

Hydraulic Linear Cylinder / Compact Cylinder

- Model LL
- Model LLR
- Model LLU
- Model DP
- Model DR
- Model DS
- Model DT



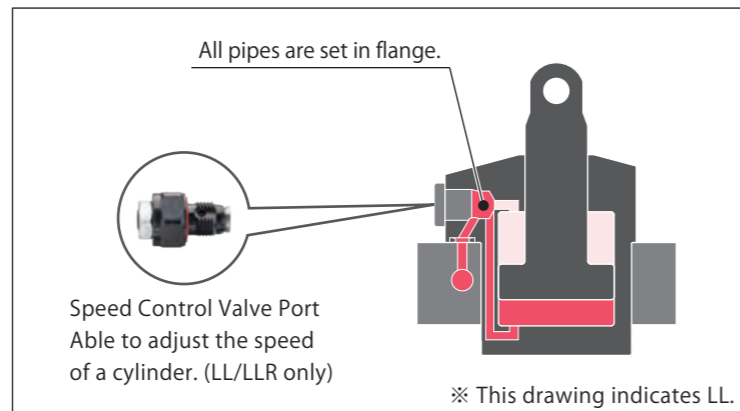
Compact and Simple Linear Cylinder

LL/LLR/LLU : Able to set the stroke in 1mm increments.

● LL/LLR/LLU : Linear Cylinder (Double-Acting Linear Cylinder)

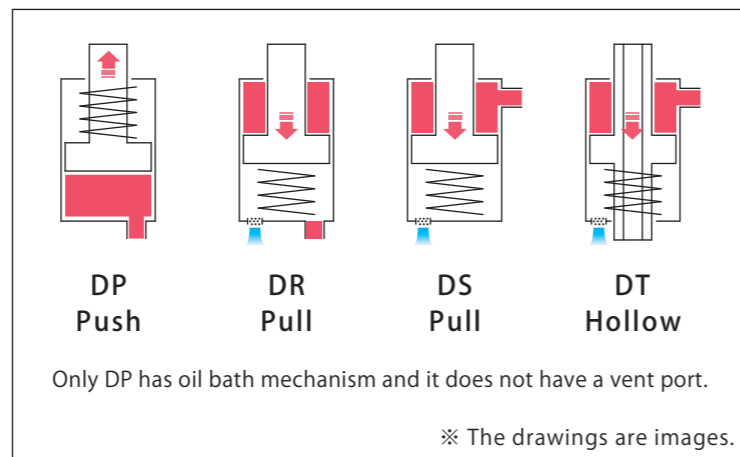
Stroke is selectable in 1mm increments (1mm ~ 200mm). The most compact double-acting cylinders for small footprint fixtures.

- Two piping options available.
- Gasket option : Needs no piping on a fixture.
- Piping option : Enables simple piping with all ports set in flange.



● DP/DR/DS/DT : Compact Cylinder (Single-Acting Linear Cylinder)




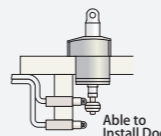
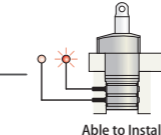
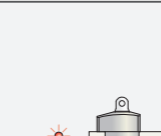



The compact single-acting linear cylinders corresponding to the pressure range from low to high.







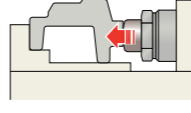
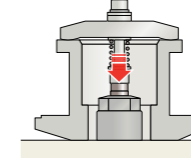
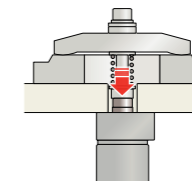
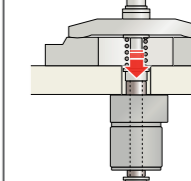
● NEW LLP : Linear Cylinder with Cushion

Cushioning mechanism allows the cylinder to slow its speed just before stroke ends. For higher speed in the middle of the stroke and the shorter cycle time.
※ Refer to our website for further information of LLP.



Double-Acting Model MAX. 7MPa	 Model LL → P.837	 Model LLR → P.837	 Model LLU → P.837
Classification	Linear Cylinder Top Flange	Linear Cylinder Bottom Flange	Linear Cylinder Bottom Flange (Compact)
Operating Pressure Range	0.5 ~ 7MPa ※1	0.5 ~ 7MPa	0.5 ~ 7MPa
Standard Model	External Dimensions → P.847	External Dimensions → P.869	External Dimensions → P.875
Action Confirmation	Double End Rod Option for Dog  External Dimensions → P.851	External Dimensions → P.873	External Dimensions → P.879
	Air Sensing Manifold Option 	External Dimensions → P.853	—
	Air Sensing Piping Option  Able to Install Air Sensor	External Dimensions → P.855	—
	Air Sensing Manifold Option for Retract End 	External Dimensions → P.859	—
	Air Sensing Piping Option for Retract End  Able to Install Air Sensor	External Dimensions → P.863	—
Accessories	Speed Control Valve Plug 	BZL, BZX, JZG, BZS → P.947	

※ 1 . The operating pressure range of the air sensing option for retract end is 1 ~ 7MPa.

Single-Acting Model MAX. 25MPa	 Model DP → P.881	 Model DR → P.891	 Model DS → P.897	 Model DT → P.905
Classification	Push Cylinder Threaded Body	Pull Cylinder Threaded Body	Pull Cylinder Threaded Body / Bottom Flange	Hollow Cylinder Threaded Body / Bottom Flange
Operating Pressure	0.8 ~ 25MPa	1 ~ 25MPa	1 ~ 25MPa	1 ~ 25MPa
Action				
Accessories Piping Block → P.1333, P.1339	DZ-M DZ-P DZ-C DZ-B	DZ-R DZ-C DZ-B	DZ-C DZ-B	DZ-C DZ-B

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



Hydraulic Single-Acting Compact Cylinder

Model DP

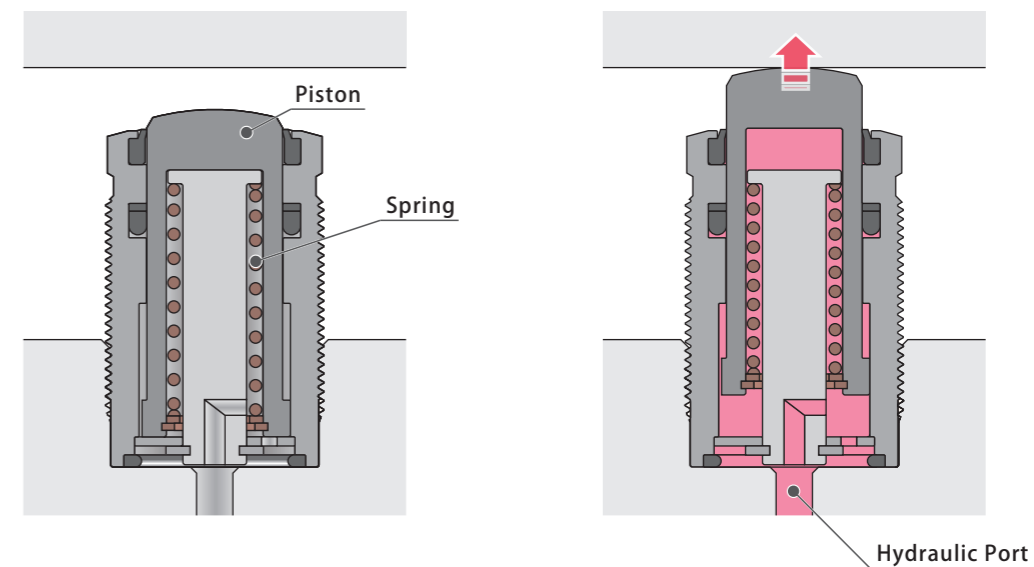
Low Pressure / High Pressure (0.8 ~ 25MPa)
Push Cylinder (Threaded Body)



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Action Description



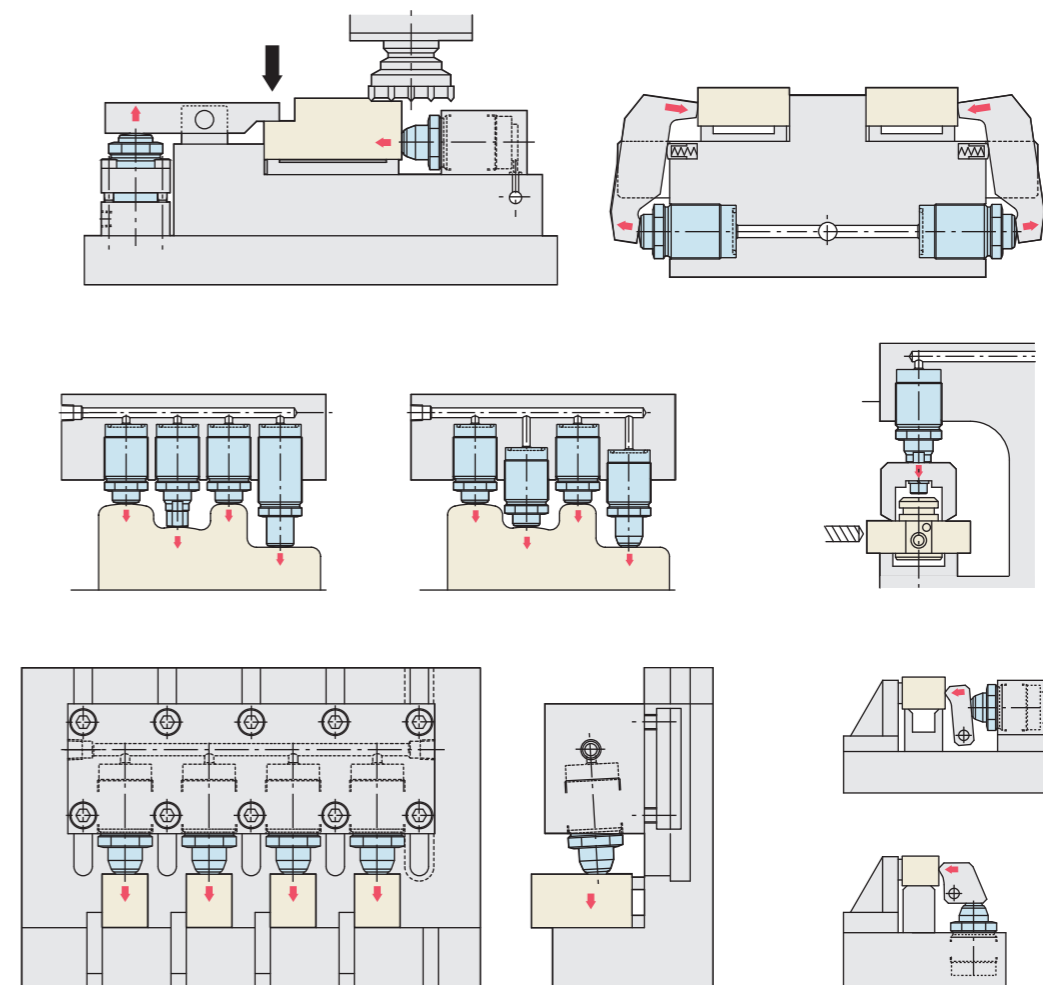
When Releasing (Initial Position)

Piston moves to release position by spring force.
(Piston retracted)

When Locking

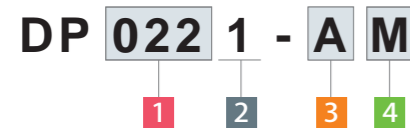
When hydraulic pressure is supplied, the piston is operated by the force of the hydraulic pressure.
(Piston extended)

Application Examples



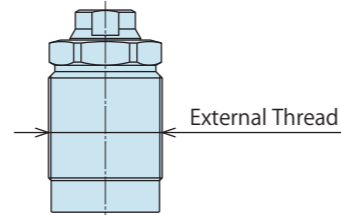
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Expansion Locating Pin
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Pull Stud Clamp
FP
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Customized Spring Cylinder
DWA/DWB

Model No. Indication



1 Body Size

- 016 : External Thread M16×1.5
- 022 : External Thread M22×1.5
- 024 : External Thread M24×1.5
- 030 : External Thread M30×1.5
- 036 : External Thread M36×1.5
- 045 : External Thread M45×1.5
- 055 : External Thread M55×2
- 065 : External Thread M65×2
- 080 : External Thread M80×2

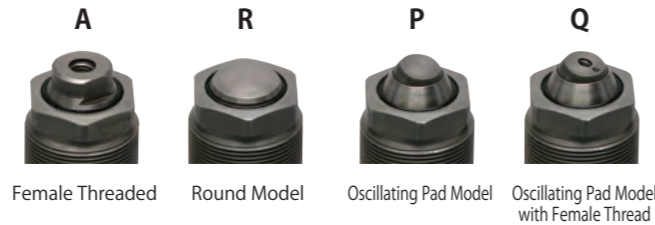


2 Design No. (Revision Number)

- 0 : For 1 Body Size : 016
- 1 : For 1 Body Size : 022~080

3 Shape of Piston Tip

- A : Female Threaded
- R : Round Model
- P : Oscillating Pad Model
- Q : Oscillating Pad Model with Female Thread



※ The body size of model P and Q is 022 ~ 080 only.

4 Stroke Code

- S : Short Stroke
- M : Standard Stroke
- L : Long Stroke

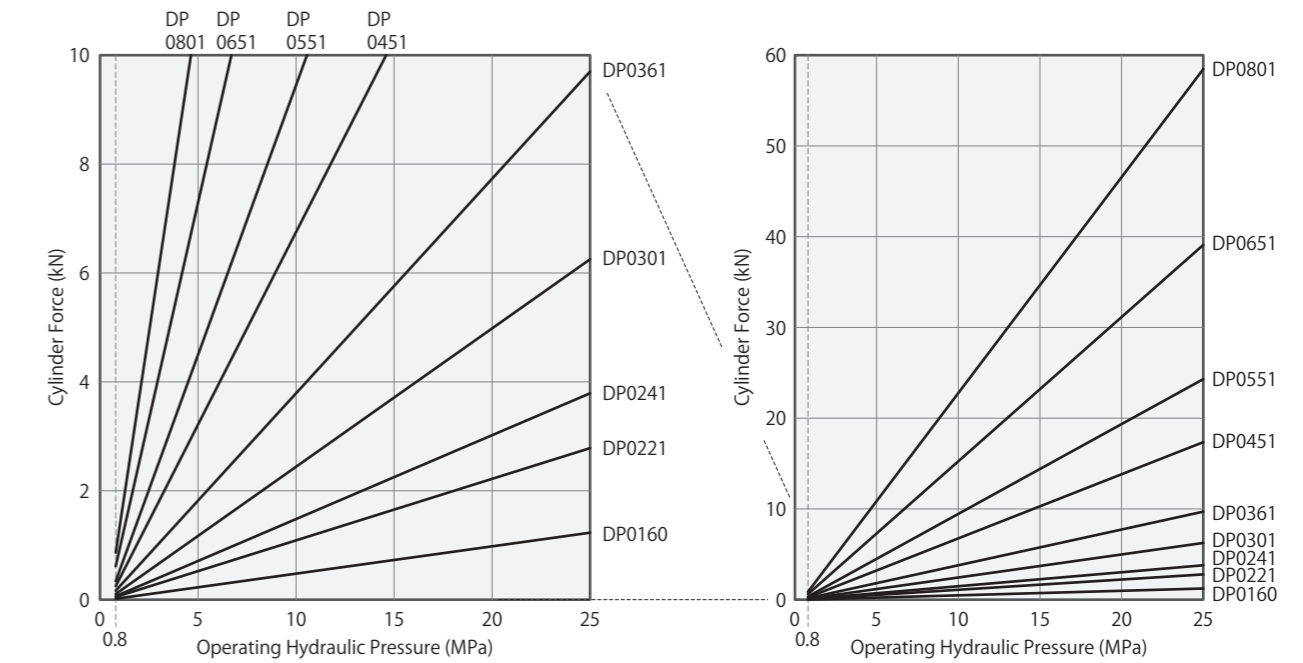
Specifications

Model No.	DP0160			DP0221			DP0241			DP0301			DP0361			DP0451			DP0551			DP0651			DP0801					
Stroke Code	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L
Stroke mm	6	10	16	6	10	16	8	12	20	8	12	20	10	16	25	10	16	25	12	20	32	16	25	40	16	25	40	16	25	40
Cylinder Force (Calculation Formula) kN	F=(0.050×P)-0.024			F=(0.113×P)-0.041			F=(0.154×P)-0.060			F=(0.254×P)-0.099			F=(0.394×P)-0.150			F=(0.707×P)-0.319			F=(0.990×P)-0.452			F=(1.59×P)-0.657			F=(2.38×P)-1.04					
Cylinder Area cm ²	0.5			1.1			1.5			2.5			3.9			7.1			9.9			15.9			23.8					
Cylinder Capacity cm ³	0.3	0.5	0.8	0.7	1.1	1.8	1.2	1.8	3.1	2	3.1	5.1	3.9	6.3	9.9	7.1	11.3	17.7	11.9	19.8	31.7	25.4	39.8	63.6	38	59.4	95			
Release Spring Force N	12.5~23.5			25.7~41.2			32.6~59.7			50.1~99.1			79.4~150			157~319			236~452			353~657			564~1040					
Max. Operating Pressure MPa	25																													
Min. Operating Pressure MPa	0.8																													
Withstanding Pressure MPa	37.5																													
Operating Temperature °C	0~70																													
Weight kg	0.03	0.04	0.05	0.06	0.08	0.1	0.08	0.1	0.15	0.15	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.8	0.8	1.0	1.3	1.4	1.7	2.2	2.2	2.7	3.6			

Note: 1. F: Cylinder Force (kN), P: Supply Hydraulic Pressure (MPa).

