	1.2	230
2.5	1.74	1.6	1.5	1.5	1.4	1.4	1.3	1.2	1.2	1.1	230
2	1.39	1.3	1.2	1.2	1.1	1.1	1.0	1.0	0.9	0.8	230
1.5	1.04	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.7	0.7	230
Max. Operating Pressure (MPa)	7.0	7.0	7.0	7.0	7.0	7.0	6.6	5.7			



**LHS0550** Clamping Force Calculation Formula  $F = P(1-0.0011 \times L) / (1.0039+0.0011 \times L)$

Hydraulic Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Lever Length L (mm)								Non-Usable Range (mm)	Max. Lever Length (mm)
		L=50	L=60	L=80	L=100	L=120	L=140	L=160	L=200		
7	7.21	6.3	6.2	5.9	5.6	5.4	5.2	4.8	4.4	4.2	142
6.5	6.69	5.8	5.7	5.5	5.2	5.0	4.8	4.4	4.0	3.8	159
6	6.18	5.4	5.3	5.1	4.8	4.6	4.4	4.0	3.6	3.4	180
5.5	5.66	5.0	4.8	4.6	4.4	4.2	4.1	3.7	3.3	3.1	209
5	5.15	4.5	4.4	4.2	4.0	3.9	3.7	3.3	3.0	2.8	245
4.5	4.63	4.1	4.0	3.8	3.6	3.5	3.3	3.0	2.7	2.5	245
4	4.12	3.6	3.5	3.4	3.2	3.1	3.0	2.7	2.4	2.2	245
3.5	3.60	3.2	3.1	3.0	2.8	2.7	2.6	2.3	2.0	1.8	245
3	3.09	2.7	2.7	2.6	2.4	2.3	2.2	2.1	1.8	1.6	245
2.5	2.57	2.3	2.2	2.1	2.0	2.0	1.9	1.8	1.6	1.4	245
2	2.06	1.8	1.8	1.7	1.6	1.6	1.5	1.4	1.3	1.2	245
1.5	1.54	1.4	1.4	1.3	1.2	1.2	1.1	1.1	1.0	0.9	245
Max. Operating Pressure (MPa)	7.0	7.0	7.0	7.0	7.0	7.0	6.4	5.6			

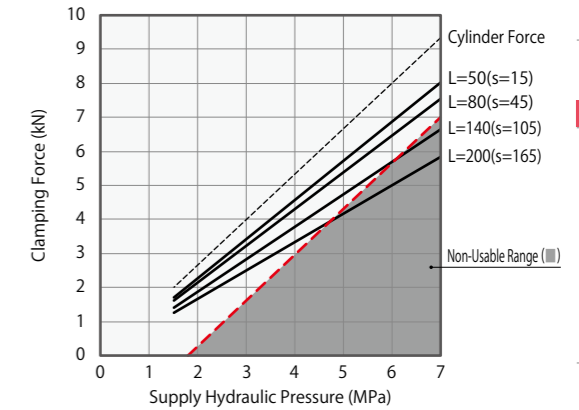


## Notes :

- Tables and graphs shown are the relationships between the clamping force (kN) and supply hydraulic pressure (MPa).
  - Cylinder force (when L=0) cannot be calculated from the calculation formula of clamping force.
  - There may be no lever swing action with large inertia depending on supply hydraulic pressure or lever mounting position.
  - Clamping force indicates the value when the lever locks a workpiece in horizontal position.
  - The clamping force varies depending on the lever length. Set the supply hydraulic pressure suitable to the lever length.
  - Using in the non-usable range may damage the clamp and lead to fluid leakage.
  - The tables and graphs are only for reference. The exact results should be calculated based on the clamping force calculation formula.
- ※1. F : Clamping Force (kN), P : Supply Hydraulic Pressure (MPa), L : Lever Length (mm).

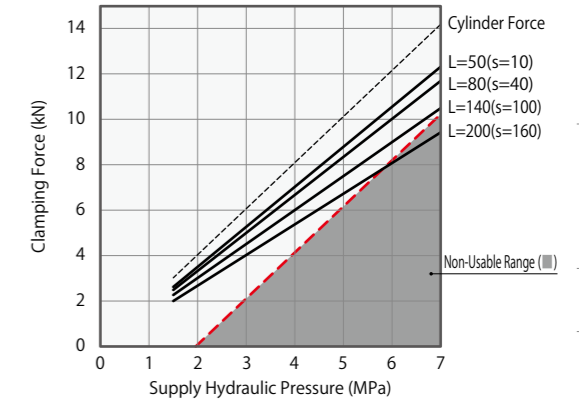
**LHS0650** Clamping Force Calculation Formula  $F = P(1-0.0009 \times L) / (0.7822+0.0010 \times L)$

Hydraulic Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Lever Length L (mm)								Non-Usable Range (mm)	Max. Lever Length (mm)
		L=50	L=60	L=80	L=100	L=120	L=140	L=160	L=200		
7	9.35	8.1	7.9	7.6	7.3	7.0	6.5	6.0	5.7	5.3	115
6.5	8.68	7.5	7.3	7.0	6.7	6.5	6.0	5.7	5.3	5.0	127
6	8.02	6.9	6.8	6.5	6.2	6.0	5.7	5.3	5.0	4.6	142
5.5	7.35	6.4	6.2	6.0	5.7	5.5	5.3	5.0	4.6	4.3	161
5	6.68	5.8	5.7	5.4	5.2	5.0	4.8	4.6	4.3	4.1	187
4.5	6.01	5.2	5.1	4.9	4.7	4.5	4.3	4.1	3.8	3.6	221
4	5.34	4.6	4.5	4.4	4.2	4.0	3.8	3.7	3.4	3.2	260
3.5	4.68	4.1	4.0	3.8	3.7	3.5	3.4	3.2	3.0	2.8	260
3	4.01	3.5	3.4	3.3	3.1	3.0	2.9	2.8	2.5	2.3	260
2.5	3.34	2.9	2.9	2.7	2.6	2.5	2.4	2.3	2.1	2.0	260
2	2.67	2.3	2.3	2.2	2.1	2.0	1.9	1.9	1.7	1.6	260
1.5	2.00	1.8	1.7	1.7	1.6	1.5	1.5	1.4	1.3	1.2	260
Max. Operating Pressure (MPa)	7.0	7.0	7.0	7.0	6.8	6.1	5.6	4.8			



**LHS0750** Clamping Force Calculation Formula  $F = P(1-0.0007 \times L) / (0.5175+0.0006 \times L)$

Hydraulic Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Lever Length L (mm)								Non-Usable Range (mm)	Max. Lever Length (mm)
		L=50	L=60	L=80	L=100	L=120	L=140	L=160	L=200		
7	14.21	12.4	12.2	11.7	11.3	10.9	10.5	10.0	9.5	9.0	147
6.5	13.19	11.5	11.3	10.9	10.5	10.2	9.8	9.5	9.0	8.7	163
6	12.18	10.6	10.4	10.1	9.7	9.4	9.0	8.7	8.3	8.0	184
5.5	11.16	9.7	9.6	9.2	8.9	8.6	8.3	8.0	7.5	7.2	209
5	10.15	8.9	8.7	8.4	8.1	7.8	7.5	7.3	6.8	6.5	244
4.5	9.13	8.0	7.8	7.6	7.3	7.0	6.8	6.6	6.1	5.8	280
4	8.12	7.1	7.0	6.7	6.5	6.3	6.0	5.8	5.4	5.1	280
3.5	7.10	6.2	6.1	5.9	5.7	5.5	5.3	5.1	4.8	4.5	280
3	6.09	5.3	5.2	5.1	4.9	4.7	4.5	4.4	4.1	3.9	280
2.5	5.07	4.5	4.4	4.2	4.1	3.9	3.8	3.7	3.4	3.2	280
2	4.06	3.6	3.5	3.4	3.3	3.2	3.0	2.9	2.7	2.6	280
1.5	3.04	2.7	2.6	2.5	2.5	2.4	2.3	2.2	2.1	2.0	280
Max. Operating Pressure (MPa)	7.0	7.0	7.0	7.0	7.0	7.0	6.9	5.9			



**LHS0900** Clamping Force Calculation Formula  $F = P(1-0.0009 \times L) / (0.3547+0.0004 \times L)$

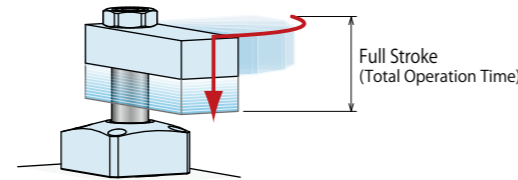
Hydraulic Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Lever Length L (mm)								Non-Usable Range (mm)	Max. Lever Length (mm)
		L=60	L=75	L=100	L=120	L=140	L=170	L=200	L=250		
7	20.62	17.5	17.0	16.2	15.6	14.9	14.1	13.3	12.3	11.1	245
6.5	19.15	16.3	15.8	15.0	14.4	13.9	13.1	12.3	11.1	10.0	292
6	17.68	15.0	14.6	13.9	13.3	12.8	12.1	11.4	10.3	9.3	330
5.5	16.20	13.8	13.4	12.7	12.2	11.7	11.1	10.4	9.4	8.4	330
5	14.73	12.5	12.2	11.6	11.1	10.7	10.1	9.5	8.6	7.7	330
4.5	13.26	11.3	11.0	10.4	10.0	9.6	9.1	8.5	7.7	7.0	330
4	11.78	10.0	9.7	9.3	8.9	8.6	8.1	7.6	6.9	6.3	330
3.5	10.31	8.8	8.5	8.1	7.8	7.5	7.1	6.6	6.0	5.5	330
3	8.84	7.5	7.3	7.0	6.7	6.4	6.1	5.7	5.2	4.8	330
2.5	7.37	6.									

● 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 parts.



(How to read the allowable swing time graph)

When using LHS0480

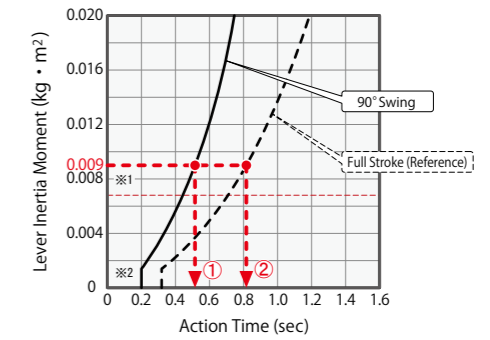
Lever Inertia Moment : 0.009 kg·m<sup>2</sup>

① 90° Swing Time : About 0.52 sec or more

② Total Action Time : About 0.82 sec or more

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

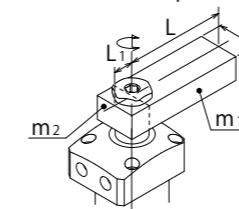
Model → LHS0480



How to Calculate Inertia Moment (Estimated)

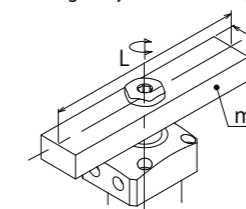
I : Inertia Moment (kg·m<sup>2</sup>) L, L<sub>1</sub>, L<sub>2</sub>, K, b : Length (m) m, m<sub>1</sub>, m<sub>2</sub>, m<sub>3</sub> : Mass (kg)

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



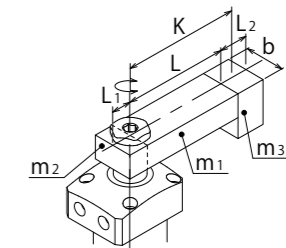
$$I = m_1 \frac{4L^2 + b^2}{12} + m_2 \frac{4L_1^2 + b^2}{12}$$

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

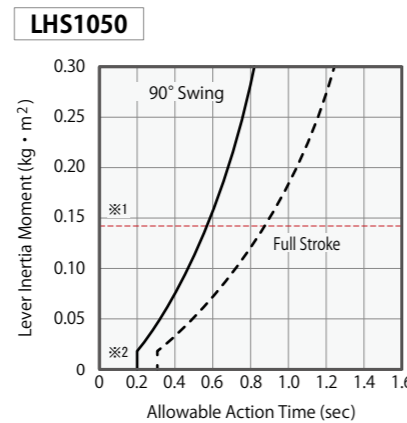
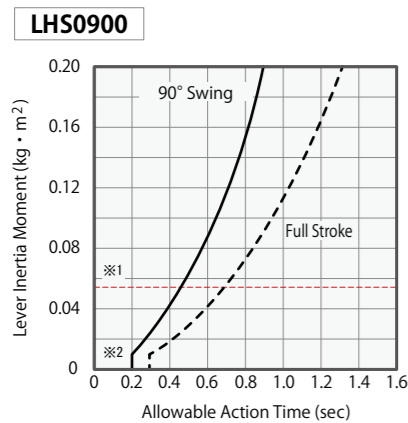
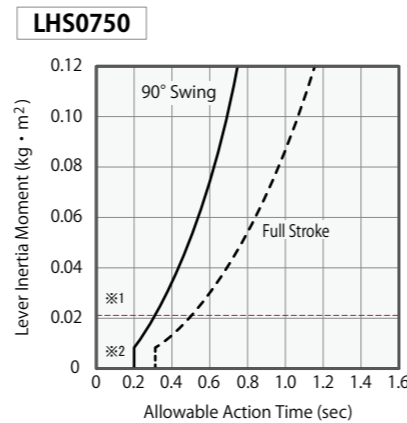
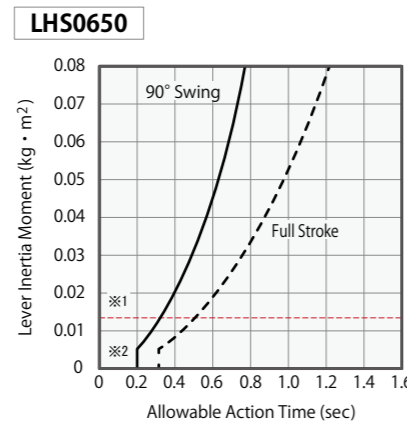
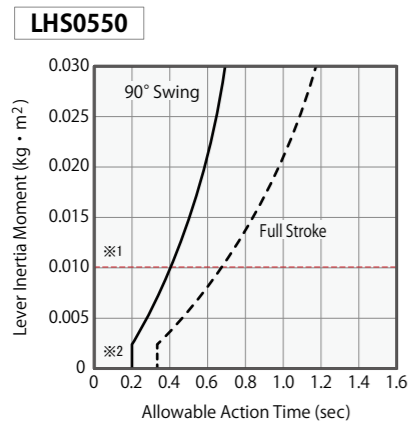
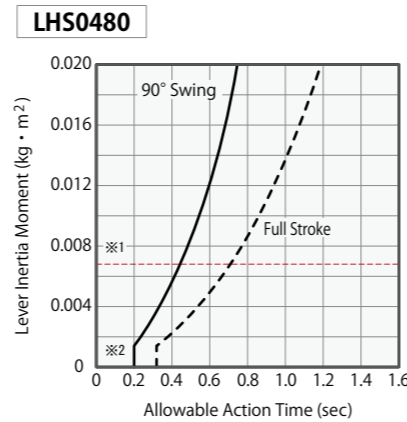
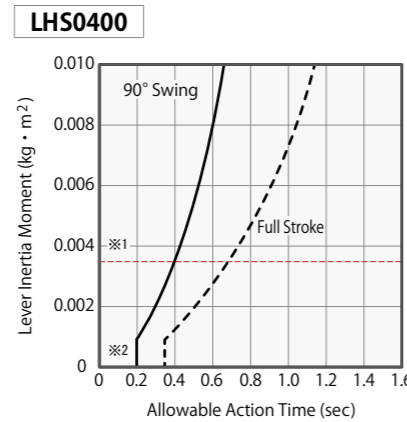
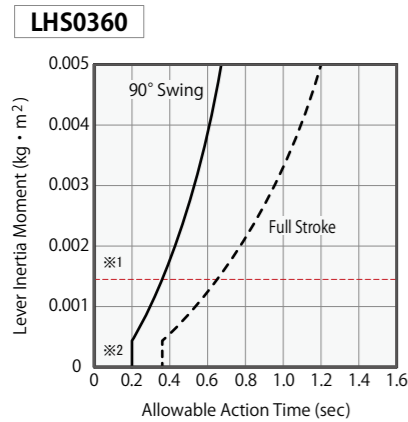


$$I = m \frac{L^2 + b^2}{12}$$

③ Load is applied on the lever front end.



