MINI SWING

MINI SWING®

CZL Series

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MINI SWING

CZL Series

Free Rotary Motion of High-Accuracy Actuator using External Driver

Ball Spline

High-accuracy ball spline used
(Liner motion block)

Rolling Bearing

Rolling bearing used
(Rotary motion block)

End-Lock Mechanism

The end lock mechanism locks rod at the pull end. (To prevent dropping)

Rolling Bearing(Rotary Motion Block)

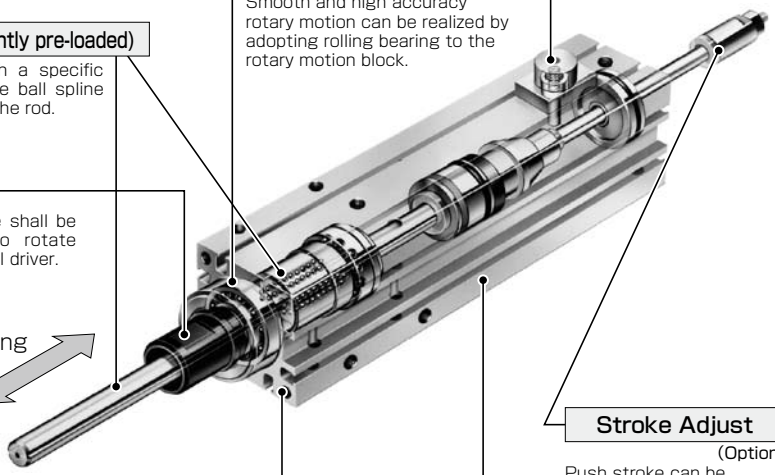
Smooth and high accuracy rotary motion can be realized by adopting rolling bearing to the rotary motion block.

Ball Spline (Lightly pre-loaded)

The rod seal with a specific shape enables the ball spline to be installed in the rod.

Boss

A pully or the like shall be attached here to rotate the rod by external driver.



Reciprocating Motion

Rotary Motion

Stroke Adjust

(Option)

Push stroke can be adjusted within -10mm from full stroke .

Multiple Mounting Directions

Mounting in three directions is possible:
- Front mounting
- Top mounting with brackets
- Bottom mounting

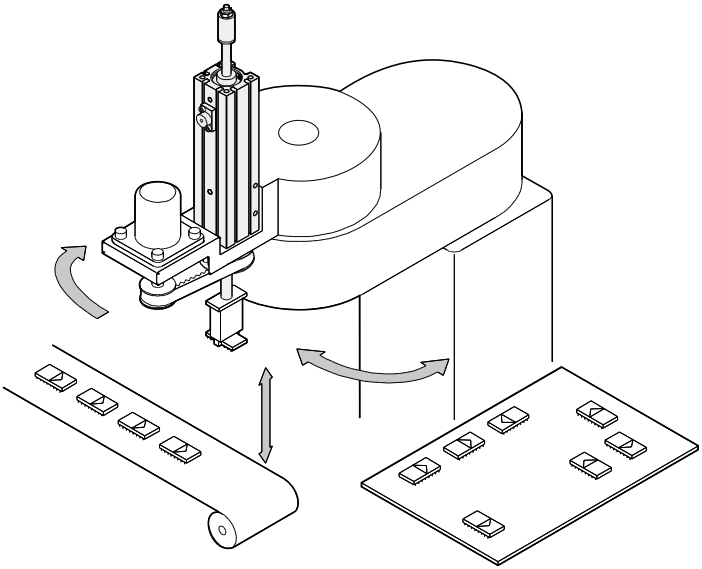
Light-Weight and Compact body

CZL20–50·····435g
(Optional parts and switches are not included)

Summary of The MINI SWING

The CZL series are light-weight, compact actuators with high accuracy reciprocating and rotary motion mechanisms combined.
This single unit enables high precision rotary motion by external driver fitting rolling bearings to the linear motion block adopting a ball spline. For use on the Z axis, the end lock mechanism can be set optionally.

■Application Examples : MINI SWING

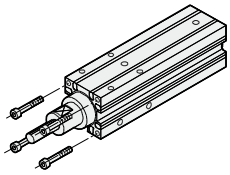


Installation Robot

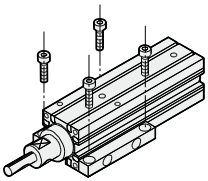
■MAIN BODY INSTALLATION

(Bolt as shown in the figure are not supplied with products)

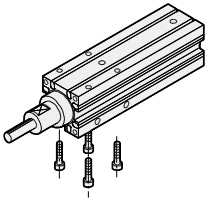
Front Mounting



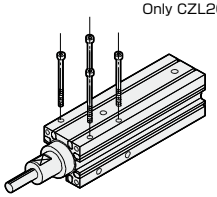
Bracket Mounting



Bottom Mounting



TOP Mounting
(Thru Hole used)
Only CZL20



Air Rotation
CTW(X) Series
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Model Code Example

CZLHS-SD20-50-ZTZE-RB12LA

●Series Name

●Magnet

No Code	None
S	with Magnet

A magnet is required when mounting switches.

●Bore Size

20	ϕ20
25	ϕ25
32	ϕ32

●Cable Length

No Code	1m
LA	3m

●Number of Switches

1	1
2	2

●Switch

No Code	None			
RB1	Straight	DC12～24V	2 Wires Reed Switch	With Indicator Light
RC1	Angle			
RB2	Straight	DC12～24V	2 Wires Reed Switch	Without Indicator Light
RC2	Angle			
RB4	Straight	DC12～24V	2 Wires Solid State Switch	With Indicator Light
RC4	Angle			
RB5	Straight	DC5～24V	3 Wires Solid State Switch	With Indicator Light
RC5	Angle			

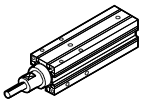
Direction of Cable Outlet

RB····Straight Outlet Cable RC····Angle Outlet Cable

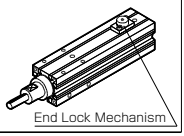
For details ☞Page1066, 1067

●End Lock

No Code	None

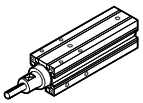


H	With End Lock

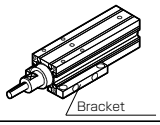


●Mounting

SD	Standard

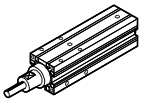


LB	With Bracket

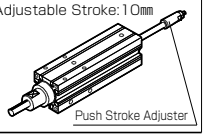


●Stroke Adjuster

No Code	None	ZE	With Push Stroke Adjuster



Adjustable Stroke:10mm



Stroke●

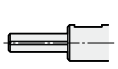
Bore Size	Standard Stroke(mm)				
	25	50	75	100	150
ϕ20	●	●	●	—	—
ϕ25	●	●	●	●	—
ϕ32	●	●	●	●	●

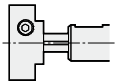
Intermediate Stroke

- 1-mm step intermediate strokes can be set by installing spacers in the standard stroke cylinder. The total length of the cylinder is the same as that of the longer cylinder for standard strokes.
- For ordering intermediate strokes on the model with stroke adjuster (ZE), contact our company.

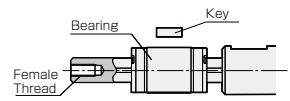
●Rod End Shape

No Code	Standard	ZT	With Flange Rod End

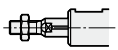


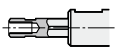


FN	With Bearing for Floating Mechanism	WT	Male Thread Rod End	WS	Female Thread Rod End



Female thread at the rod end and a key Provide (No two flats or the rod)





SPECIFICATIONS

Reciprocating Potion	Bore Size(㎜)	φ20	φ25	φ32
	Rod Size(㎜)	φ8	φ10	φ12
	Piping Size	M5×0.8		
	Guide Mechanism	Ball Spline		
	Type of Operation	Double Acting		
	Fluid	Air		
	Maximum Operating Pressure	0.70MPa		
	Minimum Operating Pressure	0.15MPa		
	Proof Pressure	1.05MPa		
	Operating Temperature	5~60℃		
	Operating Speed	50~300㎜/s		
	Lubrication	Not required		
	Cushioning	Rubber Cushion		
	Stroke Adjust	Push Stroke Adjust 10mm (Option Code ZE)		
Rotating Potion	Driver Source	External Power		
	Rotation Time	0.8s/360°		
	* Minimum Drive Torque	0.10N·m	0.16N·m	0.20N·m
	Allowable Transfer Torque	0.74N·m	1.69N·m	2.45N·m
	Allowable Kinetic Energy	0.01J	0.02J	0.034J
	Allowable Tension	25N	49N	82N
End Lock	Locking Position	Head Side only		
	Manual Release	Non-lock Type		
	Backlash	1.5㎜ or less		

*At pressure 0.5MPa

GUIDE TYPE(BALL SPLINE)

Model	Type
CZL20	IKO LSAG8
CZL25	IKO LSAG10
CZL32	IKO LSAG12

Pre-load:Zero or slightly pre-loaded

Mass

●Cylinder

Unit: g

	Model	Stroke				
		25	50	75	100	150
Standard	CZL20	380	435	490	—	—
	CZL25	600	675	750	825	—
	CZL32	1040	1145	1250	1355	1565
With Stroke Adjuster (ZE)	CZL20	415	475	535	—	—
	CZL25	680	765	840	925	—
	CZL32	1165	1285	1405	1525	1765

●Switch

Unit: g

Switch Type	Mass
RB1, RB2, RB4, RB5	15
RC1, RC2, RC4, RC5	
RB1LA, RB2LA, RB4LA, RB5LA	35
RC1LA, RC2LA, RC4LA, RC5LA	

METHOD TO CALCULATE THE MASS

Ex. CZLHS−SD20−50−ZE−RB12LA

Mass of Product·····475g
Mass of End Lock Mechanism···95g
Mass of Magnet·····7g
Mass of Switch···35×2=70g

475+95+7+35×2=647g

●Option

Unit: g

Model	With Magnet (CTLS、CTLHS)	With End Lock Mechanism (H)	With Bracket (LB)	With Flange Rod End (ZT)	With Bearing for Floating Mechanism (FN)
CZL20	7	95	50	17	26
CZL25	9	130	50	30	47
CZL32	10	210	72	50	70

OPTIONAL PARTS CODES

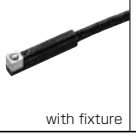
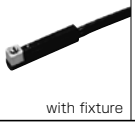
Name	Switch Fixture	Reed Switch(2 Wires, with Indicator Light) Straight Outlet Cable	Reed Switch(2 Wires, with Indicator Light) Angle Outlet Cable	Reed Switch(2 Wires, without Indicator Light) Straight Outlet Cable	Reed Switch(2 Wires, without Indicator Light) Angle Outlet Cable
PARTS CODE Note	BE(CZL) Screw, Nut	RB1(CZL) Cable Length:1m	RC1(CZL) Cable Length:1m	RB2(CZL) Cable Length:1m	RC2(CZL) Cable Length:1m
PARTS CODE Note		RB1LA(CZL) Cable Length:3m	RC1LA(CZL) Cable Length:3m	RB2LA(CZL) Cable Length:3m	RC2LA(CZL) Cable Length:3m
Content		 with fixture	 with fixture	 with fixture	 with fixture

