

# PICO TABLE LONG®

PRZ Series

Registration of a Design



## INDEX★

Overview .....	398
Explanation, Example of Use, Installation Method .....	399
Model Code No. ....	400
Specifications, Guide to be used, Theoretical Thrust .....	401
Spare Parts Code .....	402
Modification of Piping, Port, Stopper Position .....	403
Structure and Principal Components .....	404
Direction of Centralized Piping and Port .....	405
Main Body and Load Bolt Mounting .....	406
Notes on Maintenance and disassembling .....	407
Note for Safe Use .....	408, 409
Accuracy .....	410
Theoretical Deflection of Body by Moment .....	411
Allowable Mounted Load Mass, Load and Moment .....	412~415
Dimensions .....	416~419
Switch Installation, Custom Made .....	420, 421

# PICO TABLE LONG

PRZ Series

Linear Guide + Rodless Cylinder

Space-saving, easy-to-use Block Shape

Body width: 40mm( $\phi 12$ ) 45mm( $\phi 16$ )

Linear Guide



High Accuracy, High Rigidity  
Linear Guide is built-in.

With End Lock System

Option  Page 425

## New Structure Rodless Cylinder

New structure without magnet is employed on the outer circumference side to realize size reduction. Magnetism leakage has also been significantly reduced.

## Linear Guide Rail

Guide rail is directly used for mounting the body. High accuracy and high rigidity of linear guide are realized.

## Flat Rail Surface

Threaded holes for securing the body are provided in the back side to realize flat rail surface with no counterbores.

## Centralized Piping

One-side concentrated piping is possible. (Optional)

## Dust Seal

End seals on both ends and side seal on the bottom are provided as dust seals.

## Datum Plane

A recess is provided in the end plates on both sizes, which allows positioning by pressing on the datum plane of the rail.

## Linear Guide Table

High-accuracy, high-rigidity linear guide of circulating infinite linear motion type. Double bearings have achieved even higher rigidity. High accuracy and high rigidity of linear guide are realized.

## Countermeasure for Copper Parts

Copper parts are not used.

( Only blank plug Copper on body +  
electroless nickel plating )

## Summary of The PICO TABLE LONG

Integrating a linear guide with a magnet-type rodless cylinder has enabled long strokes.

The block shape features a shorter width, making the product suited for use in small space.

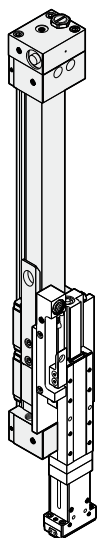
For mounting, the body connected with the linear guide rail and linear guide table can be directly used, which allows the high accuracy, high rigidity and high mounting accuracy of the linear guide to be fully brought out.

The stroke can be adjusted by either of the two methods: shock absorber and rubber stopper.

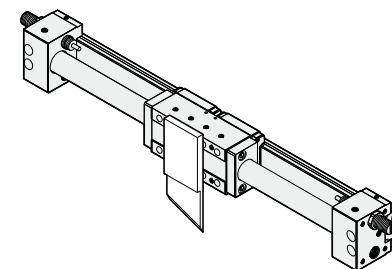
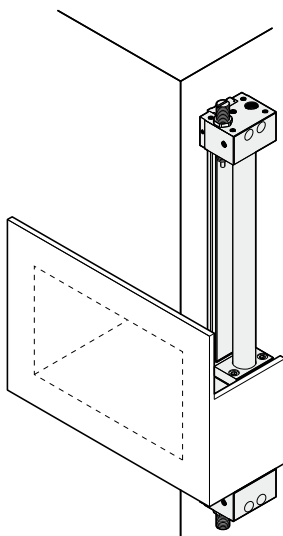
One-side concentrated piping is also possible.

For PRZH with an end lock mechanism, see p. 425.

### Application Examples : PICO TABLE LONG



Chuck Movement



Cutter Blade Movement

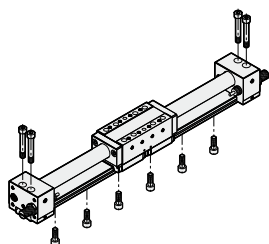
Opening and Closing of the Door

P  
R  
Z

PICO TABLE Long

### MAIN BODY INSTALLATION

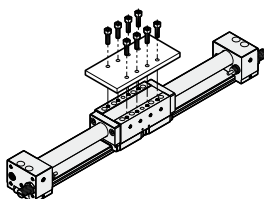
(Bolt as shown in the figure are not supplied with products)



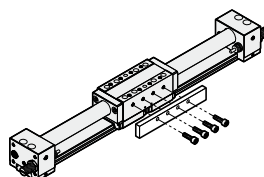
### MOUNTING

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

Top mounting



Side mounting



## Model Code Example

# PRZS-SD16-100-QZ-RD-RB12LA

### Series Name

### Magnet and Switch Rail

No Code	None
S	Magnet and Switch Rail

A magnet and switch rail is required when mounting switches.

### Bore Size

12	φ12
16	φ16

### Cable Length

No Code	1m
LA	3m

### Number of Switches

1	1
2	2
3	3

### Switch

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

### Direction of cable outlet

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



For details Page 1066, 1067

### Installation Positions of Magnet and Switch Rail

No Code	Stopper Side
RD	Stopper on the Opposite Side

For details Page 401

### Stopper Type

QZ	Both Sides Shock Absorber	QT	Both Sides Rubber Stopper
 Shock Absorber with Metal Stopper		 Rubber Stopper	

Stroke Adjustment Range Page 401

### Stroke

Bore Size	Standard Stroke(mm)				
	50	100	150	200	300
φ12	●	●	●	●	●
φ16	●	●	●	●	●

### Intermediate Stroke

Please adjust with Stopper (Shock Absorber)

### Centralized Piping

SD	None
SL	Centralized Piping Port Left
SR	Centralized Piping Port Right

For detail Page 405

## SPECIFICATIONS

Bore Size	$\phi 12\text{mm}$	$\phi 16\text{mm}$
Magnet Holding Force	73N	130N
Maximum Load Mass	With Shock Absorber 3kg	4kg
	With Rubber Stopper 1.5kg	2kg
Port Size	M5×0.8	
Guide Mechanism	Precision Linear Ball Bearing	
Type of Operation	Double Acting	
Fluid	Air	
Maximum Operating Pressure	0.6MPa	
Minimum Operating Pressure	0.3MPa	0.25MPa
Pressure	0.9MPa	
Operating Temperature	5~60℃	
Maximum Operating Speed	500mm/s	
Minimum Operating Speed	190mm/s	150mm/s
Cushioning	Shock Absorber(with Metal Stopper) Rubber Stopper	
Lubrication	Not required	

## THE TYPE OF LINEAR GUIDE

Model	Type
PRZ12	THK RSR9WZMSSC1 × 2
PRZ16	THK RSR12WZMSSC1 × 2

Pre-load:Zero or slightly pre-loaded

## STROKE ADJUSTMENT RANGE

Model	Shock Absorber	Rubber Stopper
	QZ	QT
PRZ12	Each 19 mm on one side (total 38 mm)	Each 19 mm on one side (total 38 mm)
PRZ16	Each 19 mm on one side (total 38 mm)	Each 19 mm on one side (total 38 mm)

## THEORETICAL THRUST

Unit:N

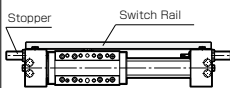
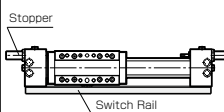
Bore Size (mm)	Operating Pressure MPa				
	0.25	0.3	0.4	0.5	0.6
$\phi 12$	—	34	45	57	68
$\phi 16$	50	60	80	100	120

For vertical use, subtract 35 N from the theoretical thrust for PRZ12 and 40 N for PRZ16.