Performance Curve

Model No.	Cylinder Force (kN)																								
	1MPa	2MPa	3MPa	4MPa	5MPa	6MPa	7MPa	8MPa	9MPa	10MPa	11MPa	12MPa	13MPa	14MPa	15MPa	16MPa	17MPa	18MPa	19MPa	20MPa	21MPa	22MPa	23MPa	24MPa	25MPa
DP0160	0.03	0.08	0.13	0.18	0.23	0.28	0.33	0.38	0.43	0.48	0.53	0.58	0.63	0.68	0.73	0.78	0.83	0.88	0.93	0.98	1.0	1.1	1.1	1.2	1.2
DP0221	0.07	0.19	0.30	0.41	0.52	0.64	0.75	0.86	0.98	1.1	1.2	1.3	1.4	1.5	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.6	2.7	2.8
DP0241	0.09	0.25	0.40	0.56	0.71	0.86	1.0	1.2	1.3	1.5	1.6	1.8	1.9	2.1	2.3	2.4	2.6	2.7	2.9	3.0	3.2	3.3	3.5	3.6	3.8
DP0301	0.16	0.41	0.66	0.92	1.2	1.4	1.7	1.9	2.2	2.4	2.7	2.9	3.2	3.5	3.7	4.0	4.2	4.5	4.7	5.0	5.2	5.5	5.7	6.0	6.3
DP0361	0.24	0.64	1.0	1.4	1.8	2.2	2.6	3.0	3.4	3.8	4.2	4.6	5.0	5.4	5.8	6.2	6.5	6.9	7.3	7.7	8.1	8.5	8.9	9.3	9.7
DP0451	0.39	1.1	1.8	2.5	3.2	3.9	4.6	5.3	6.0	6.8	7.5	8.2	8.9	9.6	10.3	11.0	11.7	12.4	13.1	13.8	14.5	15.2	15.9	16.6	17.4
DP0551	0.54	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.4	10.4	11.4	12.4	13.4	14.4	15.4	16.4	17.4	18.4	19.3	20.3	21.3	22.3	23.3	24.3
DP0651	0.93	2.5	4.1	5.7	7.3	8.9	10.5	12.1	13.7	15.2	16.8	18.4	20.0	21.6	23.2	24.8	26.4	28.0	29.6	31.1	32.7	34.3	35.9	37.5	39.1
DP0801	1.3	3.7	6.1	8.5	10.9	13.2	15.6	18.0	20.4	22.8	25.1	27.5	29.9	32.3	34.7	37.0	39.4	41.8	44.2	46.6	48.9	51.3	53.7	56.1	58.5

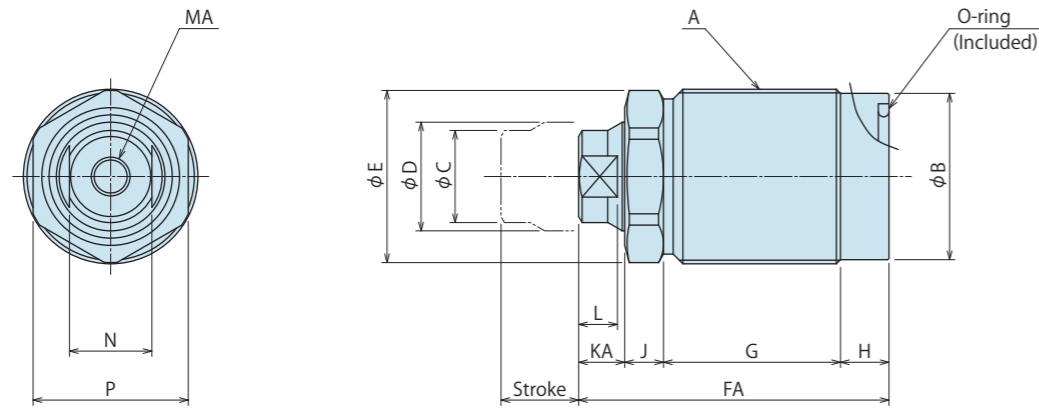


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External Dimensions

Shape of Piston Tip **A** : Female Threaded

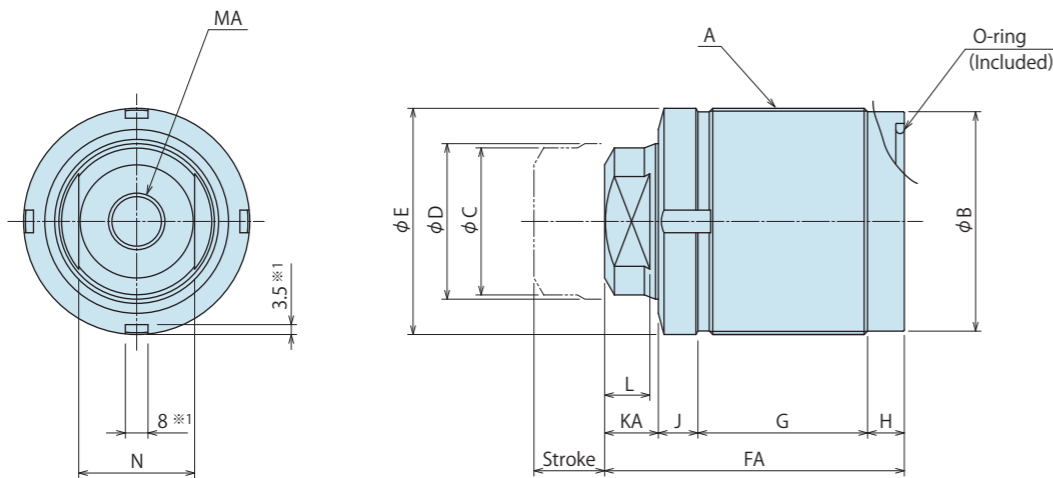
※The drawing below shows DP0160-A□ / DP0221-A□ / DP0241-A□ / DP0301-A□ / DP0361-A□ / DP0451-A□ / DP0551-A□ / DP0651-A□.



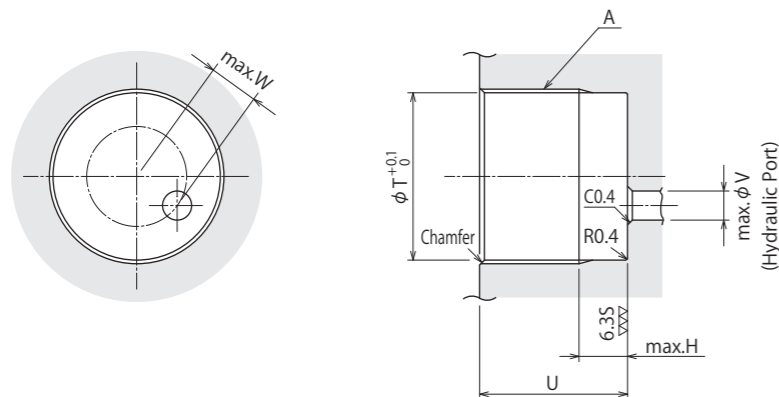
※The drawing below shows DP0801-A□.

Note :

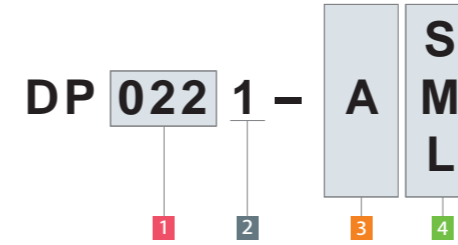
※1.Unlike other body size, a hook spanner is required. Prepare a hook spanner of the appropriate size.



Machining Dimensions of Mounting Area



Model No. Indication



Note:

1 Body Size "016" = 2 Design No. "0"



(Format Example : DP0160-AS, DP0361-AM)

- 1 Body Size
- 2 Design No.
- 3 Shape of Piston Tip
- 4 Stroke Code

External Dimensions and Machining Dimensions for Mounting

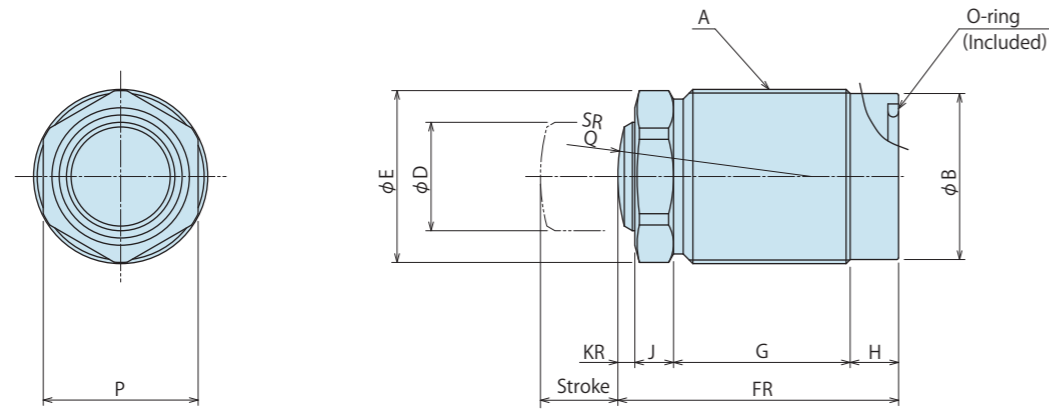
Model No.	DP0160-A			DP0221-A			DP0241-A			DP0301-A			DP0361-A			DP0451-A			DP0551-A			DP0651-A			DP0801-A			
	Stroke Code	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L			
Stroke	6	10	16	6	10	16	8	12	20	8	12	20	10	16	25	10	16	25	12	20	32	16	25	40	16	25	40	
A (Nominal × Pitch)	M16×1.5			M22×1.5			M24×1.5			M30×1.5			M36×1.5			M45×1.5			M55×2			M65×2			M80×2			
B	14.3			20.3			22.3			28.3			34.3			43.3			52.6			62.6			77.6			
C	7.5			11.2			13			17			19			28			34.5			42			52			
D	8			12			14			18			22.4			30			35.5			45			55			
E	15.5			21.2			24.5			30			35.5			45			55			66			80			
FA	35	41	50	35	43	56	39.5	47	63.5	43.5	52.5	72	51	64	85	59	72	94.5	64	79.5	102	78	94	123.5	88	106	137	
G	18.5	24.5	33.5	13	21	34	17.5	25	41.5	18	27	46.5	23.5	36.5	57.5	23	36	58.5	27	42.5	65	35	51	80.5	42	60	91	
H	6			8			8			9			10			12			12			13			13			
J	5			7			7			8			8			12			12			14			14			
KA	5.5			7			7			8.5			9.5			12			13			16			19			
L	4			5.5			5.5			7			8			10			11			13			16			
MA (Nominal×Pitch×Depth)	M5×0.8×8			M6×1×7			M6×1×7			M8×1.25×10			M8×1.25×10			M10×1.5×11			M12×1.75×12			M16×2×16			M20×2.5×20			
N	7			10			10			14			17			24			30			36			41			
P	14			19			22			27			32			41			50			60			-			
T	14.5			20.5			22.5			28.5			34.5			43.5			53			63			78			
U	(min.)	12	12	12	14	14	14	14	14	14	15	15	15	16	16	16	18	18	18	20	20	20	25	25	25	25	25	25
	(max.)	23	29	38	20	28	41	24	32	48	26	35	54	32	45	66	34	47	69	38	53	76	47	63	92	54	72	103
V	3			3			3			6			6			8			8			8			8			
W	0			3.5			5.5			6			8			10			13			19			25			
Chamfer	C1			C1			C1			C1			C1			C1			C1.5			C1.5			C1.5			
O-ring	1BP9			AS568-015(90°)			AS568-017(90°)			AS568-020(90°)			AS568-120(90°)			1BP31.5			1BP39			1BP50			AS568-230(90°)			

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External Dimensions

Shape of Piston Tip [R] : Round Model

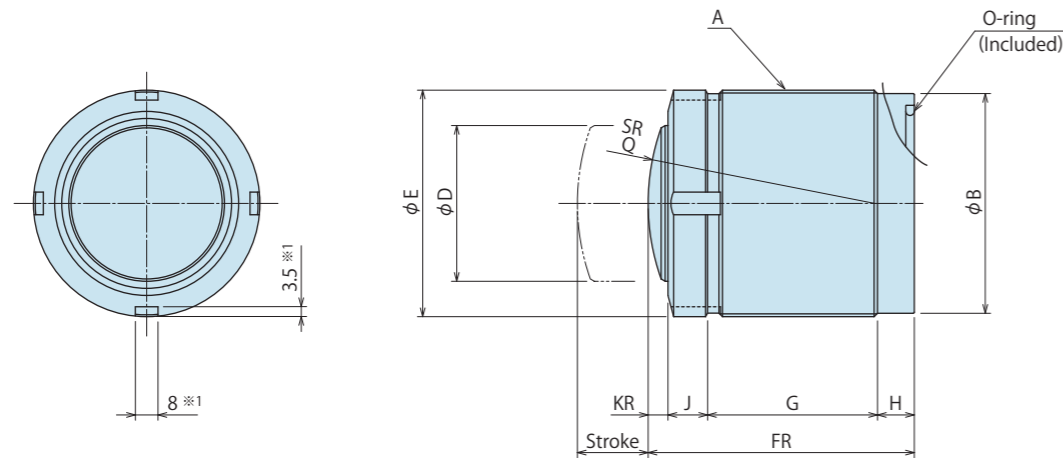
※The drawing below shows DP0160-R□ / DP0221-R□ / DP0241-R□ / DP0301-R□ / DP0361-R□ / DP0451-R□ / DP0551-R□ / DP0651-R□.



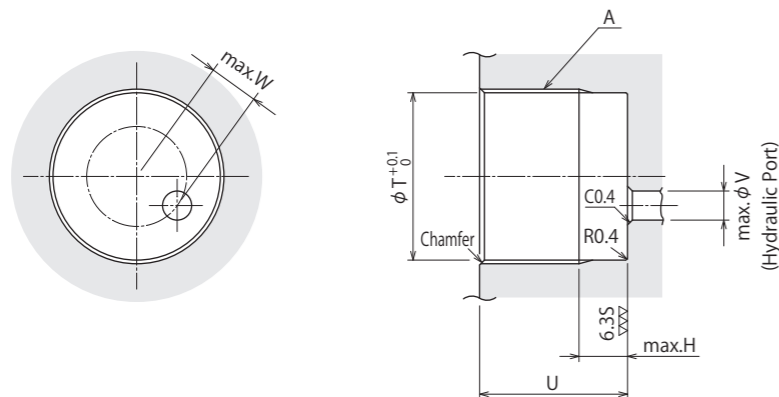
※The drawing below shows DP0801-R□.

Note :

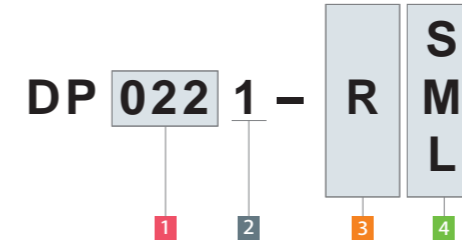
※1.Unlike other body size, a hook spanner is required. Prepare a hook spanner of the appropriate size.



Machining Dimensions of Mounting Area



Model No. Indication



Note:

1 Body Size "016" = 2 Design No. "0"



(Format Example : DP0160-RS, DP0361-RM)

- 1 Body Size
- 2 Design No.
- 3 Shape of Piston Tip
- 4 Stroke Code

External Dimensions and Machining Dimensions for Mounting

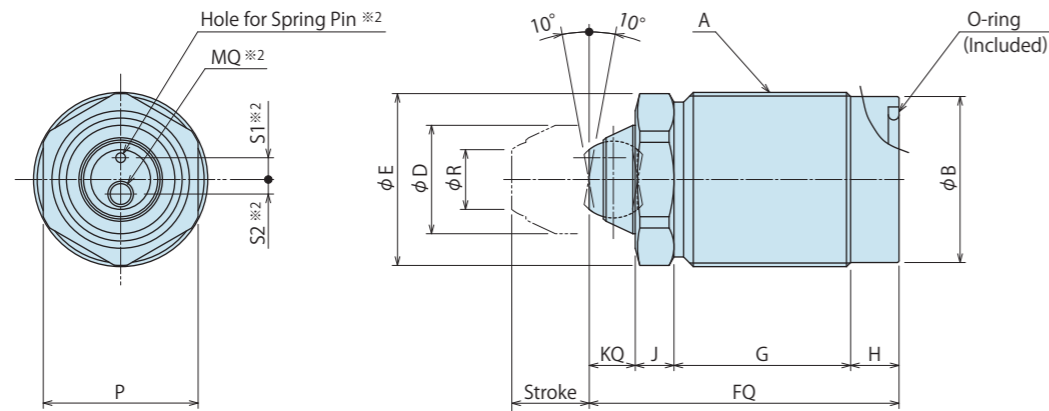
Model No.	DP0160-R			DP0221-R			DP0241-R			DP0301-R			DP0361-R			DP0451-R			DP0551-R			DP0651-R			DP0801-R					
Stroke Code	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L
Stroke	6	10	16	6	10	16	8	12	20	8	12	20	10	16	25	10	16	25	12	20	32	16	25	40	16	25	40	16	25	40
A (Nominal × Pitch)	M16×1.5			M22×1.5			M24×1.5			M30×1.5			M36×1.5			M45×1.5			M55×2			M65×2			M80×2					
B	14.3			20.3			22.3			28.3			34.3			43.3			52.6			62.6			77.6					
D	8			12			14			18			22.4			30			35.5			45			55					
E	15.5			21.2			24.5			30			35.5			45			55			66			80					
FR	31	37	46	30.5	38.5	51.5	35	42.5	59	38	47	66.5	45	58	79	51	64	86.5	56	71.5	94	68	84	113.5	76	94	125			
G	18.5	24.5	33.5	13	21	34	17.5	25	41.5	18	27	46.5	23.5	36.5	57.5	23	36	58.5	27	42.5	65	35	51	80.5	42	60	91			
H	6			8			8			9			10			12			12			13			13					
J	5			7			7			8			8			12			12			14			14					
KR	1.5			2.5			2.5			3			3.5			4			5			6			7					
P	14			19			22			27			32			41			50			60			-					
Q	16			20			25			30			40			50			60			70			80					
T	14.5			20.5			22.5			28.5			34.5			43.5			53			63			78					
U	(min.)	12	12	12	14	14	14	14	14	14	15	15	15	16	16	16	18	18	18	20	20	20	25	25	25	25	25	25		
	(max.)	23	29	38	20	28	41	24	32	48	26	35	54	32	45	66	34	47	69	38	53	76	47	63	92	54	72	103		
V	3			3			3			6			6			8			8			8			8					
W	0			3.5			5.5			6			8			10			13			19			25					
Chamfer	C1			C1			C1			C1			C1			C1			C1.5			C1.5			C1.5					
O-ring	1BP9			AS568-015(90°)			AS568-017(90°)			AS568-020(90°)			AS568-120(90°)			1BP31.5			1BP39			1BP50			AS568-230(90°)					

- 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
 - LG/LT
 - TLA-2
 - TLB-2
 - TLA-1
- Link Clamp
 - LKA
 - LKC
 - LKW
 - LJ/LM
 - TMA-2
 - TMA-1
- Work Support
 - LD
 - LC
 - TNC
 - TC
- Air Sensing Lift Cylinder
 - LLW
- Linear Cylinder / Compact Cylinder
 - LL
 - LLR
 - LLU
 - DP
 - DR
 - DS
 - DT
- Block Cylinder
 - DBA/DBC
- Centering Vise
 - FVA
 - FVD
 - FVC
- Control Valve
 - BZL
 - BZT
 - BZX/JZG
 - BZS
- Pallet Clamp
 - VS/VT
- Expansion Locating Pin
 - VFL/VFM
 - VFJ/VFK
- Pull Stud Clamp
 - FP
 - FQ
- Customized Spring Cylinder
 - DWA/DWB

External Dimensions

Shape of Piston Tip **P** : Oscillating Pad Model **Q** : Oscillating Pad Model with Female Thread.

※The drawing below shows DP0221-Q□ / DP0241-Q□ / DP0301-Q□ / DP0361-Q□ / DP0451-Q□ / DP0551-Q□ / DP0651-Q□.
The DP-P model does not have a pin hole or a thread hole of ※2 part.

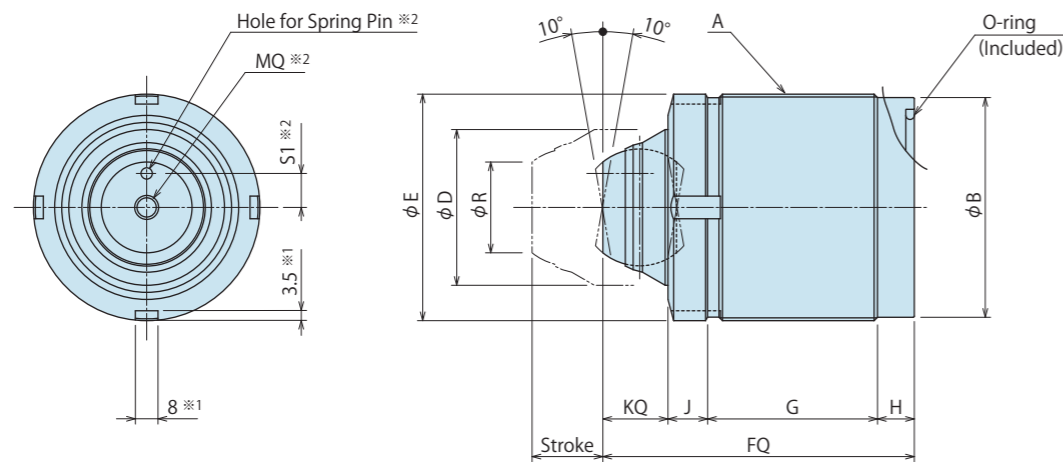


※The drawing below shows DP0801-Q□.