●RB,RC Switch

Conventional RG1,RG2 switches can be replaced to RB,RC switch

Comparison with old type

Old Type	Equivalent Current Type
RG1	RB1, RC1
	RB2, RC2
RG2	RB4, RC4
	RB5, RC5

Solid State Switch(2 Wires, with Indicator Light) Straight Outlet Cable	Solid State Switch(2 Wires, with Indicator Light) Angle Outlet Cable	Solid State Switch(3 Wires, with Indicator Light) Straight Outlet Cable	Solid State Switch(3 Wires, with Indicator Light) Angle Outlet Cable
RB4(CZL) Cable Length:1m	RC4(CZL) Cable Length:1m	RB5(CZL) Cable Length:1m	RC5(CZL) Cable Length:1m
RB4LA(CZL) Cable Length:3m	RC4LA(CZL) Cable Length:3m	RB5LA(CZL) Cable Length:3m	RC5LA(CZL) Cable Length:3m
 with fixture	 with fixture	 with fixture	 with fixture

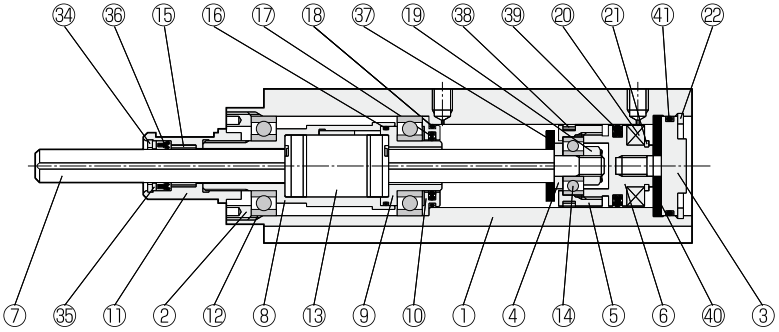
Flange Rod End	Bracket	Repair Parts Kit Standard	Repair Parts Kit End Lock Type	End Lock + Stroke Ajuster Type	Stroke Ajuster Type
ZT(CZL □) Fill in □ as bore size.	LB(CZL □) Fill in □ as bore size.	HQ(CZL □) Fill in □ as bore size.	HQ(CZLH □) Fill in □ as bore size.	HQ(CZL □ZE) Fill in □ as bore size.	HQ(CZLH □ZE) Fill in □ as bore size.
	 with fixing bolts	For details ☞ Page 1027	For details ☞ Page 1027	For details ☞ Page 1027	For details ☞ Page 1027

THEORETICAL THRUST

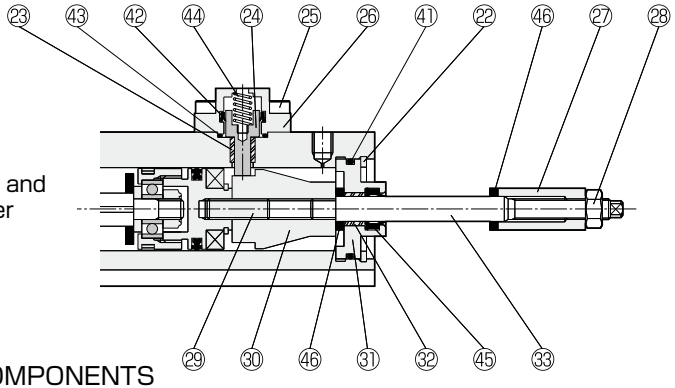
Unit: N

Bore Size (mm)	Working Direction	Operating Pressure MPa 0.2	0.3	0.4	0.5	0.6	0.7
φ20	Push	62	94	130	160	190	220
	Pull	53	79	110	130	160	190
φ25	Push	98	150	200	250	300	340
	Pull	82	120	170	210	250	290
φ32	Push	160	240	320	400	480	560
	Pull	140	210	280	350	420	480

STRUCTURE AND PRINCIPAL COMPONENTS



With End Lock and Stroke Adjuster



PRINCIPAL COMPONENTS

No.	Name	Material	Remarks	No.	Name	Material	Remarks	No.	Name	Material	Remarks
1	Body	Aluminum Alloy	Alumite Treatment	12	Rolling Bearing	High Carbon Chrome Bearing Steel		23	Bush	PTFE, Steel	
2	End Cover	Aluminum Alloy	Alumite Treatment	13	Ball Spline	Steel, Resin,etc		24	Lock Pin	Steel (Heat Treatment)	Chrome Plating
3	Head Cover	Aluminum Alloy	Alumite Treatment	14	Rolling Bearing	High Carbon Chrome Bearing Steel		25	Bolt	Steel	Nickel Plating
4	Piston Spacer	Steel	Electroless Nickel Plating	15	Bush	PTFE, Steel		26	End Lock Cover	Aluminum Alloy	Alumite Treatment
5	Piston	Stainless Steel		16	O-ring	NBR		27	Stroke Adjustmnet Stopper	Steel	Nickel Plating
6	Piston Cover	Stainless Steel		17	Rotating Seal	NBR		28	Lock Nut	Steel	Nickel Plating
7	Spline Rod	High Carbon Chrome Bearing Steel	Hard Chromium Plated	18	O-ring	NBR		29	Fixing Screw	Stainless Steel	
8	Bearing Holder	Stainless Steel		19	U-nut	Carbon Steel	Nickel Plating	30	Lock Collar	Steel (Heat Treatment)	Electroless Nickel Plating
9	Bearing Spacer	Stainless Steel		20	Magnet	Resin Bound Magnet	Only with Magnet	31	WR Head Cover	Stainless Steel	
10	Inner Spacer	Aluminum Alloy		21	Snap Ring	Steel		32	Bush	PTFE, Steel	
11	Boss	Steel	Black Nickel Plating	22	Circlip	Steel	Nickel Plating	33	WR Rod	Stainless Steel	Chrome Plating

REPAIR PARTS FOR STANDARD TYPE

No.	Name	Material	Qty
34	Circlip	Steel	1
35	Rod Seal Holder	Aluminum Alloy	1
36	Spline Seal	Urethane	1
37	Cushion Rubber	Urethane	1
38	Wear Ring	Resin	1
39	Piston Seal	NBR	1
40	Rear Cushion Rubber	Urethane	1
41	O-ring	NBR	1

REPAIR PARTS FOR END LOCK TYPE

No.	Name	Material	Qty
42	Packing	NBR	1
43	O-ring	NBR	1
44	Spring	Stainless Steel	1

REPAIR PARTS FOR STROKE ADJUSTER TYPE

No.	Name	Material	Qty
45	Rod Seal	NBR	1
46	Cushion Rubber	Urethane	2

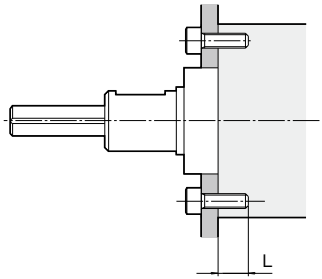
REPAIR PARTS FOR END LOCK + STROKE ADJUSTER TYPE

No.	Name	Material	Qty
42	Packing	NBR	1
43	O-ring	NBR	1
44	Spring	Stainless Steel	1
45	Rod Seal	NBR	1
46	Cushion Rubber	Urethane	2

Notes
As the optional repair parts, those with the repair parts for the standard type added are shipped.

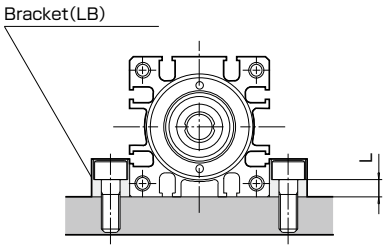
BODY INSTALLATION

Front mounting(Body Tap)



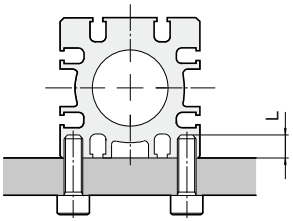
Model	Bolt Size	Screw Depth L(mm)	Fastening Torque N·m
CZL20	M4×0.7	8	2.5
CZL25	M5×0.8	12	5.1
CZL32	M6×1	15	8.6

Bracket(LB) mounting



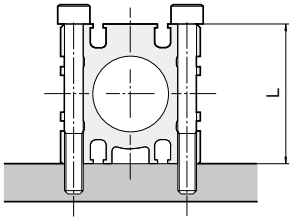
Model	Bolt Size	Thru Hole Length L(mm)	Fastening Torque N·m
CZL20	M5	4.6	5.1
CZL25	M5	4.6	5.1
CZL32	M6	5.6	8.6

Bottom mounting(Body Tap)



Model	Bolt Size	Screw Depth L(mm)	Fastening Torque N·m
CZL20	M5×0.8	6	5.1
CZL25	M5×0.8	6	5.1
CZL32	M6×1	7	8.6

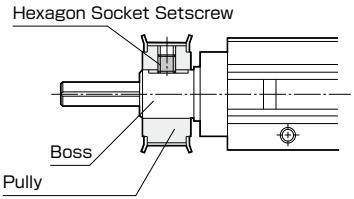
Top mounting(Thru Hole used)



Model	Bolt Size	Thru Hole Length L(mm)	Fastening Torque N·m
CZL20	M4	37	2.5

Only CZL20

PULLEY INSTALLATION



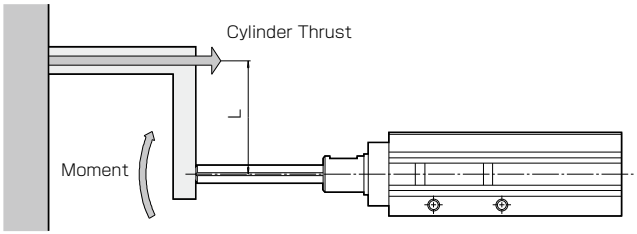
- Mount the pulley on the boss.
- Fix the pulley with a hexagon socket setscrew. by using the D-cut face of the boss.

MATTERS TO BE NOTED FOR DESGINING

⚠ Caution

Moment Generated by Cylinder Thrust in case of Offset Contact

When a load/work is put into contact at an offset point from the rod as shown, a large moment is generated due to cylinder thrust.
Check the table of allowable moment.



Moment=Cylinder thrust x L(offset distance)

Rod Deflection

In case where a load is light, but the stroke is long, or a load at the rod end is large, the rod deflection may sometimes become unexpectedly large.
Select a model referring to the graphs of deflection.

Rod Vibration

In case where stroke is long, or load mass at the rod end is large, rod vibration may be generated at the cylinder push end. Then, decrease the speed or select a model with a size larger dia. rod. Also, when the rigidity of the base for mounting the cylinder is not sufficient, enhance the rigidity of the base.