1MPa=10.2kgf/cm<sup>2</sup>


1N=0.102kgf





## INSTALLATION POSITIONS OF MAGNET AND SWITCH RAIL






No Code	Stopper Side	RD	Stopper on the Opposite Side
			


OPTIONAL PARTS CODES





Name		Switch Fixture		Reed Switch(2 Wires, with Indicator Light) Straight Outlet Cable    Angle Outlet Cable		Reed Switch(2 Wires, without Indicator Light) Straight Outlet Cable    Angle Outlet Cable	
<div>PARTS CODE</div> <div>Note</div>		<div>BF(PRZ)</div> <div>Screw, nut</div>		<div>RB1(PRZ)</div> <div>Cable Length:1m</div>	<div>RC1(PRZ)</div> <div>Cable Length:1m</div>	<div>RB2(PRZ)</div> <div>Cable Length:1m</div>	<div>RC2(PRZ)</div> <div>Cable Length:1m</div>
<div>PARTS CODE</div> <div>Note</div>				<div>RB1LA(PRZ)</div> <div>Cable Length:3m</div>	<div>RC1LA(PRZ)</div> <div>Cable Length:3m</div>	<div>RB2LA(PRZ)</div> <div>Cable Length:3m</div>	<div>RC2LA(PRZ)</div> <div>Cable Length:3m</div>
Content							

With PRZ16, the switch mounting bracket has been changed from BE to smaller BF type in accordance with PRZ12. Along with this, the switch rail has also been changed. For details  page 420

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

Shock Absorber	Adjuster Bolt with Rubber	Lock Nut	Magnet	Switch Rail
<div>ABK10</div> <div>For PRZ12, 16</div>	<div>AG(M10-50)</div> <div>For PRZ12, 16</div>	<div>NTS(M10)</div> <div>ABK10 AG(M10-50) Common use</div>	<div>RK(PRZ)</div> <div>Before mounting, apply anaerobic adhesive to the screws.</div>	<div>RJ(PRZ[A]-[B])</div> <div>Specify the bore size for [A] and stroke for [B]. Example) The rail for PRZS-SD16-100-QZ is RJ (PRZ16-100).</div>
<div>M10×1</div> 	<div>M10×1</div> 	<div>M10×1</div> 		
with nut	with nut		with mounting screws	with fixing bolts

The dimensions of the switch rail for PRZ16 have been changed.  Page 420

Repair Parts Kit	Cylinder Repair Grease	Plug	Centralized Piping Rail
<div>HP(PRZ□)</div> <div>Fill in □ as bore size</div>	<div>HG(PRZ)</div>	<div>BS-M5</div> <div>with gasket</div>	<div>PC(PRZ[A]-[B])</div> <div>Specify the bore size for [A] and stroke for [B]. Example) The Centralized Piping for PRZS-SD16-100-QZ is RJ (PRZ16-100).</div>
<div>For details  Page 404</div> <div>With Cylinder Repair Grease</div>	<div>Grease exclusively for the cylinder. The grease is different from that for the guide. Do not use this grease for the guide.</div>		
			with fixture

## Product MASS

### ●Mass of PRZ

Unit: g

Model	Stroke (mm)					
	50	100	150	200	250	300
PRZ12	820	880	940	1000	1060	1120
PRZ16	1225	1315	1405	1495	1585	1675

Note: with shock absorber, rubber stopper are both the same mass.

### ●Mass of Centralized Piping

Unit: g

Model	Stroke (mm)					
	50	100	150	200	250	300
PRZ12	45	55	65	75	85	95
PRZ16	45	55	65	75	85	95

Note: SL, SR are both the same mass.

### ●Mass of Magnet, Switch Rail

Unit: g

Model	Stroke (mm)					
	50	100	150	200	250	300
PRZ12	55	70	85	100	115	130
PRZ16	55	70	85	100	115	130

### ●Mass of Switch

Unit: g

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. PRZS-SR16-100-QZ-RD-RB42LA

Basic Mass.....1315g  
 Centralized Piping(SR).....55g  
 Magnet, Switch Rail.....70g  
 Switch.....35×2=70g



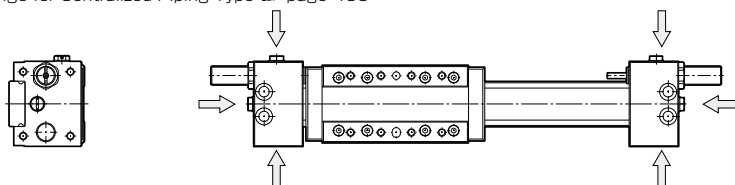
1315+55+70+70=1510g

## Port and Stopper Position Change

### ■Port

The position can be selected from three points for each of the plates on both ends.

Change the port position by the placement of the blank plug (BS-M5).

Blank Plug BR-M5 if Projection is not allowed  page 402Port Change for Centralized Piping Type  page 405

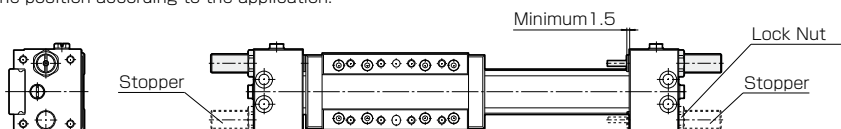
### ■Stopper

The position can be selected from two points for each of the plates on both ends.

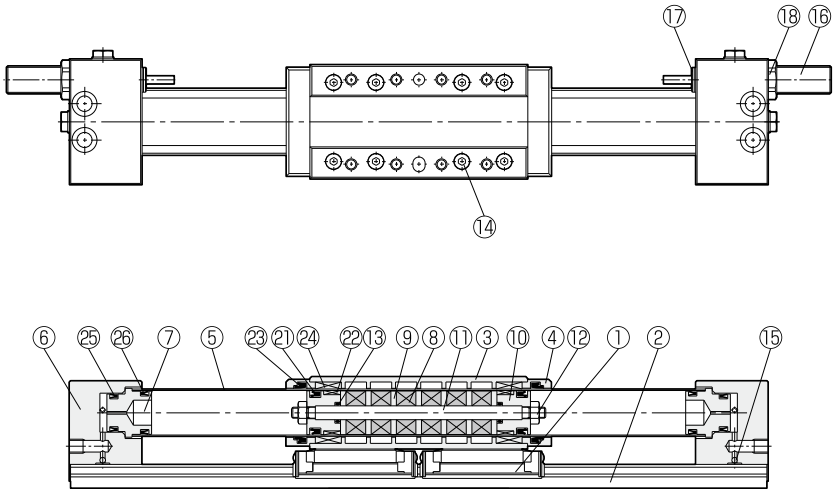
Change the position according to the application.

Lock Nut Tightening Torque

PRZ12,16 : 7.8N·m

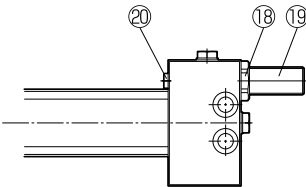


# STRUCTURE AND PRINCIPAL COMPONENTS



Stopper Type : Both Sides Rubber Stopper

Note: The tube slightly moves in the axial (up to about 1.5 mm) and circumferential directions, which is due to the play provided for preventing galling with the guide and not an abnormality.