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



Notes :

- ※1. It shows the inertia moment with material lever (LZH□-T).
- ※2. For any lever inertia moment, minimum 90° swing time should be 0.2 sec or more.
  1. The graph shows the allowable action time with respect 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.1238 for speed control of the hydraulic cylinder.
  4. Insufficient fluid supply will cause release action failure. Increase the amount of fluid and adjust the action time with meter-out.
  5. Excessive swing speed can reduce stopping accuracy and damage the internal parts.
  6. Please contact us if operational conditions differ from those shown on the graphs.

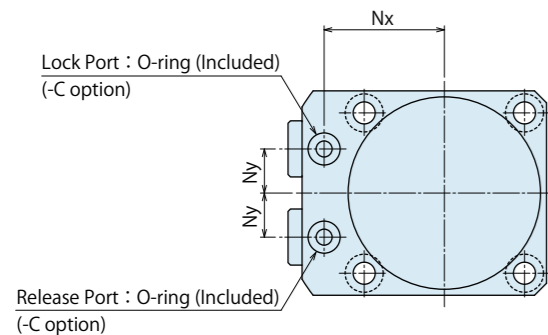
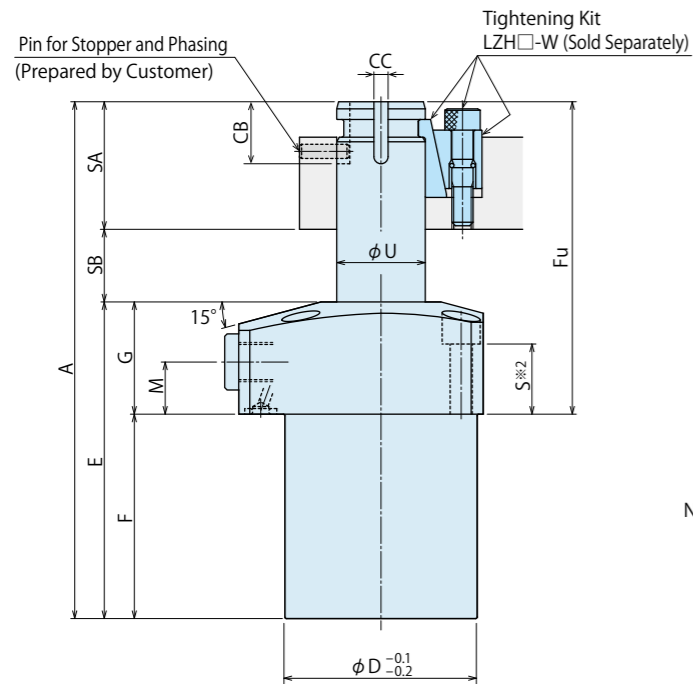
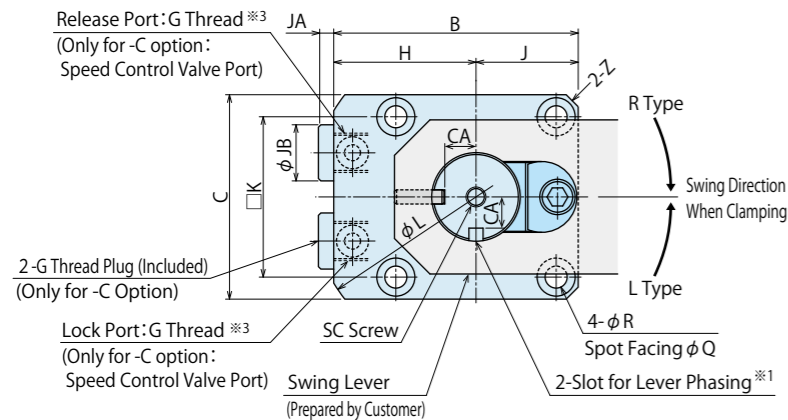
High-Power Series
Pneumatic Series
Hydraulic Series
Valve / Coupler Hydraulic Unit
Manual Operation Accessories
Cautions / Others
Hole Clamp
SFA
SFC
Swing Clamp
LHA
LHC
LHS
LHW
LT/LG
TLA-2
TLB-2
TLA-1
Link Clamp
LKA
LKC
LKW
LM/LJ
TMA-2
TMA-1
Work Support
LD
LC
TNC
TC
Air Sensing Lift Cylinder
LLW
Compact Cylinder
LL
LLR
LLU
DP
DR
DS
DT
Block Cylinder
DBA
DBC
Centering Vise
FVA
FVD
FVC
Control Valve
BZL
BZT
BZX/JZG
Pallet Clamp
VS
VT
Expansion Locating Pin
VFL
VFM
VFJ
VFK
Pull Stud Clamp
FP
FQ
Customized Spring Cylinder
DWA/DWB





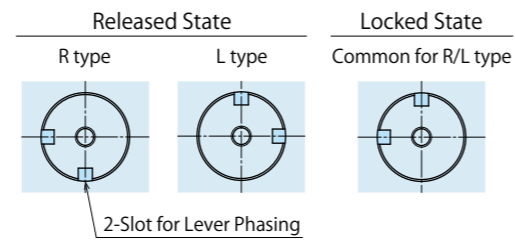
**External Dimensions**

C : Gasket Option (With G Thread Plug)  
※ The drawing shows the released state of LHS-CR-A.

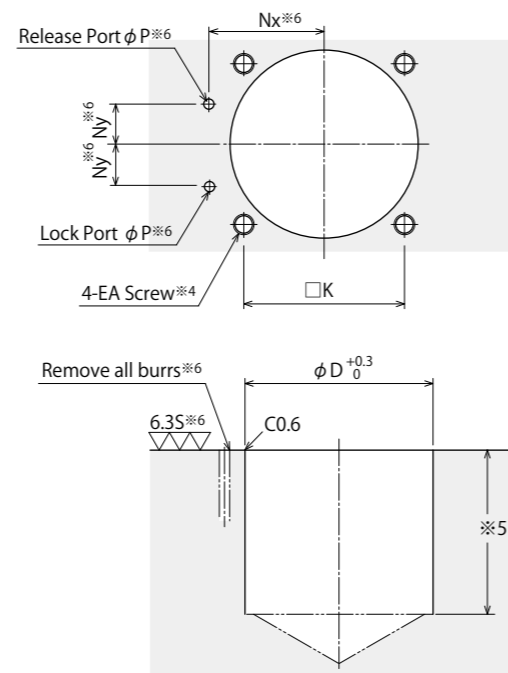


- Notes :
- ※2. Mounting bolts are not provided. Please prepare them according to the mounting height referring to dimension 'S'.
  - ※3. Speed control valve is sold separately. Please refer to P.891.
    1. Please contact us if it has a combination with other detection methods and/or options.

※1. Slot for Lever Phasing



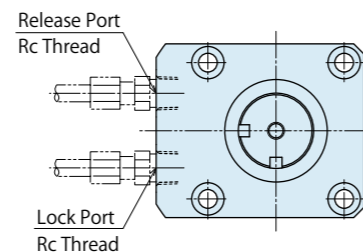
**Machining Dimensions of Mounting Area**



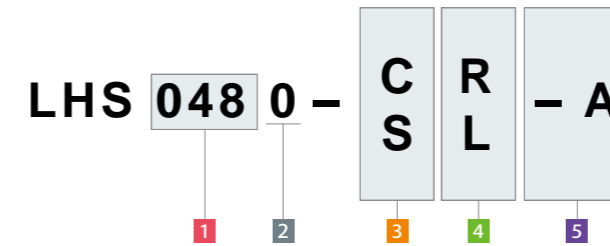
- Notes :
- ※4. EA tapping depth of the mounting bolt should be decided according to the mounting height referring to dimension 'S'.
  - ※5. The depth of the body mounting hole φ D should be decided according to the mounting height referring to dimension 'F'.
  - ※6. The machining dimension is for -C : Gasket Option.

**Piping Method**

S : Piping Option (Rc Thread)  
※ The drawing shows the released state of LHS-SR-A.



**Model No. Indication**



(Format Example : LHS0550-CR-A, LHS0750-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**

Model No.	LHS0360-□□-A	LHS0400-□□-A	LHS0480-□□-A	LHS0550-□□-A	LHS0650-□□-A	LHS0750-□□-A	LHS0900-□□-A	LHS1050-□□-A
Full Stroke (Vertical) ※8	8	8	8	10	10	12	12	16
A ※8	110	117	133.5	150.5	164.5	192.5	220	258.5
B	49	54	61	69	81	92	107	122
C	40	45	51	60	70	80	95	110
D	36	40	48	55	65	75	90	105
E ※8	76	80	91.5	102.5	112.5	132.5	151	178.5
F ※8	51	55	63.5	72.5	81.5	94.5	105	122.5
Fu	59	62	70	78	83	98	115	136
G	25	25	28	30	31	38	46	56
H	29	31.5	35.5	39	46	52	59.5	67
J	20	22.5	25.5	30	35	40	47.5	55
K	31.4	34	40	47	55	63	75	88
L	66	73	83	88	106	116	136	152
M	11	11	13	12	13	16	19	22
Nx	23.5	26	30	33.5	39.5	45	52.5	60
Ny	8	9	11	12	15	16	18.5	22.5
P	3	3	3	3	5	5	5	5
Q	7.5	9	9	11	11	14	17.5	20
R	4.5	5.5	5.5	6.8	6.8	9	11	14
S	16	15	17.5	17	17	21	25	32
U	15	18	22	25	30	35.5	45	55
Z (Chamfer)	C2	C3	C3	C3	C4	C5	C6	C6
CA	4.8	5.8	7.8	8.8	10.5	12.5	17.5	22.5
CB	12	15	16	17.5	21.5	21.5	26	26
CC	3 +0.028/+0.014	4 +0.038/+0.020	4 +0.038/+0.020	4 +0.038/+0.020	6 +0.038/+0.020	6 +0.038/+0.020	8 +0.047/+0.025	8 +0.047/+0.025
EA (Nominal × Pitch)	M4×0.7	M5×0.8	M5×0.8	M6×1	M6×1	M8×1.25	M10×1.5	M12×1.75
SA	24	27	32	36	40	46	55	62
SB ※8	10	10	10	12	12	14	14	18
SC (Nominal×Pitch×Depth)	M4×0.7×7	M5×0.8×8	M5×0.8×8	M6×1×11	M6×1×11	M8×1.25×13	M10×1.5×15	M10×1.5×15
JA	3.5	3.5	3.5	3.5	4.5	4.5	4.5	4.5
JB	14	14	14	14	19	19	22	22
Lock Port/Release Port	-C option: G1/8 -S option: Rc1/8	G1/8 Rc1/8	G1/8 Rc1/8	G1/8 Rc1/8	G1/4 Rc1/4	G1/4 Rc1/4	G3/8 Rc3/8	G3/8 Rc3/8
O-ring (-C option)	1BP5	1BP5	1BP5	1BP5	1BP7	1BP7	1BP7	1BP7
Pin for Stopper and Phasing	φ3(m6)×8	φ4(m6)×10	φ4(m6)×12	φ4(m6)×14	φ6(m6)×14	φ6(m6)×16	φ8(m6)×20	φ8(m6)×22
Cylinder Capacity ※8	Lock: 6.8 Release: 8.2	Lock: 10.1 Release: 12.1	Lock: 15.8 Release: 18.9	Lock: 27.4 Release: 32.3	Lock: 39.1 Release: 46.2	Lock: 72.0 Release: 83.8	Lock: 119.8 Release: 138.9	Lock: 202.3 Release: 240.3
Mass ※7 ※8	kg: 0.8	kg: 1.0	kg: 1.5	kg: 2.2	kg: 3.1	kg: 5.1	kg: 8.3	kg: 11.9

- Notes :
- ※7. Mass of single swing clamp without the tightening kit and swing lever.
  - ※8. It shows different dimensions than LHA□0-□□.