Rod End Runout and Repeatability (Reference Value)

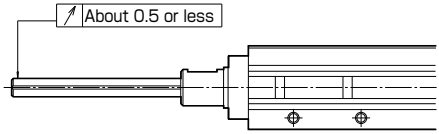
For oscillation with the rod at the full stroke position (fully projected), the circumferential runout of the rod end around the oscillation center axis is approximately 0.25 mm maximum.
The repeatability of oscillation is approximately 0.01 mm maximum.

Rolling Feel in Bearing

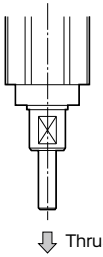
The bearing (ball spline) of this product is slightly preloaded. Accordingly, when the rod is moved by hand, rolling of balls inside the bearing may cause slight feel of operation discontinuity or difference in the rolling resistance between products. This is due to preload of the bearing and does not affect the performance.

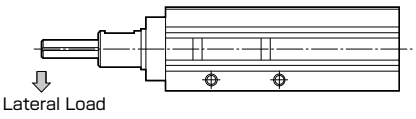
Mounting of Load

When mounting a load by using a male or female thread at the rod end, set a spanner on the across flats of the rod to prevent the tightening torque from being applied to the bearing.



ALLOWABLE LOAD MASS





Unit : kg

Model	Thrust Load	Lateral Load
CZL20	1.0	0.75
CZL25	1.5	1.2
CZL32	2.0	1.4

ALLOWABLE MOMENT

In case where the cylinder is operated under constant moment

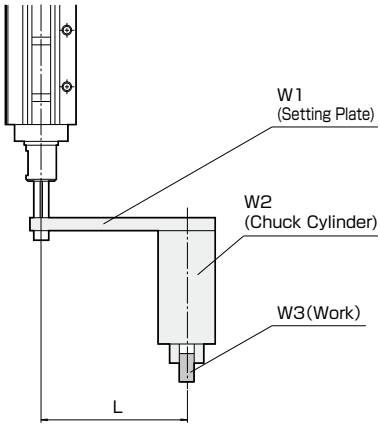
Model	CZL20	CZL25	CZL32
Allowable Moment	0.39	0.78	0.98

Unit : N·m

In case where a moment is applied temporarily while the cylinder stopped.

Model	CZL20	CZL25	CZL32
Allowable Moment	0.65	1.4	2.2

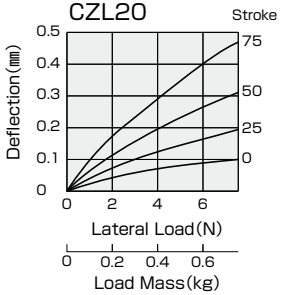
Unit : N·m

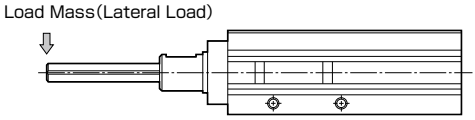


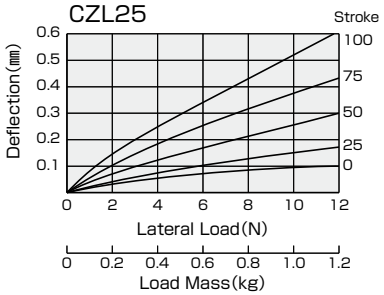
●Set the load within the allowable thrust load
W1+W2+W3≦(Allowable thrust load value)
Allowable Load Mass ☞page 1029
When a load that is not shown in the right figure is applied, consider the influence of the load.

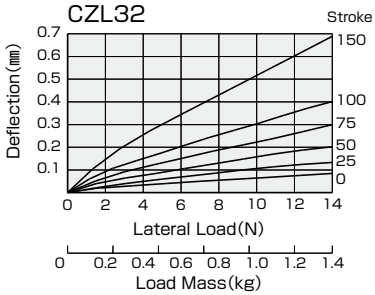
●Check the allowable kinetic energy.
☞ page 1032

Deflection







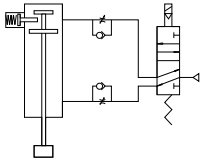


PRECAUTION FOR USING END LOCK

⚠ Caution

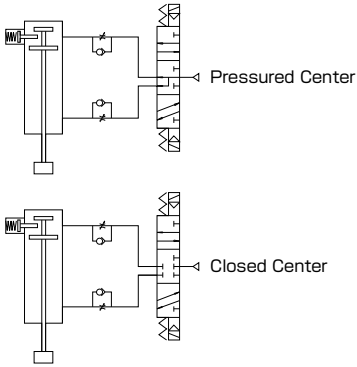
●Recommended Pneumatic Circuit

Use of two Positions valves is recommended.



●Do Not Use The Following Circuits

Do not use three oositions valves as shown below. Locking is achieved, air is exhausted in the part locking mechanism is located.



●Actuation

Before operating actuator supply air to the air inlet part without locking mechanism. For the subsequent reciprocating motion, repeat air supply-exhaust as usual for both of the parts. For air supply to the locking part, the back pressure must be applied to the oppasite part. (Please refer to Recommended Pneumatic Circuit)

⚠ Warning

If air is supplied to the locking port when the port without locking mechanism is exhausted, an excessive force will be applied so that the locking mechanism may be damaged. Also it is dangerous because the rod will jump out.

●Minimum Actuating Pressure

For the operation, apply a pressure of 0.15MPa or more. Pressure lower than that level mey be insufficient to release the lock.

●Locking

When the piston rod reaches the return end of the stroke, and air in locking mechanismis side exhausted completely, then the lock pin comes out to lock the piston rod by the force of the spring.
In this state, the piston rod will not drop even though air is exhausted from the actuator.
Do not supply the air to the locking part in this state.
Please note that the locking will take time if the exhaust speed is too low.

●locking Release

Before relasing the lock, always supply air to the part that has no locking mechanism.

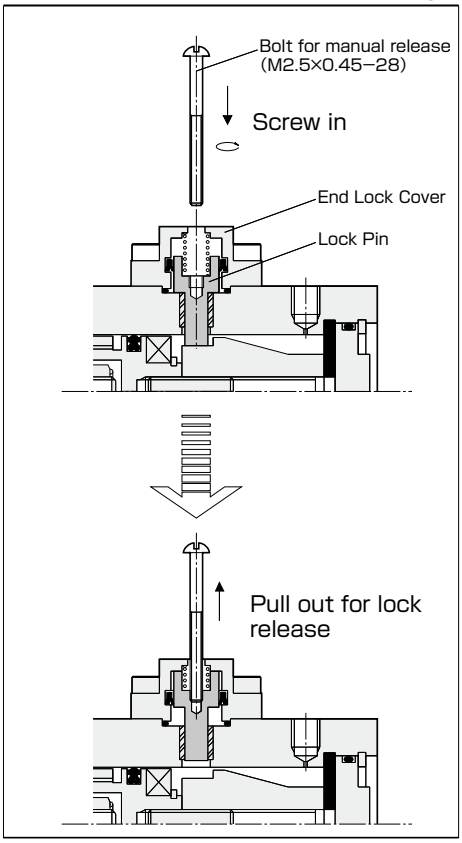
●Manual Release of Lock

While the lock will be released autmatically by the normal operation, it can also be released manually.
Insert a bolt from the upper hole of the end-lock cover, then screw it into the lock pin and pull it out. Then the lock will be released. The locked state will be returned by releasing the bolt. The bolt for the manual release (M2.5X0.45X28) is attached to the shipment.
For an ordinary operation, remove the bolt.

⚠ Warning

Before releasing the lock, always supply the air to the part that has no locking mechanism. For a munual release, if the lock is released forcibly when a load is applied to the rod, the lock mechanism may be damaged or the rod may drop suddenly. Even if no load is applied, take every possible care for the release.

How To Release The Lock Manually



CALCULATION OF KINETIC ENERGY

Be sure to use in conditions in which the kinetic energy calculated does not exceed the allowable kinetic energy.

■Kinetic Energy Calculation Formula

$$E = \frac{1}{2} I \omega^2$$

E : Kinetic Energy J
I : Inertial Moment kg · m²
ω : Angular Speed rad/s

Allowable Kinetic Energy

Model	Allowable Kinetic Energy
CZL20	0.01 J
CZL25	0.02 J
CZL32	0.034J

The inertial moment calculation formula depends on the shape of the article to be oscillated. See the following page.

■Calculation Example 1

●Calculate the inertial moment.

Based on the shape, use calculation formula No. 7 in the table on the following page.

$$I = W \cdot \frac{d^2}{8} = 0.5 \times \frac{0.06^2}{8} = 0.000225 \ (kg \cdot m^2)$$

●Calculate the angular speed.

The oscillation should cover 90° in 0.14 seconds.

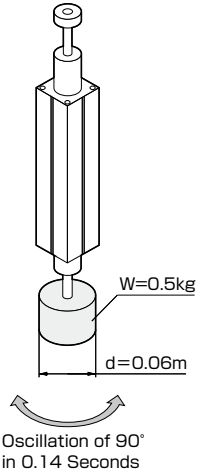
Accordingly, 90° = 0.5 π (rad) from 360° = 2 π (rad)

$$\omega = \frac{0.5\pi}{0.14} = \frac{0.5 \times 3.14}{0.14} = 11.21 \ (rad/s)$$

●The kinetic energy is:

$$E = \frac{1}{2} I \omega^2 = \frac{1}{2} \times 0.000225 \times 11.21^2 = 0.014 \ (J)$$

Based on this result, either CZL25 or 32 can be used.



■Calculation Example 2

Use formula No. 11 in the table on the next page. This formula is an addition of the inertial moments of the arm and the end.

●Calculate the inertial moment.

Calculate the inertial moment of the arm in formula No. 11.

$$I_1 = W_1 \cdot \frac{\ell_1^2}{3} = 0.1 \times \frac{0.06^2}{3} = 0.00012 \ (kg \cdot m^2)$$

Based on the end shape, use calculation formula No. 5 in the table on the following page for the turning radius K².

$$I_2 = W_2 \cdot K^2 + W_2 \cdot \ell_2^2 = W_2 \cdot \frac{a^2+b^2}{12} + W_2 \cdot \ell_2^2$$

$$= 0.2 \times \frac{0.03^2+0.02^2}{12} + 0.2 \times 0.07^2$$

$$= 0.0009866 \ (kg \cdot m^2)$$

●Calculate the angular speed.

The oscillation should cover 120° in 0.3 seconds.