## PRINCIPAL COMPONENTS

No.	Name	Material	Remarks	No.	Name	Material	Remarks
1	Linear Guide Table	Stainless Steel, Resin		11	Rod	Stainless Steel	
2	Linear Guide Rail	Stainless Steel		12	Nut	Carbon Steel	Nickel Plating
3	Body	Carbon Steel	Electroless Nickel Plating	13	O-ring	NBR	
4	Dust Cover	Carbon Steel(heat treatment)	Electroless Nickel Plating	14	Fixing Bolt	Carbon Steel	Nickel Plating
5	Tube	Stainless Steel	Hard Chromium Plated	15	Blank Ball	Stainless Steel	
6	Plate	Aluminum Alloy	Electroless Nickel Plating	16	Shock Absorber	Carbon Steel	Electroless Nickel Plating
7	End Cover	Aluminum Alloy	White Alumite	17	Metal Stopper	Carbon Steel	Heat Treatment (Nitriding)
8	Magnet	Rare-earth Magnet		18	Lock Nut	Carbon Steel	Electroless Nickel Plating
9	Inner Yoke	Carbon Steel	Electroless Nickel Plating	19	Adjuster Bolt (for Rubber)	Carbon Steel	Electroless Nickel Plating
10	Piston	Aluminum Alloy	White Alumite	20	Cushion Rubber	Urethane Rubber	

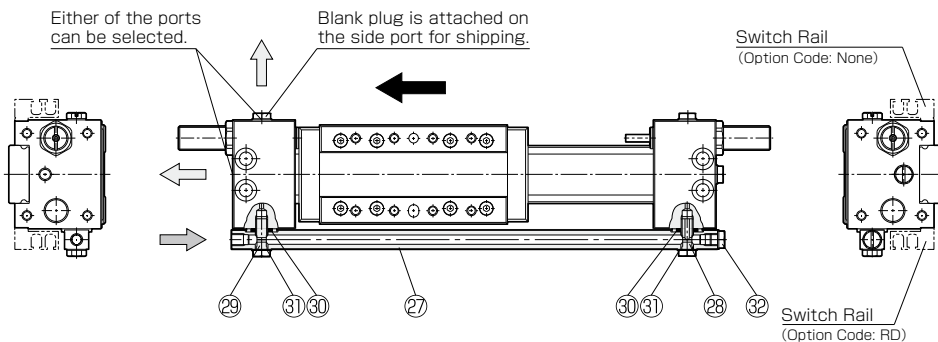
## REPAIR PARTS (With special Grease HG (PRZ))

No.	Name	Material	Qty	Remarks	No.	Name	Material	Qty	Remarks
21	Piston Seal	NBR	2		24	Bush	Synthetic Resin	2	
22	Wear Ring	Synthetic Resin	2		25	Packing	NBR	2	
23	Dust Seal	Urethane Rubber	2		26	Packing	NBR	2	

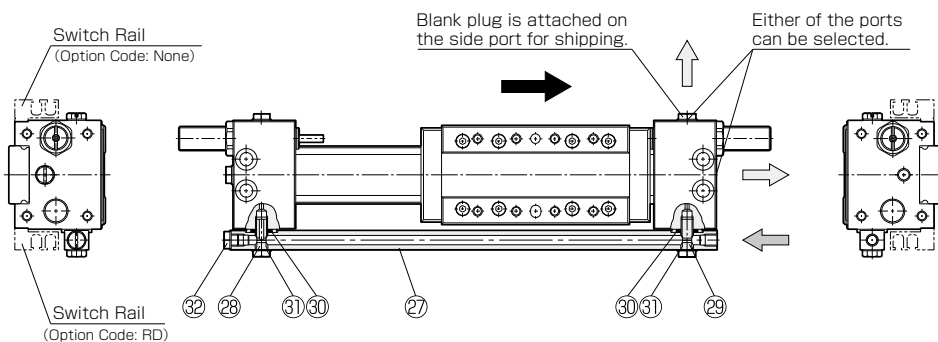


## DIRECTION OF CENTRALIZED PIPING AND PORT

### ■SL(Centralized Piping Port Left Side)



### ■SR(Centralized Piping Port Right Side)



### ■Change from SL to SR and Precautions

Plugs A and B have different shapes and simply changing the placement of the blank plug (No. 32) cannot change between SL and SR.

Follow the procedure below to change plug A for plug B.

Plugs A and B are in different colors: silver and black respectively.

- Gradually loosen plugs A (No. 28) and B (No. 29) and remove the centralized piping rail (No. 27).
- Attach the gasket (No. 31) and exchange the locations of plugs A and B.
- Remove the blank plug (No. 32) and attach it on the plug A side.
- Insert the seal washer (No. 30) and screw in plugs A and B to secure the centralized piping rail.

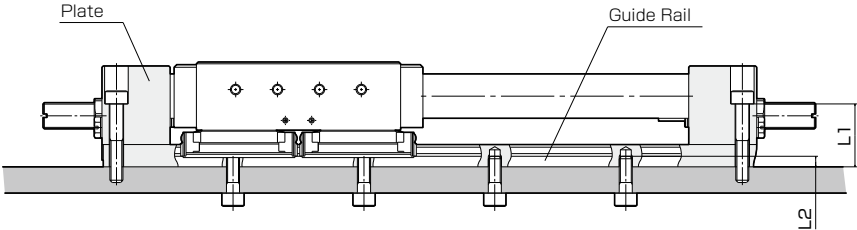
### Centralized Piping Rail

No.	Name	Material	Qty	Remarks	No.	Name	Material	Qty	Remarks
27	Centralized Piping Rail	Aluminum Alloy	1		30	Seal Washer	NBR, Steel	2	
28	Plug A	Carbon Steel	1	Electroless Nickel Plating	31	Gasket	NBR, Steel	2	
29	Plug B	Carbon Steel	1	Black Nickel Plating	32	Blank Plug	Copper	1	Electroless Nickel Plating

The parts on this parts list are grouped into one set as a part separately offered.

# BODY INSTALLATION

Top Mounting(Plate Thru Hole used)	Bottom Mounting(Rail Tap)
------------------------------------	---------------------------



## ⚠ Caution

- Ensure that the mating mounting surface is a flat surface (recommended flatness: 0.05 mm) and tighten evenly.
- For securing, use all mounting holes of the plates on both sides and the guide rail.
- Securing only with either the plates or guide rail or, even if both plates and guide rail are used for securing, failure to use all mounting holes may lead to damage to the actuator or insufficient rigidity.

### Plate Portion Mounting Bolt

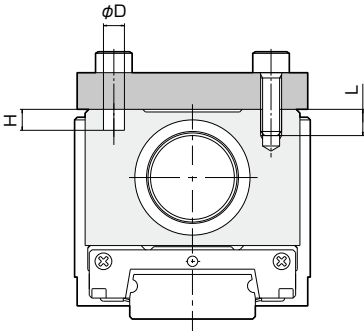
Model	Bolt Size	Thru hole length L1 (mm)	Fastening Torque N·m
PRZ12	M4	25.5	2.5
PRZ16	M5	24	5.1

### Guide Rail Portion Mounting Bolt

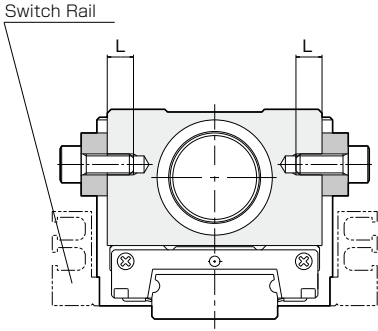
Model	Bolt Size	Screw Depth L2 (mm)	Fastening Torque N·m
PRZ12	M4×0.7	4	2.5
PRZ16	M5×0.8	4	5.1

# MOUNTING ON TABLE

## Top Mounting



## Side Mounting



Note: If the centralized piping rail is provided, that surface is not available.  
Check for any interference with the switch rail.  
Any mounted load longer than the body may come in contact with the plate on either side, leading to failure.