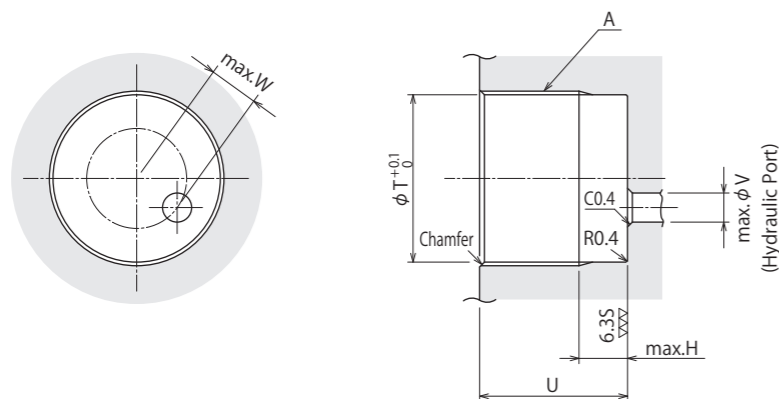
The DP-P model does not have a pin hole or a thread hole of ※2 part.

Note :

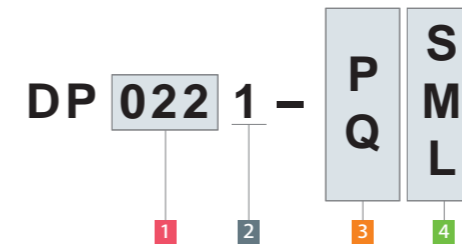
※1.Unlike other body size, a hook spanner is required. Prepare a hook spanner of the appropriate size.



Machining Dimensions of Mounting Area



Model No. Indication



(Format Example : DP0221-PS, DP0361-QM)

- 1 Body Size
- 2 Design No.
- 3 Shape of Piston Tip
- 4 Stroke Code

External Dimensions and Machining Dimensions for Mounting

Model No.	DP0221-P DP0221-Q			DP0241-P DP0241-Q			DP0301-P DP0301-Q			DP0361-P DP0361-Q			DP0451-P DP0451-Q			DP0551-P DP0551-Q			DP0651-P DP0651-Q			DP0801-P DP0801-Q					
	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L			
Stroke Code	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L
Stroke	6	10	16	8	12	20	8	12	20	10	16	25	10	16	25	12	20	32	16	25	40	16	25	40	16	25	40
A (Nominal × Pitch)	M22×1.5			M24×1.5			M30×1.5			M36×1.5			M45×1.5			M55×2			M65×2			M80×2					
B	20.3			22.3			28.3			34.3			43.3			52.6			62.6			77.6					
D	12			14			18			22.4			30			35.5			45			55					
E	21.2			24.5			30			35.5			45			55			66			80					
FQ	32	40	53	38.5	46	62.5	42	51	70.5	51	64	85	60	73	95.5	67	82.5	105	82	98	127.5	92	110	141			
G	13	21	34	17.5	25	41.5	18	27	46.5	23.5	36.5	57.5	23	36	58.5	27	42.5	65	35	51	80.5	42	60	91			
H	8			8			9			10			12			12			13			13					
J	7			7			8			8			12			12			14			14					
KQ	4			6			7			9.5			13			16			20			23					
MQ (Nominal×Pitch×Depth)※2	M3×0.5×6			M3×0.5×8			M4×0.7×7			M5×0.8×10			M6×1×8			M6×1×11			M6×1×11			M8×1.25×13					
P	19			22			27			32			41			50			60			-					
R	7.4			7.7			10.7			12.3			17.3			22.2			27.1			32.1					
S1※2	2			2			3.5			4.5			6			8			10			12					
S2※2	1.5			2			2.5			0			0			0			0			0					
Hole for Spring Pin (Diam. × Depth)※2	phi 2×4			phi 2×4			phi 2×4			phi 2×4			phi 3×6			phi 3×6			phi 3×6			phi 4×8					
T	20.5			22.5			28.5			34.5			43.5			53			63			78					
U	(min.)	14	14	14	14	14	14	15	15	15	16	16	16	18	18	18	20	20	20	25	25	25	25	25	25		
	(max.)	20	28	41	24	32	48	26	35	54	32	45	66	34	47	69	38	53	76	47	63	92	54	72	103		
V	3			3			6			6			8			8			8			8					
W	3.5			5.5			6			8			10			13			19			25					
Chamfer	C1			C1			C1			C1			C1			C1.5			C1.5			C1.5					
O-ring	AS568-015(90°)			AS568-017(90°)			AS568-020(90°)			AS568-120(90°)			1BP31.5			1BP39			1BP50			AS568-230(90°)					

Note : ※2. The dimensions of DP-Q. The DP-P model does not have a pin hole or a thread hole of ※2 part.

Regarding the piston tip of DP0221-Q□, DP0241-Q□, DP0301-Q□, and DP0361-Q□, please install an attachment (which has to be prepared by customer) to prevent contaminants from entering into the MQ thread.

- 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
 - LG/LT
 - TLA-2
 - TLB-2
 - TLA-1
- Link Clamp
 - LKA
 - LKC
 - LKW
 - LJ/LM
 - TMA-2
 - TMA-1
- Work Support
 - LD
 - LC
 - TNC
 - TC
- Air Sensing Lift Cylinder
 - LLW
- Linear Cylinder / Compact Cylinder
 - LL
 - LLR
 - LLU
 - DP
 - DR
 - DS
 - DT
- Block Cylinder
 - DBA/DBC
- Centering Vise
 - FVA
 - FVD
 - FVC
- Control Valve
 - BZL
 - BZT
 - BZX/JZG
 - BZS
- Pallet Clamp
 - VS/VT
- Expansion Locating Pin
 - VFL/VFM
 - VFJ/VFK
- Pull Stud Clamp
 - FP
 - FQ
- Customized Spring Cylinder
 - DWA/DWB



Hydraulic Single-Acting Compact Cylinder

Model DR

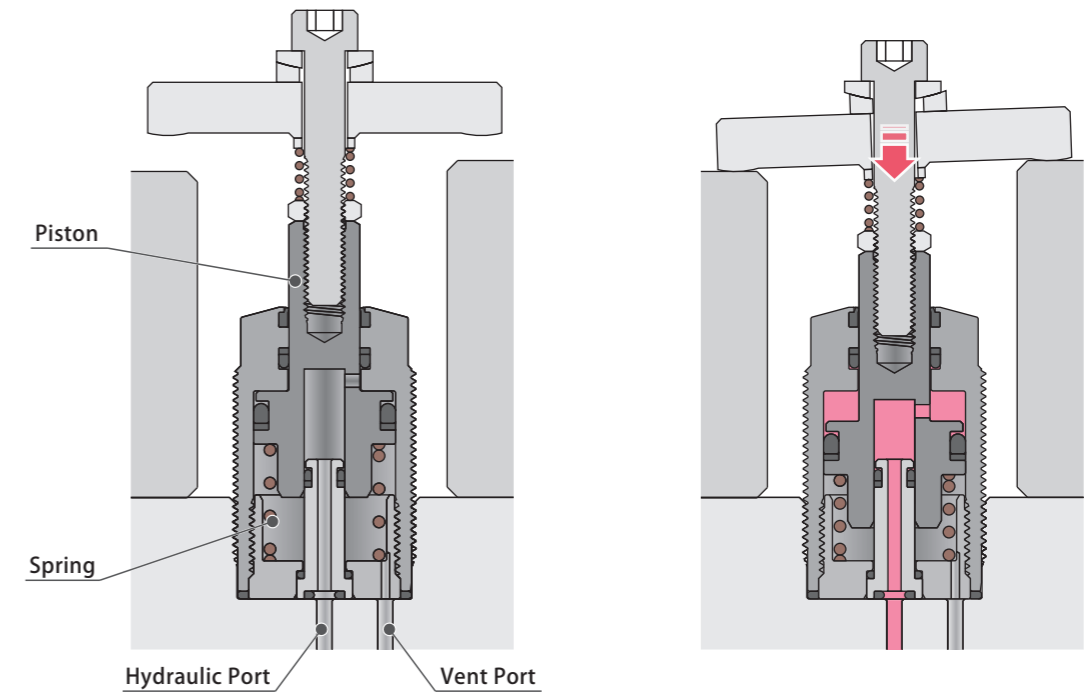
Low Pressure / High Pressure (1 ~ 25MPa)
Pull Cylinder (Threaded Body)



Index

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Cautions	
• Notes for Hydraulic Compact Cylinder	P.913
• Cautions (Common)	P.1355
• Installation Notes • Hydraulic Fluid List • Notes on Hydraulic Cylinder Speed Control Circuit	
• Notes on Handling • Maintenance/Inspection • Warranty	

Action Description



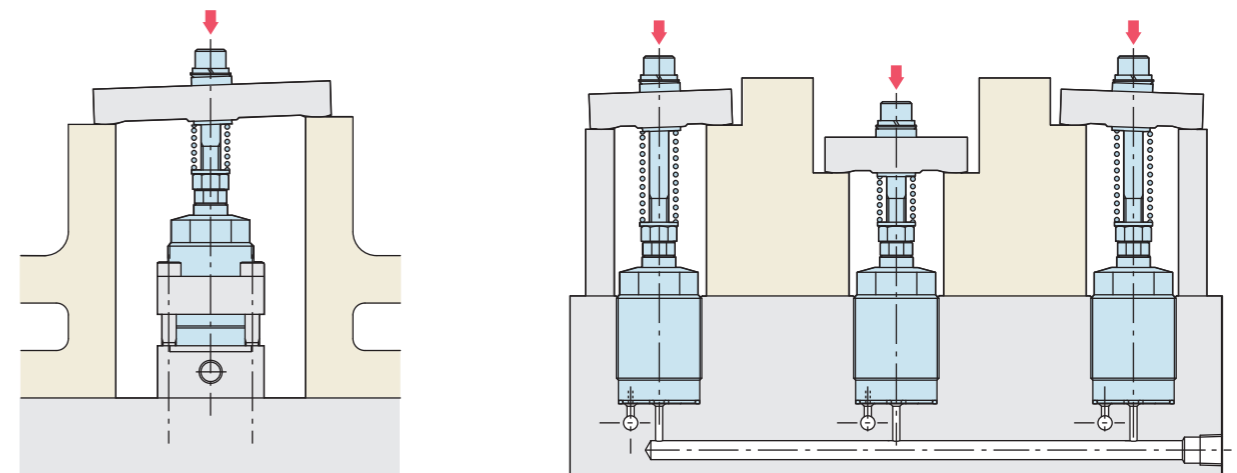
When Releasing (Initial Position)

Piston moves to release position by spring force.
(Piston extended)

When Locking

When hydraulic pressure is supplied, the piston is operated by the force of the hydraulic pressure.
(Piston retracted)

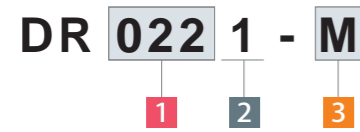
Application Examples



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

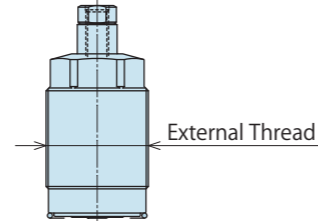
- Hole Clamp
 - SFA
 - SFC
- Swing Clamp
 - LHA
 - LHC
 - LHS
 - LHW
 - LG/LT
 - TLA-2
 - TLB-2
 - TLA-1
- Link Clamp
 - LKA
 - LKC
 - LKW
 - LJ/LM
 - TMA-2
 - TMA-1
- Work Support
 - LD
 - LC
 - TNC
 - TC
- Air Sensing Lift Cylinder
 - LLW
- Linear Cylinder / Compact Cylinder**
 - LL
 - LLR
 - LLU
 - DP
 - DR**
 - DS
 - DT
- Block Cylinder
 - DBA/DBC
- Centering Vise
 - FVA
 - FVD
 - FVC
- Control Valve
 - BZL
 - BZT
 - BZX/JZG
 - BZS
- 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

- 022** : External Thread M22×1.5
- 024** : External Thread M24×1.5
- 030** : External Thread M30×1.5
- 036** : External Thread M36×1.5
- 045** : External Thread M45×1.5
- 055** : External Thread M55×2
- 065** : External Thread M65×2
- 080** : External Thread M80×2



2 Design No.

- 1** : Revision Number

3 Stroke Code

- S** : Short Stroke
- M** : Standard Stroke
- L** : Long Stroke

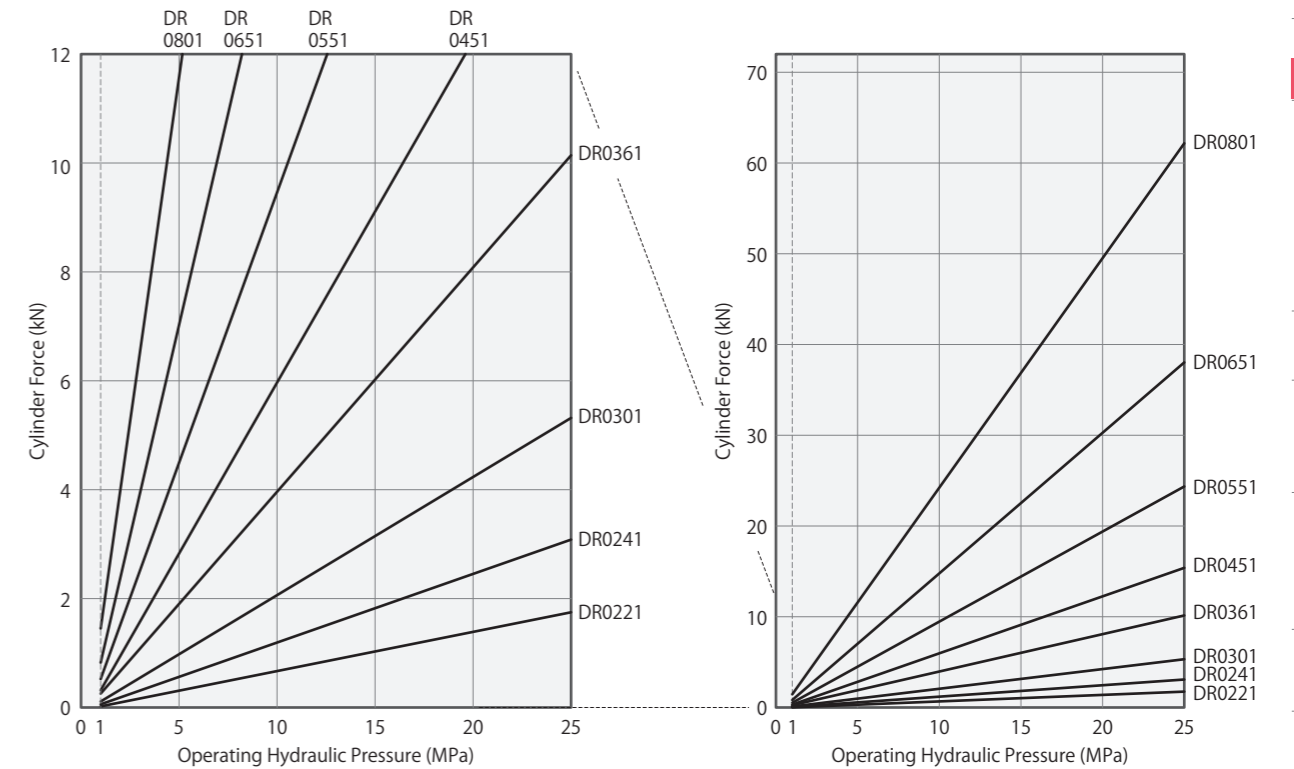
Specifications

Model No.	DR0221			DR0241			DR0301			DR0361			DR0451			DR0551			DR0651			DR0801					
Stroke Code	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L
Stroke	mm			4 6 10			5 8 12			6 10 16			6 10 16			8 12 20			8 12 20			10 16 25			10 16 25		
Cylinder Force (Calculation Formula) kN	F=(0.072×P)-0.051			F=(0.126×P)-0.067			F=(0.217×P)-0.108			F=(0.412×P)-0.175			F=(0.628×P)-0.313			F=(0.993×P)-0.471			F=(1.55×P)-0.726			F=(2.53×P)-1.08					
Cylinder Area	cm ²			0.7			1.3			2.2			4.1			6.3			9.9			15.5			25.3		
Cylinder Capacity	cm ³			0.3 0.4 0.7			0.6 1.0 1.5			1.3 2.2 3.5			2.5 4.1 6.6			5.0 7.5 12.6			7.9 11.9 19.9			15.5 24.9 38.9			25.3 40.5 63.3		
Release Spring Force	N			30.2~50.8			38.8~67.2			56.5~108			92~175			141~313			213~471			327~726			513~1076		
Max. Operating Pressure	MPa																								25		
Min. Operating Pressure	MPa																								1.0		
Withstanding Pressure	MPa																								37.5		
Operating Temperature	°C																								0 ~ 70		
Weight	kg			0.07 0.08 0.1			0.1 0.1 0.15			0.2 0.2 0.3			0.3 0.3 0.4			0.5 0.6 0.7			0.8 0.9 1.0			1.3 1.5 1.8			2.2 2.5 3.0		

Note: 1. F: Cylinder Force (kN), P: Supply Hydraulic Pressure (MPa).

Performance Curve

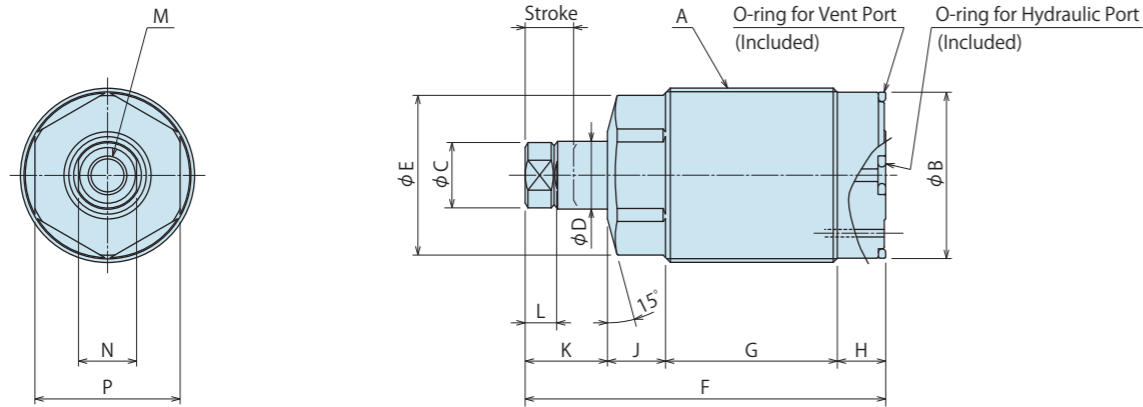
Model No.	Cylinder Force (kN)																								
	1MPa	2MPa	3MPa	4MPa	5MPa	6MPa	7MPa	8MPa	9MPa	10MPa	11MPa	12MPa	13MPa	14MPa	15MPa	16MPa	17MPa	18MPa	19MPa	20MPa	21MPa	22MPa	23MPa	24MPa	25MPa
DR0221	0.02	0.09	0.17	0.24	0.31	0.38	0.45	0.53	0.60	0.67	0.74	0.81	0.89	0.96	1.0	1.1	1.2	1.3	1.4	1.5	1.5	1.6	1.7	1.7	
DR0241	0.06	0.19	0.31	0.44	0.56	0.69	0.82	0.94	1.1	1.2	1.3	1.4	1.6	1.7	1.8	1.9	2.1	2.2	2.3	2.5	2.6	2.7	2.8	3.0	3.1
DR0301	0.11	0.33	0.54	0.76	0.98	1.2	1.4	1.6	1.8	2.1	2.3	2.5	2.7	2.9	3.1	3.4	3.6	3.8	4.0	4.2	4.5	4.7	4.9	5.1	5.3
DR0361	0.24	0.65	1.1	1.5	1.9	2.3	2.7	3.1	3.5	3.9	4.4	4.8	5.2	5.6	6.0	6.4	6.8	7.2	7.6	8.1	8.5	8.9	9.3	9.7	10.1
DR0451	0.32	0.94	1.6	2.2	2.8	3.5	4.1	4.7	5.3	6.0	6.6	7.2	7.9	8.5	9.1	9.7	10.4	11.0	11.6	12.2	12.9	13.5	14.1	14.8	15.4
DR0551	0.52	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.4	12.4	13.4	14.4	15.4	16.4	17.4	18.4	19.4	20.4	21.4	22.4	23.4	24.4
DR0651	0.82	2.4	3.9	5.5	7.0	8.6	10.1	11.7	13.2	14.8	16.3	17.9	19.4	21.0	22.5	24.1	25.6	27.2	28.7	30.3	31.8	33.4	34.9	36.5	38.0
DR0801	1.5	4.0	6.5	9.0	11.6	14.1	16.6	19.2	21.7	24.2	26.8	29.3	31.8	34.3	36.9	39.4	41.9	44.5	47.0	49.5	52.1	54.6	57.1	59.6	62.2



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

External Dimensions

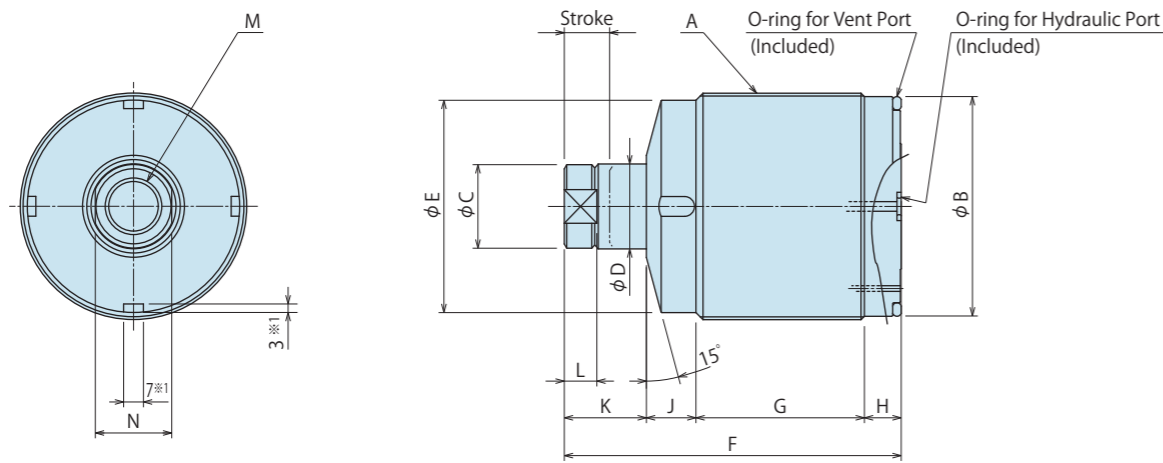
※The drawing below shows DR0221-□ / DR0241-□ / DR0301-□ / DR0361-□ / DR0451-□ / DR0551-□ / DR0651-□.