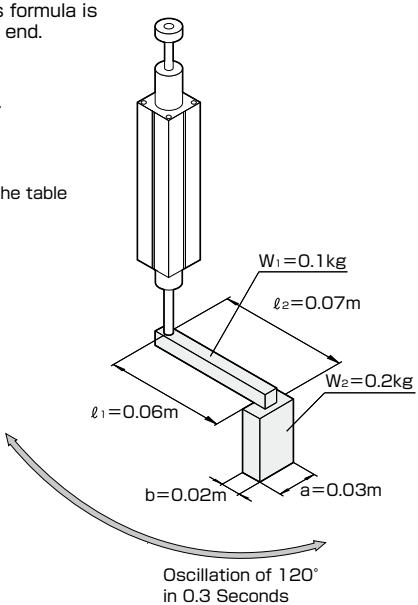
Accordingly, 120° = 0.67 π (rad) from 360° = 2 π (rad)

$$\omega = \frac{0.67\pi}{0.3} = \frac{0.67 \times 3.14}{0.3} = 7.01 \ (rad/s)$$

●The kinetic energy is:

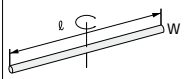
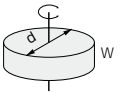
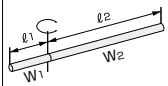
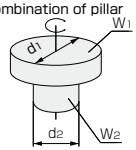
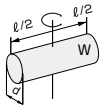
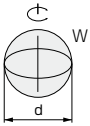
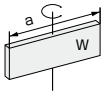
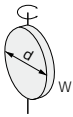
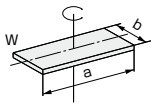
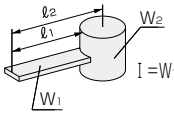
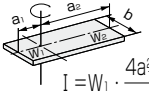
$$E = \frac{1}{2} (I_1 + I_2) \ \omega^2 = \frac{1}{2} \times (0.00012 + 0.0009866) \times 7.01^2 = 0.027 \ (J)$$

Based on this result, CZL32 can be used.



CALCULATION OF INERTIA MOMENT

I : Moment of Inertia W : Mass

No.	Shape	Inertia moment	Rotational Radius	No.	Shape	Inertia moment	Rotational Radius
1	Thin bar 	$I = W \cdot \frac{\ell^2}{12}$	$K^2 = \frac{\ell^2}{12}$	7	Pillar (including a thin disk) 	$I = W \cdot \frac{d^2}{8}$	$K^2 = \frac{d^2}{8}$
2	Thin bar 	$I = W_1 \cdot \frac{\ell_1^2}{3} + W_2 \cdot \frac{\ell_2^2}{3}$	$K^2 = \frac{\ell_1^2}{3} + \frac{\ell_2^2}{3}$	8	Combination of pillar 	$I = W_1 \cdot \frac{d_1^2}{8} + W_2 \cdot \frac{d_2^2}{8}$	$K^2 = \frac{d_1^2}{8} + \frac{d_2^2}{8}$
3	Thick bar 	$I = W\left(\frac{\ell^2}{12} + \frac{d^2}{16}\right)$	$K^2 = \frac{\ell^2}{12} + \frac{d^2}{16}$	9	Sphere 	$I = W \cdot \frac{d^2}{10}$	$K^2 = \frac{d^2}{10}$
4	Thin rectangle board (cubic-rectangle) 	$I = W \cdot \frac{a^2}{12}$	$K^2 = \frac{a^2}{12}$	10	Thin disk 	$I = W \cdot \frac{d^2}{16}$	$K^2 = \frac{d^2}{16}$
5	Rectangle board (cubic-rectangle) 	$I = W \cdot \frac{a^2+b^2}{12}$	$K^2 = \frac{a^2+b^2}{12}$	11	Concentrated load at the top of a bar  $I = W_1 \cdot \frac{\ell_1^2}{3} + W_2 \cdot K^2 + W_2 \cdot \ell_2^2$	Calculation using the shape of W_2
6	Rectangle board (cubic-rectangle)  $I = W_1 \cdot \frac{4a_1^2+b^2}{12} + W_2 \cdot \frac{4a_2^2+b^2}{12}$	$K^2 = \frac{4a_1^2+b^2}{12} + \frac{4a_2^2+b^2}{12}$					

BEARING FOR FLOATING MECHANISM (Option Code FN)

●Prevention of damage when work installation fails

In case where work installation fails due to incomplete location, defective parts, etc. and the work is bumped, the floating mechanism will prevent the work from damage by absorving the shock.

●Softening of impact force at work installation

In case where an impact force due to actuator velocity may cause breakage of work or defective assembling at work installation, the floating mechanism will prevent the work from such damage by softening the impact force and help to achieve smooth work installation and press fit.

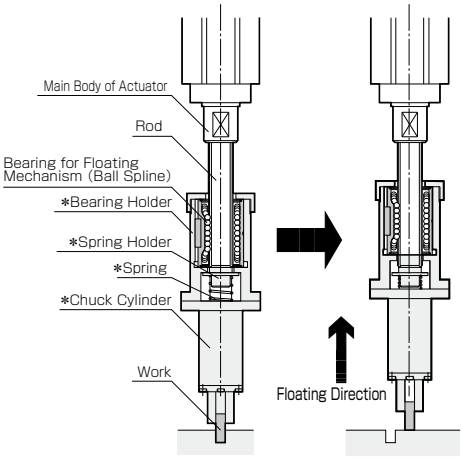
●Work installation at different levels

In case where works are installed at the positions of different levels, only one actuator can perform the operation by setting floating stroke by level difference in advance.

●The bearing for floating mechanism incorporates the high precision and high rigidity ball spline.

●As for the parts (parts marked ＊ in the figure right) other than the bearing for floating mechanism, it is required to design and produce the construction and parts fitting with the machine at your side.

●Construction and application example



MATTERS TO BE NOTED FOR DESIGNING

⚠ Caution

①Specific resistnace of Bearing

The bearing for floating mechanism has the specific resistance respectively. Pay attention to the setting load value of the spring. (The spring force shall be determined from a viewpoint of the mechanism as a whole.)

Model	Specific Resistance N
CZL20	3
CZL25	3.5
CZL32	4

②For Bearing of check mark

The check mark means the digit indicated in the optional place on the outside of the bearing. The digit are optional and mean nothing.

③Combination of the bearing and the rod

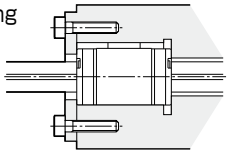
The bearing for floating mechanism and the rod are combinedly supplied. If other bearing, which is ordered additionally, attached to other actuator (including the part of the same specification), or purchased from somewhere afterward, is mounted to the rod, this may cause malfunction or poor accuracy. Be sure to use bearing attached to the actuator. The check mark (See clause 2 of this note.) on the bearing has nothing to do with the combination with rod. Even if the check mark on the bearing is the same, the combination of the bearing and the rod is another matter.

④Tolerance of the housing inside dia. for the bearing

Generally, the tolerance between the bearing for floating mechanism and the housing shall be by transition fit (J6). In case where accuracy is not so required, it shall be by loose fit (H7).

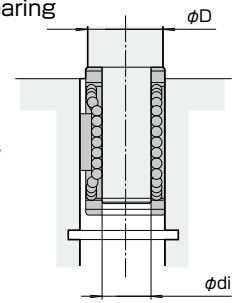
Tolerance of Housing Inside Dia.	General Service Conditions	J6
	Accuracy is not required	H7

⑤Mounting of the bearing



The right figure shows a mounting example of the bearing for floating mechanism. Fixing strength in the axial direction is not so required, but only driving fit is not enought to hold and another measures shall be taken.

⑥Insertion of the bearing



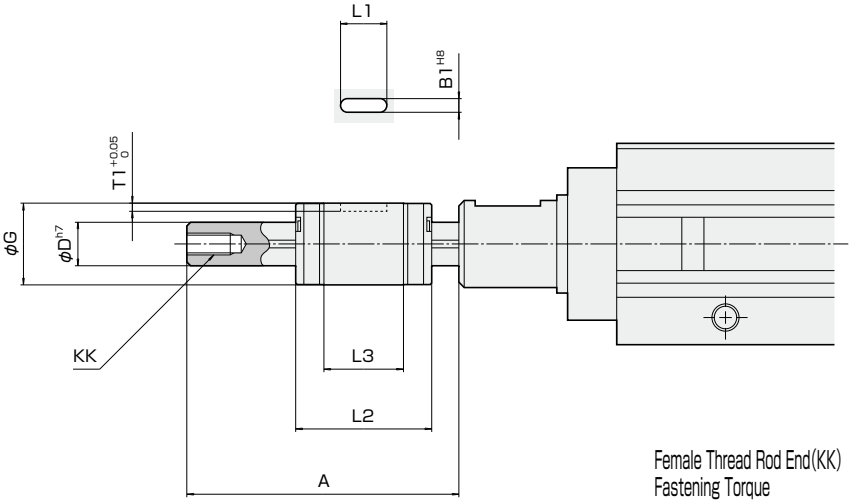
Use the insertion jig in the figure on the right to insert the bearing for floating mechanism into the bearing holder. Insertion with the bearing tilted may cause galling, which may adversely affect the performance such as increase of the specific resistance. The side plates on the two ends of the bearing are made of plastic. Avoid pressing with excessive force.

Model	di	D
CZL20	ϕ 7.0	ϕ14.5
CZL25	ϕ 8.5	ϕ18.5
CZL32	ϕ10.5	ϕ20.5

⑦Actual stroke of the actuator

The length of actuator stroke minus floating stroke is the stroke by which the work actually shifts.
Be careful to select stroke.

DIMENSIONS OF ROD END WITH BEARING FOR FLOATING MECHANISM(Option code FN)



Female Thread Rod End(KK)
Fastening Torque

Unit: N·m

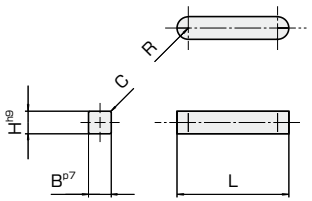
Model	Fastening Torque
CZL20	1.7
CZL25	4.8
CZL32	6.6

Unit: mm

Model	A	$B1^{H8}$	D^{h7}	G	KK	L1	L2	L3	$T1^{+0.05}_{0}$
CZL20	50	2.5	ϕ8	$\phi 15^{0}_{-0.011}$	M4x0.7 depth8	8.5	(25)	14.6	1.5
CZL25	55	3	ϕ10	$\phi 19^{0}_{-0.013}$	M5×0.8 depth10	11	(30)	18.2	1.8
CZL32	65	3	ϕ12	$\phi 21^{0}_{-0.013}$	M6×1 depth12	15	(35)	23	1.8

Note 1: Bearing Dimensions ϕG shows the dimensions of L3 part.
Note 2: The rod protrudes longer than that of the standard type (A in the figure). Check the total length of the cylinder. For the details of the other dimensions, Please see the page of Dimensions.
Note 3: A bolt and washer to prevent the bearing from dropping are attached to the female thread (KK in the figure) for shipment. Remove the bolt and washer before using the cylinder. (The bolt and washer are not adhered.)

■DIMENSIONS of KEY (A KEY IS ATTACHED TO THE PRODUCT.)