High-Power Series

Pneumatic Series

Hydraulic Series

Valve / Coupler Hydraulic Unit

Manual Operation Accessories

Cautions / Others

Hole Clamp

SFA

SFC

Swing Clamp

LHA

LHC

LHS

LHW

LT/LG

TLA-2

TLB-2

TLA-1

Link Clamp

LKA

LKC

LKW

LM/LJ

TMA-2

TMA-1

Work Support

LD

LC

TNC

TC

Air Sensing Lift Cylinder

LLW

Compact Cylinder

LL

LLR

LLU

DP

DR

DS

DT

Block Cylinder

DBA

DBC

Centering Vise

FVA

FVD

FVC

Control Valve

BZL

BZT

BZX/JZG

Pallet Clamp

VS

VT

Expansion Locating Pin

VFL

VFM

VFJ

VFK

Pull Stud Clamp

FP

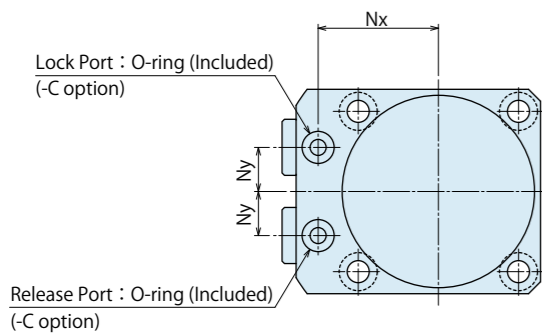
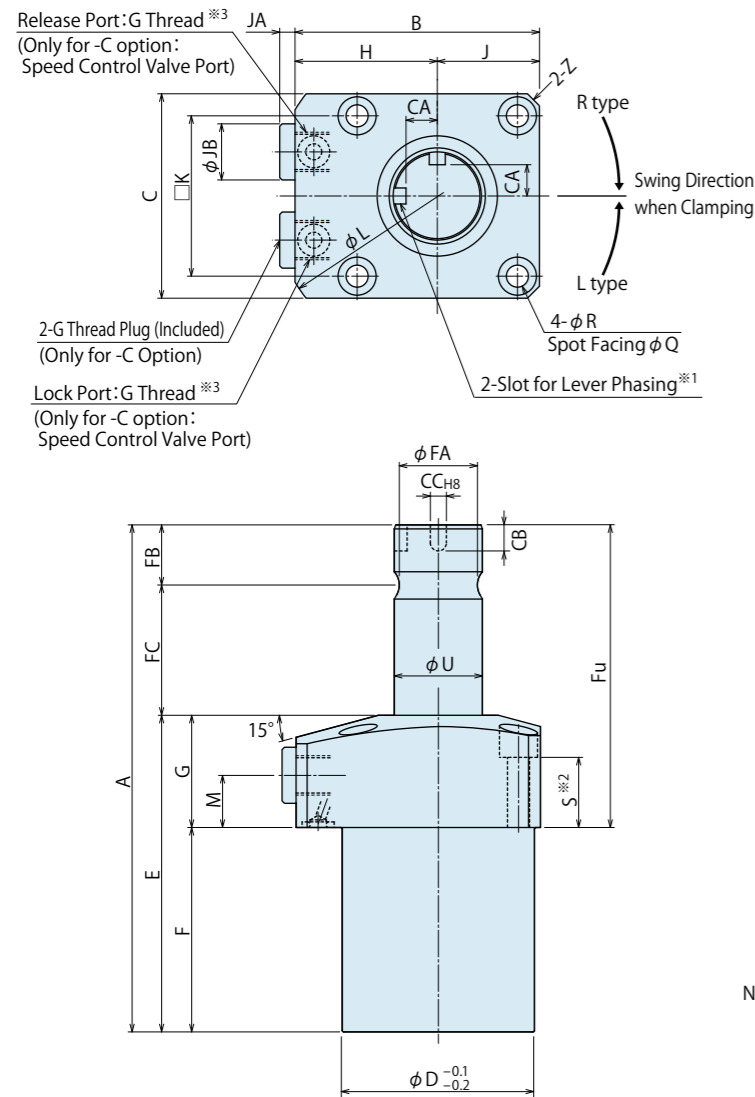
FQ

Customized Spring Cylinder

DWA/DWB

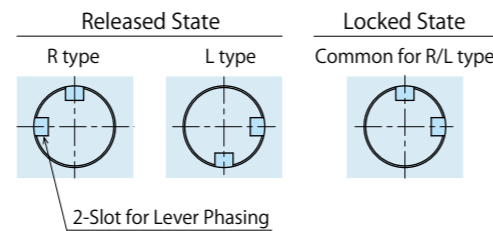
**External Dimensions**

C : Gasket Option (With G Thread Plug)  
※The drawing shows the released state of LHS-CR-F.

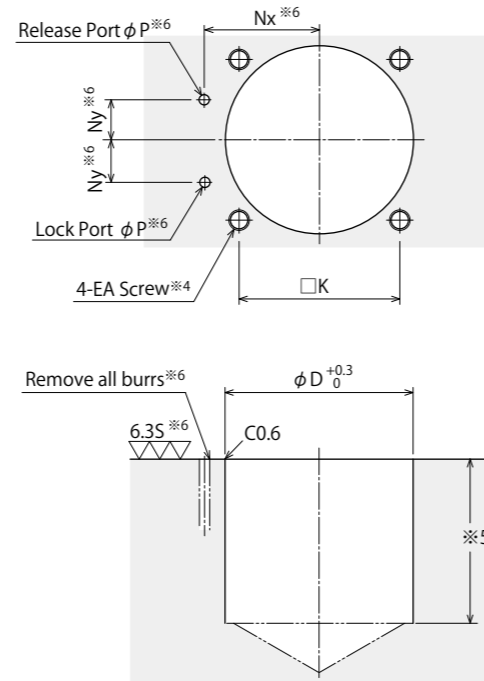


- Notes :
- ※2. Mounting bolts are not provided. Please prepare them according to the mounting height referring to dimension 'S'.
  - ※3. Speed control valve is sold separately. Please refer to P.891.
  - 1. Please contact us if it has a combination with other options.

※1. Slot for Lever Phasing



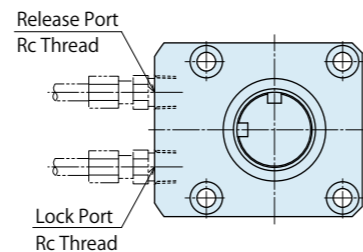
**Machining Dimensions of Mounting Area**



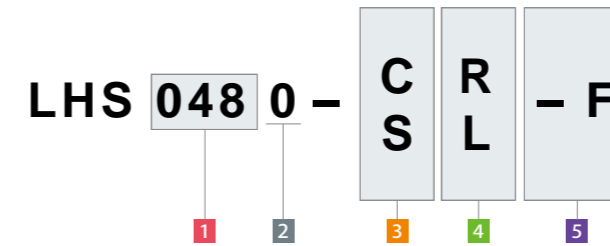
- Notes :
- ※4. EA tapping depth of the mounting bolt should be decided according to the mounting height referring to dimension 'S'.
  - ※5. The depth of the body mounting hole φD should be decided according to the mounting height referring to dimension 'F'.
  - ※6. The machining dimension is for -C : Gasket Option.

**Piping Method**

S : Piping Option (Rc Thread)  
※ The drawing shows the released state of LHS-SR-F.



**Model No. Indication**



(Format Example : LHS0550-CR-F, LHS0750-SL-F)

- 1 Body Size
- 2 Design No.
- 3 Piping Method
- 4 Swing Direction when Clamping
- 5 Option (When F is chosen)

**External Dimensions and Machining Dimensions for Mounting**

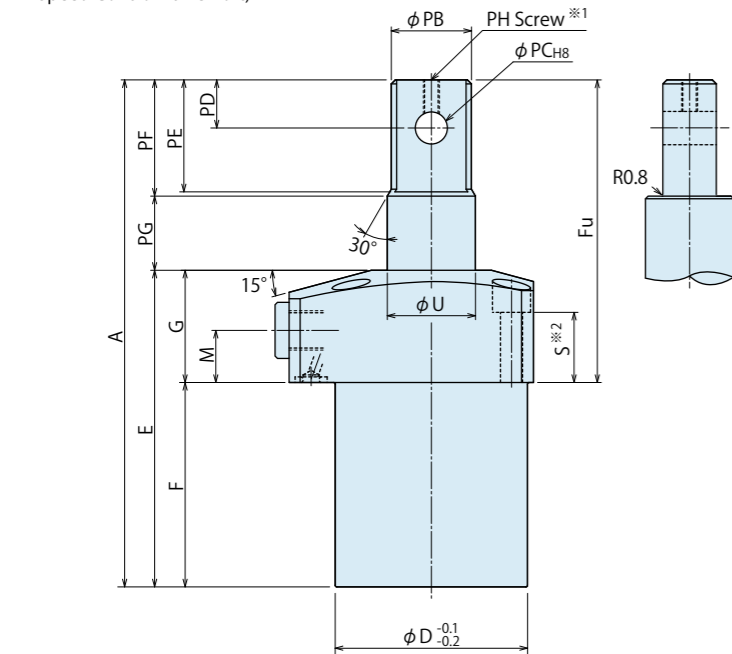
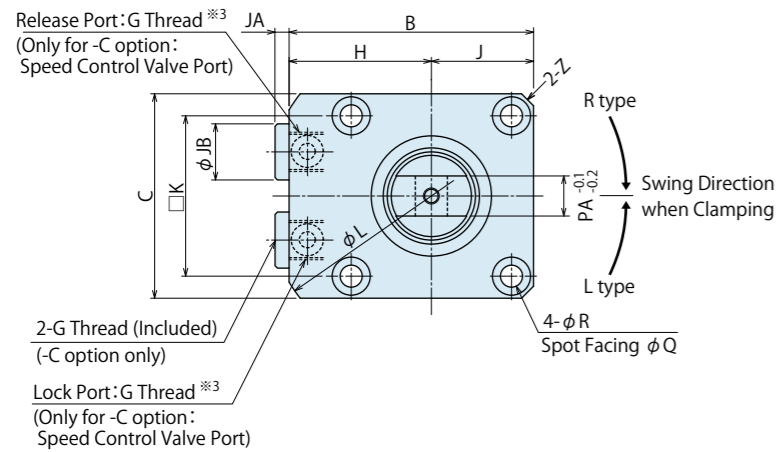
Model No.	LHS0360-□□-F	LHS0400-□□-F	LHS0480-□□-F	LHS0550-□□-F	LHS0650-□□-F	LHS0750-□□-F	LHS0900-□□-F	LHS1050-□□-F
Full Stroke (Vertical) ※8	8	8	8	10	10	12	12	16
A ※8	108	115	131.5	148.5	164.5	192.5	220	256.5
B	49	54	61	69	81	92	107	122
C	40	45	51	60	70	80	95	110
D	36	40	48	55	65	75	90	105
E ※8	76	80	91.5	102.5	112.5	132.5	151	178.5
F ※8	51	55	63.5	72.5	81.5	94.5	105	122.5
Fu ※8	57	60	68	76	83	98	115	134
G	25	25	28	30	31	38	46	56
H	29	31.5	35.5	39	46	52	59.5	67
J	20	22.5	25.5	30	35	40	47.5	55
K	31.4	34	40	47	55	63	75	88
L	66	73	83	88	106	116	136	152
M	11	11	13	12	13	16	19	22
Nx	23.5	26	30	33.5	39.5	45	52.5	60
Ny	8	9	11	12	15	16	18.5	22.5
P	3	3	3	3	5	5	5	5
Q	7.5	9	9	11	11	14	17.5	20
R	4.5	5.5	5.5	6.8	6.8	9	11	14
S	16	15	17.5	17	17	21	25	32
U	15	18	22	25	30	35.5	45	55
Z (Chamfer)	C2	C3	C3	C3	C4	C5	C6	C6
CA	5	5.8	7.8	9	10	13.25	17.5	22.5
CB	5	6.5	6.5	7	9.5	9.5	13	13.5
CC	3 <sup>+0.014</sup> <sub>0</sub>	4 <sup>+0.018</sup> <sub>0</sub>	4 <sup>+0.018</sup> <sub>0</sub>	4 <sup>+0.018</sup> <sub>0</sub>	6 <sup>+0.018</sup> <sub>0</sub>	6 <sup>+0.018</sup> <sub>0</sub>	8 <sup>+0.022</sup> <sub>0</sub>	8 <sup>+0.022</sup> <sub>0</sub>
EA (Nominal × Pitch)	M4×0.7	M5×0.8	M5×0.8	M6×1	M6×1	M8×1.25	M10×1.5	M12×1.75
FA	13.5	16	19.5	22	26	31	39.5	48
FB	11	12.5	15	17	20	23	27.5	30
FC ※8	21	22.5	25	29	32	37	41.5	48
JA	3.5	3.5	3.5	3.5	4.5	4.5	4.5	4.5
JB	14	14	14	14	19	19	22	22
Lock Port/Release Port	-C option G1/8 -S option Rc1/8	G1/8 Rc1/8	G1/8 Rc1/8	G1/8 Rc1/8	G1/4 Rc1/4	G1/4 Rc1/4	G3/8 Rc3/8	G3/8 Rc3/8
O-ring (-C option)	1BP5	1BP5	1BP5	1BP5	1BP7	1BP7	1BP7	1BP7
Cylinder ※8	Lock 6.8	10.1	15.8	27.4	39.1	72.0	119.8	202.3
Capacity cm <sup>3</sup>	Release 8.2	12.1	18.9	32.3	46.2	83.8	138.9	240.3
Mass ※7 ※8	kg 0.8	1.0	1.5	2.2	3.1	5.1	8.3	11.9

- Notes :
- ※7. Mass of single swing clamp.
  - ※8. It shows different dimensions than LHA□□0-□□-F.

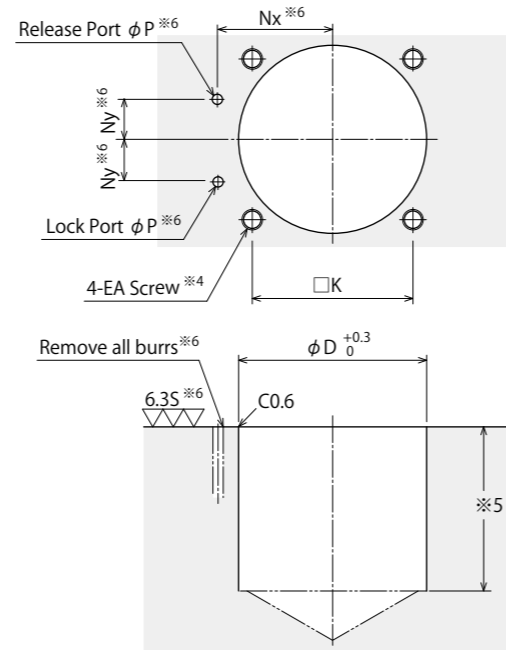
- High-Power Series
- Pneumatic Series
- Hydraulic Series
- Valve / Coupler Hydraulic Unit
- Manual Operation Accessories
- Cautions / Others
- Hole Clamp
  - SFA
  - SFC
- Swing Clamp
  - LHA
  - LHC
  - LHS
  - LHW
  - LT/LG
  - TLA-2
  - TLB-2
  - TLA-1
- Link Clamp
  - LKA
  - LKC
  - LKW
  - LM/LJ
  - TMA-2
  - TMA-1
- Work Support
  - LD
  - LC
  - TNC
  - TC
- Air Sensing Lift Cylinder
  - LLW
- Compact Cylinder
  - LL
  - LLR
  - LLU
  - DP
  - DR
  - DS
  - DT
- Block Cylinder
  - DBA
  - DBC
- Centering Vise
  - FVA
  - FVD
  - FVC
- Control Valve
  - BZL
  - BZT
  - BZX/JZG
- Pallet Clamp
  - VS
  - VT
- Expansion Locating Pin
  - VFL
  - VFM
  - VFJ
  - VFK
- Pull Stud Clamp
  - FP
  - FQ
- Customized Spring Cylinder
  - DWA/DWB

**External Dimensions**

C : Gasket Option (With G Thread Plug)  
※The drawing shows the released state of LHS-C□-P.