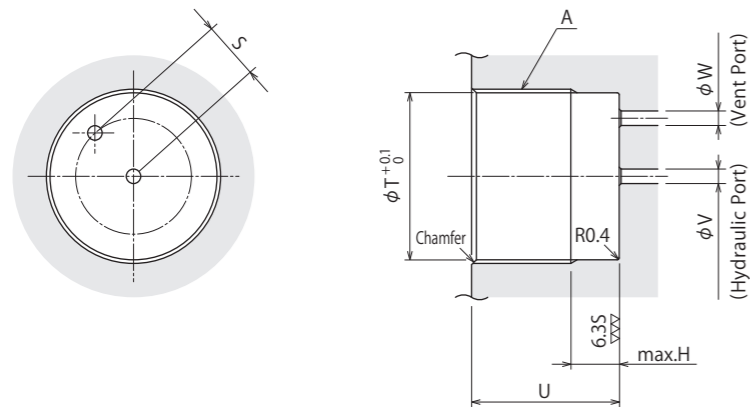
※The drawing below shows DR0801-□.

Note :

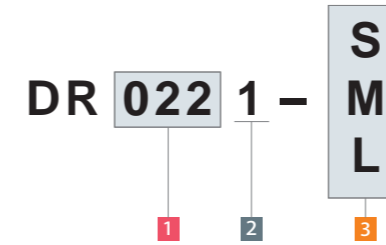
※1.Unlike other body size, a hook spanner is required. Prepare a hook spanner of the appropriate size.



Machining Dimensions of Mounting Area



Model No. Indication



(Format Example : DR0221-S, DR0361-M)

- 1 Body size
- 2 Design No.
- 3 Stroke Code

External Dimensions and Machining Dimensions for Mounting

Model No.	DR0221			DR0241			DR0301			DR0361			DR0451			DR0551			DR0651			DR0801		
	Stroke Code	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M
Stroke	4	6	10	5	8	12	6	10	16	6	10	16	8	12	20	8	12	20	10	16	25	10	16	25
A (Nominal × Pitch)	M22×1.5			M24×1.5			M30×1.5			M36×1.5			M45×1.5			M55×2			M65×2			M80×2		
B	20.3			22.3			28.3			34.3			43.3			52.6			62.6			77.6		
C	9.5			9.5			11.5			13.5			15.5			19.5			24.5			29.5		
D	10			10			12			14			16			20			25			30		
E	19			21.2			26.5			33			40			50			60			75		
F	48.5	53.5	65.5	51.5	59.5	71.5	59.5	71.5	88.5	63	74.5	91.5	72	83	103	79	91	112	93	109	135	103	119	145
G	23.5	26.5	34.5	25	30	38	28.5	36.5	47.5	28	35.5	46.5	33	40	52	33	41	54	42	52	69	49.5	59.5	76.5
H	8			8			9			10			12			12			13			13		
J	8			8.5			10			12			12			16			17			17.5		
K	9	11	15	10	13	17	12	16	22	13	17	23	15	19	27	18	22	30	21	27	36	23	29	38
L	4.5			4.5			5.5			6.5			6.5			8.5			10			11.5		
M (Nominal×Pitch×Depth)	M6×1×11			M6×1×11			M8×1.25×18			M8×1.25×18			M10×1.5×20			M12×1.75×22			M16×2×28			M20×2.5×31		
N	8			8			10			12			14			17			22			27		
P	17			19			24			30			36			46			55			-		
S	7			7 ~ 7.5			7 ~ 10.5			10.5 ~ 13.5			12.5 ~ 16			14.5 ~ 20			18.5 ~ 25.5			24.5 ~ 32		
T	20.5			22.5			28.5			34.5			43.5			53			63			78		
U	(min.)	14	14	14	14	14	15	15	15	16	16	16	18	18	18	20	20	20	25	25	25	25	25	25
	(max.)	31	34	42	32	37	45	37	45	56	37	45	56	44	51	63	44	52	65	54	64	81	62	72
V	3			3			3			3			5			5			5			5		
W	3			3			3			3			5			5			5			5		
Chamfer	C1			C1			C1			C1			C1			C1.5			C1.5			C1.5		
O-ring for Hydraulic	1BP5			1BP5			1BP5			1BP5			1BP7			1BP7			1BP7			1BP7		
O-ring for Vent Port	AS568-017(90°)			AS568-018(90°)			AS568-022(90°)			AS568-026(90°)			AS568-128(90°)			AS568-133(90°)			AS568-140(90°)			AS568-232(90°)		

- 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
 - LG/LT
 - TLA-2
 - TLB-2
 - TLA-1
- Link Clamp
 - LKA
 - LKC
 - LKW
 - LJ/LM
 - TMA-2
 - TMA-1
- Work Support
 - LD
 - LC
 - TNC
 - TC
- Air Sensing Lift Cylinder
 - LLW
- Linear Cylinder / Compact Cylinder
 - LL
 - LLR
 - LLU
 - DP
 - DR
 - DS
 - DT
- Block Cylinder
 - DBA/DBC
- Centering Vise
 - FVA
 - FVD
 - FVC
- Control Valve
 - BZL
 - BZT
 - BZX/JZG
 - BZS
- Pallet Clamp
 - VS/VT
- Expansion Locating Pin
 - VFL/VFM
 - VFJ/VFK
- Pull Stud Clamp
 - FP
 - FQ
- Customized Spring Cylinder
 - DWA/DWB



Hydraulic Single-Acting Compact Cylinder

Model DS

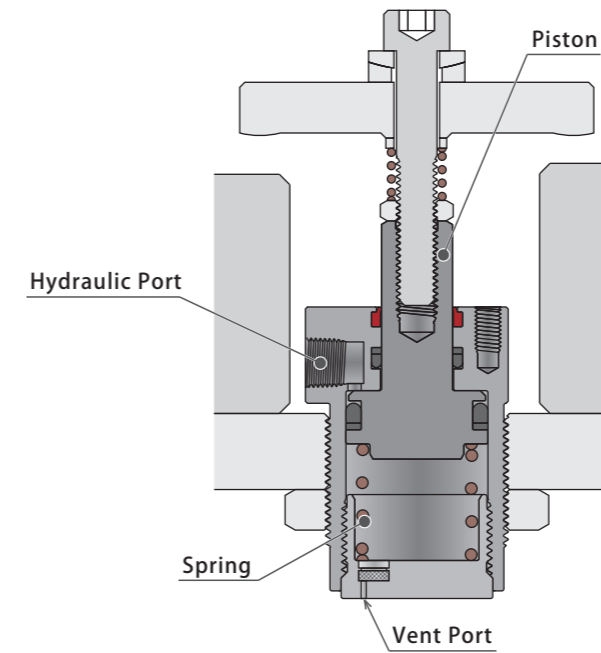
Low Pressure / High Pressure (1 ~ 25MPa)
Pull Cylinder (Threaded Body/Bottom Flange)



Index

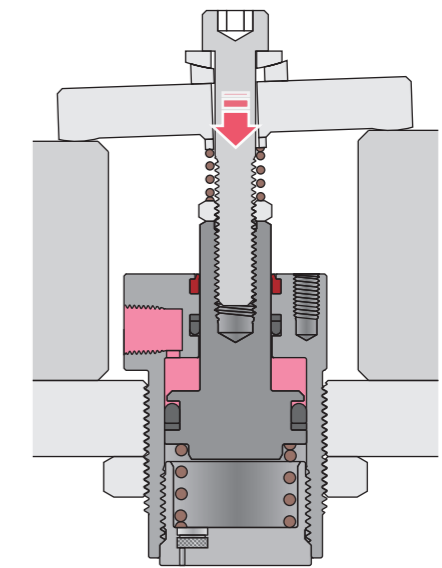
Hydraulic Compact Cylinder Digest	P.835
Action Description / Application Examples	P.898
Model No. Indication	P.899
Specifications	P.900
Performance Curve	P.900
External Dimensions	
• Piping Method : Gasket Option (DS-G)	P.901
• Piping Method : Piping Option (DS-S)	P.903
Accessories	
• Piping Block / Nut (Common Items of Other Models)	P.1341
Cautions	
• Notes for Hydraulic Compact Cylinder	P.913
• Cautions (Common)	P.1355
• Installation Notes • Hydraulic Fluid List • Notes on Hydraulic Cylinder Speed Control Circuit • Notes on Handling • Maintenance/Inspection • Warranty	

Action Description



When Releasing (Initial Position)

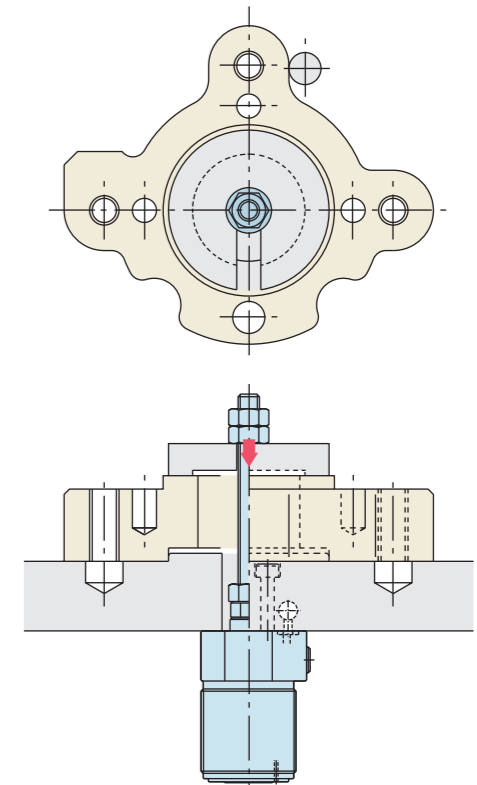
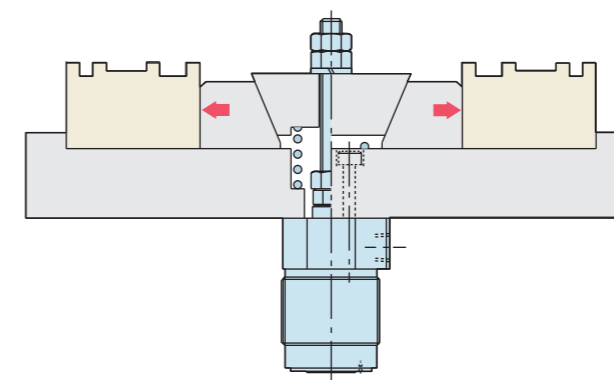
Piston moves to the release position by spring force. (Piston extended)



When Locking

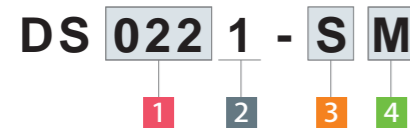
When hydraulic pressure is supplied, the piston is operated by the force of the hydraulic pressure. (Piston retracted)

Application Examples



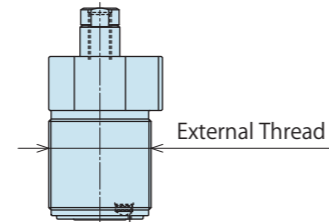
High-Power Series
Pneumatic Series
Hydraulic Series
Valve / Coupler Hydraulic Unit
Manual Operation Accessories
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Hole Clamp
SFA
SFC
Swing Clamp
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LKW
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TMA-2
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Work Support
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LL
LLR
LLU
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DR
DS
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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

- 022 : External Thread M22×1.5
- 024 : External Thread M24×1.5
- 030 : External Thread M30×1.5
- 036 : External Thread M36×1.5
- 045 : External Thread M45×1.5
- 055 : External Thread M55×2
- 065 : External Thread M65×2
- 080 : External Thread M80×2



2 Design No.

1 : Revision Number

3 Piping Method

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



4 Stroke Code

- S : Short Stroke
- M : Standard Stroke
- L : Long Stroke

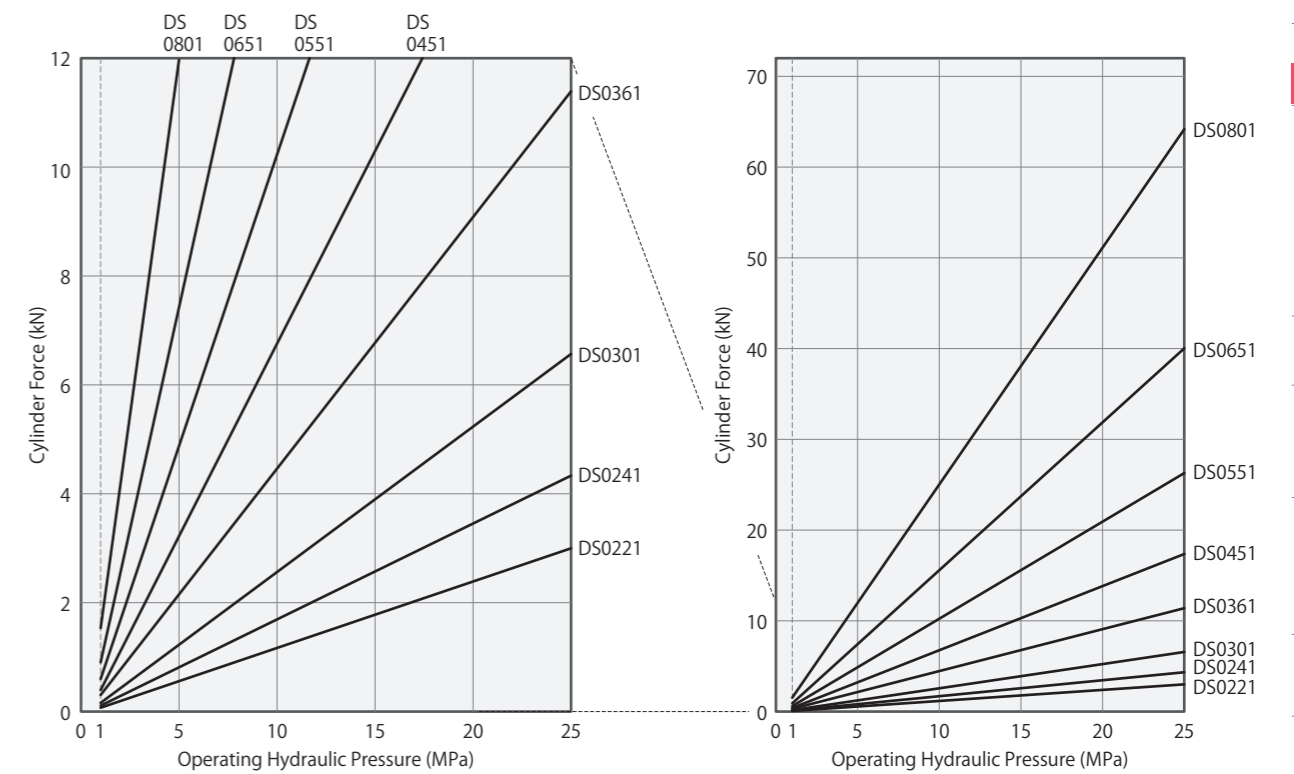
Specifications

Model No.	DS0221			DS0241			DS0301			DS0361			DS0451			DS0551			DS0651			DS0801					
Stroke Code	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L
Stroke	mm			mm			mm			mm			mm			mm			mm			mm			mm		
Cylinder Force (Calculation Formula) kN	F=(0.122×P)-0.051			F=(0.176×P)-0.067			F=(0.267×P)-0.108			F=(0.462×P)-0.175			F=(0.707×P)-0.313			F=(1.07×P)-0.471			F=(1.63×P)-0.726			F=(2.61×P)-1.08					
Cylinder Area	cm ²			cm ²			cm ²			cm ²			cm ²			cm ²			cm ²			cm ²					
Cylinder Capacity	cm ³			cm ³			cm ³			cm ³			cm ³			cm ³			cm ³			cm ³					
Release Spring Force	N			N			N			N			N			N			N			N					
Max. Operating Pressure	MPa																										
Min. Operating Pressure	MPa																										
Withstanding Pressure	MPa																										
Operating Temperature	°C																										
Weight	kg			kg			kg			kg			kg			kg			kg			kg			kg		

Note: 1. F: Cylinder Force (kN), P: Supply Hydraulic Pressure (MPa).