Unit: mm

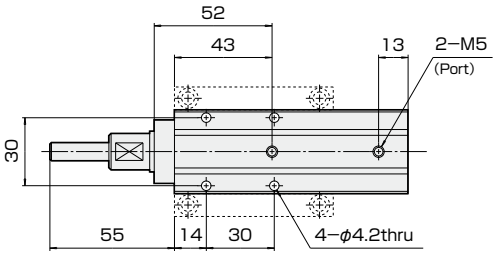
Model	B^{p7}	C	H^{h9}	L	R
CZL20	2.5	0.16	2.5	8.3	1.25
CZL25	3	0.16	3	10.8	1.5
CZL32	3	0.16	3	14.8	1.5

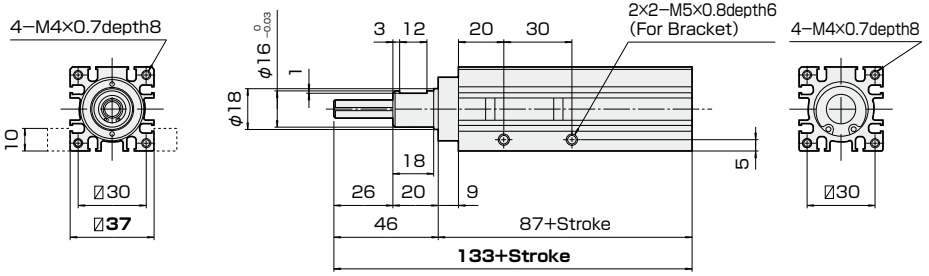
DIMENSIONS(mm) CZL20 STANDARD TYPE

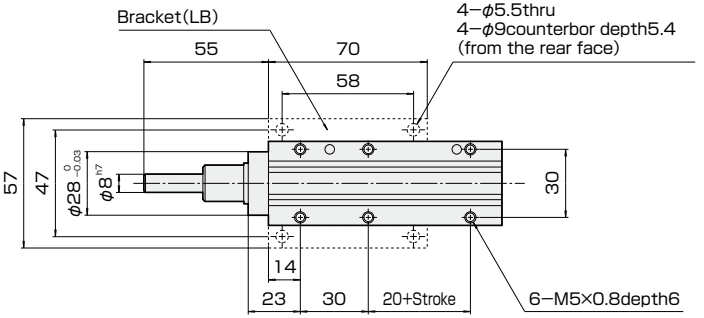
CZL(S)−SD20−(Stroke)

Bore Size

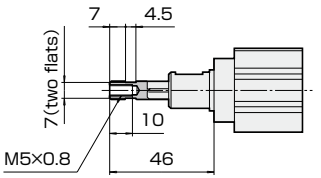
Standard Stroke ☞page 1024



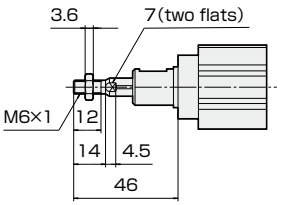




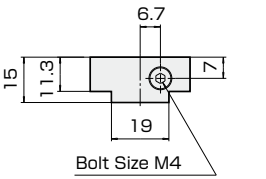
Female Thread Rod End(WS)

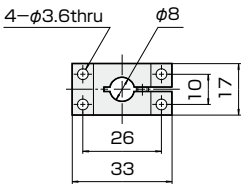


Male Thread Rod End(WT)

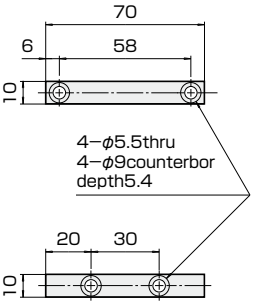


Flange Rod End(ZT)





Bracket(LB)



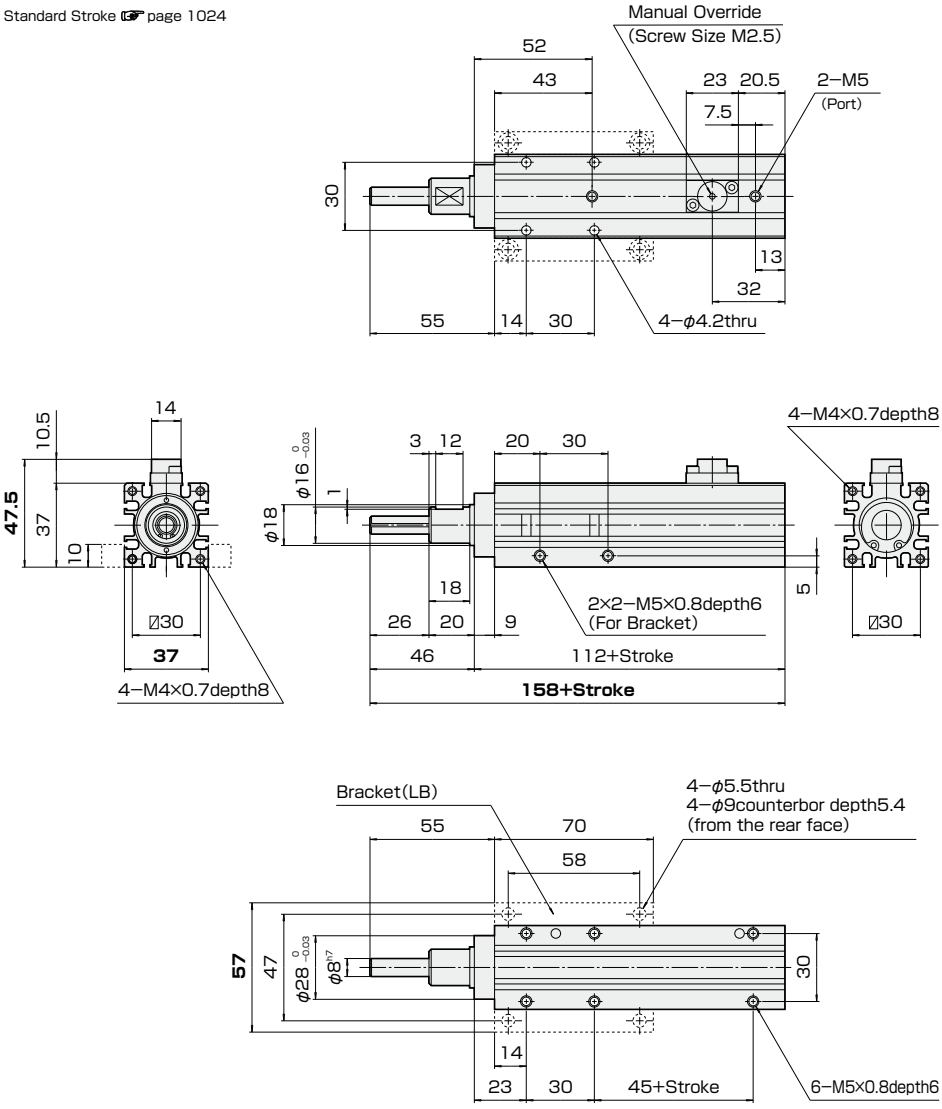
DIMENSIONS(mm) CZL20 END LOCK TYPE

CZLH(S)−SD20−(Stroke)

With End Lock Mechanism

Bore Size

Standard Stroke ☞page 1024



●Female Thread Rod End(WS), Male Thread Rod End(WT), Flange Rod End(ZT), Bracket(LB) ☞page 1036
●With Bearing for Floating Mechanism ☞page 1034
●Precaution for using End Lock ☞page 1031

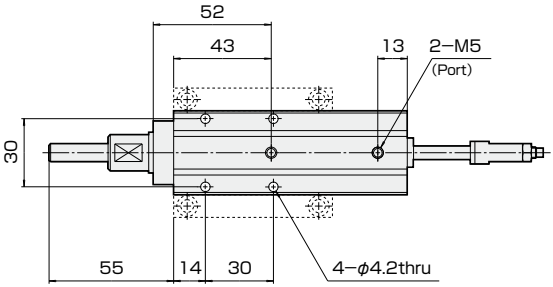
DIMENSIONS(mm)　CZL20　STROKE ADJUSTER TYPE

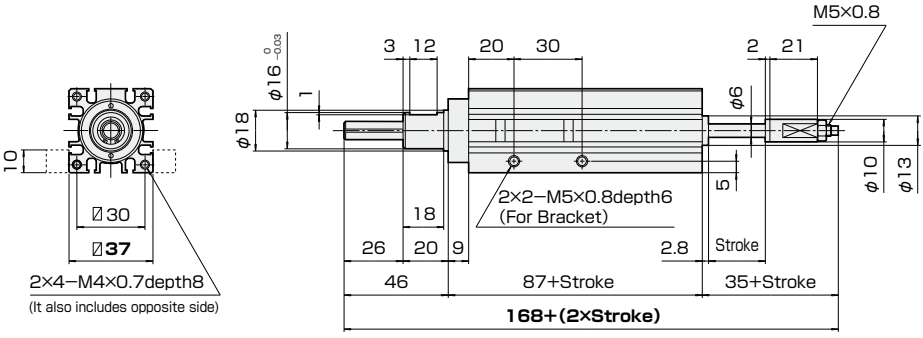
CZL(S)−SD20−(Stroke)−ZE

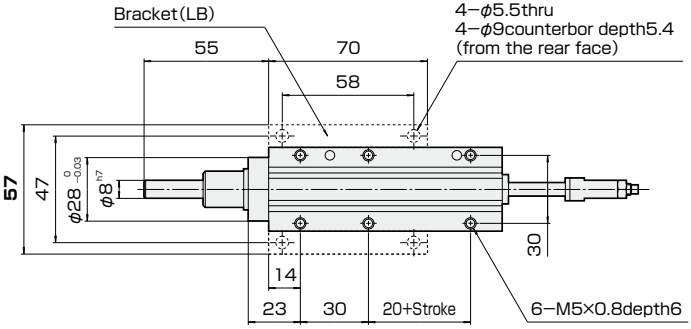
Bore Size

with Stroke Adjuster
Push Stroke Adjustable Range: 10mm

Standard Stroke ☞page 1024







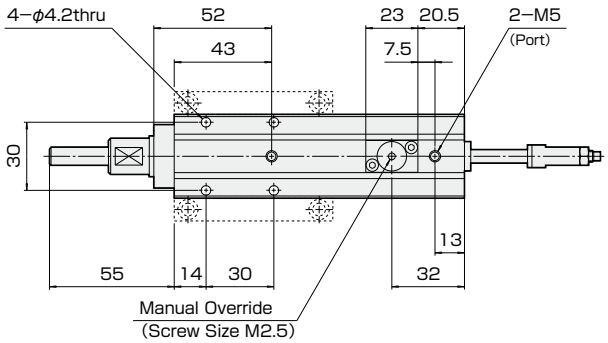
●Female Thread Rod End(WS), Male Thread Rod End(WT), Flange Rod End(ZT), Bracket(LB) ☞page 1036
●With Bearing for Floating Mechanism ☞page 1034