Model	Bolt Size	Screw Depth L (mm)	Fastening Torque N·m	Pin Holes for Positioning φD×H (mm)
PRZ12	M4×0.7	4.5	2.5	φ4 <sup>+0.05</sup> <sub>0</sub> depth4
PRZ16	M4×0.7	5	2.5	φ4 <sup>+0.05</sup> <sub>0</sub> depth4

Model	Bolt Size	Screw Depth L (mm)	Fastening Torque N·m
PRZ12	M4×0.7	4.5	2.5
PRZ16	M4×0.7	5	2.5

# PRECAUTIONS FOR MAINTENANCE AND DISASSEMBLY

## ⚠ Caution

Structure And Principal Components  page 404  
Structural Drawing with Centralized Piping  page 405

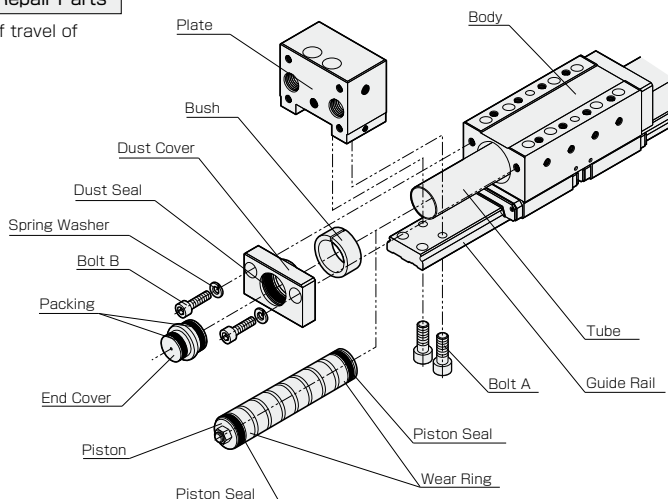
	Step	Notes
1	<ul style="list-style-type: none"> <li>Loosen bolts A, which connect between the plate and the guide rail.</li> <li>Remove the plate and end cover.</li> </ul>	
2	<ul style="list-style-type: none"> <li>Force the body to be displaced from the piston.</li> </ul>	<ul style="list-style-type: none"> <li>Do this without pulling the tube out of the body.</li> <li>Move to a point where the holding force that connects between the body and the piston disappears.</li> <li>Pulling the tube out of the body while the holding force remains makes it impossible to remove because of the magnetism of the magnet.</li> </ul>
3	<ul style="list-style-type: none"> <li>Pull the piston out of the tube.</li> <li>Remove the old piston seals.</li> <li>Apply grease on the entire surface of new piston seals and mount the seals.</li> </ul>	<ul style="list-style-type: none"> <li>Do this without pulling the tube out of the body.</li> <li>The magnet may be broken if dropped or hit. Use sufficient care in handling the magnet.</li> <li>Ensure that the piston seal housing is not scratched.</li> <li>For the grease, use the special grease included in the repair parts set.</li> <li>Piston seals need to be correctly oriented.</li> </ul>
4	<ul style="list-style-type: none"> <li>Replace the wear rings, bushing and packing and dust seal of the end cover.</li> </ul>	<ul style="list-style-type: none"> <li>Apply a sufficient amount of grease. Inadequate application may adversely affect durability.</li> <li>For the grease, use the special grease included in the repair parts set.</li> <li>Ensure that the housing is not scratched.</li> </ul>
5	<ul style="list-style-type: none"> <li>Apply grease on the outer circumference of the piston and inner circumference of the cylinder tube.</li> </ul>	<ul style="list-style-type: none"> <li>Apply a sufficient amount of grease on the entire surface of the piston. Inadequate application may adversely affect durability.</li> <li>For the grease, use the special grease included in the repair parts set.</li> </ul>
6	<ul style="list-style-type: none"> <li>Push in the piston so that the piston and the body are at the right positions (the centers are aligned).</li> <li>Use bolts B to secure the dust cover.</li> <li>Mount the end cover on the tube.</li> <li>Mount the plate on the guide rail and secure with bolts A.</li> </ul>	<ul style="list-style-type: none"> <li>If they are displaced, sufficient holding force cannot be obtained, which may cause malfunction.</li> <li>Ensure that the end faces of the body and the piston are roughly at the same position.</li> <li>Tighten bolts B with the specified torque. (See Table below)</li> <li>Apply an anaerobic adhesive on bolts A.</li> <li>Tighten bolts A with the specified torque. (See Table below)</li> </ul>

### Notes on Magnetic Products

The piston in the tube contains a magnet with strong magnetism. Bringing it close to any magnetic recording medium may cause the data to be erased. Do not bring it close to any device that may malfunction due to magnetism.

### Timing of Replacement of Repair Parts

As a rule, replace at intervals of travel of about 1000 km.




Model	Fixing Screws	Bolt Size	Fastening Torque
PRZ12	A	M4×0.7	4N·m
	B	M3×0.5	2.5N·m
PRZ16	A	M4×0.7	4N·m
	B	M4×0.7	4N·m

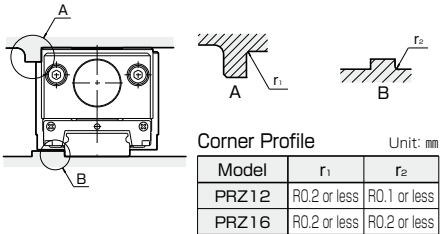
PRECAUTIONS FOR DESIGN AND USE

⚠ Caution

Mounting Surface Accuracy

①The body and guide rail bottom side of PICO TABLE LONG are precision-ground. Ensure that the mating mounting surface of a machine, equipment, jig, etc. is a flat surface machined to high precision without unevenness or projections and mounting is correct in order to achieve stable, high-accuracy linear motion. Low mounting surface accuracy or incorrect mounting may cause looseness, increase the rolling resistance or adversely affect the service life. Mounting Datum Plane of Body and Guide Rail  page 410

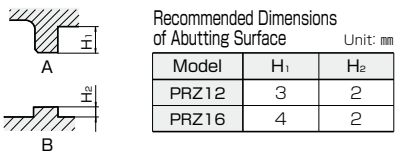
②It is recommended to provide a recess in the corner of a mating mounting surface of the body but a curve as shown in the figure below can be made for use. A larger corner profile than the chamfer dimension of the body or guide rail may cause inaccurate contact with the abutting surface.



③Ensure that there is no squareness error between the body or guide rail mounting surface and the abutting surface. Inadequate squareness may cause inaccurate contact with the abutting surface.



④When designing the abutting surface, pay attention to the height and thickness of the abutting surface. Inadequate thickness may lead to poor accuracy due to insufficient rigidity against transverse load or positioning with a lateral pressing bolt.



Rigidity of Mounting (Securing Part)

Insufficient rigidity of the securing method and mounting of the product may hinder realization of the high rigidity and high accuracy of PICO TABLE LONG. When designing, give sufficient consideration to the rigidity of equipment such as the mounting base.

Maximum Operating Pressure

The piston subjected to air pressure and the body on which to mount the load are connected together by magnetism of the magnet of the piston. Accordingly, operation at a pressure exceeding the maximum operating pressure 0.6MPa may disengage the connection and allows the body to move freely, which renders the unit uncontrollable. Ensure that the pressure does not exceed the maximum operating pressure.

Intermediate Stop

Avoid any intermediate stop in a pneumatic circuit using a closed center valve, etc. Forced stop of the piston alone may disengage the magnetic connection between the body and the piston because of the inertial force of the body and the mounted load, which renders the unit uncontrollable. Likewise, do not switch operation in the middle of a stroke.

Connection with Load


For connection with any load that has an external supporting mechanism, ensure sufficient centering. Direct loading within the allowable range for operation is possible but insufficient centering of connection with load that has an external supporting mechanism may adversely affect operation, service life, etc. A longer stroke means a larger displacement of the axis. Consider a method of connection that tolerates the displacement.

Load Center of Gravity

Bring the load center of gravity as close to the body center as possible. The load center of gravity distant from the body center may generate a large moment of force, adversely affecting the service life and rigidity. Ensure that the load and the moment are within the allowable ranges for operation.

Stroke Adjustment

Stop the motion by bringing the stopper to hit against the dust cover on the end of the body. Removal of the stopper or inappropriate stopper adjustment may cause the dust cover to come in contact with the plate on both ends, leading to failure. Ensure that the stopper projects from the plate by 1.5 mm or longer.