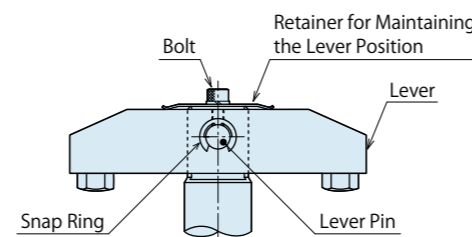
**Machining Dimensions of Mounting Area**



**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.

**Balance Lever Reference Drawing**



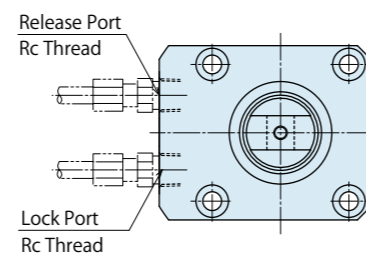
**Note :**

- 1. Lever, bolt, lever pin, snap ring and retainer for maintaining the lever position are not provided. Please design and prepare by Customer.

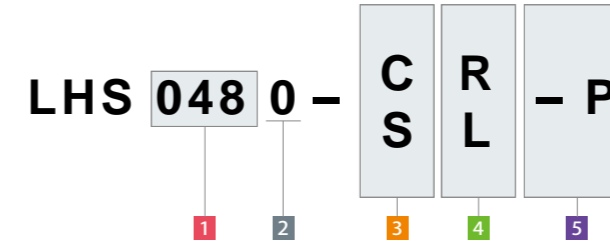
**Piping Method**

S : Piping Option (Rc Thread)

※The drawing shows the released state of LHS-S□-P.



**Model No. Indication**



(Format Example : LHS0550-CR-P, LHS0750-SL-P)

- 1 Body Size
- 2 Design No.
- 3 Piping Method
- 4 Swing Direction when Clamping
- 5 Option (When P is chosen)

**External Dimensions and Machining Dimensions for Mounting**

Model No.	LHS0360-□□-P	LHS0400-□□-P	LHS0480-□□-P	LHS0550-□□-P	LHS0650-□□-P	LHS0750-□□-P	LHS0900-□□-P	LHS1050-□□-P
Full Stroke (Vertical) ※8	8	8	8	10	10	12	12	16
A ※8	108	115	131.5	148.5	164.5	192.5	220	256.5
B	49	54	61	69	81	92	107	122
C	40	45	51	60	70	80	95	110
D	36	40	48	55	65	75	90	105
E ※8	76	80	91.5	102.5	112.5	132.5	151	178.5
F ※8	51	55	63.5	72.5	81.5	94.5	105	122.5
Fu ※8	57	60	68	76	83	98	115	134
G	25	25	28	30	31	38	46	56
H	29	31.5	35.5	39	46	52	59.5	67
J	20	22.5	25.5	30	35	40	47.5	55
K	31.4	34	40	47	55	63	75	88
L	66	73	83	88	106	116	136	152
M	11	11	13	12	13	16	19	22
Nx	23.5	26	30	33.5	39.5	45	52.5	60
Ny	8	9	11	12	15	16	18.5	22.5
P	3	3	3	3	5	5	5	5
Q	7.5	9	9	11	11	14	17.5	20
R	4.5	5.5	5.5	6.8	6.8	9	11	14
S	16	15	17.5	17	17	21	25	32
U	15	18	22	25	30	35.5	45	55
Z (Chamfer)	C2	C3	C3	C3	C4	C5	C6	C6
EA (Nominal×Pitch)	M4×0.7	M5×0.8	M5×0.8	M6×1	M6×1	M8×1.25	M10×1.5	M12×1.75
PA	7	8	10	12	14	16	22	26
PB	13.5	16	20	23	28	33.5	43	53
PC	6 <sup>+0.018</sup> / <sub>0</sub>	6 <sup>+0.018</sup> / <sub>0</sub>	8 <sup>+0.022</sup> / <sub>0</sub>	10 <sup>+0.022</sup> / <sub>0</sub>	13 <sup>+0.027</sup> / <sub>0</sub>	13 <sup>+0.027</sup> / <sub>0</sub>	16 <sup>+0.027</sup> / <sub>0</sub>	20 <sup>+0.033</sup> / <sub>0</sub>
PD	9	11	12	12.5	16.5	19	23.5	25.5
PE	21	24	27.5	31.5	38.5	43.5	52.5	58.5
PF	22	25	29	33	40	45	54	60
PG ※8	10	10	11	13	12	15	15	18
PH (Nominal×Pitch)	M3×0.5	M3×0.5	M4×0.7	M5×0.8	M6×1	M6×1	M8×1.25	M8×1.25
JA	3.5	3.5	3.5	3.5	4.5	4.5	4.5	4.5
JB	14	14	14	14	19	19	22	22
Lock Port/Release Port	-C option: G1/8 -S option: Rc1/8	G1/8 Rc1/8	G1/8 Rc1/8	G1/8 Rc1/8	G1/4 Rc1/4	G1/4 Rc1/4	G3/8 Rc3/8	G3/8 Rc3/8
O-ring (-C option)	1BP5	1BP5	1BP5	1BP5	1BP7	1BP7	1BP7	1BP7
Cylinder ※8	Lock: 6.8 Release: 8.2	Lock: 10.1 Release: 12.1	Lock: 15.8 Release: 18.9	Lock: 27.4 Release: 32.3	Lock: 39.1 Release: 46.2	Lock: 72.0 Release: 83.8	Lock: 119.8 Release: 138.9	Lock: 202.3 Release: 240.3
Mass ※7 ※8	kg: 0.8	kg: 1.0	kg: 1.5	kg: 2.2	kg: 3.1	kg: 5.1	kg: 8.3	kg: 11.9

- Notes : ※7. Mass of single swing clamp.
- ※8. It shows different dimensions than LHA□□0-□□-P.

- Notes :**
- ※1. Use the tapped hole (PH thread) on top of rod to attach a retainer for lever.
  - ※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.891.
    1. Please contact us if it has a combination with other options.

High-Power Series

Pneumatic Series

Hydraulic Series

Valve / Coupler Hydraulic Unit

Manual Operation Accessories

Cautions / Others

Hole Clamp

SFA

SFC

Swing Clamp

LHA

LHC

LHS

LHW

LT/LG

TLA-2

TLB-2

TLA-1

Link Clamp

LKA

LKC

LKW

LM/LJ

TMA-2

TMA-1

Work Support

LD

LC

TNC

TC

Air Sensing Lift Cylinder

LLW

Compact Cylinder

LL

LLR

LLU

DP

DR

DS

DT

Block Cylinder

DBA

DBC

Centering Vise

FVA

FVD

FVC

Control Valve

BZL

BZT

BZX/JZG

Pallet Clamp

VS

VT

Expansion Locating Pin

VFL

VFM

VFJ

VFK

Pull Stud Clamp

FP

FQ

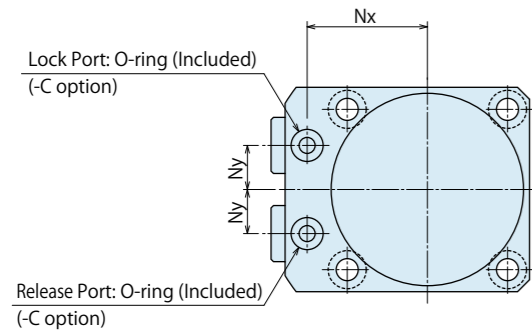
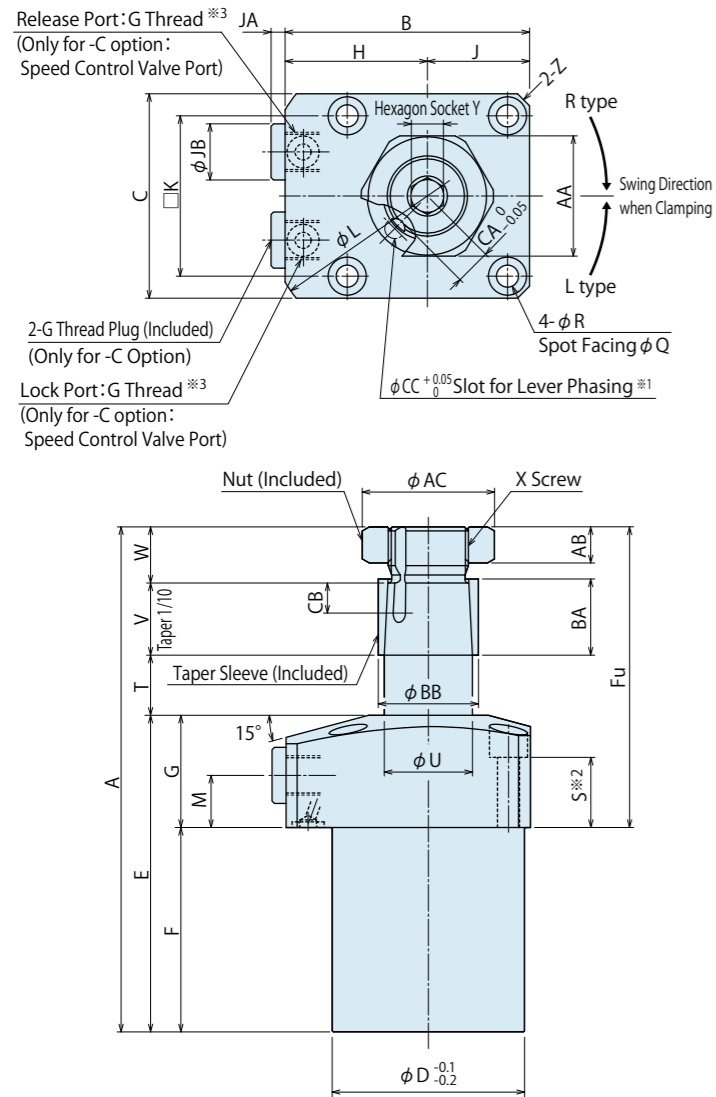
Customized Spring Cylinder

DWA/DWB



**External Dimensions**

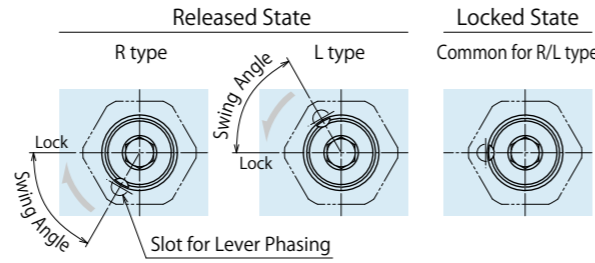
C : Gasket Option (With G Thread Plug)  
※The drawing shows the released state of LHS-CR-Y45.



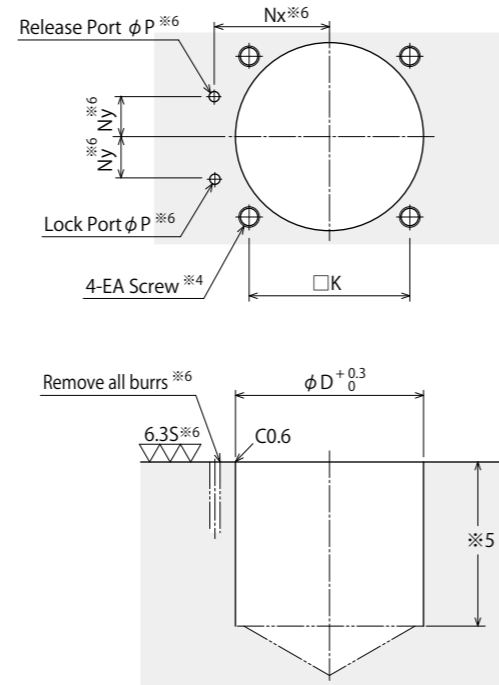
Notes :  
※2. Mounting bolts are not provided. Please prepare them according to the mounting height referring to dimension 'S'.  
※3. Speed control valve is sold separately. Please refer to P.891.  
1. Please contact us if it has a combination with other options.

**※1. Slot for Lever Phasing**

The slot position at released state differs depending on the swing direction/angle at locked state. It faces the port side when locked.



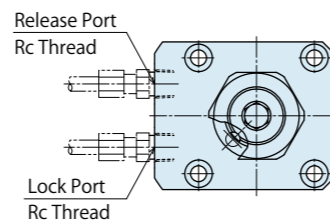
**Machining Dimensions of Mounting Area**



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.

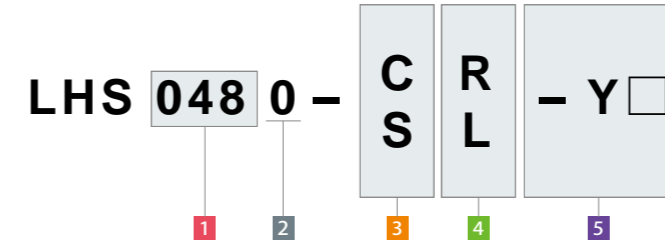
**Piping Method**

S : Piping Option (Rc Thread)  
※The drawing shows the released state of LHS-SR-Y45.



**Model No. Indication**

(Format Example : LHS0550-CR-Y30, LHS0750-SL-Y45)