Performance Curve

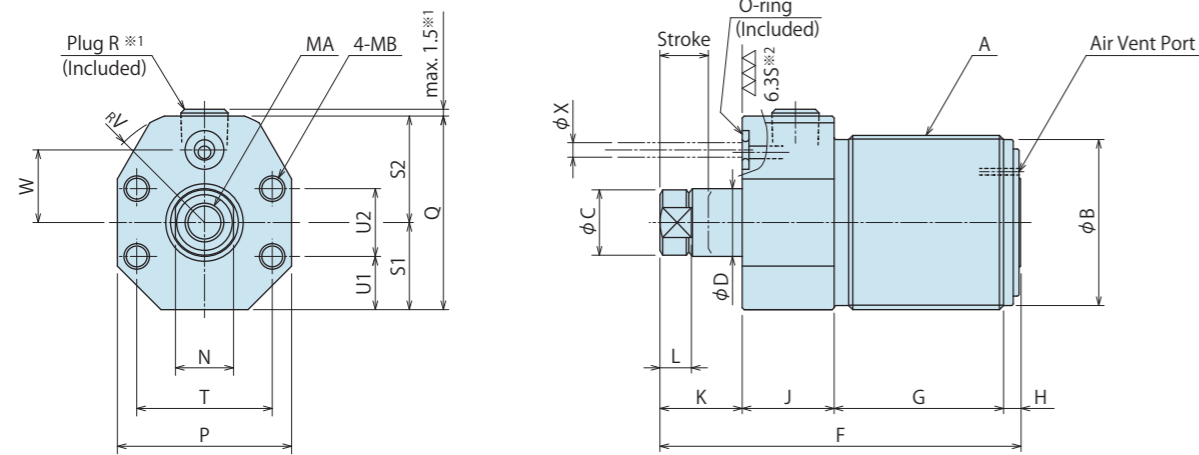
Model No.	Cylinder Force (kN)																								
	1MPa	2MPa	3MPa	4MPa	5MPa	6MPa	7MPa	8MPa	9MPa	10MPa	11MPa	12MPa	13MPa	14MPa	15MPa	16MPa	17MPa	18MPa	19MPa	20MPa	21MPa	22MPa	23MPa	24MPa	25MPa
DS0221	0.07	0.19	0.32	0.44	0.56	0.68	0.80	0.93	1.0	1.2	1.3	1.4	1.5	1.7	1.8	1.9	2.0	2.1	2.3	2.4	2.5	2.6	2.8	2.9	3.0
DS0241	0.11	0.29	0.46	0.64	0.81	0.99	1.2	1.3	1.5	1.7	1.9	2.0	2.2	2.4	2.6	2.7	2.9	3.1	3.3	3.5	3.6	3.8	4.0	4.2	4.3
DS0301	0.16	0.43	0.69	0.96	1.2	1.5	1.8	2.0	2.3	2.6	2.8	3.1	3.4	3.6	3.9	4.2	4.4	4.7	5.0	5.2	5.5	5.8	6.0	6.3	6.6
DS0361	0.29	0.75	1.2	1.7	2.1	2.6	3.1	3.5	4.0	4.4	4.9	5.4	5.8	6.3	6.8	7.2	7.7	8.1	8.6	9.1	9.5	10.0	10.5	10.9	11.4
DS0451	0.39	1.1	1.8	2.5	3.2	3.9	4.6	5.3	6.1	6.8	7.5	8.2	8.9	9.6	10.3	11.0	11.7	12.4	13.1	13.8	14.5	15.2	15.9	16.7	17.4
DS0551	0.60	1.7	2.7	3.8	4.9	5.9	7.0	8.1	9.2	10.2	11.3	12.4	13.4	14.5	15.6	16.6	17.7	18.8	19.9	20.9	22.0	23.1	24.1	25.2	26.3
DS0651	0.90	2.5	4.2	5.8	7.4	9.1	10.7	12.3	13.9	15.6	17.2	18.8	20.5	22.1	23.7	25.4	27.0	28.6	30.2	31.9	33.5	35.1	36.8	38.4	40.0
DS0801	1.5	4.1	6.8	9.4	12.0	14.6	17.2	19.8	22.4	25.0	27.6	30.2	32.9	35.5	38.1	40.7	43.3	45.9	48.5	51.1	53.7	56.3	59.0	61.6	64.2



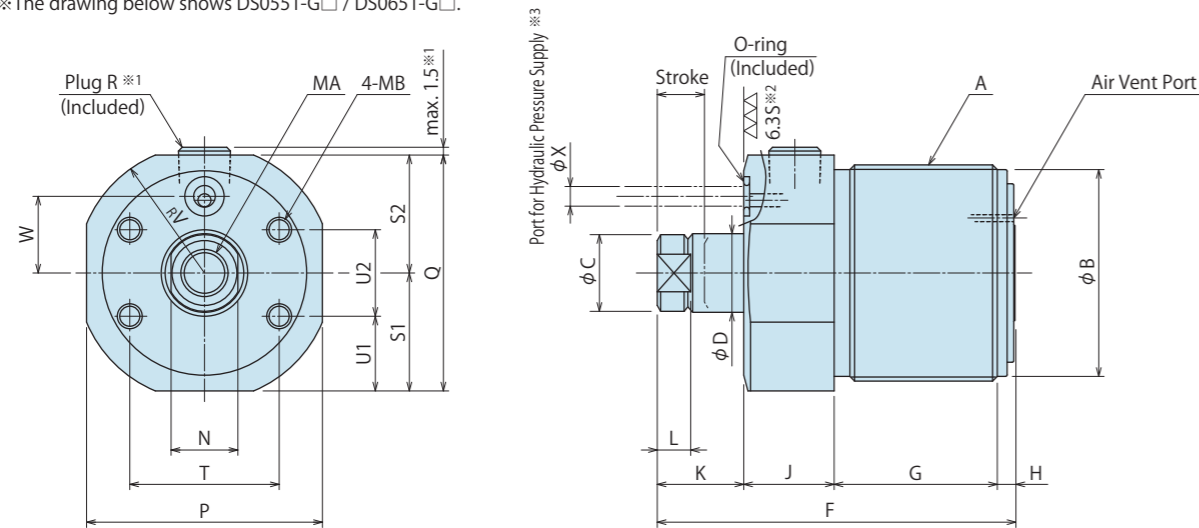
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 - TLB-2
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 - BZS
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 - VS/VT
- Expansion Locating Pin
 - VFL/VFM
 - VFJ/VFK
- Pull Stud Clamp
 - FP
 - FQ
- Customized Spring Cylinder
 - DWA/DWB

External Dimensions

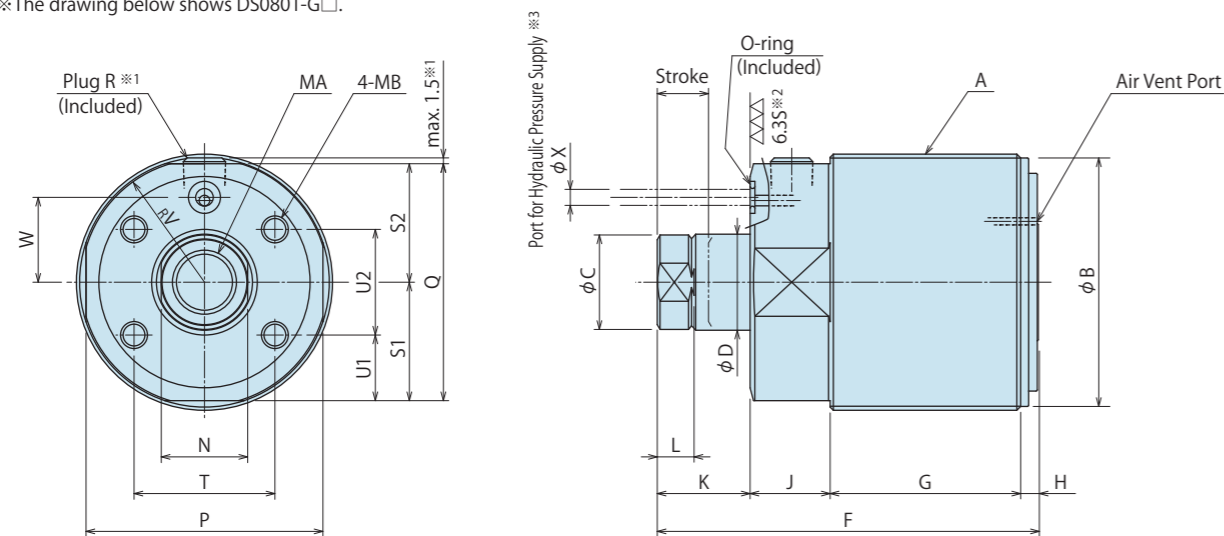
※The drawing below shows DS0221-G□ / DS0241-G□ / DS0301-G□ / DS0361-G□ / DS0451-G□.



※The drawing below shows DS0551-G□ / DS0651-G□.

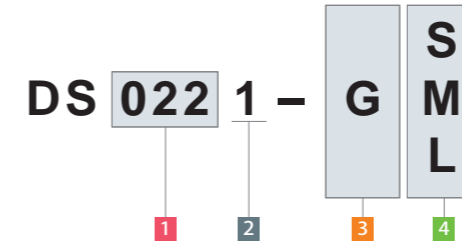


※The drawing below shows DS0801-G□.



- Notes :
- ※1. The R-thread plug is screwed in before shipping. There will be some variation in how far the plug protrudes.
 - ※2. The part of the DS mounting surface that touches the O ring should have a roughness of $\sqrt{6.35}$.
 - ※3. Shows the recommendation for the hole drilled by the customer for the supply of hydraulic pressure. Make sure there are no burrs around the connection and no cutting chips or other contaminants inside.

Model No. Indication



(Format Example : DS0221-GS, DS0361-GM)

- 1 Body Size
- 2 Design No.
- 3 Piping Method G : Gasket Option
- 4 Stroke Code

External Dimensions and Machining Dimensions for Mounting

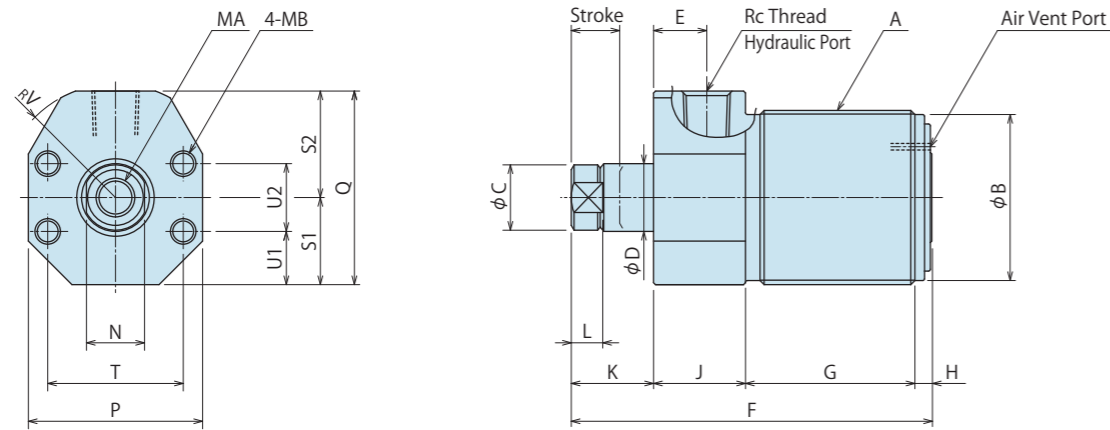
Model No.	DS0221-G			DS0241-G			DS0301-G			DS0361-G			DS0451-G			DS0551-G			DS0651-G			DS0801-G		
	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L
Stroke	4	6	10	5	8	12	6	10	16	6	10	16	8	12	20	8	12	20	10	16	25	10	16	25
A (Nominal × Pitch)	M22×1.5			M24×1.5			M30×1.5			M36×1.5			M45×1.5			M55×2			M65×2			M80×2		
B	20.3			22.3			28.3			34.3			43.3			52.6			62.6			77.6		
C	9.5			9.5			11.5			13.5			15.5			19.5			24.5			29.5		
D	10			10			12			14			16			20			25			30		
F	48.5	53.5	65.5	51.5	59.5	71.5	59.5	71.5	88.5	63	74.5	91.5	72	83	103	79	91	112	93	109	135	103	119	145
G	19	22	30	21	26	34	25	33	44	27.5	35	46	29.5	36.5	48.5	33.5	41.5	54.5	44.5	54.5	71.5	49.5	59.5	76.5
H	3.5			3.5			3.5			3.5			4.5			4.5			4.5			5.5		
J	17			17			19			19			23			23			23			25		
K	9	11	15	10	13	17	12	16	22	13	17	23	15	19	27	18	22	30	21	27	36	23	29	38
L	4.5			4.5			5.5			6.5			6.5			8.5			10			11.5		
MA (Nominal×Pitch×Depth)	M6×1×11			M6×1×11			M8×1.25×18			M8×1.25×18			M10×1.5×20			M12×1.75×22			M16×2×30			M20×2.5×31		
MB (Nominal×Pitch×Depth) ^{※4}	M4×0.7×7			M4×0.7×7			M5×0.8×8			M5×0.8×8			M6×1×11			M6×1×11			M8×1.25×13			M8×1.25×13		
N	8			8			10			12			14			17			22			27		
P	22			24			30			36			45			60			67			74		
Q	31			32			37			40			50			60			67			74		
R	R1/8			R1/8			R1/8			R1/8			R1/4			R1/4			R1/4			R1/4		
S1	11			12			15			18			22.5			30			33.5			37		
S2	20			20			22			22			27.5			30			33.5			37		
T	16			18			22			28			36			38			42			44		
U1	5			6			8			11			13.5			19			20.5			20.5		
U2	12			12			14			14			18			22			26			33		
V	21.5			21.5			23.4			23.5			29.5			32.5			36.5			38.5		
W	13			13			15			15			17.5			19.5			23			26.5		
X	3			3			3			3			5			5			5			5		
O-ring	1BP5			1BP5			1BP5			1BP5			1BP7			1BP7			1BP7			1BP7		

Note : ※4. Mounting bolts are not provided. Please prepare them according to the mounting height.

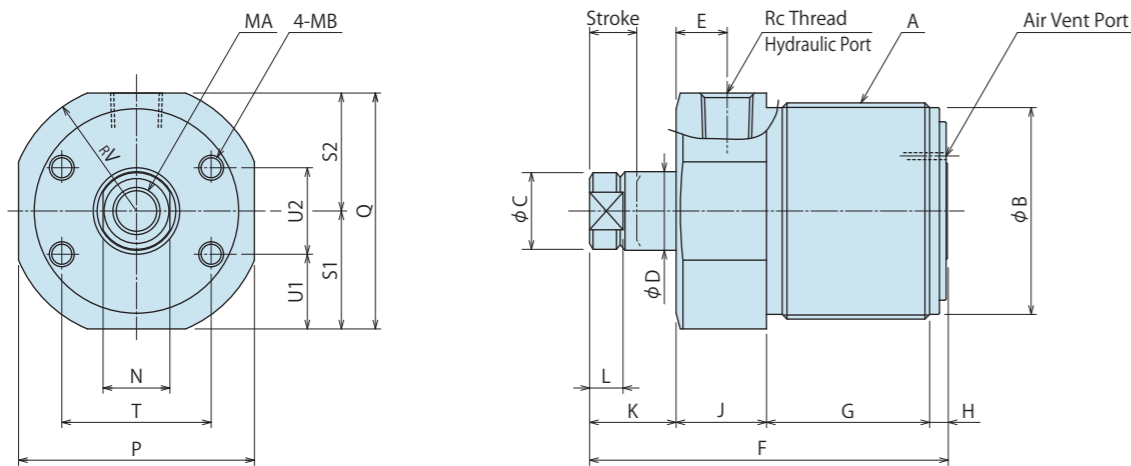
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- Expansion Locating Pin
 - VFL/VFM
 - VFJ/VFK
- Pull Stud Clamp
 - FP
 - FQ
- Customized Spring Cylinder
 - DWA/DWB

External Dimensions

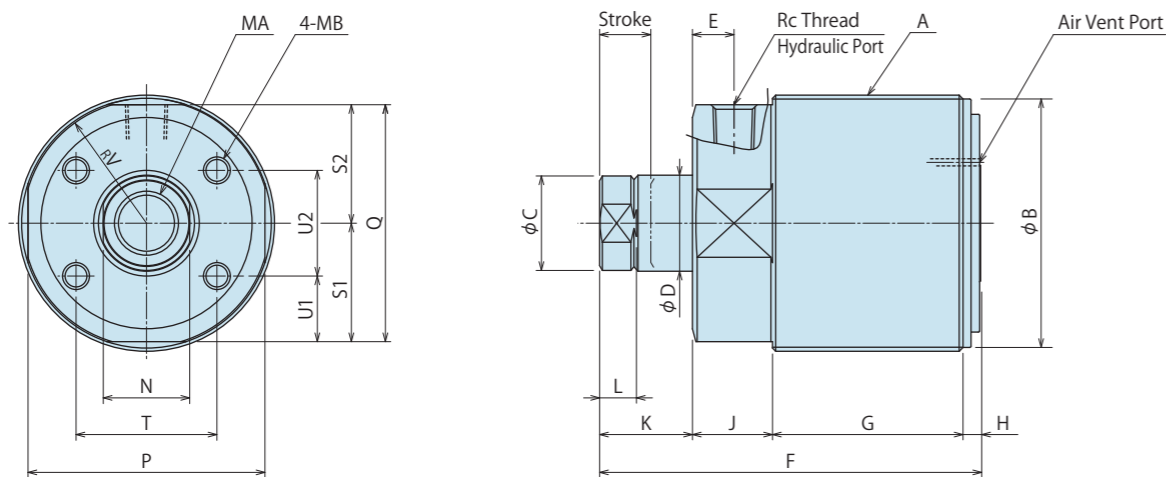
※The drawing below shows DS0221-S□ / DS0241-S□ / DS0301-S□ / DS0361-S□ / DS0451-S□.



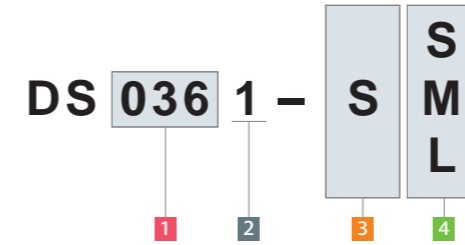
※The drawing below shows DS0551-S□ / DS0651-S□.



※The drawing below shows DS0801-S□.



Model No. Indication



(Format Example : DS0361-SS, DS0801-SM)

- 1 Body Size
- 2 Design No.
- 3 Piping Method S : Piping Option
- 4 Stroke Code

External Dimensions and Machining Dimensions for Mounting

Model No.	DS0221-S			DS0241-S			DS0301-S			DS0361-S			DS0451-S			DS0551-S			DS0651-S			DS0801-S					
Stroke Code	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L
Stroke	4	6	10	5	8	12	6	10	16	6	10	16	8	12	20	8	12	20	10	16	25	10	16	25	10	16	25
A (Nominal × Pitch)	M22×1.5			M24×1.5			M30×1.5			M36×1.5			M45×1.5			M55×2			M65×2			M80×2					
B	20.3			22.3			28.3			34.3			43.3			52.6			62.6			77.6					
C	9.5			9.5			11.5			13.5			15.5			19.5			24.5			29.5					
D	10			10			12			14			16			20			25			30					
E	9			9			11			11			13			13			13			13					
F	48.5	53.5	65.5	51.5	59.5	71.5	59.5	71.5	88.5	63	74.5	91.5	72	83	103	79	91	112	93	109	135	103	119	145			
G	19	22	30	21	26	34	25	33	44	27.5	35	46	29.5	36.5	48.5	33.5	41.5	54.5	44.5	54.5	71.5	49.5	59.5	76.5			
H	3.5			3.5			3.5			3.5			4.5			4.5			4.5			5.5					
J	17			17			19			19			23			23			23			25					
K	9	11	15	10	13	17	12	16	22	13	17	23	15	19	27	18	22	30	21	27	36	23	29	38			
L	4.5			4.5			5.5			6.5			6.5			8.5			10			11.5					
MA (Nominal×Pitch×Depth)	M6×1×11			M6×1×11			M8×1.25×18			M8×1.25×18			M10×1.5×20			M12×1.75×22			M16×2×30			M20×2.5×31					
MB (Nominal×Pitch×Depth) ^{※1}	M4×0.7×7			M4×0.7×7			M5×0.8×8			M5×0.8×8			M6×1×11			M6×1×11			M8×1.25×13			M8×1.25×13					
N	8			8			10			12			14			17			22			27					
P	22			24			30			36			45			60			67			74					
Q	31			32			37			40			50			60			67			74					
Rc	Rc1/8			Rc1/8			Rc1/8			Rc1/8			Rc1/4			Rc1/4			Rc1/4			Rc1/4					
S1	11			12			15			18			22.5			30			33.5			37					
S2	20			20			22			22			27.5			30			33.5			37					
T	16			18			22			28			36			38			42			44					
U1	5			6			8			11			13.5			19			20.5			20.5					
U2	12			12			14			14			18			22			26			33					
V	21.5			21.5			23.4			23.5			29.5			32.5			36.5			38.5					

Note : ※1. Mounting bolts are not provided. Please prepare them according to the mounting height.