 Page 403, 429

### Linear Guide Lubrication

Lubricant is enclosed in the guide table in advance but the performance will be deteriorated by a long operating time, operating conditions, environment, etc. Regular lubrication is necessary.

Using without lubrication may accelerate wear of the rolling part or cause earlier end of the service life.

The timing of regreasing depends on the operating conditions and environment. As a rule, regrease at intervals of travel of 100 km or one month.

After wiping the old grease off, supply lithium soap-based grease through the oil hole in the guide table.

Supplying a different type of grease may cause malfunction or failure due to lubrication performance degradation or chemical change.

Turbine oil can be applied or drop-fed for use.

Do not use spindle oil or machine oil because they adversely affect the packing.

### Lubrication of Tube Outer Circumferential Surface

Apply the special grease on the tube outer circumferential surface at regular intervals (about 300 km).

Shortage of grease may adversely affect durability.

Use the special grease HG (PRZ) separately offered.

Use of anything other than the special grease may cause malfunction.

Note that HG (PRZ) is a grease exclusively for the cylinder and different from that for the guide.

### Lubrication of Compressed Air

The inside of the tube is initially lubricated with special grease. Use without regreasing.

When applying grease for repair, etc., use the grease included in the repair parts set or cylinder repair grease HG (PRZ) separately offered.

### Play of Tube

The tube slightly moves in the axial (up to about 1.5 mm) and circumferential directions, which is due to the play provided for preventing galling with the guide and not an abnormality.

### Rolling Feel in Linear Guide

When the body is moved by hand without pressurizing the air, rolling of balls inside the linear guide may cause slight feel of operation discontinuity or difference in the rolling resistance between products. This is due to preload (preload condition) of the linear guide and does not affect the performance.

### Magnetization of Body

The body is made of iron and may be magnetized if a magnet or other magnetized object is brought in contact. If the sucked object is subsequently removed, the body remains magnetized.

Note that, when a switch is used, this magnetization may cause faulty operation of the switch.

### Positioning Pin Hole in Body

Press-fitting a pin into a positioning pin hole may cause failure due to deformation, damage or excessive load applied during press-fitting.

Ensure that the fit allows for a clearance between the hole and the pin (clearance fit: tolerance class position g max.).

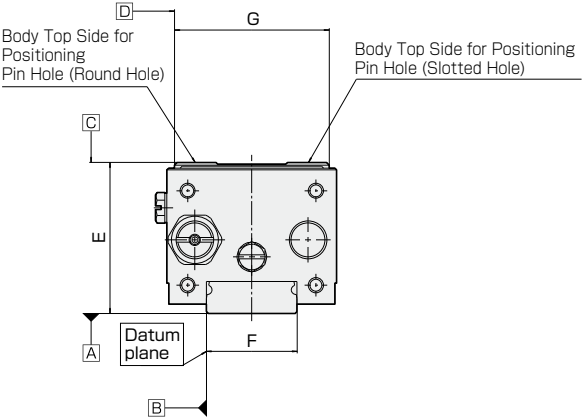
### Projection and Stick-Slip

Magnetic rodless cylinders are subject to slight projection at the start of operation due to their structure.

In the middle of a stroke movement, a slight stick-slip phenomenon may occur.

### Effect of Magnetic Force

The piston integrates a magnet. Do not bring close to it any product or part that may be affected by magnetic force.



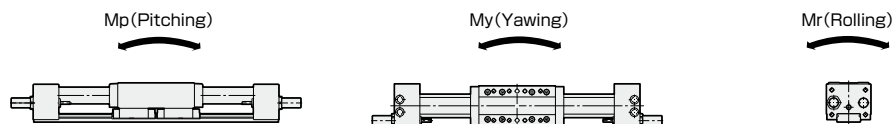
ACCURACY Unit: mm

Model	PRZ12	PRZ16
Running parallelism of C with respect to A	0.015	0.02
Running parallelism of D with respect to B	0.015	0.02
Tolerance of dimension E	±0.09	±0.07
Tolerance of dimension F	0 -0.05	0 -0.05
Tolerance of dimension G	±0.1	±0.1

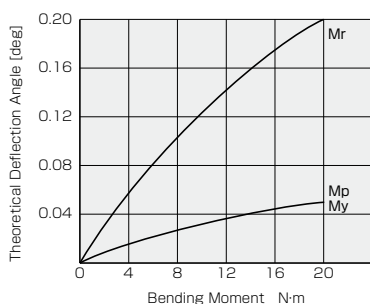
## THEORETICAL DEFLECTION OF BODY BY MOMENT

If the body is subjected to external force due to gravity or external force on the mounted load, a slight angular displacement occurs.

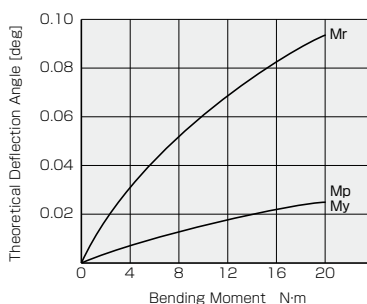
The displacement angles of the body according to moments in the respective directions are plotted in the graphs below.



PRZ12



PRZ16



ALLOWABLE MOUNTED LOAD MASS, ALLOWABLE LOAD FORCE AND ALLOWABLE MOMENT

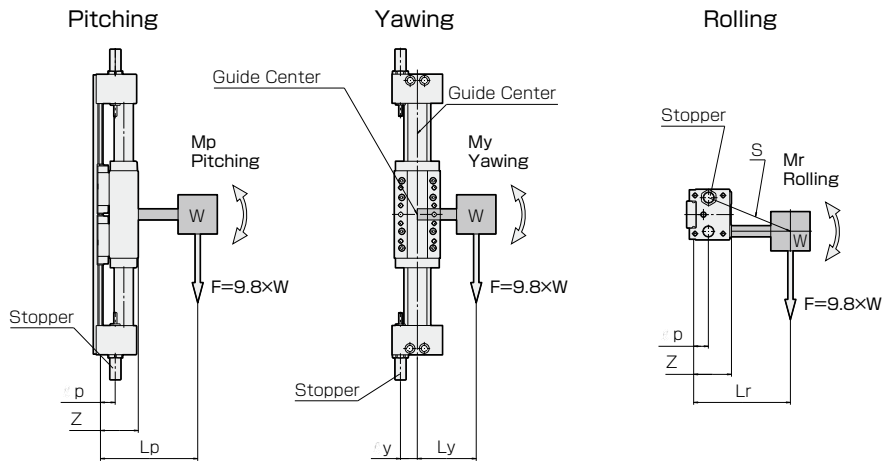
Caution

Before using this unit, check that the applied load is within the allowable load. Using out of allowable limit may cause bad influence for movement, accuracy and life. At the worst, the actuators would be broken.

Types of Load	Situation of Actuator	Situation of Load	Item to be confirmed
Mounted Load(W)	Operating	Continuously Acting	Allowable Mounted Load Mass, Allowable Mounted Load Moment, Allowable Inertia Mass, Allowable Absorber Collision Energy
External Force	Stopping	Temporarily Acting	Basic Static-load Rating, Allowable Static Moment

Direction of Moment and Guide Center Line and Stopper

The moment directions are classified into three types in accordance with the mounting condition of a load to the actuator.



Position of Guide,Stopper Unit: m

Model	Guide	Stopper	
	Z	ℓ p	ℓ y
PRZ12	0.0261	0.0101	0.0128
PRZ16	0.0337	0.0132	0.0150

- W..... Mounted load mass(kg)
- F..... Gravity applied on load(N)
- Lp, Ly, Lr..... Distance between guide center line and center of gravity of mounted load(m)
- ℓ p, ℓ y..... Distance between guide center line and center of Stopper bolt(m)
- S..... Distance between center of gravity of mounted load and stopper bolt(m)

Allowable Mounted Load Mass, Allowable Mounted Load Moment, Allowable Inertia Mass

When the actuator is operated with mounted load, confirm that the following four values are within the allowable range.