**External Dimensions and Machining Dimensions for Mounting**

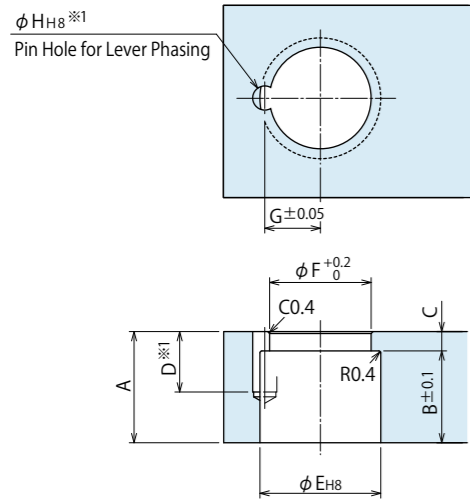
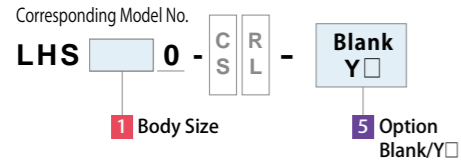
Model No.	LHS0360-□□-Y□		LHS0400-□□-Y□			LHS0480-□□-Y□			LHS0550-□□-Y□			LHS0650-□□-Y□			LHS0750-□□-Y□			LHS0900-□□-Y□			LHS1050-□□-Y□				
	Y30	Y45	Y60	Y30	Y45	Y60	Y30	Y45	Y60	Y30	Y45	Y60	Y30	Y45	Y60	Y30	Y45	Y60	Y30	Y45	Y60				
Option Form	Y30	Y45	Y60	Y30	Y45	Y60	Y30	Y45	Y60	Y30	Y45	Y60	Y30	Y45	Y60	Y30	Y45	Y60	Y30	Y45	Y60				
Swing Angle	30°	45°	60°	30°	45°	60°	30°	45°	60°	30°	45°	60°	30°	45°	60°	30°	45°	60°	30°	45°	60°				
Full Stroke (Vertical) ※8	8		8			8			10			10			12			12			16				
A ※8	110		117			133.5			150.5			164.5			192.5			220			258.5				
B	49		54			61			69			81			92			107			122				
C	40		45			51			60			70			80			95			110				
D	36		40			48			55			65			75			90			105				
E ※8	76		80			91.5			102.5			112.5			132.5			151			178.5				
F ※8	51		55			63.5			72.5			81.5			94.5			105			122.5				
Fu ※8	59		62			70			78			83			98			115			136				
G	25		25			28			30			31			38			46			56				
H	29		31.5			35.5			39			46			52			59.5			67				
J	20		22.5			25.5			30			35			40			47.5			55				
K	31.4		34			40			47			55			63			75			88				
L	66		73			83			88			106			116			136			152				
M	11		11			13			12			13			16			19			22				
Nx	23.5		26			30			33.5			39.5			45			52.5			60				
Ny	8		9			11			12			15			16			18.5			22.5				
P	3		3			3			3			5			5			5			5				
Q	7.5		9			9			11			11			14			17.5			20				
R	4.5		5.5			5.5			6.8			6.8			9			11			14				
S	16		15			17.5			17			17			21			25			32				
T ※8	10		10			10			12			12			14			14			18				
U	15		18			22			25			30			35.5			45			55				
V	13		15			18			21			24			30			37			43				
W	11		12			14			15			16			16			18			19				
X (Nominal × Pitch)	M14×1.5		M16×1.5			M20×1.5			M22×1.5			M27×1.5			M30×1.5			M39×1.5			M48×1.5				
Y	5		6			8			8			10			10			14			14				
Z (Chamfer)	C2		C3			C3			C3			C4			C5			C6			C6				
AA	22		24			30			32			41			46			55			65				
AB	7		8			9			10			11			11			12			12				
AC	24.5		26.5			33			35.5			45			50			60			71				
BA	14		16			19			22			25			31			38			44				
BB	17		20			25			28			34			40			49			60				
CA	6		7			9			10			12.5			14			18.5			23				
CB	6.5		6.5			7.5			9.5			11.5			12.5			11.5			13.5				
CC	4		4			5			6			6			8			8			10				
EA (Nominal × Pitch)	M4×0.7		M5×0.8			M5×0.8			M6×1			M6×1			M8×1.25			M10×1.5			M12×1.75				
JA	3.5		3.5			3.5			3.5			4.5			4.5			4.5			4.5				
JB	14		14			14			14			19			19			22			22				
Lock Port/Release Port	-C option	G1/8	G1/8			G1/8			G1/8			G1/4			G1/4			G3/8			G3/8				
	-S option	Rc1/8	Rc1/8			Rc1/8			Rc1/8			Rc1/4			Rc1/4			Rc3/8			Rc3/8				
O-ring (-C option)		1BP5	1BP5			1BP5			1BP5			1BP7			1BP7			1BP7			1BP7				
Cylinder ※8	Lock	5.0	5.5	5.9	7.3	8.0	8.7	11.2	12.4	13.6	19.7	21.6	23.5	27.5	30.4	33.2	50.0	55.6	61.1	81.5	90.9	100.6	140.5	155.9	171.4
Capacity cm <sup>3</sup>	Release	6.4	6.9	7.3	9.4	10.0	10.8	14.2	15.5	16.6	24.6	26.5	28.4	34.5	37.5	40.3	61.9	67.5	73.0	100.6	110.0	119.7	178.5	194.0	209.4
Mass ※7 ※8	kg	0.8		1.0			1.5			2.2			3.1			5.1			8.3			11.9			

Notes : ※7. Mass of single swing clamp including taper sleeve and nut.  
※8. It shows different dimensions than LHA□□-□□-Y□.

High-Power Series
Pneumatic Series
Hydraulic Series
Valve / Coupler Hydraulic Unit
Manual Operation Accessories
Cautions / Others
Hole Clamp
SFA
SFC
Swing Clamp
LHA
LHC
LHS
LHW
LT/LG
TLA-2
TLB-2
TLA-1
Link Clamp
LKA
LKC
LKW
LM/LJ
TMA-2
TMA-1
Work Support
LD
LC
TNC
TC
Air Sensing Lift Cylinder
LLW
Compact Cylinder
LL
LLR
LLU
DP
DR
DS
DT
Block Cylinder
DBA
DBC
Centering Vise
FVA
FVD
FVC
Control Valve
BZL
BZT
BZX/JZG
Pallet Clamp
VS
VT
Expansion Locating Pin
VFL
VFM
VFJ
VFK
Pull Stud Clamp
FP
FQ
Customized Spring Cylinder
DWA/DWB

### Taper Lock Lever Design Dimensions

※ Reference for designing taper lock swing lever.



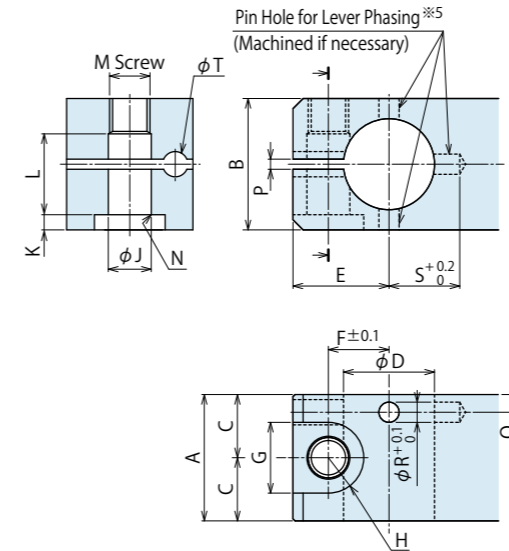
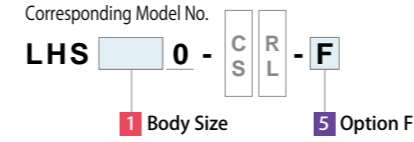
Corresponding Model No. <sup>※3</sup>	LHS0360	LHS0400	LHS0480	LHS0550	LHS0650	LHS0750	LHS0900	LHS1050
A	17	19	23	26	29	35	43	50
B	14	16	19	22	25	31	38	44
C	3	3	4	4	4	4	5	6
D	10.5	10.5	12.5	14.5	16.5	17.5	17.5	20.5
E	17 <sup>+0.027</sup>	20 <sup>+0.033</sup>	25 <sup>+0.033</sup>	28 <sup>+0.033</sup>	34 <sup>+0.039</sup>	40 <sup>+0.039</sup>	49 <sup>+0.039</sup>	60 <sup>+0.046</sup>
F	15	17	21	23.5	29	33	42	51
G	8	9	11.5	13	15.5	18	22.5	28
H	4 <sup>+0.018</sup>	4 <sup>+0.018</sup>	5 <sup>+0.018</sup>	6 <sup>+0.018</sup>	6 <sup>+0.018</sup>	8 <sup>+0.022</sup>	8 <sup>+0.022</sup>	10 <sup>+0.022</sup>
Phasing Pin <sup>※2</sup> (Reference)	φ4(h8)×10	φ4(h8)×10	φ5(h8)×12	φ6(h8)×14	φ6(h8)×16	φ8(h8)×16	φ8(h8)×16	φ10(h8)×20

Notes :

- Swing lever should be designed with its length according to performance curve.
- If the swing lever is not in accordance with the dimension shown above, performance may be degraded and damage can occur.
- ※1. The pin hole (φ H) for determining the lever phase should be added, if necessary.
- ※2. Phasing pin is not included. Prepare it separately.
- ※3. Refer to Design Dimensions of Quick Change Lever Type A for -A (Quick Change Lever Type A).  
Refer to Design Dimensions of Quick Change Lever Type F for -F (Quick Change Lever Type F).  
For -P (Balance Lever Option), it should be designed by customer.

### Quick Change Lever Type F Design Dimensions

※ Reference for designing Quick Change Swing Lever Type F.



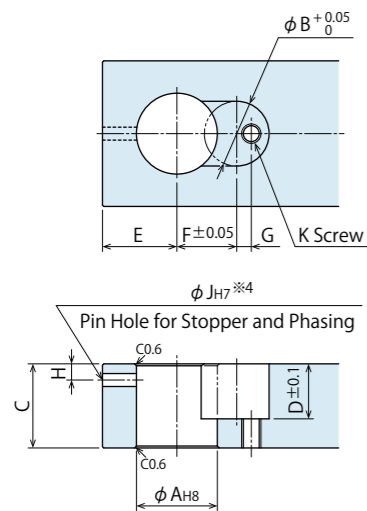
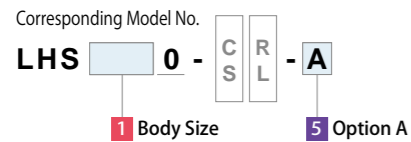
Corresponding Model No.	LHS0360 -□-F	LHS0400 -□-F	LHS0480 -□-F	LHS0550 -□-F	LHS0650 -□-F	LHS0750 -□-F	LHS0900 -□-F	LHS1050 -□-F
A	22	25	30	34	40	46	55	60
B	22	26	32	36	45	53	70	82
C	11	12.5	15	17	20	23	27.5	30
D	15 <sup>-0.016</sup>	18 <sup>-0.016</sup>	22 <sup>-0.020</sup>	25 <sup>-0.020</sup>	30 <sup>-0.020</sup>	35.5 <sup>-0.025</sup>	45 <sup>-0.025</sup>	55 <sup>-0.030</sup>
E	15	19	23	26.5	31.5	36.5	46	55
F	9.75	12	14.75	17	20	23.5	29.75	36
G	11	14	17.5	20	23	26	32	39
H	R5.5	R7	R8.75	R10	R11.5	R13	R16	R19.5
J	6.5	8.5	10.5	12.5	14.5	16.5	21	25
K	2	3	4	4	5	7	9	11
L	13.5	16	18	22	26.5	31	42	46
M	M6×1	M8×1	M10×1.25	M12×1.5	M14×1.5	M16×1.5	M20×2	M24×2
N	C0.4	C0.6	C0.6	C1	C1	C1	C1	C1
P	2	2	2	2	2	2	2	2
Q	2.5	3.5	3.5	4	5.5	5.5	7.5	8
R	3	4	4	4	6	6	8	8
S	13.5	14	18	19.5	24.5	27.75	38	45
T	3.4	4.5	4.5	4.5	6.5	6.5	9	9
Phasing Pin <sup>※6</sup> (Reference)	φ3×8	φ4×8	φ4×10	φ4×10	φ6×14	φ6×14	φ8×20	φ8×22

Notes :

- Swing lever should be designed with its length according to performance curve.
- If the swing lever is not in accordance with the dimension shown above, performance may be degraded and damage can occur.
- Tightening Bolt (LZH□-B) for Quick Change Lever is sold separately.
- ※5. The pin hole (φ R) for determining the lever phase should be added, if necessary.
- ※6. Phasing pin is not included. Prepare it separately.

### Quick Change Lever Type A Design Dimensions

※ Reference for designing Quick Change Swing Lever Type A.



Corresponding Model No.	LHS0360 -□-A	LHS0400 -□-A	LHS0480 -□-A	LHS0550 -□-A	LHS0650 -□-A	LHS0750 -□-A	LHS0900 -□-A	LHS1050 -□-A
A	15 <sup>+0.027</sup>	18 <sup>+0.027</sup>	22 <sup>+0.033</sup>	25 <sup>+0.033</sup>	30 <sup>+0.033</sup>	35.5 <sup>+0.039</sup>	45 <sup>+0.039</sup>	55 <sup>+0.046</sup>
B	12	15	18	20	24	28	36	46
C	17	19	23	26	29	35	43	50
D	11	13	15.5	17	19	21	28	33
E	13	16	20	23	25	29	38	45
F	12.5	15	16.5	18.5	20.5	25	31	33.5
G	2	2.5	4	4.5	6.5	6.5	9	14
H	3	4	4	4	6	6	8	8
J	3 <sup>+0.010</sup>	4 <sup>+0.012</sup>	4 <sup>+0.012</sup>	4 <sup>+0.012</sup>	6 <sup>+0.012</sup>	6 <sup>+0.012</sup>	8 <sup>+0.015</sup>	8 <sup>+0.015</sup>
K	M4×0.7	M5×0.8	M5×0.8	M6×1	M6×1	M8×1.25	M10×1.5	M10×1.5
Pin for Stopper <sup>※4</sup> and Phasing	φ3(m6)×8	φ4(m6)×10	φ4(m6)×12	φ4(m6)×14	φ6(m6)×14	φ6(m6)×16	φ8(m6)×20	φ8(m6)×22

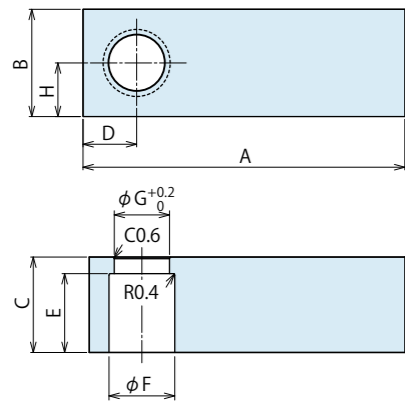
Notes :

- Swing lever should be designed with its length according to performance curve.
- If the swing lever is not in accordance with the dimension shown above, performance may be degraded and damage can occur.
- Tightening Kit (LZH□-W) for Quick Change Lever Type A is sold separately.
- ※4. The pin hole for stopper and phasing (φ J) 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.

High-Power Series
Pneumatic Series
Hydraulic Series
Valve / Coupler Hydraulic Unit
Manual Operation Accessories
Cautions / Others
Hole Clamp
SFA
SFC
Swing Clamp
LHA
LHC
LHS
LHW
LT/LG
TLA-2
TLB-2
TLA-1
Link Clamp
LKA
LKC
LKW
LM/LJ
TMA-2
TMA-1
Work Support
LD
LC
TNC
TC
Air Sensing Lift Cylinder
LLW
Compact Cylinder
LL
LLR
LLU
DP
DR
DS
DT
Block Cylinder
DBA
DBC
Centering Vise
FVA
FVD
FVC
Control Valve
BZL
BZT
BZX/JZG
Pallet Clamp
VS
VT
Expansion Locating Pin
VFL
VFM
VFJ
VFK
Pull Stud Clamp
FP
FQ
Customized Spring Cylinder
DWA/DWB

Accessories : Material Swing Lever for Taper Lock Option

Model No. Indication  
**LZH 048 0 - T**  
Size (Refer to the table.) Design No. (Revision Number)

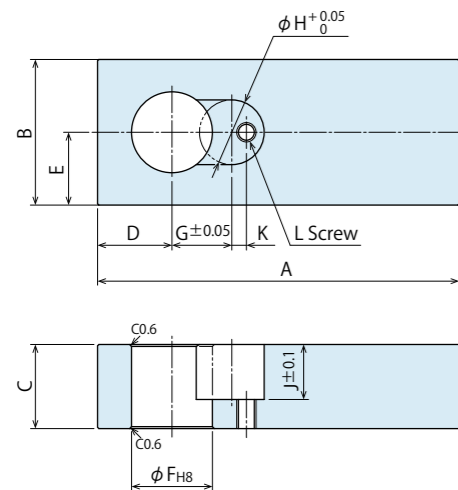


Model No.	LZH0360-T	LZH0400-T	LZH0480-T	LZH0550-T	LZH0650-T	LZH0750-T	LZH0900-T	LZH1050-T
Corresponding Model No. <sup>(1)</sup>	LHS0360	LHS0400	LHS0480	LHS0550	LHS0650	LHS0750	LHS0900	LHS1050
A	120	145	160	170	175	185	220	270
B	26	32	40	45	50	58	75	90
C	17	19	23	26	29	35	43	50
D	13	16	20	23	25	29	38	45
E	14	16	19	22	25	31	38	44
F	17	20	25	28	34	40	49	60
G	15	17	21	23.5	29	33	42	51
H	13	16	20	22.5	25	29	37.5	45

- Notes :
1. Material : S50CH
  2. If necessary, the front end should be additionally machined.
  3. When determining the phase, refer to taper lock lever design dimensions for each model for the additional machining.
- ※ 1. Refer to Accessory of Quick Change Lever Type A for -A (Quick Change Lever Type A). Refer to Accessory of Quick Change Lever Type F for -F (Quick Change Lever Type F). For -P (Balance Lever Option), it should be designed by customer.