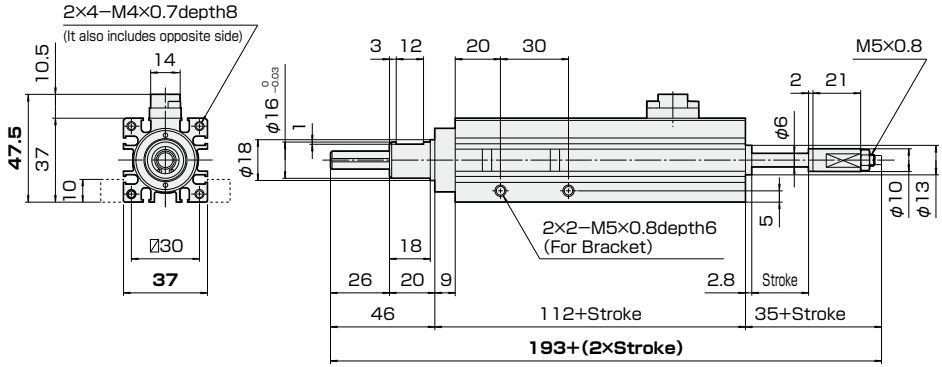
DIMENSIONS(mm) CZLH20 STROKE ADJUSTER AND END LOCK TYPE

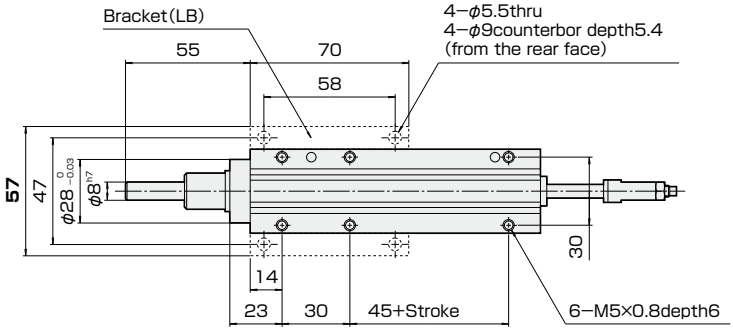
CZLH(S)−SD20−(Stroke)−ZE

- With End Lock Mechanism
- Bore Size
- with Stroke Adjuster
  Push Stroke Adjustable Range: 10mm

Standard Stroke ☞page 1024







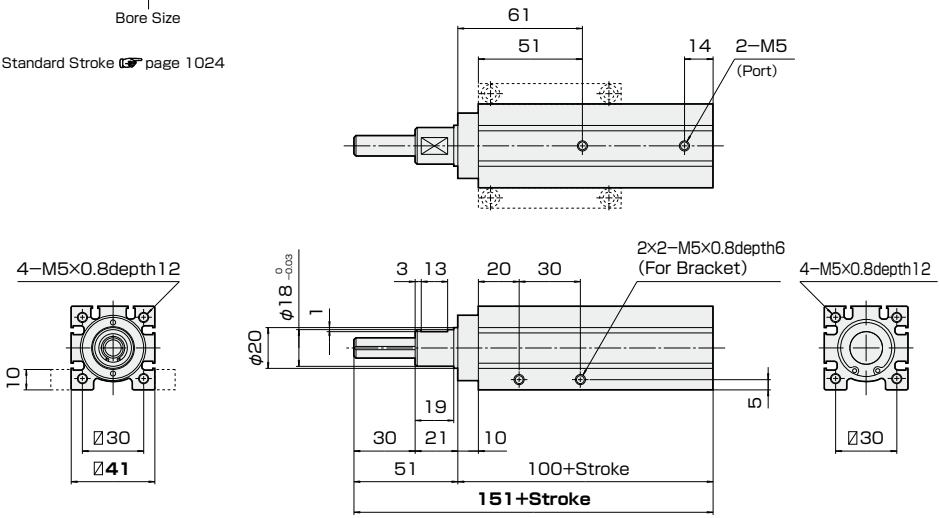
●Female Thread Rod End(WS), Male Thread Rod End(WT), Flange Rod End(ZT), Bracket(LB) ☞page 1036
●With Bearing for Floating Mechanism ☞page 1034
●Precaution for using End Lock ☞page 1031

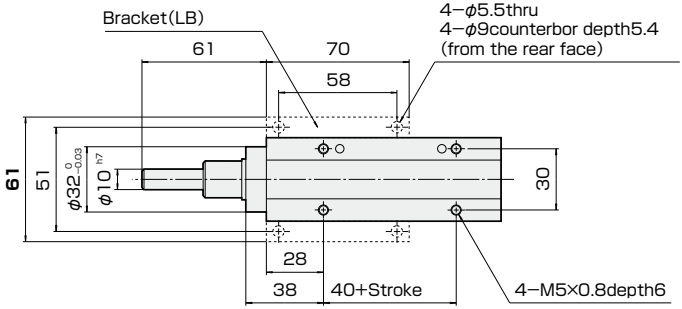
DIMENSIONS(mm) CZL25 STANDARD TYPE

CZL(S)−SD25−(Stroke)

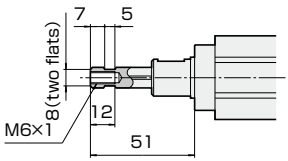
Bore Size

Standard Stroke ☞page 1024

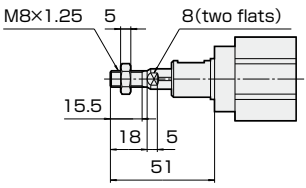




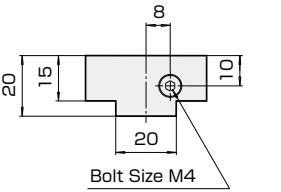
Female Thread Rod End(WS)

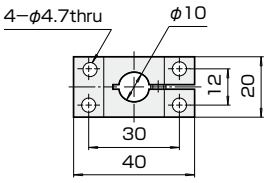


Male Thread Rod End(WT)

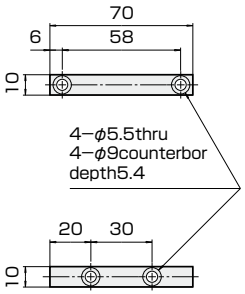


Flange Rod End(ZT)





Bracket(LB)



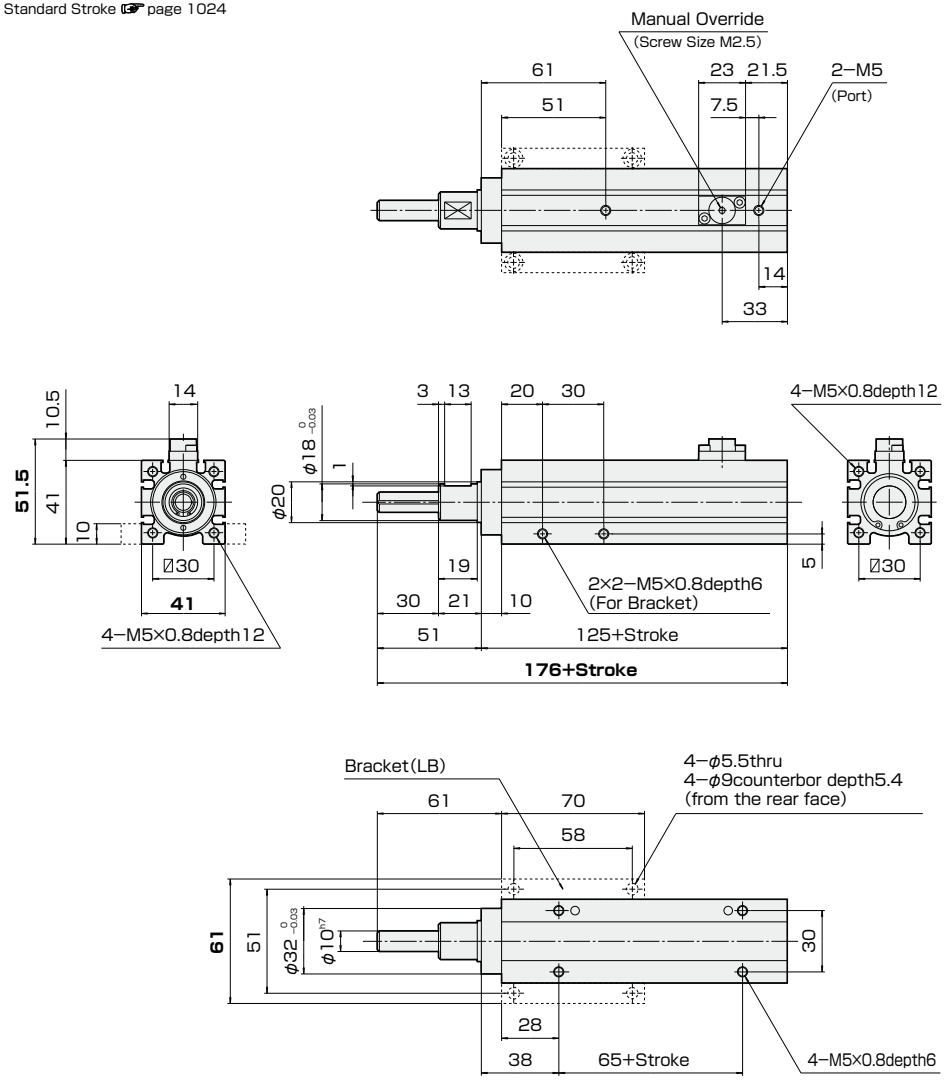
DIMENSIONS(mm) CZL25 END LOCK TYPE

CZLH(S)−SD25−(Stroke)

Bore Size

With End Lock Mechanism

Standard Stroke ☞page 1024



●Female Thread Rod End(WS), Male Thread Rod End(WT), Flange Rod End(ZT), Bracket(LB) ☞page 1036
●With Bearing for Floating Mechanism ☞page 1034
●Precaution for using End Lock ☞page 1031

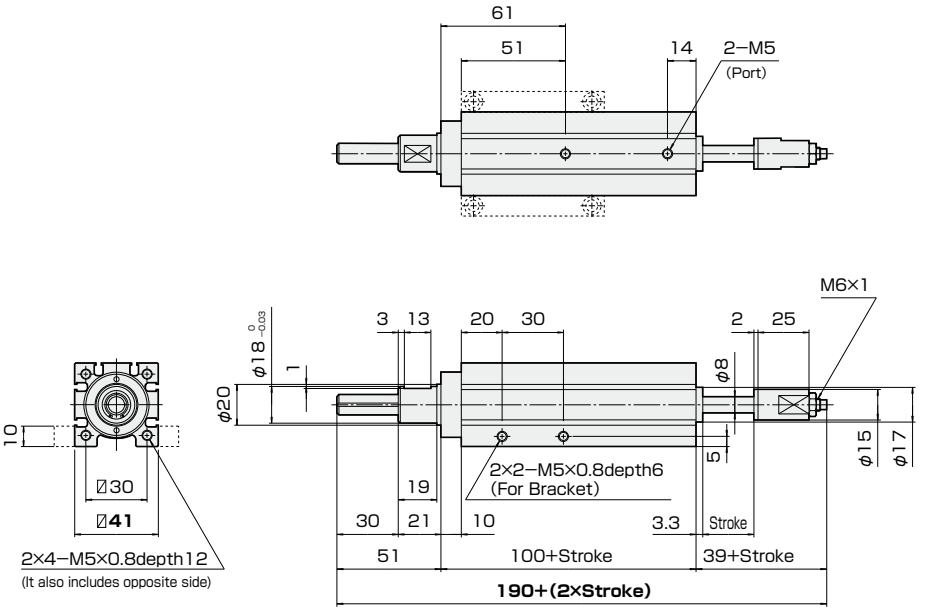
DIMENSIONS(mm)　CZL25　STROKE ADJUSTER TYPE