① Allowable Load Mass Unit: kg

Model		PRZ12	PRZ16
Allowable Load Mass	Shock Absorber (QZ)	3	4
	Rubber Stopper (QT)	1.5	2

Caution

When operating in the vertical direction, even if mounted load mass is within the allowable range, there might be some cases the thrust are not enough to move or to get the expected speed depending on supplied air pressure. Besides, there might be some cases the thrust are not enough to push the rod of the shock absorber to end. In this case, please arrange the load mass less than 20% of theoretical thrust. Theoretical thrust (page 40)



## ② Allowable Mounted load Moment

There is the formula below to calculate three moments by the gravity. Please confirm they are within the allowable moments in the table below.

$$\begin{aligned} (\text{Mounted load moment}) &= (\text{Gravity applied on load: } F) \times (\text{Distance between guide center line and center of gravity of mounted load: } L) \\ &= 9.8 \times (\text{Mounted load mass: } W) \times (\text{Distance between guide center line and center of gravity of mounted load: } L) \end{aligned}$$

$$(\text{Gravity applied on load: } F) = 9.8 \times (\text{Mounted load mass: } W)$$

$$\text{Pitching} \cdots M_p (\text{N} \cdot \text{m}) = 9.8 \times W (\text{kg}) \times L_p (\text{m})$$

$$\text{Yawing} \cdots M_y (\text{N} \cdot \text{m}) = 9.8 \times W (\text{kg}) \times L_y (\text{m})$$

$$\text{Rolling} \cdots M_r (\text{N} \cdot \text{m}) = 9.8 \times W (\text{kg}) \times L_r (\text{m})$$

### Allowable Mounted Load Moment

Model	Allowable Mounted Load Moment N·m		
	Mp	My	Mr
PRZ12	4.5	4.5	2.8
PRZ16	5.5	5.6	4.3

$$1 \text{ N} \cdot \text{m} = 0.102 \text{ kgf} \cdot \text{m}$$

## ③ Allowable Inertia Mass

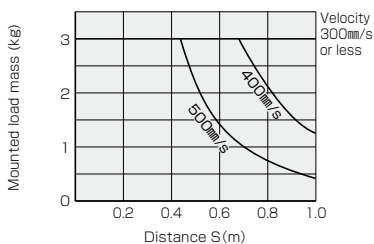
When an actuator stops at the end of its stroke, a force is generated due to the inertia of the load. The value of this force depends on various conditions like the shape of load, mounting ways and operating pressure. Therefore, it is very difficult to formulate the allowable value.

The graphs below show theoretically relation between "the velocity at the stroke end", "mounted load mass" and "the distance between the center of the gravity of load and stopper".

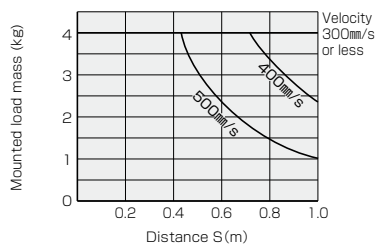
These graphs can be used as reference to the allowable values of the load.

S: The distance between the center of the gravity of load and stopper. Please refer to the figures of rolling in the previous page.

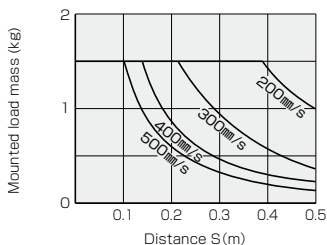
PRZ12-QZ



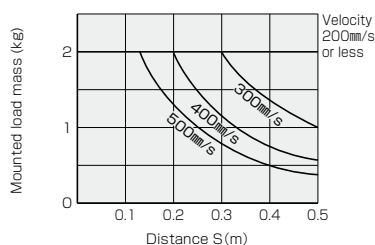
PRZ16-QZ



PRZ12-QT



PRZ16-QT

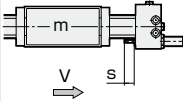
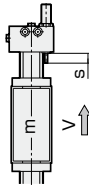
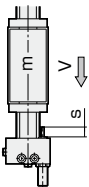


Note: When a metal stopper is used externally for stopping, it may generate extremely large impact force.  
As a rule, consider 1/5 to 1/10 of the values in the graph above as the mounted load mass.

④Shock Absorber Collision Energy(Only QZ)

The energy that the shock absorber of the stopper must absorb consists of three element: kinetic energy, energy of cylinder thrust and energy due to gravity.  
The collision energy is the total of three.

See the shock absorber specifications and energy absorption graphs below. Use the product within the shock absorber specifications.

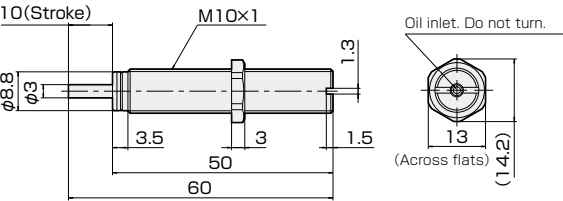
	Horizontal Use	Vertical Upward Use	Vertical Downward Use
Usage Condition Example			
Collision Energy E	$E=1/2(mV^2)+Fs$	$E=1/2(mV^2)+Fs-mgs$	$E=1/2(mV^2)+Fs+mgs$

E : Collision energy(J)  
m : Colliding mass(kg)  
V : Collision velocity(m/s)  
F : Cylinder thrust(N)  
s : Shock absorber stroke(m)  
g : Gravity acceleration(9.8m/S²)

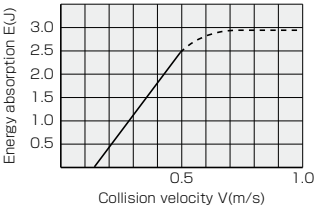
SHOCK ABSORBER SPECIFICATIONS

Model	ABK10
Max Energy Absorption	3J
Stroke	10mm
Energy Absorption Per Minute	60.8J/min
Max. Collision Velocity	1 m/s
Usage Frequency	60c.p.m. or less
Operating Temperature Range	-5~70°C
Piston Rod Return Force	4.9N
Applied Model	PRZ12, 16

MODEL: ABK10



Energy Absorption Graph



## ■ Allowable Load and Allowable Moment for External Force (Motionless)

In the case that an external force is applied temporarily when the actuator stops at the stroke end or so, confirm that the following two values are within allowable range.

### ① External Force Value (Basic Static Load Rating)

### ② External Moment (Static Moment Rating)

Note: The arm length of a moment shall be length from the guide center and the point where an external force is applied.

If a guide table receives an excessive load or a large impact, permanent deformation is locally generated between the ball and the ball rolling surface. This deformation will prevent the actuator from smooth operation when it develops more than the allowable limit. The basic static load rating  $C_0$ , the static moment rating  $M_{p0}$ ,  $M_{y0}$  and  $M_{r0}$  mean such a static load and static moment of constant direction and the total of the permanent deformation values at the ball rolling surface is 0.0001 times of the ball diameter on the contact surface receiving the maximum stress.

The static moment applied to the table is limited under  $C_0$ ,  $M_{p0}$ ,  $M_{y0}$  and  $M_{r0}$  with considering about static safety factor,  $f_s$ .