Accessories : Material Swing Lever for Quick Change Lever Type A

Model No. Indication  
**LZH 048 0 - A**  
Size (Refer to the table.) Design No. (Revision Number)

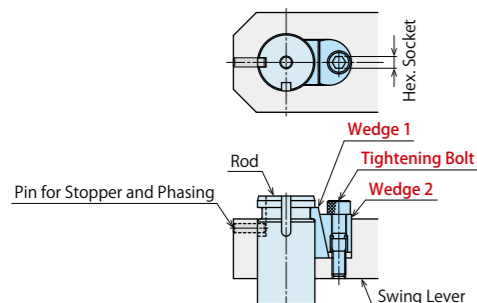


Model No.	LZH0360-A	LZH0400-A	LZH0480-A	LZH0550-A	LZH0650-A	LZH0750-A	LZH0900-A	LZH1050-A
Corresponding Model No.	LHS0360-□-A	LHS0400-□-A	LHS0480-□-A	LHS0550-□-A	LHS0650-□-A	LHS0750-□-A	LHS0900-□-A	LHS1050-□-A
A	120	145	160	170	175	185	220	270
B	26	32	40	45	50	58	75	90
C	17	19	23	26	29	35	43	50
D	13	16	20	23	25	29	38	45
E	13	16	20	22.5	25	29	37.5	45
F	15 <sup>+0.027</sup>	18 <sup>+0.027</sup>	22 <sup>+0.033</sup>	25 <sup>+0.033</sup>	30 <sup>+0.033</sup>	35.5 <sup>+0.039</sup>	45 <sup>+0.039</sup>	55 <sup>+0.046</sup>
G	12.5	15	16.5	18.5	20.5	25	31	33.5
H	12	15	18	20	24	28	36	46
J	11	13	15.5	17	19	21	28	33
K	2	2.5	4	4.5	6.5	6.5	9	14
L	M4×0.7	M5×0.8	M5×0.8	M6×1	M6×1	M8×1.25	M10×1.5	M10×1.5

- Notes :
1. Material : S50CH
  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.

Accessories : Tightening Kit for Quick Change Lever Type A

Model No. Indication  
**LZH 048 0 - W**  
Size (Refer to the table.) Design No. (Revision Number)



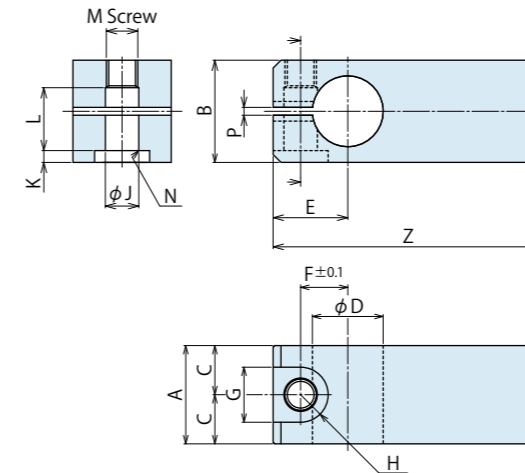
Tightening Kit for mounting Quick Change Lever Type A.  
Sold separately from clamp body.

- 【Contents of Tightening Kit】  
• Wedge 1 • Wedge 2 • Tightening Bolt

Model No.	LZH0360-W	LZH0400-W	LZH0480-W	LZH0550-W	LZH0650-W	LZH0750-W	LZH0900-W	LZH1050-W
Corresponding Model No.	LHS0360-□-A	LHS0400-□-A	LHS0480-□-A	LHS0550-□-A	LHS0650-□-A	LHS0750-□-A	LHS0900-□-A	LHS1050-□-A
Nominal×Pitch of Tightening Bolt	M4×0.7	M5×0.8	M5×0.8	M6×1	M6×1	M8×1.25	M10×1.5	M10×1.5
Hex. Socket mm	3	4	4	5	5	6	8	8
Tightening Torque N·m	2.5	5.0	5.0	8.0	8.0	20	40	45

Accessories : Material Swing Lever for Quick Change Lever Type F

Model No. Indication  
**LZH 048 0 - F**  
Size (Refer to the table.) Design No. (Revision Number)

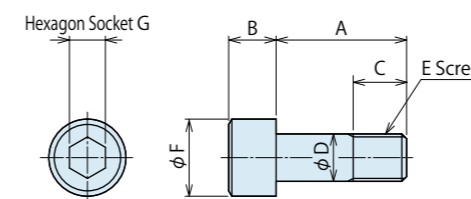


Model No.	LZH0360-F	LZH0400-F	LZH0480-F	LZH0550-F	LZH0650-F	LZH0750-F	LZH0900-F	LZH1050-F
Corresponding Model No.	LHS0360-□-F	LHS0400-□-F	LHS0480-□-F	LHS0550-□-F	LHS0650-□-F	LHS0750-□-F	LHS0900-□-F	LHS1050-□-F
A	22	25	30	34	40	46	55	60
B	22	26	32	36	45	53	70	82
C	11	12.5	15	17	20	23	27.5	30
D	15 <sup>-0.016</sup>	18 <sup>-0.016</sup>	22 <sup>-0.020</sup>	25 <sup>-0.020</sup>	30 <sup>-0.020</sup>	35.5 <sup>-0.025</sup>	45 <sup>-0.025</sup>	55 <sup>-0.030</sup>
E	15	19	23	26.5	31.5	36.5	46	55
F	9.75	12	14.75	17	20	23.5	29.75	36
G	11	14	17.5	20	23	26	32	39
H	R5.5	R7	R8.75	R10	R11.5	R13	R16	R19.5
J	6.5	8.5	10.5	12.5	14.5	16.5	21	25
K	2	3	4	4	5	7	9	11
L	13.5	16	18	22	26.5	31	42	46
M	M6×1	M8×1	M10×1.25	M12×1.5	M14×1.5	M16×1.5	M20×2	M24×2
N	C0.4	C0.6	C0.6	C1	C1	C1	C1	C1
P	2	2	2	2	2	2	2	2
Z	120	145	160	170	175	185	220	270

- Notes :
1. Material : S50CH
  2. If necessary, the front end should be additionally machined.
  3. When determining the phase, refer to quick change lever design dimensions for each model for the additional machining.
  4. Tightening Bolt (LZH□-B) for Quick Change Lever is sold separately.

Accessories : Tightening Bolts for Quick Change Lever Type F

Model No. Indication  
**LZH 048 0 - B**  
Size (Refer to the table.) Design No. (Revision Number)



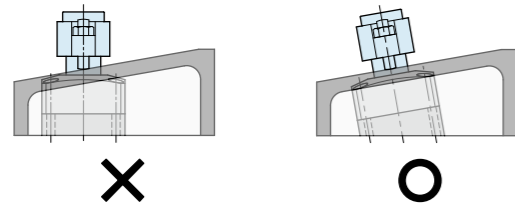
Model No.	LZH0360-B	LZH0400-B	LZH0480-B	LZH0550-B	LZH0650-B	LZH0750-B	LZH0900-B	LZH1050-B
Corresponding Model No.	LHS0360-□-F	LHS0400-□-F	LHS0480-□-F	LHS0550-□-F	LHS0650-□-F	LHS0750-□-F	LHS0900-□-F	LHS1050-□-F
A	20	23	28	32	40	46	61	71
B	6	8	10	12	14	16	20	24
C	7	10	11	13	16	18	23	27
D	6	8	10	12	14	16	20	24
E	M6×1	M8×1	M10×1.25	M12×1.5	M14×1.5	M16×1.5	M20×2	M24×2
F	10	13	16	18	21	24	30	36
G	5	6	8	10	12	14	17	19

High-Power Series
Pneumatic Series
Hydraulic Series
Valve / Coupler Hydraulic Unit
Manual Operation Accessories
Cautions / Others
Hole Clamp
SFA
SFC
Swing Clamp
LHA
LHC
LHS
LHW
LT/LG
TLA-2
TLB-2
TLA-1
Link Clamp
LKA
LKC
LKW
LM/LJ
TMA-2
TMA-1
Work Support
LD
LC
TNC
TC
Air Sensing Lift Cylinder
LLW
Compact Cylinder
LL
LLR
LLU
DP
DR
DS
DT
Block Cylinder
DBA
DBC
Centering Vise
FVA
FVD
FVC
Control Valve
BZL
BZT
BZX/JZG
Pallet Clamp
VS
VT
Expansion Locating Pin
VFL
VFM
VFJ
VFK
Pull Stud Clamp
FP
FQ
Customized Spring Cylinder
DWA/DWB

**Cautions**

● Notes for Design

- Check Specifications
  - Please use each product according to the specifications.
- Notes for Circuit Design
  - Please read "Notes on Hydraulic Cylinder Speed Control Circuit" on P. 1238 to assist with proper hydraulic circuit designing.
  - Ensure there is no possibility of supplying hydraulic pressure to the lock and release ports simultaneously.
- Swing lever should be designed so that the inertia moment 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.
  - Set the allowable operation time after the inertia moment is calculated. Refer to "Allowable Swing Time Graph" and make sure to operate clamps within the allowable operation time.
- 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.
- When clamping on a sloped surface of the workpiece
  - Make sure the clamp surface and mounting surface of the clamp are parallel.

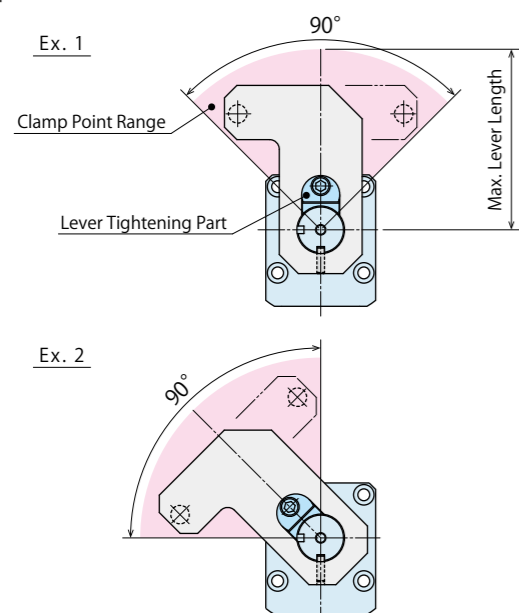


6) Notes for LHA-M/N, LHW

- When using air sensing swing clamp (LHA-M/N, LHW), make sure to check the Notes for Design • Installation • Use (Pages shown below).
  - Swing clamp with air sensing option LHA-M/N : Refer to P.407.
  - Swing clamp with air sensing valve LHW : Refer to P.453.

7) When using an offset lever for Quick Change Lever Type A.

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



● Installation Notes

- Check the Usable Fluid
  - Please use the appropriate fluid by referring to the Hydraulic Fluid List (P.1237).
- Mounting the clamp
  - When mounting the clamp, use hexagon socket bolts as multiple bolt holes for mounting (with tensile strength of 12.9) and tighten them with the torque shown in the chart below. Tightening with greater torque than recommended can depress the seating surface or break the bolt.

	Model No.	Thread Size	Tightening Torque (N·m)	
LHA LHC LHS LHW	LHA0360 / LHC0360 LHS0360	M4×0.7	4.0	
	LHA0400 / LHC0400 LHS0400 / LHW0401	M5×0.8	8.0	
	LHA0480 / LHC0480 LHS0480 / LHW0481	M5×0.8	8.0	
	LHA0550 / LHC0550 LHS0550 / LHW0551	M6×1	14	
	LHA0650 / LHC0650 LHS0650 / LHW0651	M6×1	14	
	LHA0750 LHS0750 / LHW0751	M8×1.25	33	
	LHA0900 LHS0900	M10×1.5	65	
	LHA1050 LHS1050	M12×1.75	114	
	LT LG	LT0301 / LG0301	M4×0.7	3.2
		LT0361 / LG0361	M4×0.7	3.2
LT0401 / LG0401		M5×0.8	6.3	
LT0481 / LG0481		M5×0.8	6.3	
LT0551 / LG0551		M6×1	10	
LT0651 / LG0651		M6×1	10	
LT0751 / LG0751		M8×1.25	25	
LG0901		M10×1.5	58.8	
LG1051		M12×1.75	98	
TLA-2 TLB-2 TLA-1		TLA0401-2 / TLB0401-2 TLA0402-1	M5×0.8	6.9
	TLA0601-2 / TLB0601-2 TLA0602-1	M6×1	11.8	
	TLA0801-2 / TLB0801-2 TLA0802-1	M6×1	11.8	
	TLA1001-2 / TLB1001-2 TLA1002-1	M8×1.25	25	
	TLA1601-2 / TLB1601-2 TLA1602-1	M8×1.25	25	
	TLA2001-2 / TLB2001-2 TLA2002-1	M10×1.5	58.8	
	TLA2501-2 / TLB2501-2 TLA2502-1	M10×1.5	58.8	
	TLA4001-2 / TLB4001-2 TLA4002-1	M12×1.75	98	

- Installation / Removal of the Swing Lever
  - Oil or debris on the mating surfaces of the lever, taper sleeve 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.