- 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
 - LG/LT
 - TLA-2
 - TLB-2
 - TLA-1
- Link Clamp
 - LKA
 - LKC
 - LKW
 - LJ/LM
 - TMA-2
 - TMA-1
- Work Support
 - LD
 - LC
 - TNC
 - TC
- Air Sensing Lift Cylinder
 - LLW
- Linear Cylinder / Compact Cylinder
 - LL
 - LLR
 - LLU
 - DP
 - DR
 - DS
 - DT
- Block Cylinder
 - DBA/DBC
- Centering Vise
 - FVA
 - FVD
 - FVC
- Control Valve
 - BZL
 - BZT
 - BZX/JZG
 - BZS
- Pallet Clamp
 - VS/VT
- Expansion Locating Pin
 - VFL/VFM
 - VFJ/VFK
- Pull Stud Clamp
 - FP
 - FQ
- Customized Spring Cylinder
 - DWA/DWB



Hydraulic Single-Acting Compact Cylinder

Model DT

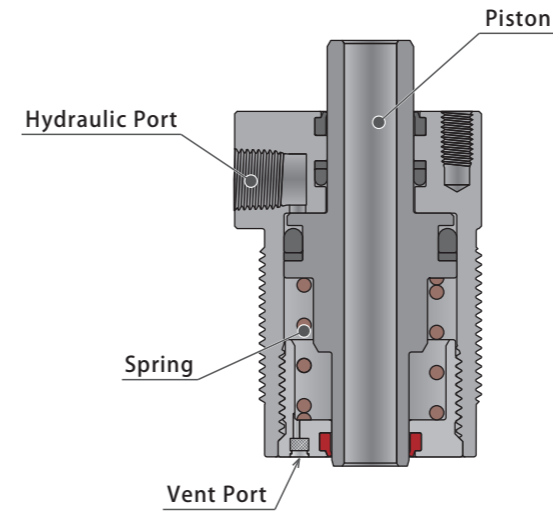
Low Pressure / High Pressure (1 ~ 25MPa)
Hollow Cylinder (Threaded Body / Bottom Flange)



Index

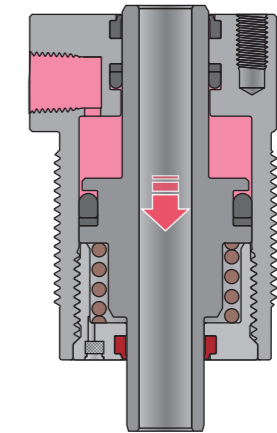
Hydraulic Compact Cylinder Digest	P.835
Action Description / Application Examples	P.906
Model No. Indication	P.907
Specifications	P.908
Performance Curve	P.908
External Dimensions	
• Piping Method : Gasket Option (DT-G)	P.909
• Piping Method : Piping Option (DT-S)	P.911
Accessories	
• Nut (Common Items of Other Models)	P.1341
Cautions	
• Notes for Hydraulic Compact Cylinder	P.913
• Cautions (Common)	P.1355
• Installation Notes • Hydraulic Fluid List • Notes on Hydraulic Cylinder Speed Control Circuit • Notes on Handling • Maintenance/Inspection • Warranty	

Action Description



When Releasing (Initial Position)

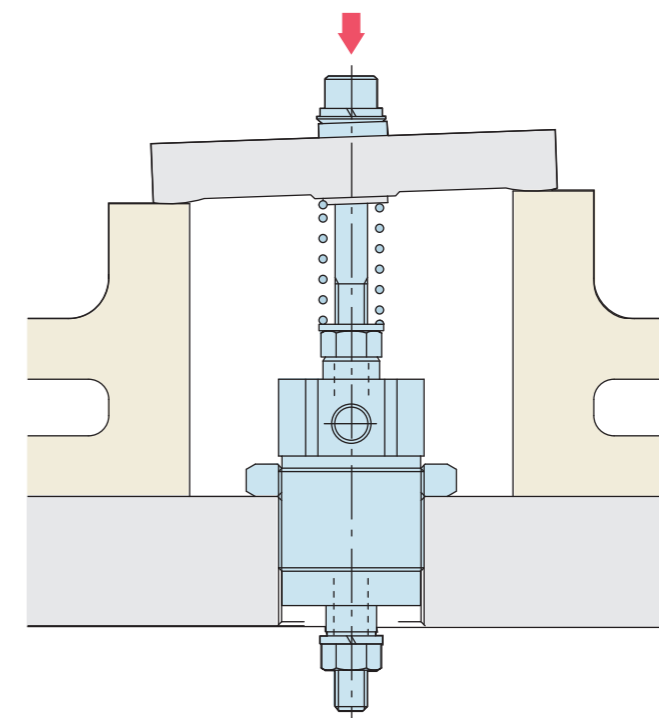
Piston moves to the release position by spring force.



When Locking

When hydraulic pressure is supplied, the piston is operated by the force of the hydraulic pressure.

Application Examples

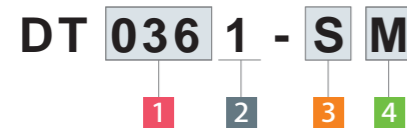


- High-Power Series
- Pneumatic Series
- Hydraulic Series**
- Valve / Coupler Hydraulic Unit
- Manual Operation Accessories
- Cautions / Others

- Hole Clamp
 - SFA
 - SFC
- Swing Clamp
 - LHA
 - LHC
 - LHS
 - LHW
 - LG/LT
 - TLA-2
 - TLB-2
 - TLA-1
- Link Clamp
 - LKA
 - LKC
 - LKW
 - LJ/LM
 - TMA-2
 - TMA-1
- Work Support
 - LD
 - LC
 - TNC
 - TC
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 - LLW
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 - LLR
 - LLU
 - DP
 - DR
 - DS
 - DT**
- Block Cylinder
 - DBA/DBC
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 - FVA
 - FVD
 - FVC
- Control Valve
 - BZL
 - BZT
 - BZX/JZG
 - BZS
- Pallet Clamp
 - VS/VT
- Expansion Locating Pin
 - VFL/VFM
 - VFJ/VFK
- Pull Stud Clamp
 - FP
 - FQ
- Customized Spring Cylinder
 - DWA/DWB

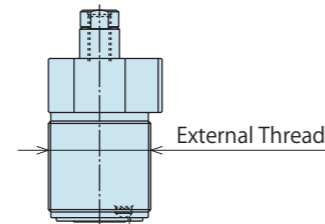


Model No. Indication



1 Body Size

- 036** : External Thread M36×1.5
- 045** : External Thread M45×1.5
- 055** : External Thread M55×2
- 065** : External Thread M65×2
- 080** : External Thread M80×2



2 Design No.

- 1** : Revision Number

3 Piping Method

- G** : Gasket Option (With R Thread Plug)
- S** : Piping Option (Rc Thread)



4 Stroke Code

- S** : Short Stroke
- M** : Standard Stroke
- L** : Long Stroke

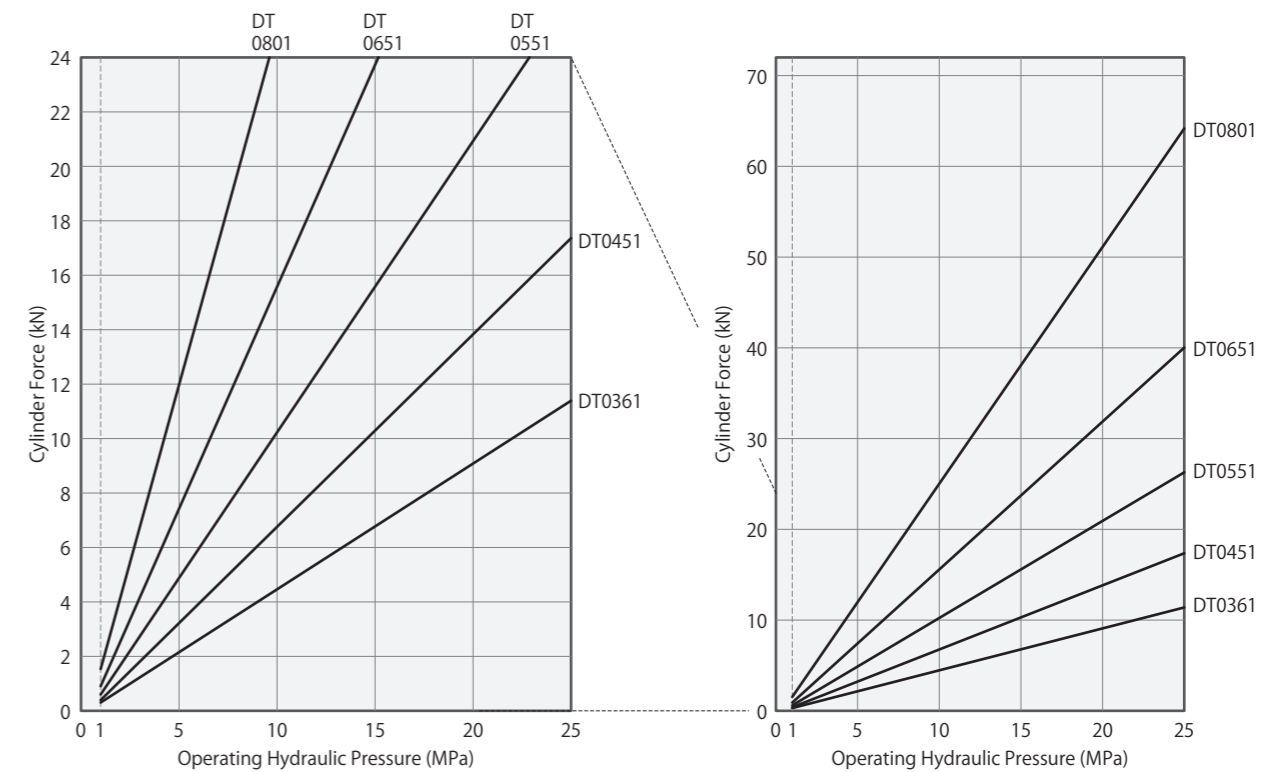
Specifications

Model No.	DT0361			DT0451			DT0551			DT0651			DT0801		
	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L
Stroke	mm			mm			mm			mm			mm		
Stroke	6	10	16	8	12	20	8	12	20	10	16	25	10	16	25
Cylinder Force (Calculation Formula) kN	F=(0.462×P)-0.175			F=(0.707×P)-0.313			F=(1.07×P)-0.471			F=(1.63×P)-0.726			F=(2.61×P)-1.08		
Cylinder Area	cm ²			cm ²			cm ²			cm ²			cm ²		
Cylinder Capacity	cm ³			cm ³			cm ³			cm ³			cm ³		
Release Spring Force	N			N			N			N			N		
Max. Operating Pressure	MPa														
Min. Operating Pressure	MPa														
Withstanding Pressure	MPa														
Operating Temperature	°C														
Weight	kg			kg			kg			kg			kg		

Note: 1. F: Cylinder Force (kN), P: Supply Hydraulic Pressure (MPa).

Performance Curve

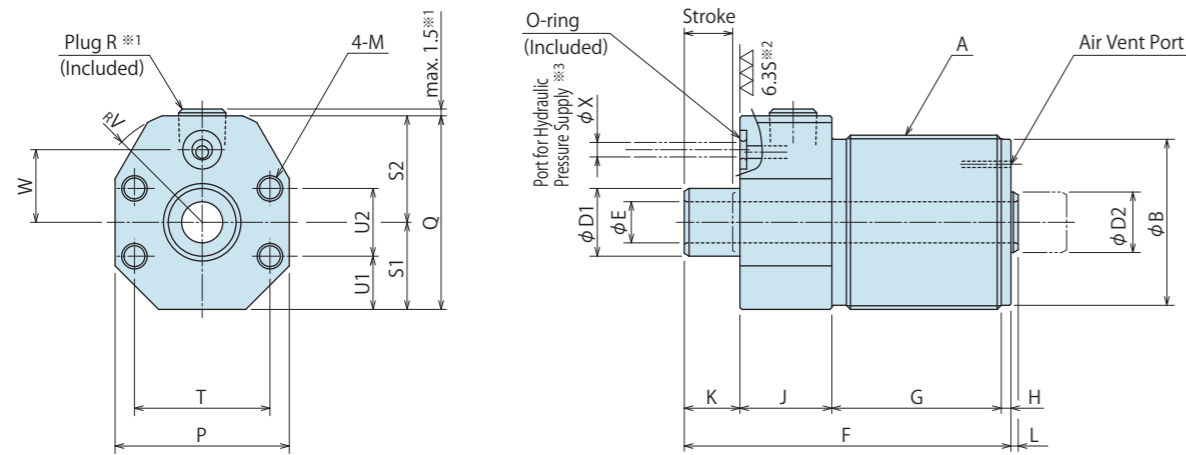
Model No.	Cylinder Force (kN)																								
	1MPa	2MPa	3MPa	4MPa	5MPa	6MPa	7MPa	8MPa	9MPa	10MPa	11MPa	12MPa	13MPa	14MPa	15MPa	16MPa	17MPa	18MPa	19MPa	20MPa	21MPa	22MPa	23MPa	24MPa	25MPa
DT0361	0.29	0.75	1.2	1.7	2.1	2.6	3.1	3.5	4.0	4.4	4.9	5.4	5.8	6.3	6.8	7.2	7.7	8.1	8.6	9.1	9.5	10.0	10.5	10.9	11.4
DT0451	0.39	1.1	1.8	2.5	3.2	3.9	4.6	5.3	6.1	6.8	7.5	8.2	8.9	9.6	10.3	11.0	11.7	12.4	13.1	13.8	14.5	15.2	15.9	16.7	17.4
DT0551	0.60	1.7	2.7	3.8	4.9	5.9	7.0	8.1	9.2	10.2	11.3	12.4	13.4	14.5	15.6	16.6	17.7	18.8	19.9	20.9	22.0	23.1	24.1	25.2	26.3
DT0651	0.90	2.5	4.2	5.8	7.4	9.1	10.7	12.3	13.9	15.6	17.2	18.8	20.5	22.1	23.7	25.4	27.0	28.6	30.2	31.9	33.5	35.1	36.8	38.4	40.0
DT0801	1.5	4.1	6.8	9.4	12.0	14.6	17.2	19.8	22.4	25.0	27.6	30.2	32.9	35.5	38.1	40.7	43.3	45.9	48.5	51.1	53.7	56.3	59.0	61.6	64.2



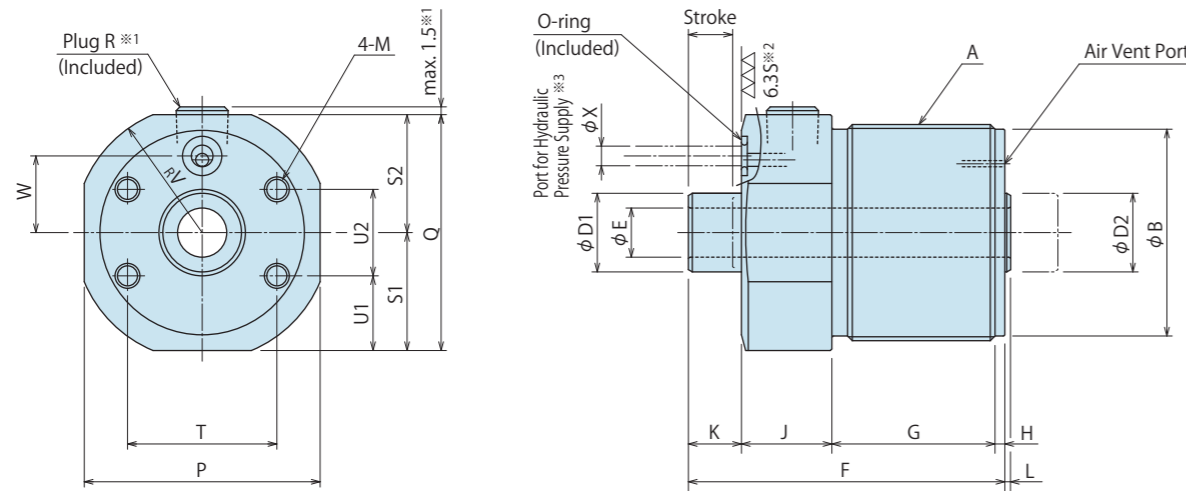
- High-Power Series
- Pneumatic Series
- Hydraulic Series
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- Cautions / Others
- Hole Clamp
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 - SFC
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- Expansion Locating Pin
 - VFL/VFM
 - VFJ/VFK
- Pull Stud Clamp
 - FP
 - FQ
- Customized Spring Cylinder
 - DWA/DWB

External Dimensions

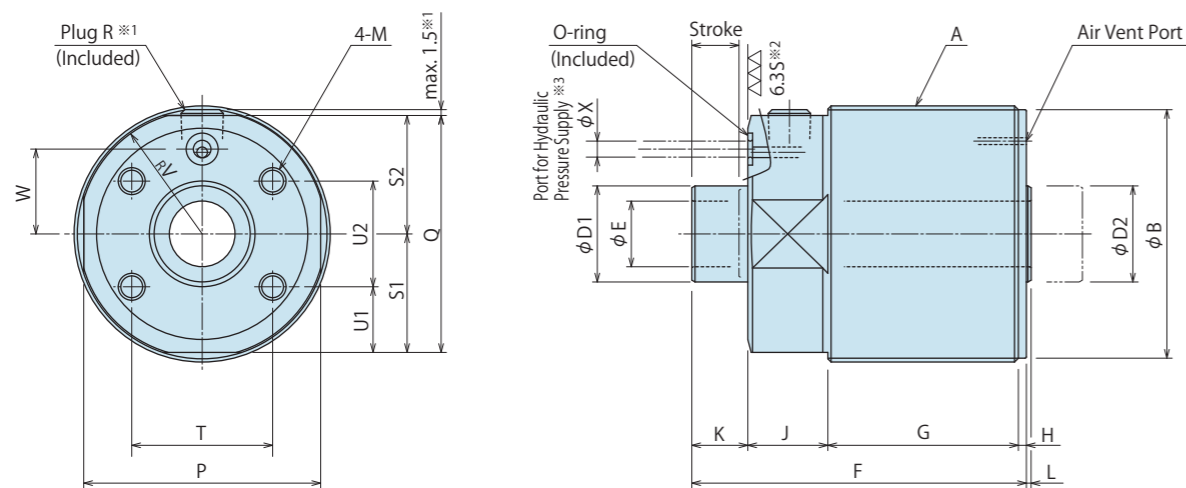
※The drawing below shows DT0361-G□ / DT0451-G□.



※The drawing below shows DT0551-G□ / DT0651-G□.

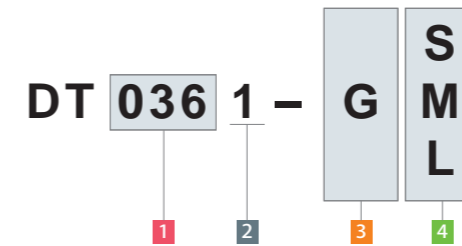


※The drawing below shows DT0801-G□.



- Notes :
- ※1. The R-thread plug is screwed in before shipping. There will be some variation in how far the plug protrudes.
 - ※2. The part of the DT mounting surface that touches the O ring should have a roughness of $\sqrt{6.35}$.
 - ※3. Shows the recommendation for the hole drilled by the customer for the supply of hydraulic pressure. Make sure there are no burrs around the connection and no cutting chips or other contaminants inside.