$C_0 \geq f_s \cdot P$        $C_0$ : basic static load rating N     $M_{p0} \geq f_s \cdot M_{p1}$        $M_{p0}$ ,  $M_{y0}$ ,  $M_{r0}$ : Static moment rating N·m  
 $P$ : static load N                       $M_{y0} \geq f_s \cdot M_{y1}$        $M_{p1}$ ,  $M_{y1}$ ,  $M_{r1}$ : Static moment N·m  
 $f_s$ : static safety factor                   $M_{r0} \geq f_s \cdot M_{r1}$        $f_s$ : Static safety factor

### STATIC SAFETY FACTOR $f_s$

Load Conditions	Lower Limit of $f_s$
Impact with Light Load	1.0~1.3
Impact with Heavy Load	2.0~3.0

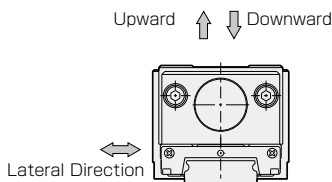
### BASIC STATIC LOAD RATING, STATIC MOMENT RATING

Model	Basic Static Load Rating N	Static Moment Rating N·m		
		$M_{p0}$	$M_{y0}$	$M_{r0}$
PRZ12	7840	117	117	72
PRZ16	12160	124	125	95.2

$1\text{N}\cdot\text{m}=0.102\text{kgf}\cdot\text{m}$   
 $1\text{N}=0.102\text{kgf}$

### Loading Direction and Rated Load (PRZ16 Only)

The basic static load rating  $C_0$  in the table above shows values for downward loading. Find the values for the upward and lateral directions from the table below.




Load Direction	Load Rating	Basic Static Load Rating
Downward		$C_0$
Upward		$0.70C_0$
Lateral direction		$0.71C_0$

DIMENSIONS(mm) PRZ12

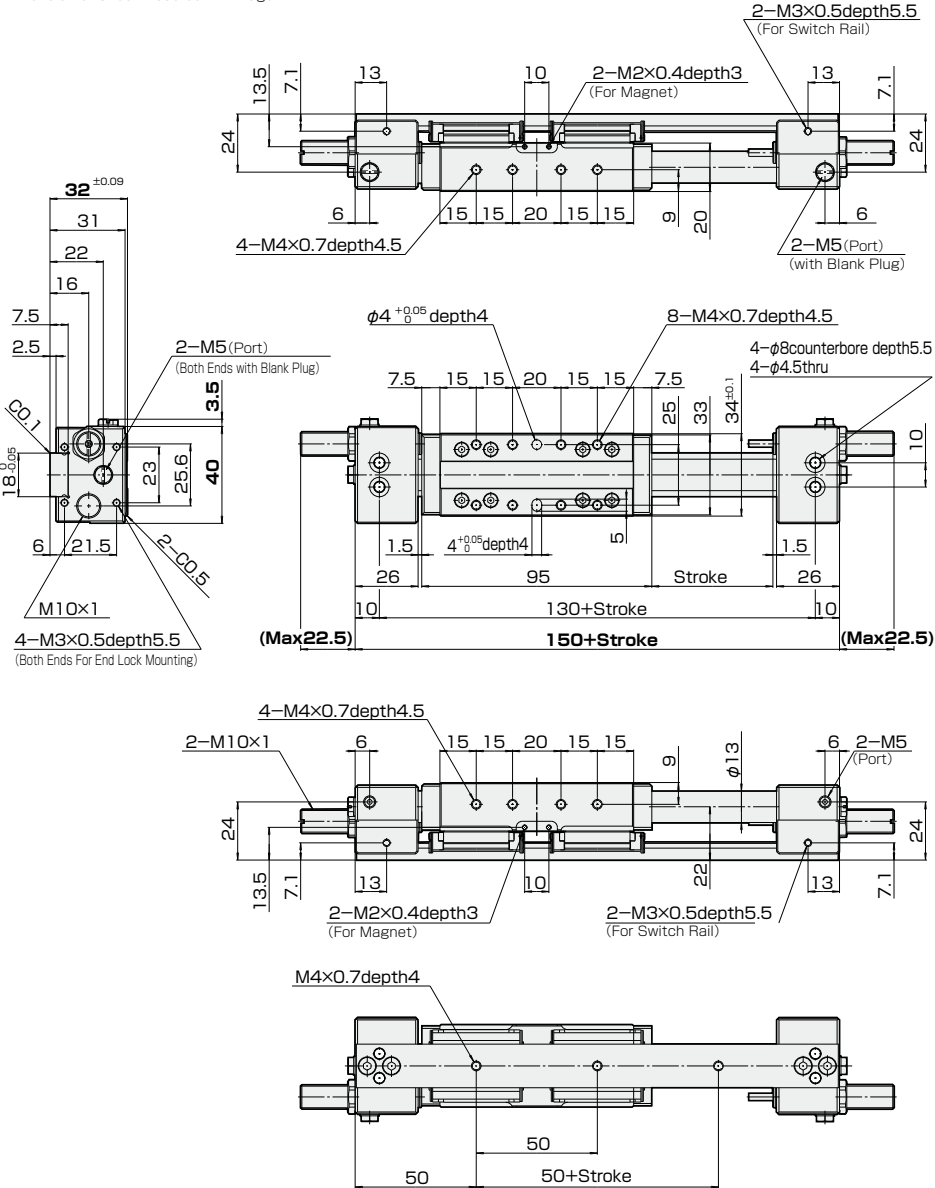
PRZ-SD12-(Stroke)-QZ  
QT

No Centralized Piping  
Bore Size  
Stopper  
QZ:Both Side Shock Absorber  
QT:Both Side Rubber Stopper  
Stroke Adjustment Range--Single Side-19mm(Total-38mm)