LHA/LHC/LHS/LHW/LT/LG Standard : Taper Lock Lever

	Model No.	Thread Size	Tightening Torque (N·m)	
LHA LHC LHS LHW	LHA0360 / LHC0360 LHS0360	M14×1.5	21 ~ 25	
	LHA0400 / LHC0400 LHS0400 / LHW0401	M16×1.5	33 ~ 40	
	LHA0480 / LHC0480 LHS0480 / LHW0481	M20×1.5	54 ~ 65	
	LHA0550 / LHC0550 LHS0550 / LHW0551	M22×1.5	84 ~ 100	
	LHA0650 / LHC0650 LHS0650 / LHW0651	M27×1.5	120 ~ 145	
	LHA0750 LHS0750 / LHW0751	M30×1.5	175 ~ 210	
	LHA0900 LHS0900	M39×1.5	280 ~ 335	
	LHA1050 LHS1050	M48×1.5	333 ~ 400	
	LT LG	LT0301 / LG0301	M8×1	8 ~ 10
		LT0361 / LG0361	M10×1	15 ~ 18
LT0401 / LG0401		M12×1.5	24 ~ 29	
LT0481 / LG0481		M16×1.5	37 ~ 45	
LT0551 / LG0551		M18×1.5	59 ~ 71	
LT0651 / LG0651		M22×1.5	93 ~ 112	
LT0751 / LG0751		M28×1.5	147 ~ 177	
LG0901		M36×1.5	235 ~ 282	
LG1051		M45×1.5	300 ~ 360	

LHA-F/LHS-F/LT-F/LG-F : Quick Change Lever Type F, TLA-2/TLB-2/TLA-1 : Standard

	Model No.	Thread Size	Tightening Torque (N·m)
LHA-F LHS-F LT-F LG-F	LT0301-F / LG0301-F	M5×0.8	7.5
	LHA0360-F / LHS0360-F LT0361-F / LG0361-F	M6×1	14
	LHA0400-F / LHS0400-F LT0401-F / LG0401-F	M8×1	33
	LHA0480-F / LHS0480-F LT0481-F / LG0481-F	M10×1.25	65
	LHA0550-F / LHS0550-F LT0551-F / LG0551-F	M12×1.5	100 ~ 114
	LHA0650-F / LHS0650-F LT0651-F / LG0651-F	M14×1.5	160 ~ 180
	LHA0750-F / LHS0750-F LT0751-F / LG0751-F	M16×1.5	250 ~ 280
	LHA0900-F / LHS0900-F LG0901-F	M20×2	500 ~ 540
	LHA1050-F / LHS1050-F LG1051-F	M24×2	760 ~ 810
	TLA-2 TLB-2 TLA-1	TLA0401-2 / TLB0401-2 TLA0402-1	M6×1
TLA0601-2 / TLB0601-2 TLA0602-1		M8×1	32
TLA0801-2 / TLB0801-2 TLA0802-1		M8×1	32
TLA1001-2 / TLB1001-2 TLA1002-1		M10×1.25	63
TLA1601-2 / TLB1601-2 TLA1602-1		M12×1.5	100
TLA2001-2 / TLB2001-2 TLA2002-1		M14×1.5	160
TLA2501-2 / TLB2501-2 TLA2502-1		M16×1.5	250
TLA4001-2 / TLB4001-2 TLA4002-1		M20×2	500

LHA-A/LHC-A/LHS-A/LHW-A/LT-A/LG-A : Quick Change Lever Type A

	Model No.	Thread Size	Tightening Torque (N·m)
LHA-A LHC-A LHS-A LHW-A LT-A LG-A	LT0301-A / LG0301-A	M4×0.7	2.5
	LHA0360-A / LHC0360-A LHS0360-A LT0361-A / LG0361-A	M4×0.7	2.5
	LHA0400-A / LHC0400-A LHS0400-A / LHW0401-A LT0401-A / LG0401-A	M5×0.8	5.0
	LHA0480-A / LHC0480-A LHS0480-A / LHW0481-A LT0481-A / LG0481-A	M5×0.8	5.0
	LHA0550-A / LHC0550-A LHS0550-A / LHW0551-A LT0551-A / LG0551-A	M6×1	8.0
	LHA0650-A / LHC0650-A LHS0650-A / LHW0651-A LT0651-A / LG0651-A	M6×1	8.0
	LHA0750-A LHS0750-A / LHW0751-A LT0751-A / LG0751-A	M8×1.25	20
	LHA0900-A LHS0900-A LG0901-A	M10×1.5	40
	LHA1050-A LHS1050-A LG1051-A	M10×1.5	45

High-Power Series

Pneumatic Series

**Hydraulic Series**

Valve / Coupler Hydraulic Unit

Manual Operation Accessories

Cautions / Others

Hole Clamp

SFA

SFC

**Swing Clamp**

LHA

LHC

LHS

LHW

LT/LG

TLA-2

TLB-2

TLA-1

Link Clamp

LKA

LKC

LKW

LM/LJ

TMA-2

TMA-1

Work Support

LD

LC

TNC

TC

Air Sensing Lift Cylinder

LLW

Compact Cylinder

LL

LLR

LLU

DP

DR

DS

DT

Block Cylinder

DBA

DBC

Centering Vise

FVA

FVD

FVC

Control Valve

BZL

BZT

BZX/JZG

Pallet Clamp

VS

VT

Expansion Locating Pin

VFL

VFM

VFJ

VFK

Pull Stud Clamp

FP

FQ

Customized Spring Cylinder

DWA/DWB



**Cautions**

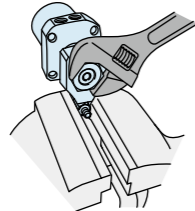
**Installation Notes**

**When Using Taper Lock Lever**

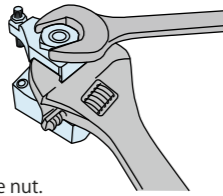
If the piston rod is subjected to excessive torque or shock, the rod or the internal mechanism may be damaged. Observe the following points to prevent such shock.

**Installation Procedure**

① With the clamp is positioned to the fixture, determine the lever position, and temporarily tighten the nut for fixing the lever.



② Remove the clamp from a fixture, fix the lever by machine vise etc., and tighten the nut.

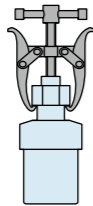


③ If tightening the nut with the clamp positioned to the fixture, please use a wrench to the hexagon part of piston rod, or fix the lever with a spanner. It is best to bring the lever to the middle of the swing stroke before tightening the nut.

**Removal Procedure**

① While the clamp is in the fixture or vise, use a hex wrench to bring the lever to the middle of the swing stroke and then loosen the nut.

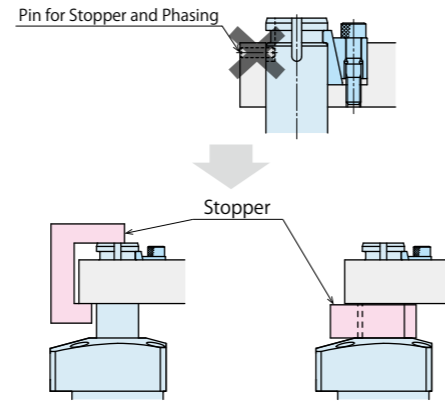
② Loosen the nut after securing the lever two or three turns then remove the lever with a puller without any rotational torque applied on the piston rod.



**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.

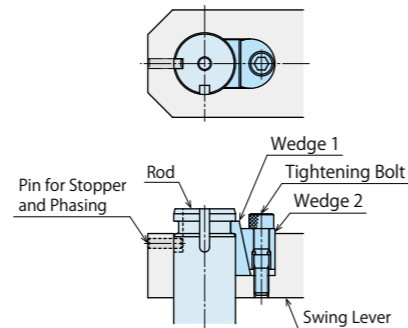


**Installation Procedure**

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.



**4) Swing Speed Adjustment**

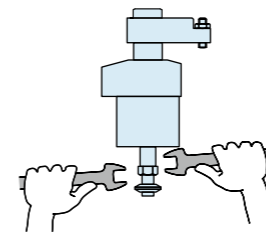
- Adjust the speed following "Allowable Swing Time Graph". If the clamp operates too fast the parts will wear out leading to premature damage and ultimately complete equipment failure.
- Please make sure to release air from the circuit before adjusting speed. It will be difficult to adjust the speed 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.

**5) Checking Looseness and Retightening**

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

**6) Notes on dual rod option (-D) for dog application.**

- When attaching dog, set up the piston so that it will not turn around. Please secure the dog or cam and prevent any rotation or torque on the piston rod. Torque values for the mounting screw are shown in the table below.



Model No.	Thread Size	Tightening Torque (N·m)
LHA0360-□□D	M4×0.7	3.2
LHA0400-□□D	M6×1	10
LHA0480-□□D	M8×1.25	25
LHA0550-□□D	M8×1.25	25
LHA0650-□□D	M8×1.25	25
LHA0750-□□D	M10×1.5	50
LHA0900-□□D	M10×1.5	50
LHA1050-□□D	M10×1.5	50

※ Please refer to P.1237 for common cautions. • Installation Notes • Hydraulic Fluid List • Notes on Hydraulic Cylinder Speed Control Circuit • Notes on Handling • Maintenance/Inspection • Warranty



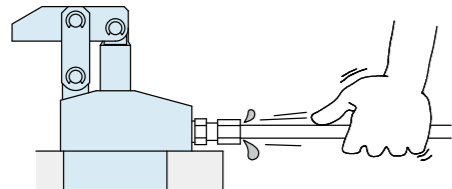
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kosmek@wahltec.de  
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- High-Power Series
- Pneumatic Series
- Hydraulic Series**
- Valve / Coupler Hydraulic Unit
- Manual Operation Accessories
- Cautions / Others
- Hole Clamp
  - SFA
  - SFC
- Swing Clamp**
  - LHA
  - LHC
  - LHS
  - LHW
  - LT/LG
  - TLA-2
  - TLB-2
  - TLA-1
- Link Clamp
  - LKA
  - LKC
  - LKW
  - LM/LJ
  - TMA-2
  - TMA-1
- Work Support
  - LD
  - LC
  - TNC
  - TC
- Air Sensing Lift Cylinder
  - LLW
- Compact Cylinder
  - LL
  - LLR
  - LLU
  - DP
  - DR
  - DS
  - DT
- Block Cylinder
  - DBA
  - DBC
- Centering Vise
  - FVA
  - FVD
  - FVC
- Control Valve
  - BZL
  - BZT
  - BZX/JZG
- Pallet Clamp
  - VS
  - VT
- Expansion Locating Pin
  - VFL
  - VFM
  - VFJ
  - VFK
- Pull Stud Clamp
  - FP
  - FQ
- Customized Spring Cylinder
  - DWA/DWB

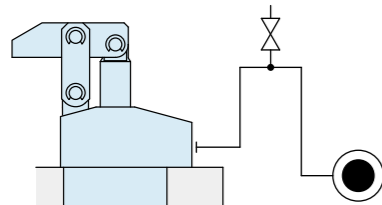
● Cautions

● Installation Notes (For Hydraulic Series)

- 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 prevents 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) Checking Looseness and Retightening

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

● Hydraulic Fluid List

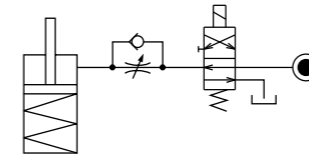
Maker	ISO Viscosity Grade ISO-VG-32	
	Anti-Wear Hydraulic Oil	Multi-Purpose Hydraulic Oil
Showa Shell Sekiyu	Tellus S2 M 32	Morlina S2 B 32
Idemitsu Kosan	Daphne Hydraulic Fluid 32	Daphne Super Multi Oil 32
JX Nippon Oil & Energy	Super Hyrando 32	Super Mulpus DX 32
Cosmo Oil	Cosmo Hydro AW32	Cosmo New 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.

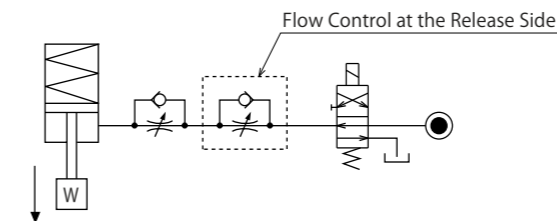
● Notes on Hydraulic Cylinder Speed Control Unit

⚠ 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.

- Flow Control Circuit for Single Acting Cylinder  
For spring return single acting cylinders, restricting flow during release can extremely slow down or disrupt release action. The preferred method is to control the flow during the lock action using a valve that has free-flow in the release direction. It is also preferred to provide a flow control valve at each actuator.

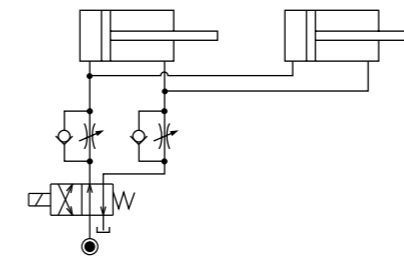


Accelerated clamping speed by excessive hydraulic flow to the cylinder may sustain damage. In this case add flow control to regulate flow. (Please add flow control to release flow if the lever weight is put on at the time of release action when using swing clamps.)

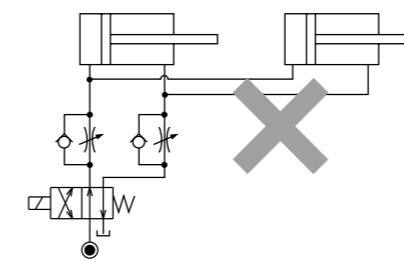


- Flow Control Circuit for Double Acting Cylinder  
Flow control circuit for double acting cylinder should have meter-out circuits for both the lock and release sides. Meter-in control can have adverse effect by presence of air in the system. **However, in the case of controlling LKE, TMA, TLA, both lock side and release side should be meter-in circuit. Refer to P.75 for speed adjustment of LKE. For TMA and TLA, if meter-out circuit is used, abnormal high pressure is created, which causes oil leakage and damage.**

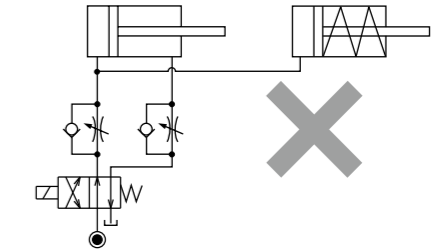
【Meter-out Circuit】 (Except LKE/TMA/TLA)



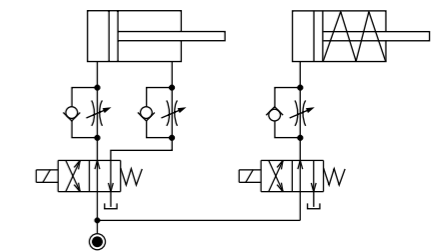
【Meter-in Circuit】 (LKE/TMA/TLA must be controlled with meter-in.)



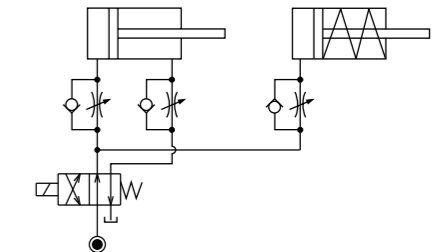
- ① Single acting components should not be used in the same flow control circuit as the double acting components. The release action of the single acting cylinders may become erratic or very slow.



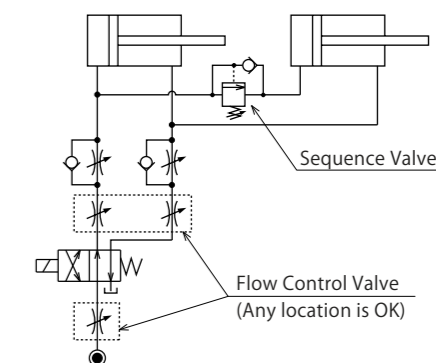
Refer to the following circuit when both the single acting cylinder and double acting cylinder are used together.  
○ Separate the control circuit.