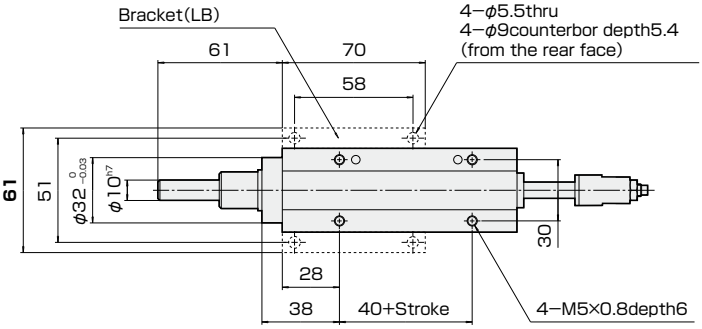
CZL(S)−SD25−(Stroke)−ZE

Bore Size

with Stroke Adjuster
Push Stroke Adjustable Range: 10mm

Standard Stroke ☞page 1024





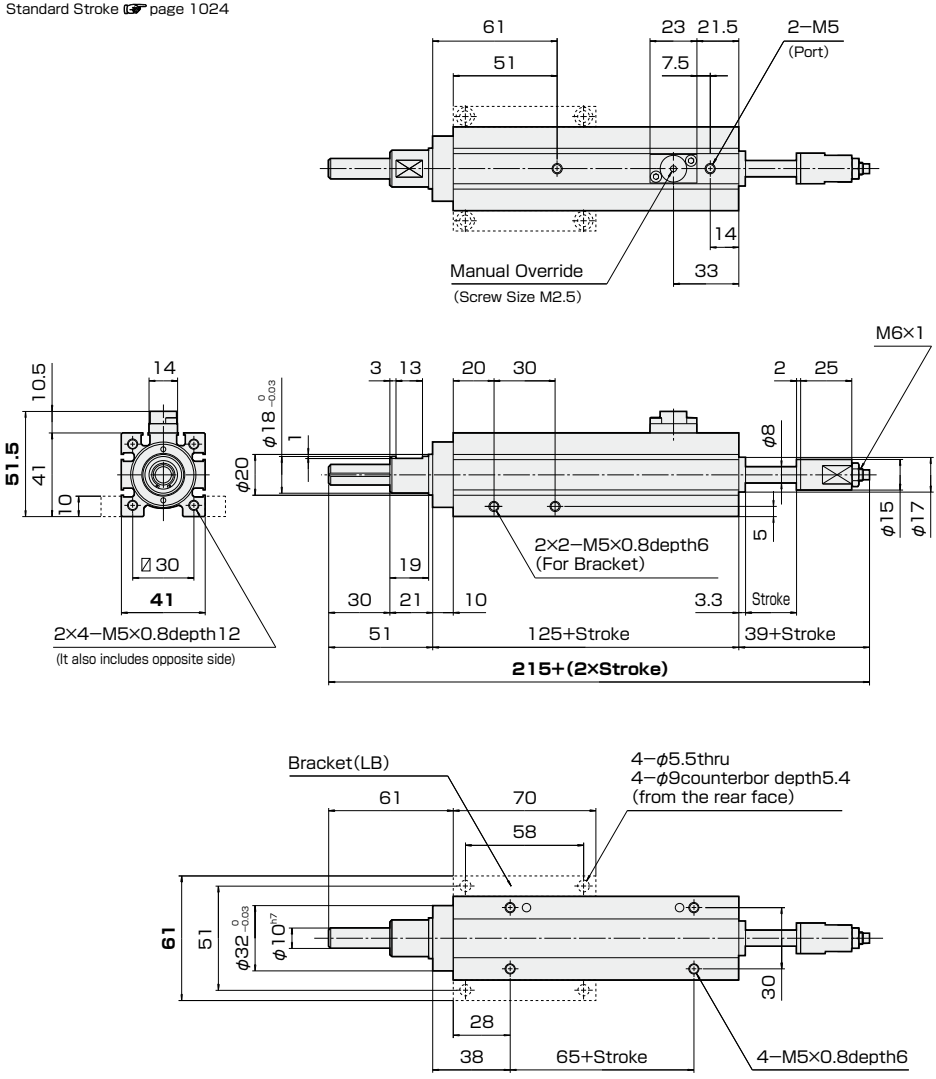
●Female Thread Rod End(WS), Male Thread Rod End(WT), Flange Rod End(ZT), Bracket(LB) ☞page 1036
●With Bearing for Floating Mechanism ☞page 1034

DIMENSIONS(mm) CZLH25 STROKE ADJUSTER AND END LOCK TYPE

CZLH(S)−SD25−(Stroke)−ZE

- CZLH(S): With End Lock Mechanism
- SD25: Bore Size
- ZE: with Stroke Adjuster, Push Stroke Adjustable Range: 10mm

Standard Stroke ☞page 1024



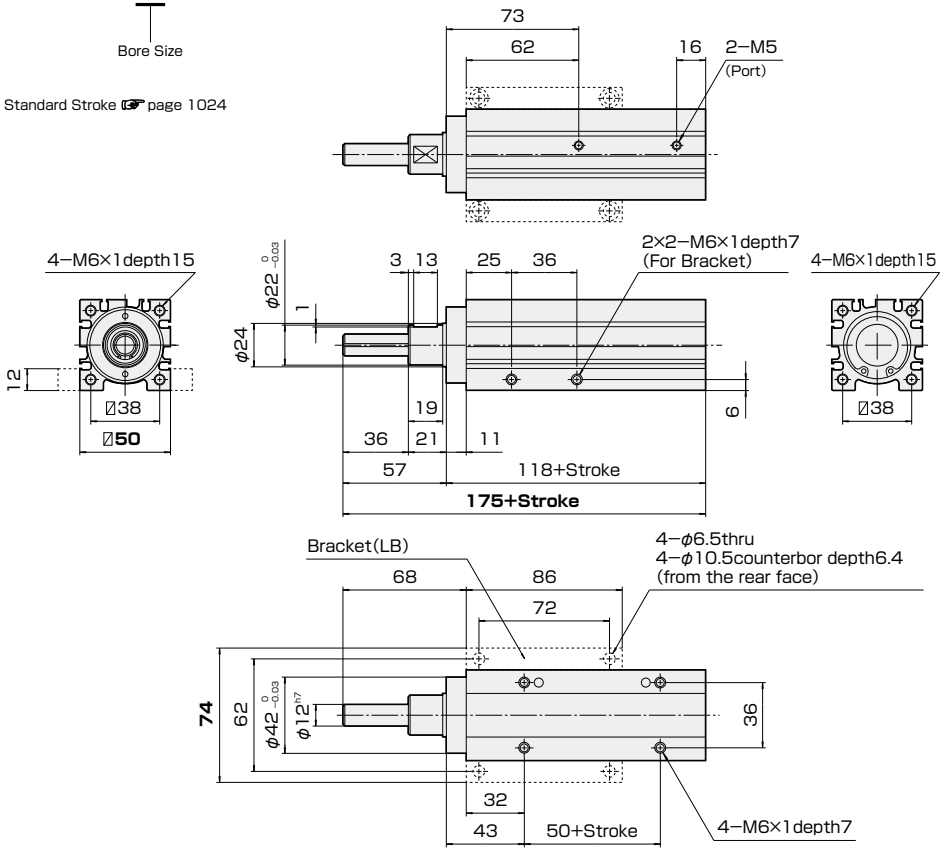
●Female Thread Rod End(WS), Male Thread Rod End(WT), Flange Rod End(ZT), Bracket(LB) ☞page 1036
●With Bearing for Floating Mechanism ☞page 1034
●Precaution for using End Lock ☞page 1031

DIMENSIONS(mm) CZL32 STANDARD TYPE

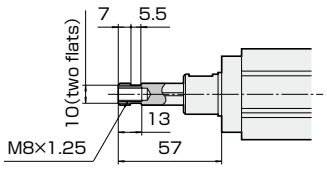
CZL(S)−SD32−(Stroke)

Bore Size

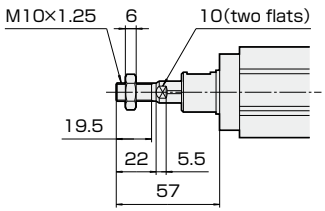
Standard Stroke ☞page 1024



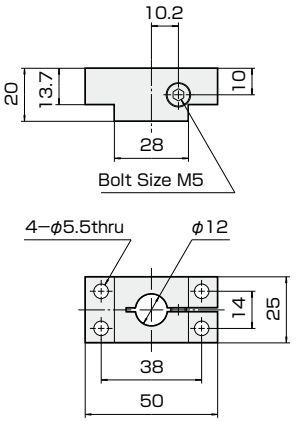
Female Thread Rod End(WS)



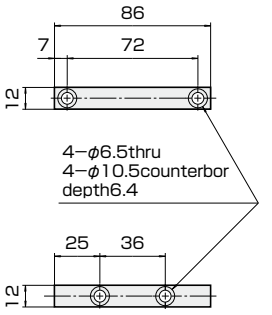
Male Thread Rod End(WT)



Flange Rod End(ZT)



Bracket(LB)