Model No. Indication



(Format Example : DT0361-GS, DT0801-GM)

- 1 Body Size
- 2 Design No.
- 3 Piping Method G : Gasket Option
- 4 Stroke Code

External Dimensions and Machining Dimensions for Mounting

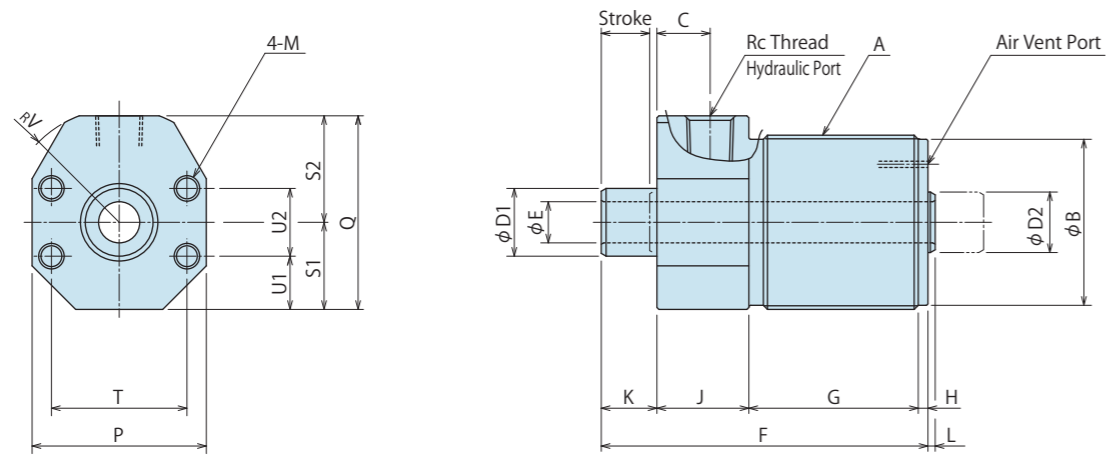
Model No.	DT0361-G			DT0451-G			DT0551-G			DT0651-G			DT0801-G			
	Stroke Code	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L
Stroke	6	10	16	8	12	20	8	12	20	10	16	25	10	16	25	
A (Nominal × Pitch)	M36×1.5			M45×1.5			M55×2			M65×2			M80×2			
B	34.3			43.3			52.6			62.6			77.6			
D1	14			16			20			25			30			
D2	12.5			16			20			25			30			
E	8.5			10.5			12.5			16.5			20.5			
F	56	67.5	84.5	64.5	75.5	95.5	68.5	80.5	101.5	81.5	97.5	123.5	88.5	104.5	130.5	
G	27.5	35	46	29.5	36.5	48.5	33.5	41.5	54.5	44.5	54.5	71.5	49.5	59.5	76.5	
H	2			2.5			2.5			2.5			2.5			
J	19			23			23			23			25			
K	7.5	11.5	17.5	9.5	13.5	21.5	9.5	13.5	21.5	11.5	17.5	26.5	11.5	17.5	26.5	
L	1.5			1.5			1.5			1.5			1.5			
M (Nominal×Pitch×Depth) ^{※4}	M5×0.8×8			M6×1×11			M6×1×11			M8×1.25×13			M8×1.25×13			
P	36			45			60			67			74			
Q	40			50			60			67			74			
R	R1/8			R1/4			R1/4			R1/4			R1/4			
S1	18			22.5			30			33.5			37			
S2	22			27.5			30			33.5			37			
T	28			36			38			42			44			
U1	11			13.5			19			20.5			20.5			
U2	14			18			22			26			33			
V	23.5			29.5			32.5			36.5			38.5			
W	15			17.5			19.5			23			26.5			
X	3			5			5			5			5			
O-ring	1BP5			1BP7			1BP7			1BP7			1BP7			

Note : ※4. Mounting bolts are not provided. Please prepare them according to the mounting height.

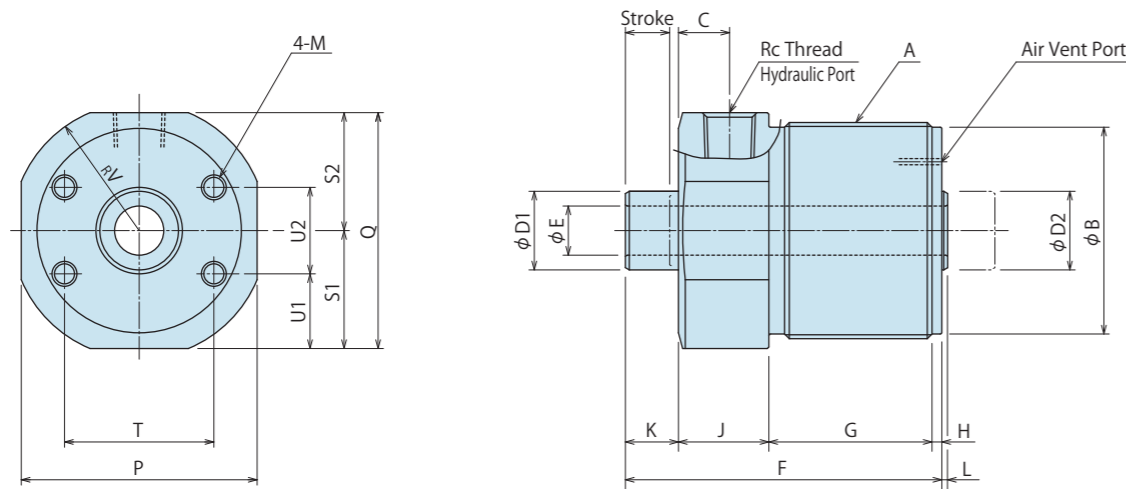
- High-Power Series
- Pneumatic Series
- Hydraulic Series
- Valve / Coupler Hydraulic Unit
- Manual Operation Accessories
- Cautions / Others
- Hole Clamp
 - SFA
 - SFC
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 - LHC
 - LHS
 - LHW
 - LG/LT
 - TLA-2
 - TLB-2
 - TLA-1
- Link Clamp
 - LKA
 - LKC
 - LKW
 - LJ/LM
 - TMA-2
 - TMA-1
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 - LC
 - TNC
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 - VS/VT
- Expansion Locating Pin
 - VFL/VFM
 - VFJ/VFK
- Pull Stud Clamp
 - FP
 - FQ
- Customized Spring Cylinder
 - DWA/DWB

External Dimensions

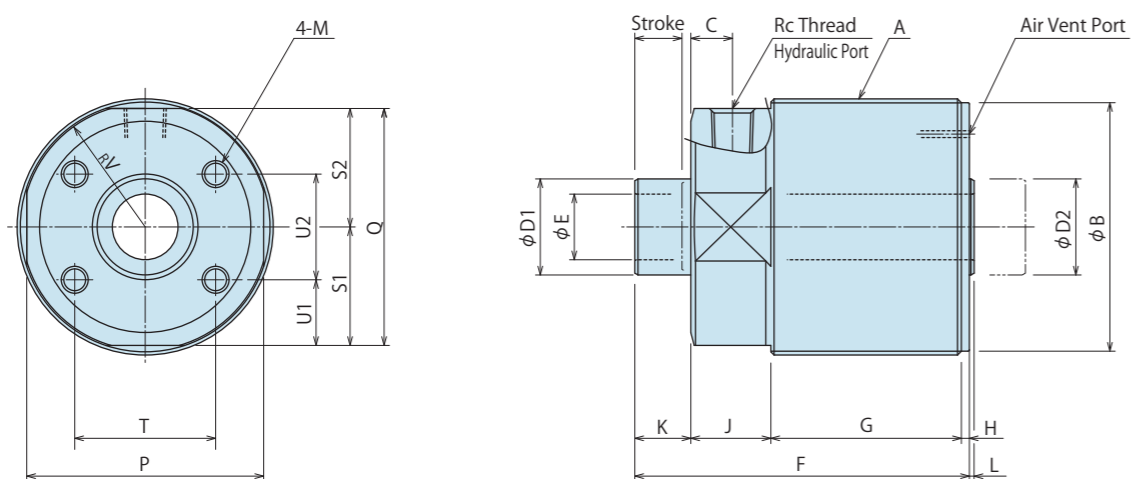
※The drawing below shows DT0361-S□ / DT0451-S□.



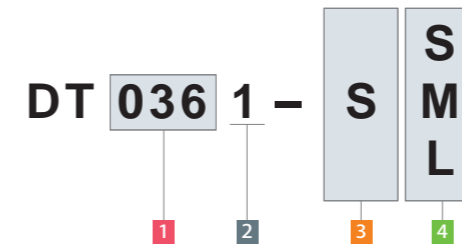
※The drawing below shows DT0551-S□ / DT0651-S□.



※The drawing below shows DT0801-S□.



Model No. Indication



(Format Example : DT0361-SS, DT0801-SM)

- 1 Body Size
- 2 Design No.
- 3 Piping Method S : Piping Option
- 4 Stroke Code

External Dimensions and Machining Dimensions for Mounting

(mm)

Model No.	DT0361-S			DT0451-S			DT0551-S			DT0651-S			DT0801-S		
Stroke Code	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L
Stroke	6	10	16	8	12	20	8	12	20	10	16	25	10	16	25
A (Nominal × Pitch)	M36×1.5			M45×1.5			M55×2			M65×2			M80×2		
B	34.3			43.3			52.6			62.6			77.6		
C	11			13			13			13			13		
D1	14			16			20			25			30		
D2	12.5			16			20			25			30		
E	8.5			10.5			12.5			16.5			20.5		
F	56	67.5	84.5	64.5	75.5	95.5	68.5	80.5	101.5	81.5	97.5	123.5	88.5	104.5	130.5
G	27.5	35	46	29.5	36.5	48.5	33.5	41.5	54.5	44.5	54.5	71.5	49.5	59.5	76.5
H	2			2.5			2.5			2.5			2.5		
J	19			23			23			23			25		
K	7.5	11.5	17.5	9.5	13.5	21.5	9.5	13.5	21.5	11.5	17.5	26.5	11.5	17.5	26.5
L	1.5			1.5			1.5			1.5			1.5		
M (Nominal×Pitch×Depth) ^{※1}	M5×0.8×8			M6×1×11			M6×1×11			M8×1.25×13			M8×1.25×13		
P	36			45			60			67			74		
Q	40			50			60			67			74		
Rc	Rc1/8			Rc1/4			Rc1/4			Rc1/4			Rc1/4		
S1	18			22.5			30			33.5			37		
S2	22			27.5			30			33.5			37		
T	28			36			38			42			44		
U1	11			13.5			19			20.5			20.5		
U2	14			18			22			26			33		
V	23.5			29.5			32.5			36.5			38.5		

Note : ※1. Mounting bolts are not provided. Please prepare them according to the mounting height.

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 - TLB-2
 - TLA-1
- Link Clamp
 - LKA
 - LKC
 - LKW
 - LJ/LM
 - TMA-2
 - TMA-1
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 - LC
 - TNC
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- Air Sensing Lift Cylinder
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 - LLU
 - DP
 - DR
 - DS
 - DT**
- Block Cylinder
 - DBA/DBC
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 - FVA
 - FVD
 - FVC
- Control Valve
 - BZL
 - BZT
 - BZX/JZG
 - BZS
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- Expansion Locating Pin
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 - VFJ/VFK
- Pull Stud Clamp
 - FP
 - FQ
- Customized Spring Cylinder
 - DWA/DWB

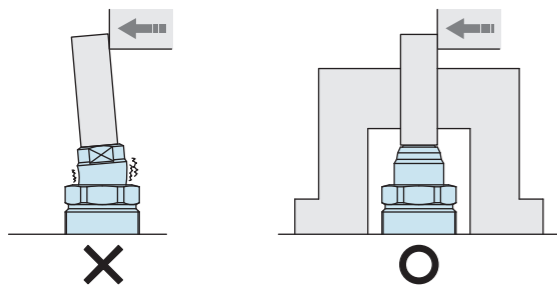
Cautions

● Notes for Design

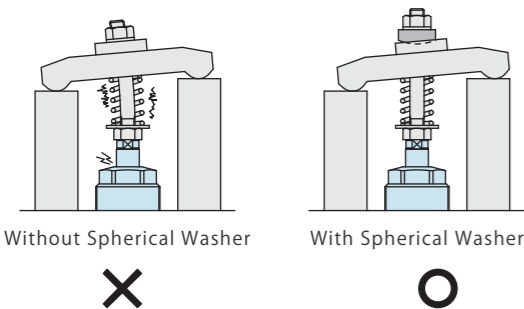
For LL/LLR/LLU/DP/DR/DS/DT

- Check Specifications
 - Please use each product according to the specifications.
- Notes for Circuit Design
 - Please read "Notes on Hydraulic Cylinder Speed Control Unit" for proper hydraulic circuit design. Improper circuit design may lead to malfunctions and damages. (Refer to P.1356)
 - Ensure there is no possibility of supplying hydraulic pressure to the push side and the pull side simultaneously.
- Notes for Pipe Design
 - It is recommended to select as large diameter pipes as possible. The back pressure is proportional to the pipe size, so if the pipes are small the release and lock times will be longer. Please note that the single-acting models in particular are largely affected by the number of cylinders, the pipe length and the inner diameter of pipes and hoses.
- Protect the exposed area of the piston rod when using on a welding fixture.
 - If spatter attaches to the sliding surface it could lead to malfunction and fluid leakage.
- The Load Direction Given to the Piston Rod
 - Make sure no force is applied to the piston rod except from the axial direction. Usage like the one shown in the figure below will apply a large bending stress to the piston rod and must be avoided.

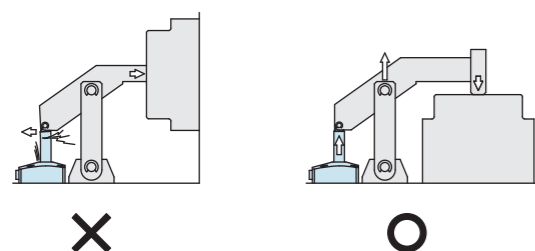
In case a load is applied except from the axial direction



When clamping workpieces of different heights

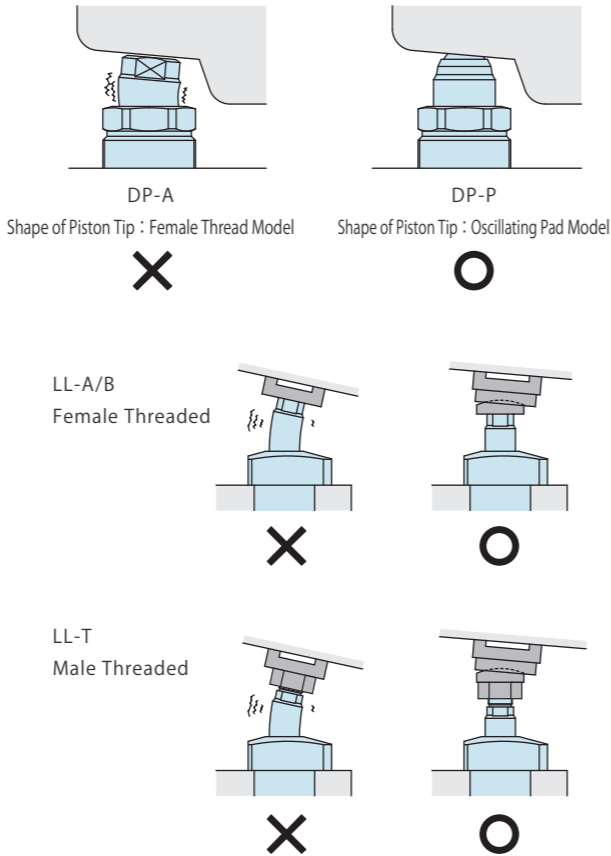


A Combination with Link Mechanism



- When Clamping on a Sloped Surface of a Workpiece
 - When clamping an inclined surface, make sure that the clamping area is level when looking from the cylinder side. The clamping surface and the cylinder mounting surface should be parallel. A workpiece may move and a piston rod may slip when a cylinder is used on an inclined surface. (When the workpiece is a casting, it is recommended that a spiked attachment be used for a cylinder on draft angle.)

When clamping an inclined surface



7) LLR/LLU : Offset Size

- The exterior dimension of LLR/LLU on this catalog are when offset dimension is 0mm. When setting offset size, please check the notes on each page.

8) DP/DR/DS/DT : Considerations for Attachments

- Whenever possible, use lightweight attachments. Using attachments that weigh more than the release spring force will result in releasing failures.

● Installation Notes

For LL/LLR/LLU

- Check the Usable Fluid
 - Please use the appropriate fluid by referring to the Hydraulic Fluid List (P.1355).
- Installation of the Cylinder
 - When mounting the cylinder, use four hexagonal socket bolts (with tensile strength of 12.9) and tighten them with the torque shown in the table below. Tightening with greater torque than recommended can dent the seating surface or break the bolt.
- Installation / Removal of Attachment
 - When installing or removing an attachment, always use a wrench on the piston rod to keep it from turning, and tighten it with the torque shown below.

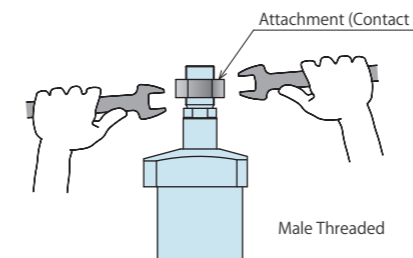
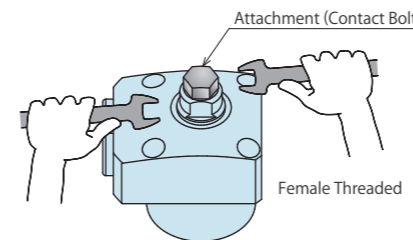
Model No.	Thread Size	Tightening Torque (N·m)
LL/LLR/LLU0360	M4×0.7	3.2
LL/LLR/LLU0400	M5×0.8	6.3
LL/LLR/LLU0480	M5×0.8	6.3
LL/LLR/LLU0550	M6×1	10
LL/LLR/LLU0650	M6×1	10
LL/LLR/LLU0750	M8×1.25	25
LL/LLR/LLU0900	M10×1.5	50
LL/LLR/LLU1050	M12×1.75	80

LL/LLR/LLU□-□A/B : Female Threaded

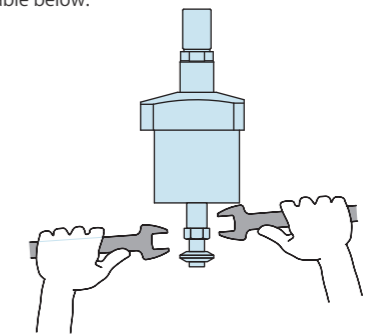
Model No.	Thread Size	Tightening Torque (N·m)
LL/LLR/LLU0360-□A/B	M6×1	10
LL/LLR/LLU0400-□A/B	M8×1.25	16
LL/LLR/LLU0480-□A/B	M8×1.25	16
LL/LLR/LLU0550-□A/B	M10×1.5	40
LL/LLR/LLU0650-□A/B	M12×1.75	63
LL/LLR/LLU0750-□A/B	M16×2	100
LL/LLR/LLU0900-□A/B	M20×2.5	125
LL/LLR/LLU1050-□A/B	M24×3	250

LL/LLR/LLU□-□T : Male Threaded

Model No.	Thread Size	Tightening Torque (N·m)
LL/LLR/LLU0360-□T	M10×1.25	40
LL/LLR/LLU0400-□T	M12×1.25	63
LL/LLR/LLU0480-□T	M14×1.5	80
LL/LLR/LLU0550-□T	M16×1.5	100
LL/LLR/LLU0650-□T	M20×1.5	125
LL/LLR/LLU0750-□T	M24×1.5	250
LL/LLR/LLU0900-□T	M30×1.5	315
LL/LLR/LLU1050-□T	M36×1.5	400



- Speed Adjustment
 - Adjust the rod operating speed less than 100mm/sec both the push and pull operation. If the cylinder operates too fast the parts will be worn 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.
- 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. Tightening torque of mounting screw is shown in the table below.