Standard Stroke  Page 400

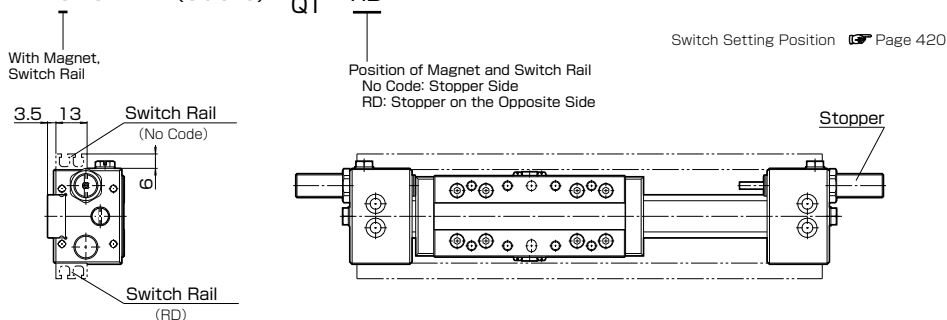
Dimension of Shock Absorber  Page 414

PRZ-SD12  
NANO  
PICO TABLE Long



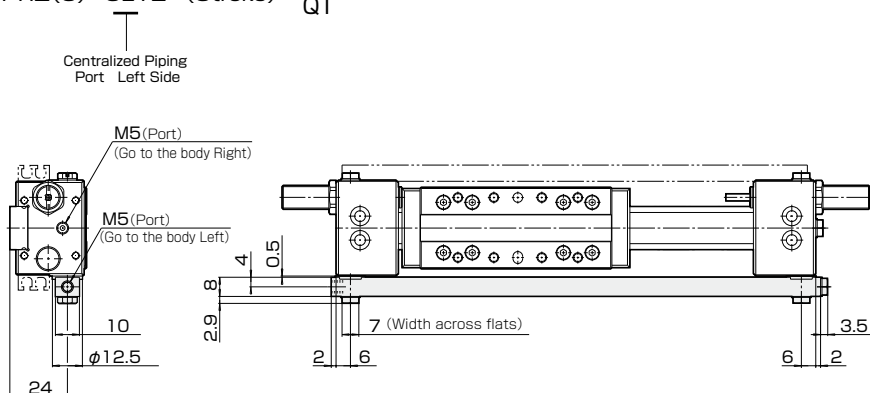
## With Magnet, Switch Rail

PRZ-SD12-(Stroke)-QZ-RT



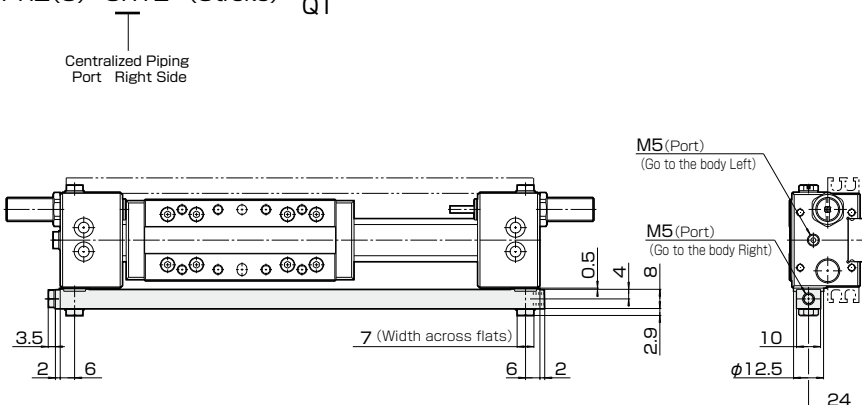
## Centralized Piping Port Left Side

PRZ(S)-SL12-(Stroke)-QZ



## Centralized Piping Port Right Side

PRZ(S)-SR12-(Stroke)-QZ

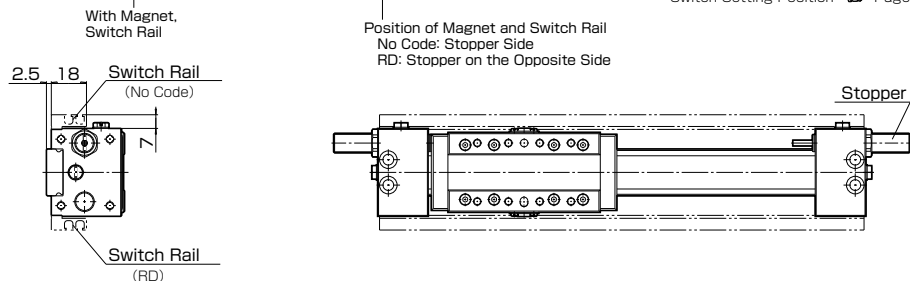




## With Magnet, Switch Rail

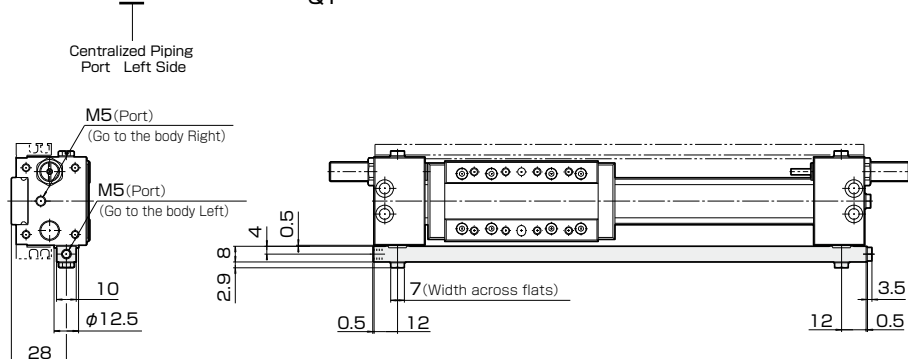
PRZ(S)–SD16–(Stroke)– $\begin{matrix} \text{QZ} \\ \text{QT} \end{matrix}$ –RD

Switch Setting Position  Page 420



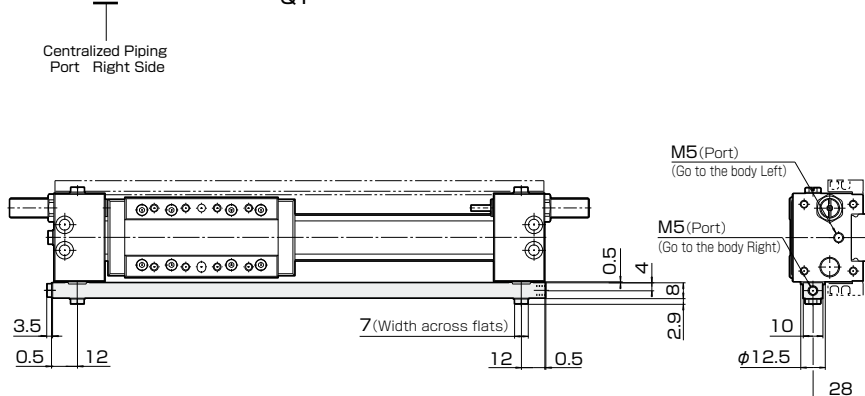
## Centralized Piping Port Left Side

PRZ(S)–SL16–(Stroke)– $\begin{matrix} \text{QZ} \\ \text{QT} \end{matrix}$



## Centralized Piping Port Right Side

PRZ(S)–SR16–(Stroke)– $\begin{matrix} \text{QZ} \\ \text{QT} \end{matrix}$



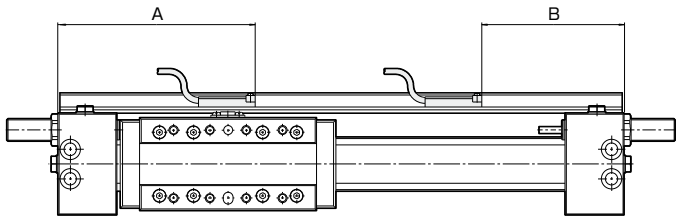
PRZ–SL (SR) 16

NPD

PICO TABLE Long

# INSTALLATION OF SWITCH

## Switch Setting Position



RB(RC) 1, 2 Switch		Unit: mm		
Model	Switch Setting Position		On hold distance (ℓ)	Hysteresis (c)
	A	B		
PRZ12	87	63	6	1
PRZ16	87	63		

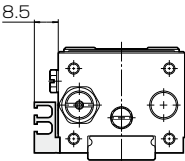
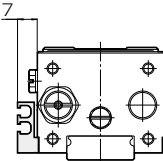
RB(RC)4, 5 Switch		Unit: mm		
Model	Switch Setting Position		On hold distance (ℓ)	Hysteresis (c)
	A	B		
PRZ12	85	65	2.5	1
PRZ16	85	65		

Explanation of hysteresis and on hold distance.  page 1084

## Changes to Dimensions of PRZ16 Switch Rail and Mounting Bracket

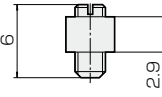
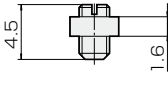
Changes have been made as shown below to the switch rail and mounting bracket for PRZ16. (Starting on April 1, 2000)  
When ordering a switch rail, switch mounting bracket or switch as a separately offered part, make sure of the type.

### Switch Rail

Major Change	Before Change	After Change
OPTIONAL PARTS CODES	RJ(PRZ16-□)-B	RJ(PRZ16-□)
Projection (Thickness)	8.5	7
Dimensions		

Note: The switch rail after change can be mounted on a product before change as well.

### Switch Fixture

Major Change	Before Change	After Change
OPTIONAL PARTS CODES	BE(PRZ)	BF(PRZ)
Nut Thickness	2.9	1.6
Screw Length	6	4.5
Dimensions		

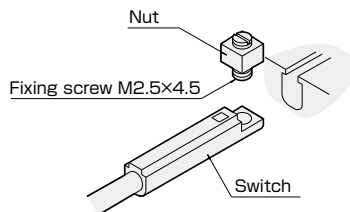
### Switch (With Mounting Bracket)

Major Change	Before Change	After Change
OPTIONAL PARTS CODES	RB□(PRZ)-B, RC□(PRZ)-B	RB□(PRZ), RC□(PRZ)
Mounting Bracket	See Above	See Above



## ■ 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 torque of fixing screw must be 0.1 N·m.



## Costom made

### ■ To change grease

- Change the grease of bearing part to the other grease.
- There is a case might not be handled depends on kind of grease or request.
- Cylinder grease at the cylinder part can not be exchanged to assure operation performance of product.
- Grease of purchased item can not be exchanged.

Please ask us for more detailed infomation.

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