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



High-Power Series  
Pneumatic Series  
Hydraulic Series  
Valve / Coupler Hydraulic Unit  
Manual Operation Accessories  
Cautions / Others

Cautions  
Installation Notes (For Hydraulic Series)  
Hydraulic Fluid List  
Notes on Hydraulic Cylinder Speed Control Circuit  
Notes on Handling  
Maintenance/Inspection  
Warranty

Company Profile  
Company Profile  
Our Products  
History

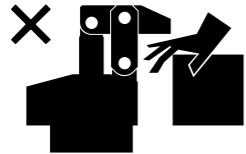
Index  
Search by Alphabetical Order

Sales Offices

**Cautions**

● Notes on Handling

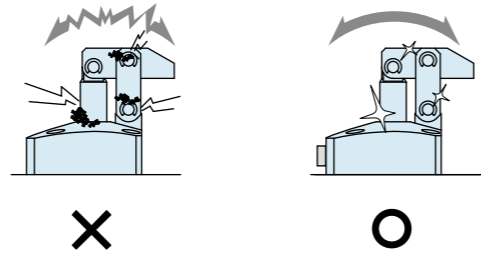
- 1) It should be handled by qualified personnel.
  - The hydraulic machine and air compressor should be handled and maintained by qualified personnel.
- 2) Do not handle or remove the machine unless the safety protocols are ensured.
  - ① The machine and equipment can only be inspected or prepared when it is confirmed that the preventive devices are in place.
  - ② Before the machine is removed, make sure that the above-mentioned safety measures are in place. Shut off the air of hydraulic source and make sure no pressure exists in the hydraulic and air circuit.
  - ③ After stopping the machine, 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.



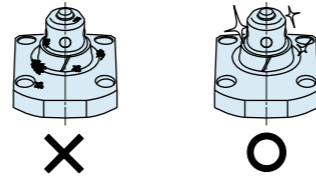
- 4) Do not disassemble or modify.
  - If the equipment is taken apart or modified, the warranty will be voided even within the warranty period.

● Maintenance and Inspection

- 1) Removal of the Machine and Shut-off of Pressure Source
  - Before the machine is removed, make sure that the above-mentioned safety measures are in place. Shut off the air of hydraulic source and make sure no pressure exists in the hydraulic and air circuit.
  - Make sure there is no abnormality in the bolts and respective parts before restarting.
- 2) Regularly clean the area around the piston rod and plunger.
  - 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) Please clean out the reference surface regularly (taper reference surface and seating surface) of locating machine. (VS/VT/VFL/VFM/VFJ/VFK/WVS/VWM/VWK/VX/VXF)
  - Location products, except VX/VXF model, can remove contaminants with cleaning functions. When installing pallets make sure there is no thick sludge like substances on pallets.
  - Continuous use with dirt on components will lead to locating functions not work properly, leaking and malfunction.



- 4) If disconnecting by couplers on a regular basis, air bleeding should be carried out daily to avoid air mixed in the circuit.
- 5) Regularly tighten nuts, bolts, pins, cylinders and pipe line to ensure proper use.
- 6) Make sure the hydraulic fluid has not deteriorated.
- 7) 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.
- 8) The products should be stored in the cool and dark place without direct sunshine or moisture.
- 9) 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.



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- High-Power Series
- Pneumatic Series
- Hydraulic Series
- Valve / Coupler Hydraulic Unit
- Manual Operation Accessories
- Cautions / Others

- Cautions
- Installation Notes (For Hydraulic Series)
- Hydraulic Fluid List
- Notes on Hydraulic Cylinder Speed Control Circuit
- Notes on Handling
- Maintenance/Inspection
- Warranty

- Company Profile
- Company Profile
- Our Products
- History

- Index
- Search by Alphabetical Order

- Sales Offices

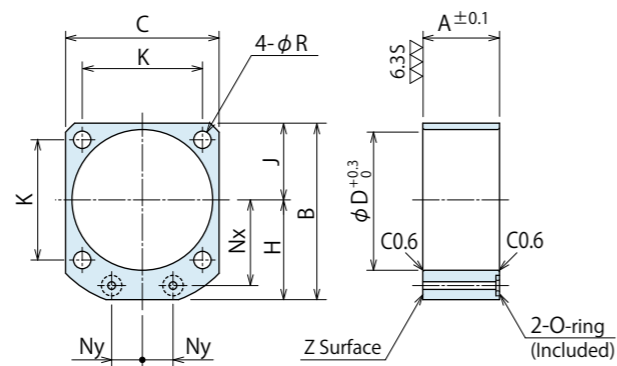
Manifold Block for WCA/WCE/WHA/WHE

Model No. Indication

**WHZ 048 0 - MD**

Size  
(Refer to following table)

Design No.  
(Revision Number)



(mm)

Model No.	WHZ0600-MD	WHZ0320-MD	WHZ0400-MD	WHZ0500-MD	WHZ0630-MD
Corresponding Item	WCE0602	WCA0321	WCA0401	WCA0501	WCA0631
Model Number	WHE0600	WHA0320	WHA0400	WHA0500	WHA0630
		WCE1002	WCE1602	WCE2502	WCE4002
		WHE1000	WHE1600	WHE2500	WHE4000
A	23	25	27	31	35
B	54	60	67	77	88.5
C	45	50	58	68	81
D	40	46	54	64	77
H	31.5	35	38	43	48
J	22.5	25	29	34	40.5
K	34	39	45	53	65
Nx	26	28	31	36	41
Ny	9	10	13	15	20
R	5.5	5.5	5.5	6.5	6.5
O-ring	1BP5	1BP7	1BP7	1BP7	1BP7
Mass kg	0.1	0.1	0.1	0.2	0.2

- Notes:
1. Material: A2017BE-T4
  2. Mounting bolts are not provided. Prepare mounting bolts according to the mounting height using the A dimensions as a reference.
  3. If thickness other than A is required, perform additional machining on surface Z. Please refer to the drawing.

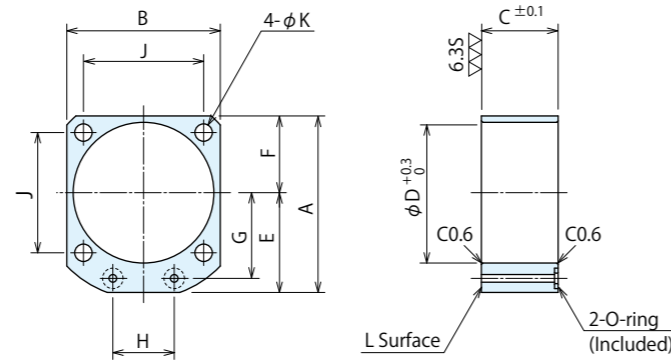
Manifold Block for LKA/LKC/LKE/LHA/LHC/LHE/LHS/LL

Model No. Indication

**LZY 048 0 - MD**

Size  
(Refer to following table)

Design No.  
(Revision Number)



(mm)

Model No.	LZY0360-MD	LZY0400-MD	LZY0480-MD	LZY0550-MD	LZY0650-MD	LZY0750-MD	LZY0900-MD	LZY1050-MD
Corresponding Item	LKA0360 / LKE0360	LKA0400 / LKC0400	LKA0480 / LKC0480	LKA0550 / LKC0550	LKA0650 / LKC0650	LKA0750	LKA0900	LKA1050
Model Number	LHA0360 / LHC0360	LHE0400 / LHA0400	LHE0480 / LHA0480	LHE0550 / LHA0550	LHA0650 / LHC0650	LHA0750	LHA0900	LHA1050
	LHE0360 / LHS0360	LHC0400 / LHE0400	LHC0480 / LHE0480	LHC0550 / LHE0550	LHS0650	LHS0750	LHS0900	LHS1050
	LL0360	LHS0400 / LL0400	LHS0480 / LL0480	LHS0550 / LL0550	LL0650	LL0750	LL0900	LL1050
A	49	54	61	69	81	92	107	122
B	40	45	51	60	70	80	95	110
C	20	20	27	30	32	37	45	50
D	36	40	48	55	65	75	90	105
E	29	31.5	35.5	39	46	52	59.5	67
F	20	22.5	25.5	30	35	40	47.5	55
G	23.5	26	30	33.5	39.5	45	52.5	60
H	16	18	22	24	30	32	37	45
J	31.4	34	40	47	55	63	75	88
K	4.5	5.5	5.5	6.8	6.8	9	11	14
O-ring	1BP5	1BP5	1BP5	1BP5	1BP7	1BP7	1BP7	1BP7
Mass kg	0.2	0.2	0.3	0.4	0.5	0.8	1.2	1.7

- Notes:
1. Material: S45C
  2. Mounting bolts are not provided. Prepare mounting bolts according to the mounting height using the C dimensions as a reference.
  3. If thickness other than C is required, perform additional machining on surface L. Please refer to the drawing.

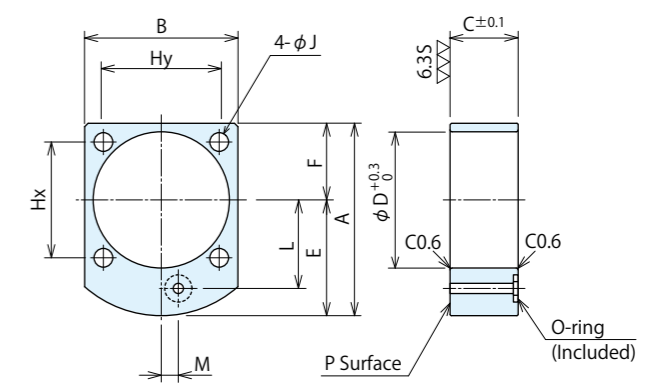
Manifold Block for LM/LJ/LT/LG

Model No. Indication

**LZ 048 0 - MS**

Size  
(Refer to following table)

Design No.  
(Revision Number)



(mm)

Model No.	LZ0300-MS	LZ0360-MS	LZ0400-MS	LZ0480-MS	LZ0550-MS	LZ0650-MS	LZ0750-MS	LZ0900-MS	LZ1050-MS
Corresponding Item	LT0301 / LG0301	LT036□ / LG036□	LT040□ / LG040□	LT048□ / LG048□	LT055□ / LG055□	LT065□ / LG065□	LT075□ / LG075□	LG090□	LG105□
Model Number	LM0300 / LJ0302	LM0360 / LJ0362	LM0400 / LJ0402	LM0480 / LJ0482	LM0550 / LJ0552	LM0650 / LJ0652	LM0750 / LJ0752	LJ0902	LJ1052
A	48	51.5	56.5	62	70	82	93	107	122
B	34	40	45	51	60	70	80	95	110
C	18	20	20	27	30	32	37	45	50
D	30	36	40	48	55	65	75	90	105
E	28.5	31.5	34	36.5	40	47	53	59.5	67
F	19.5	20	22.5	25.5	30	35	40	47.5	55
Hx	30	31.4	34	40	47	55	63	75	88
Hy	23	31.4	34	40	47	55	63	75	88
J	4.5	4.5	5.5	5.5	6.8	6.8	9	11	14
L	20.5	23.5	26	30	33.5	39.5	45	52.5	60
M	3	5	5	0	0	0	0	0	0
O-ring	1BP5	1BP5	1BP5	1BP5	1BP5	1BP7	1BP7	1BP7	1BP7
Mass kg	0.1	0.2	0.2	0.3	0.4	0.5	0.8	1.2	1.7

- Notes:
1. Material: S45C
  2. Mounting bolts are not provided. Prepare mounting bolts according to the mounting height using the C dimensions as a reference.
  3. If thickness other than C is required, perform additional machining on surface P. Please refer to the drawing.

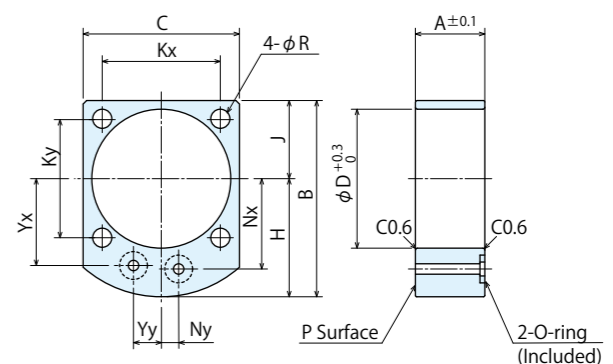
Manifold Block for LC/TC

Model No. Indication

**LZ 048 0 - MP**

Size  
(Refer to following table)

Design No.  
(Revision Number)



(mm)

Model No.	LZ0260-MP	LZ0300-MP	LZ0360-MP	LZ0400-MP	LZ0480-MP	LZ0550-MP	LZ0650-MP	LZ0750-MP	LZ0900-MP
Corresponding Item	LC0262	LC0302	LC0362	LC0402	LC0482	LC0552	LC0652	LC0752	LC0902
Model Number				TC0402	TC0482	TC0552	TC0652	TC0752	
A	18	18	20	20	27	30	32	37	45
B	43	48	51.5	56.5	62	70	82	93	107
C	29	34	40	45	51	60	70	80	95
D	26	30	36	40	48	55	65	75	90
H	26.5	28.5	31.5	34	36.5	40	47	53	59.5
J	16.5	19.5	20	22.5	25.5	30	35	40	47.5
Kx	25	30	31.4	34	40	47	55	63	75
Ky	21	23	31.4	34	40	47	55	63	75
Nx	18.5	20.5	23.5	26	30	33.5	39.5	45	52.5
Ny	3	3	5	5	0	0	0	0	0
R	3.4	4.5	4.5	5.5	5.5	6.8	6.8	9	11
Yx	18.5	20.5	23.5	25	28	31	37	42.5	50
Yy	7	7	8	8	11	13	14	15	15
O-ring	1BP5	1BP5	1BP5	1BP5	1BP5	1BP5	1BP7	1BP7	1BP7
Mass kg	0.1	0.1	0.2	0.2	0.3	0.4	0.5	0.8	1.2

- Notes:
1. Material: S45C
  2. Mounting bolts are not provided. Prepare mounting bolts according to the mounting height using the A dimensions as a reference.
  3. If thickness other than A is required, perform additional machining on surface P. Please refer to the drawing.

- High-Power Series
- Pneumatic Series
- Hydraulic Series
- Valve / Coupler Hydraulic Unit
- Manual Operation Accessories
- Cautions / Others

- Screw Locator
- VXF

- Manual Expansion Locating Pin
- VX

- Manifold Block
- WHZ-MD
- LZY-MD
- LZ-MS
- LZ-MP
- TMZ-1MB
- TMZ-2MB
- DZ-M

- Manifold Block / Nut
- DZ-R
- DZ-C
- DZ-P
- DZ-B
- LZ-S
- LZ-SQ
- TNZ-S
- TNZ-SQ
- WNZ-SQ

- Pressure Switch
- JBA

- Pressure Gauge
- JGA/JGB

- Manifold
- JX

- Coupler Switch
- PS

- G-Thread Fitting