Model No.	Thread Size	Tightening Torque (N·m)
LL/LLR/LLU0360-□□D	M5×0.8	6.3
LL/LLR/LLU0400-□□D	M6×1	10
LL/LLR/LLU0480-□□D	M8×1.25	25
LL/LLR/LLU0550-□□D	M8×1.25	25
LL/LLR/LLU0650-□□D	M8×1.25	25
LL/LLR/LLU0750-□□D	M10×1.5	50
LL/LLR/LLU0900-□□D	M10×1.5	50
LL/LLR/LLU1050-□□D	M10×1.5	50

※ Please refer to P.1355 for common cautions. • Installation Notes • Hydraulic Fluid List • Notes on Hydraulic Cylinder Speed Control Circuit • Notes on Handling • Maintenance/Inspection • Warranty

- 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
 - LG/LT
 - TLA-2
 - TLB-2
 - TLA-1
- Link Clamp
 - LKA
 - LKC
 - LKW
 - LJ/LM
 - TMA-2
 - TMA-1
- Work Support
 - LD
 - LC
 - TNC
 - TC
- Air Sensing Lift Cylinder
 - LLW
- Linear Cylinder / Compact Cylinder
 - LL
 - LLR
 - LLU
 - DP
 - DR
 - DS
 - DT
- Block Cylinder
 - DBA/DBC
- Centering Vise
 - FVA
 - FVD
 - FVC
- Control Valve
 - BZL
 - BZT
 - BZX/JZG
 - BZS
- 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 and Installation **DP**

- Be careful not to damage the O-ring.
 - When mounting to a fixture, be careful not to damage the O-ring on the bottom mounting surface. Apply an appropriate amount of grease to the O-ring. (O-ring may be damaged without grease.)
- Be careful not to let the piston fall out.
 - If the piston falls out of the cylinder during assembly, make sure to attach the O-ring to the bottom after inserting the piston into the cylinder. If the O-ring is inserted first it could get crushed and severed.

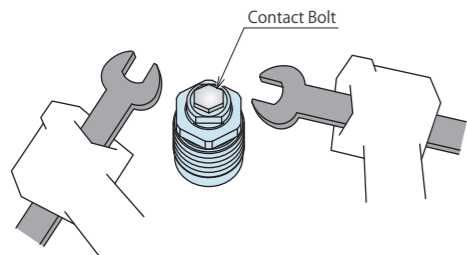
- Installation of the Cylinder
 - When mounting the cylinder, tighten it with the torque shown in the table below.

Model No.	Thread Size	Tightening Torque (N·m)
DP0160	M16×1.5	16
DP0221	M22×1.5	40
DP0241	M24×1.5	63
DP0301	M30×1.5	100
DP0361	M36×1.5	250
DP0451	M45×1.5	400
DP0551	M55×2	※630
DP0651	M65×2	※1000
DP0801	M80×2	※1600

(It shows the tightening torque when using the product with max. operating pressure.)
 ※ The torque is large, so use an impact tightening tool or a locking device.

- Installation of the Contact Bolt

- When installing or removing the contact bolt always use a wrench on the piston rod to keep it from turning.



- When mounting the contact bolt, tighten it with the torque shown in the table below.

Model No.	Thread Size	Tightening Torque (N·m)
DP0160	M5×0.8	4.0
DP0221	M6×1	5.0
DP0241	M6×1	8.0
DP0301	M8×1.25	16
DP0361	M8×1.25	25
DP0451	M10×1.5	50
DP0551	M12×1.75	100
DP0651	M16×2	200
DP0801	M20×2.5	400

(It shows the tightening torque when using the product with max. operating pressure.)

- The DP-Q type has a thread hole at the end for attachments. When removing an attachment or attaching it to the end, make sure that no cutting oil or other contaminants get inside through the thread hole and perform the work in a clean environment. Do not use the cylinder without the attachment in place.

- Check the Usable Fluid

- Please use the appropriate fluid by referring to the Hydraulic Fluid List (P.1355).

● Notes for Design and Installation **DR**

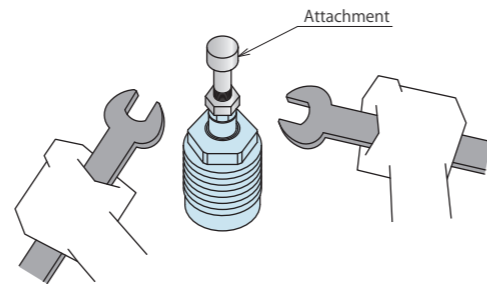
- Be careful not to damage the O-ring.
 - When mounting to a fixture, be careful not to damage the O-ring on the bottom mounting surface. Apply an appropriate amount of grease to the O-ring. (O-ring may be damaged without grease.)
- Installation of the Cylinder
 - When mounting the cylinder, tighten it with the torque shown in the table below.

Model No.	Thread size	Tightening Torque (N·m)
DR0221	M22×1.5	20
DR0241	M24×1.5	32
DR0301	M30×1.5	63
DR0361	M36×1.5	125
DR0451	M45×1.5	250
DR0551	M55×2	400
DR0651	M65×2	※800
DR0801	M80×2	※1600

(It shows the tightening torque when using the product with max. operating pressure.)
 ※ The torque is large, so use an impact tightening tool or a locking device.

- Installation of Attachment

- When installing or removing an attachment, always use a wrench on the piston rod to keep it from turning.



- When mounting an attachment, tighten it with the torque shown in the table below.

Model No.	Thread Size	Tightening Torque (N·m)
DR0221	M6×1	4.0
DR0241	M6×1	6.3
DR0301	M8×1.25	12.5
DR0361	M8×1.25	25
DR0451	M10×1.5	50
DR0551	M12×1.75	100
DR0651	M16×2	200
DR0801	M20×2.5	400

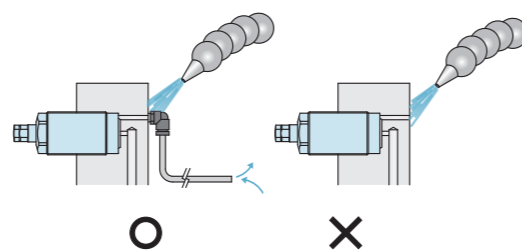
(It shows the tightening torque when using the product with max. operating pressure.)

- Check the Usable Fluid

- Please use the appropriate fluid by referring to the Hydraulic Fluid List (P.1355).

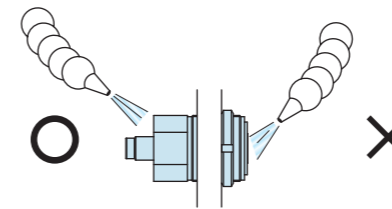
- Appropriate Measures for the Vent Port

- There is an air vent at the bottom of the cylinder. Consider the environment and avoid cutting fluid, coolant or any contaminants.
- If using it without air vent port, it will not function properly.



● Notes for Design and Installation **DS**

- There is an air vent at the bottom of the cylinder. Consider the environment and avoid cutting fluid, coolant or any contaminants.



- Installation of the Cylinder

- When mounting, tighten it with the torque shown in the table below.

- When Mounting the Cylinder with External Thread

Model No.	Thread Size	Tightening Torque (N·m)
DS0221	M22×1.5	20
DS0241	M24×1.5	32
DS0301	M30×1.5	63
DS0361	M36×1.5	125
DS0451	M45×1.5	250
DS0551	M55×2	400
DS0651	M65×2	※800
DS0801	M80×2	※1600

(It shows the tightening torque when using the product with max. operating pressure.)
 ※ The torque is large, so use an impact tightening tool or a locking device.

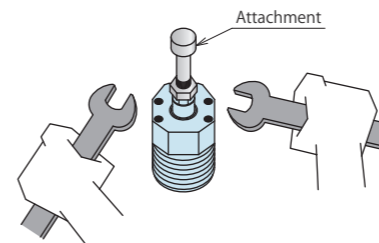
- When Mounting the Cylinder with Bolts

- Use four bolts (Strength Grade : 12.9) and tighten them with the torque shown in the table below.

Model No.	Thread Size	Tightening Torque (N·m)
DS0221	M4×0.7	4.0
DS0241	M4×0.7	4.0
DS0301	M5×0.8	6.3
DS0361	M5×0.8	6.3
DS0451	M6×1	16
DS0551	M6×1	16
DS0651	M8×1.25	25
DS0801	M8×1.25	25

- Installation of Attachment

- When installing or removing an attachment, always use a wrench on the piston rod to keep it from turning.



- When mounting an attachment, tighten it with the torque shown in the table below.

Model No.	Thread Size	Tightening Torque (N·m)
DS0221	M6×1	6.3
DS0241	M6×1	8.0
DS0301	M8×1.25	16
DS0361	M8×1.25	30
DS0451	M10×1.5	50
DS0551	M12×1.75	100
DS0651	M16×2	200
DS0801	M20×2.5	400

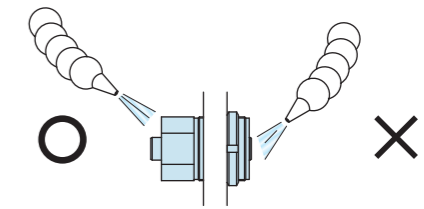
(It shows the tightening torque when using the product with max. operating pressure.)

- Check the Usable Fluid

- Please use the appropriate fluid by referring to the Hydraulic Fluid List (P.1355).

● Notes for Design and Installation **DT**

- There is an air vent at the bottom of the cylinder. Consider the environment and avoid cutting fluid, coolant or any contaminants.



- Installation of the Cylinder

- When mounting, tighten it with the torque shown in the table below.

- When Mounting the Cylinder with External Thread

Model No.	Thread Size	Tightening Torque (N·m)
DT0361	M36×1.5	125
DT0451	M45×1.5	250
DT0551	M55×2	400
DT0651	M65×2	※800
DT0801	M80×2	※1600

(It shows the tightening torque when using the product with max. operating pressure.)
 ※ The torque is large, so use an impact tightening tool or a locking device.

- When Mounting the Cylinder with Bolts

- Use four bolts (Strength Grade : 12.9) and tighten them with the torque shown in the table below.

Model No.	Thread Size	Tightening Torque (N·m)
DT0361	M5×0.8	6.3
DT0451	M6×1	16
DT0551	M6×1	16
DT0651	M8×1.25	25
DT0801	M8×1.25	25

- Installation of Attachment

- When mounting an attachment, tighten it with the torque shown in the table below.

Model No.	Thread Size	Tightening Torque (N·m)
DT0361	M8 × 1.25 (φ 8.5)	30
DT0451	M10 × 1.5 (φ 10.5)	50
DT0551	M12 × 1.75 (φ 12.5)	100
DT0651	M16 × 2 (φ 16.5)	200
DT0801	M20 × 2.5 (φ 20.5)	400

(It shows the tightening torque when using the product with max. operating pressure.)
 Values in () shows the size of the through hole in the cylinder center.

- Check the Usable Fluid

- Please use the appropriate fluid by referring to the Hydraulic Fluid List (P.1355).

※ Please refer to P.1355 for common cautions. • Installation Notes • Hydraulic Fluid List • Notes on Hydraulic Cylinder Speed Control Circuit • Notes on Handling • Maintenance/Inspection • Warranty

※ Please refer to P.1355 for common cautions. • Installation Notes • Hydraulic Fluid List • Notes on Hydraulic Cylinder Speed Control Circuit • Notes on Handling • Maintenance/Inspection • Warranty

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
LG/LT
TLA-2
TLB-2
TLA-1
Link Clamp
LKA
LKC
LKW
LJ/LM
TMA-2
TMA-1
Work Support
LD
LC
TNC
TC
Air Sensing Lift Cylinder
LLW
Linear Cylinder / Compact Cylinder
LL
LLR
LLU
DP
DR
DS
DT
Block Cylinder
DBA/DBC
Centering Vise
FVA
FVD
FVC
Control Valve
BZL
BZT
BZX/JZG
BZS
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.

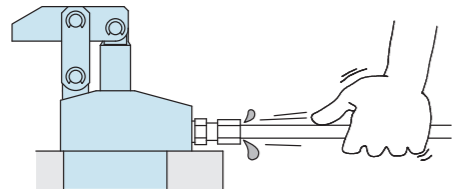
3) Applying Sealing Tape

- Wrap with tape 1 to 2 times following the screw direction.
- Pieces of the sealing tape can lead to oil leakage and malfunction.
- Please implement piping construction in a clear environment to prevent anything getting in products.

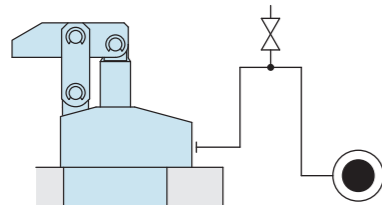
4) Air Bleeding of the Hydraulic Circuit

- 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 Shake 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 release 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	

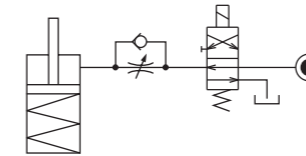
Note : Please contact manufacturers when customers require products in the list above.

● Notes on Hydraulic Cylinder Speed Control Unit

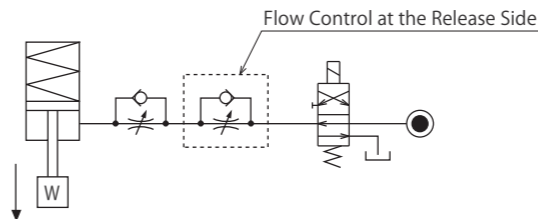
⚠ Please pay attention to the cautions below. Design the hydraulic circuit for controlling the action speed of hydraulic cylinder. Improper circuit design may lead to malfunctions and damages. Please review the circuit design in advance.

● 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.



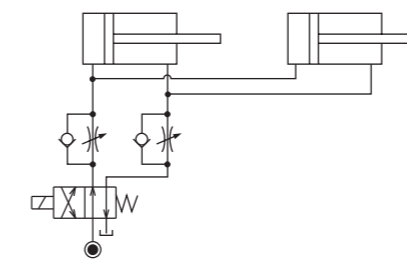
Accelerated clamping speed by excessive hydraulic flow to the cylinder may sustain damage. In this case add flow control to regulate flow. (Please add flow control to release flow if the lever weight is put on at the time of release action when using swing clamps.)



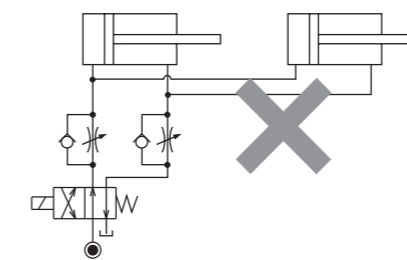
● Flow Control Circuit for Double Acting Cylinder

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)

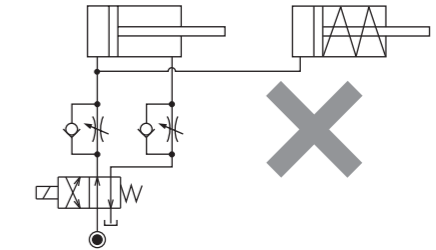


【Meter-in Circuit】 (LKE/TMA/TLA must be controlled with meter-in.)

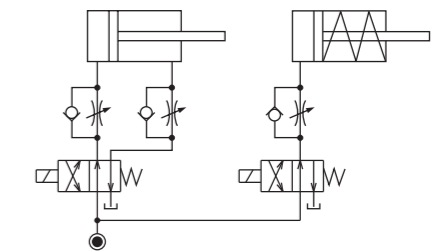


In the case of meter-out circuit, the hydraulic circuit should be designed with the following points.

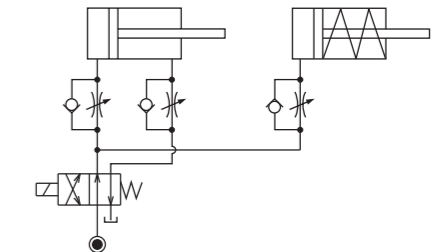
- ① Single acting components should not be used in the same flow control circuit as the double acting components. The release action of the single acting cylinders may become erratic or very slow.



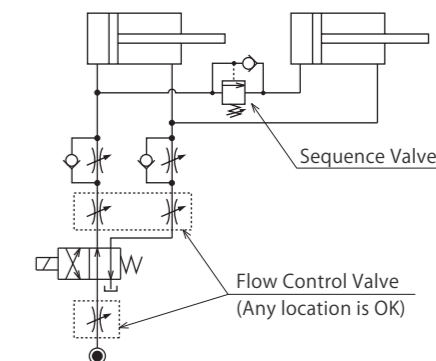
Refer to the following circuit when both the single acting cylinder and double acting cylinder are used together.
○ Separate the control circuit.



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

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Company Profile
Company Profile
Our Products
History

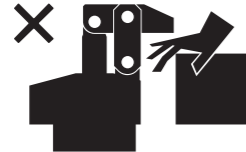
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Sales Offices

Cautions

● Notes on Handling

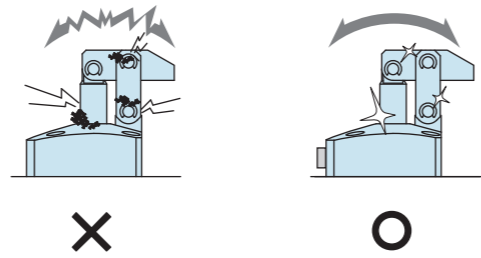
- 1) It should be operated by qualified personnel.
 - The hydraulic machine and air compressor should be operated and maintained by qualified personnel.
- 2) Do not operate or remove the product unless the safety protocols are ensured.
 - ① The machine and equipment can only be inspected or prepared when it is confirmed that the safety devices are in place.
 - ② Before the product is removed, make sure that the above-mentioned safety devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.
 - ③ After stopping the product, do not remove until the temperature drops.
 - ④ Make sure there is no abnormality in the bolts and respective parts before restarting the machine or equipment.
- 3) Do not touch a clamp (cylinder) while it is working. Otherwise, your hands may be injured due to clinching.



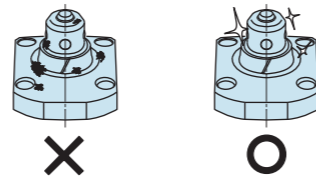
- 4) Do not disassemble or modify.
 - If the equipment is taken apart or modified, the warranty will be voided even within the warranty period.

● Maintenance and Inspection

- 1) Removal of the Machine and Shut-off of Pressure Source
 - Before the machine is removed, make sure that safety devices and preventive devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.
 - Make sure there is no abnormality in the bolts and respective parts before restarting.
- 2) Regularly clean the area around the piston rod and plunger.
 - If it is used when the surface is contaminated with dirt, it may lead to packing seal damage, malfunctioning and fluid leakage.



- 3) Please clean out the reference surfaces on a regular basis (taper reference surface and seating surface) of the locating products. (VS/VT/VFL/VFM/VFJ/VFK/WVS/VWM/VWK/VX/VXE/VXF)
 - The locating products, except VX/VXE/VXF model, can remove contaminants with cleaning functions. However, hardened cutting chips, adhesive coolant and others may not be removed. Make sure there are no contaminants before installing a workpiece/pallet.
 - Continuous use with contaminant on components will lead to locating accuracy failure, malfunction and fluid leakage.



- 4) If disconnecting by couplers, air bleeding should be carried out on a regular basis to avoid air mixed in the circuit.
- 5) Regularly tighten nut, bolt, pin, cylinder, pipe line and others to ensure proper use.
- 6) Make sure the hydraulic fluid has not deteriorated.
- 7) Make sure there is a smooth action without an irregular 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 operated in an 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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- Hydraulic Series
- Valve / Coupler Hydraulic Unit
- Manual Operation Accessories
- Cautions / Others

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- Installation Notes (For Hydraulic Series)
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