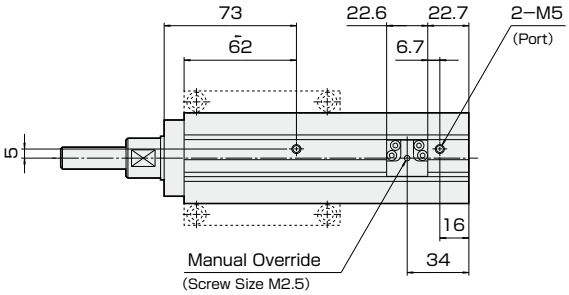
DIMENSIONS(mm) CZL32 END LOCK TYPE

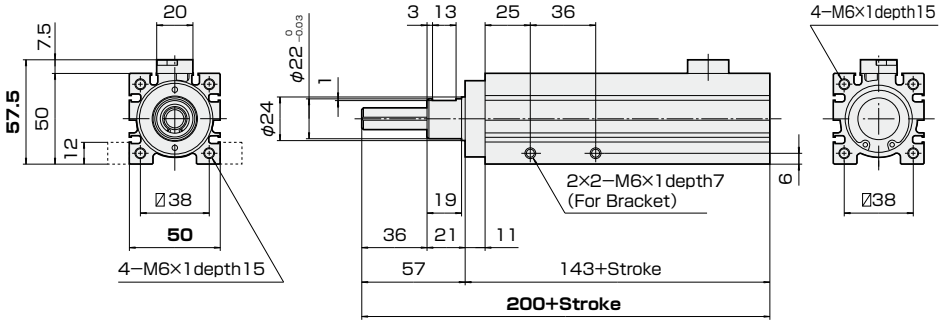
CZLH(S)−SD32−(Stroke)

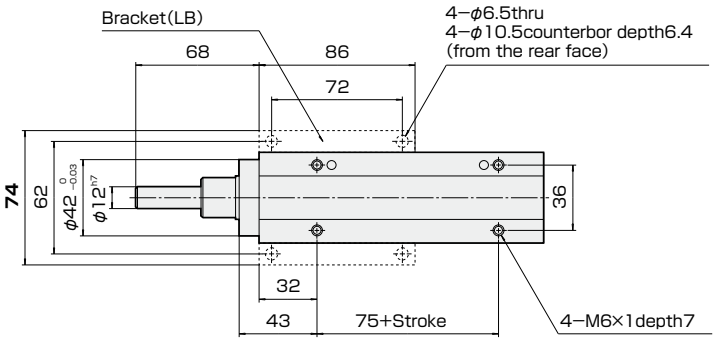
With End Lock Mechanism

Bore Size

Standard Stroke ☞page 1024







●Female Thread Rod End(WS), Male Thread Rod End(WT), Flange Rod End(ZT), Bracket(LB) ☞page 1036
●With Bearing for Floating Mechanism ☞page 1034
●Precaution for using End Lock ☞page 1031

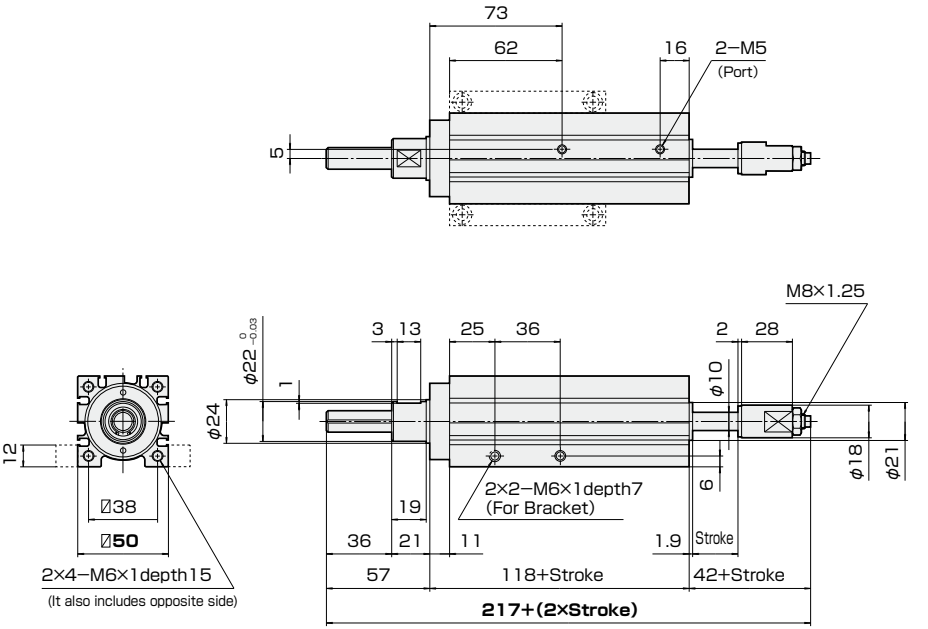
DIMENSIONS(mm) CZL32 STROKE ADJUSTER TYPE

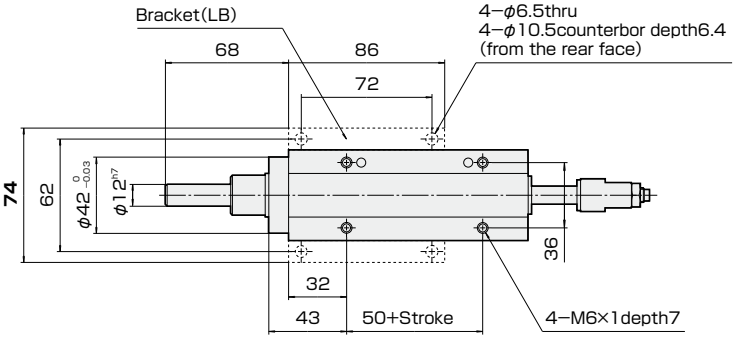
CZL(S)−SD32−(Stroke)−ZE

Bore Size

with Stroke Adjuster
Push Stroke Adjustable Range: 10mm

Standard Stroke ☞page 1024





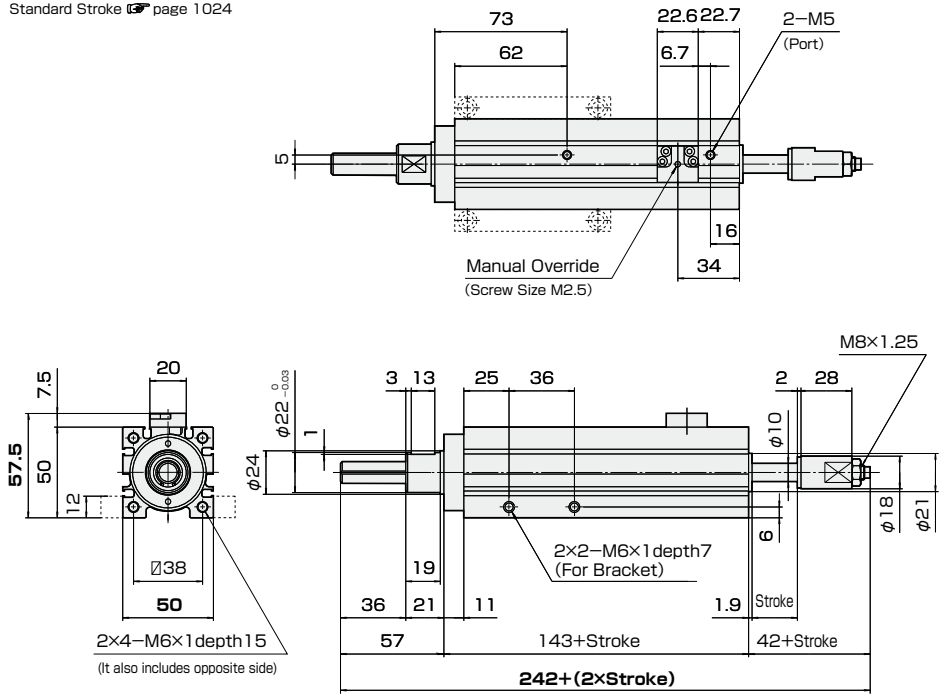
●Female Thread Rod End(WS), Male Thread Rod End(WT), Flange Rod End(ZT), Bracket(LB) ☞page 1036
●With Bearing for Floating Mechanism ☞page 1034

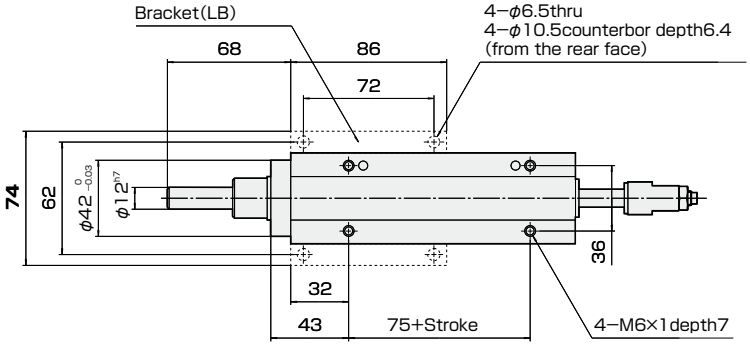
DIMENSIONS(mm) CZLH32 STROKE ADJUSTER AND END LOCK TYPE

CZLH(S)−SD32−(Stroke)−ZE

- With End Lock Mechanism
- Bore Size
- with Stroke Adjuster
  Push Stroke Adjustable Range: 10mm

Standard Stroke ☞page 1024

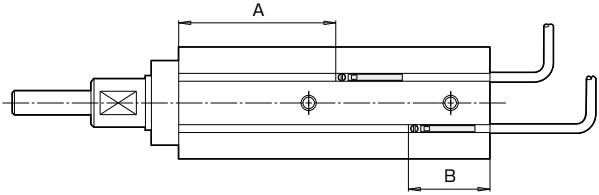




●Female Thread Rod End(WS), Male Thread Rod End(WT), Flange Rod End(ZT), Bracket(LB) ☞page 1036
●With Bearing for Floating Mechanism ☞page 1034
●Precaution for using End Lock ☞page 1031

INSTALLATION OF SWITCH

■Switch Setting Position



Standard Type
Stroke Adjuster Type

Unit: mm

Model	RB(RC)1, 2(Reed Switch)				RB(RC)4, 5(Solid State Switch)			
	Switch Setting Position		On Hold Distance(ℓ)	Hysteresis (c)	Switch Setting Position		On Hold Distance(ℓ)	Hysteresis (c)
	A	B			A	B		
CZL20	55	25	11	1	57	23	4.5	1
CZL25	65	26	12		67	24	4	
CZL32	76	28	13		78	26	4	

End Lock Type
End Lock + Stroke Adjuster Type

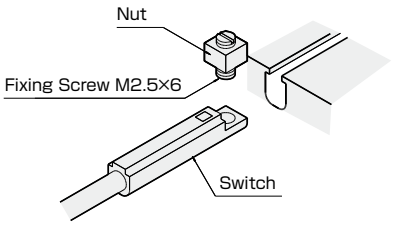
Unit: mm

Model	RB(RC)1, 2(Reed Switch)				RB(RC)4, 5(Solid State Switch)			
	Switch Setting Position		On Hold Distance(ℓ)	Hysteresis (c)	Switch Setting Position		On Hold Distance(ℓ)	Hysteresis (c)
	A	B			A	B		
CZL20	55	47	11	1	57	45	4.5	1
CZL25	65	50	12		67	48	4	
CZL32	76	52	13		78	50	4	

Explanation of hysteresis and on hold distance ☞ Page 1064

■Installation of Switch

Assemble the fixing screw with a nut to the switch.
Insert the switch into the groove.
After setting the position, fasten the screw by a screwdriver.
Fastening torgue of fixing screw must be 0.1 N·m.



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