

PICO UNIT

PICO UNIT®

PPU Series

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PPUH	End Lock Mechanism Type	369 Page

P
C
U

P
C
U
H

PICO UNIT

PICO UNIT Line Up

Standard Type

PPU



313
Page

With End Lock Mechanism

PPUH

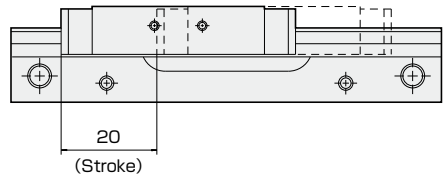


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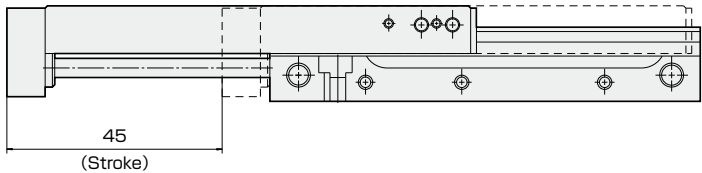
PICO UNIT

PICO UNIT Concept

PICO TABLE PPT10-20



PICO UNIT PPU10-45



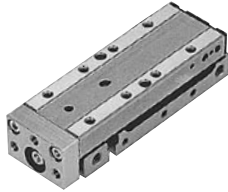
Pico Unit PPU is a long stroke type of Pico Table PPT.

Pico Unit PPU is high accuracy and high rigidity since bearing of Pico Table PPT is installed.

Size



PPU10-15



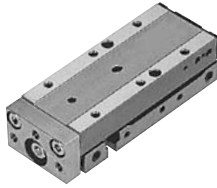
PPU10-30



PPU10-45



PPU12-20



PPU12-30



PPU12-45



PPU12-60

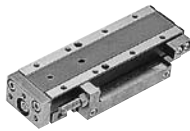
PPU

PICO UNIT

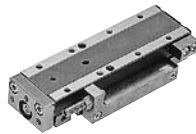
Stopper (Option)



No Stroke Adjustment



With Metal Stopper



With Rubber Stopper
on Outstroke Side



With Shock Absorber
on Outstroke Side



With Metal Stopper
on Both Sides



With Rubber Stopper
on Both Sides

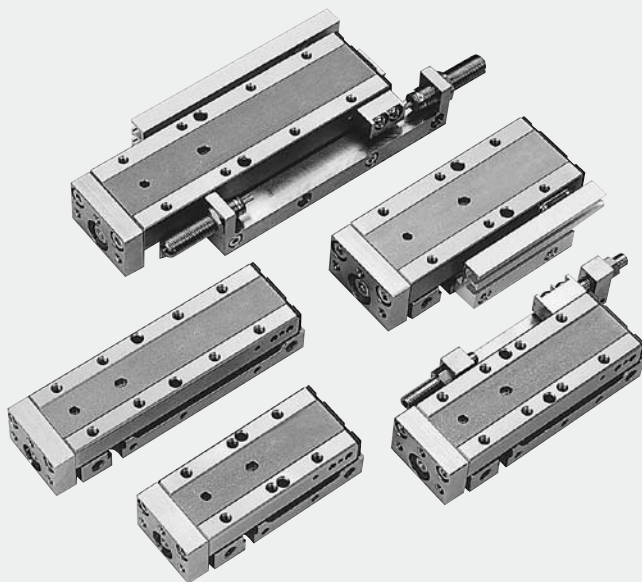


With Shock Absorber
on Both Sides

PICO UNIT®

PPU Series

Registration of a Design



PICO UNIT

PICO UNIT

INDEX★

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PICO UNIT

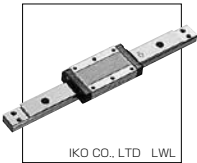
PPU Series ($\phi 10$, $\phi 12$)

PPU series is another version as PPT series for long stroke. The head table for attachment is united to the structure of PPT. (Miniature precision linear bearing with integrated air cylinder)

Running Parallelism **0.004mm**, Mounting Parallelism **0.02mm**

PICO UNIT

Linear Bearing



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

Precision linear bearing by 4-points contact

Strong structure for complex load



Stainless Guide Table

Linear Guide Integral Structure
High rigidity by integral structure installing air cylinder in the linear guide.

Dust Seal

With dust seal to protect linear bearing ball and race against dust.

Stroke Adjustment

Available to select one from the 6 kinds of stroke adjustment for application. Besides, it can be installed either right or left side on the body. (Refer to SD type, GT type)

Switch is Available.

Switch and switch rail can be installed either right or left side on the body. (Refer to SD type, GT type)

Pin holes for Positioning

Easy installation and detaching of tool as reproducibility

Stainless Guide Body

Installation of Tool

Direct mounting on the top and front of table

Flexible Installation of Piping Port

Available to select either right or left side on the body for application.

End Lock Mechanism

Option PPUH

Countermeasure for Copper Parts

Copper parts are not used.

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

Summary of the PICO UNIT (PPU) Series

The "PICO UNIT" (PPU series) is one of our family of miniature linear guide with integrated air cylinder, which can give high precision and high accuracy of linear guide itself to various application.

PPU series is derivative one from PPT.

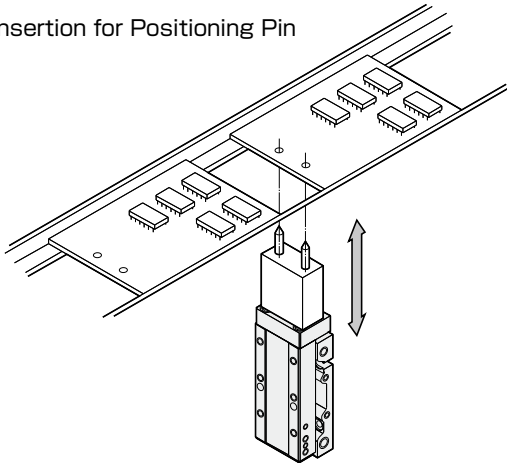
PPU has longer stroke than PPT and a useful front side for mounting.

PPU also has abundantly many choices for use, which has three kinds of stroke adjustment, metal stopper, rubber stopper and shock absorber and installation of switch can detect position of stroke is available.

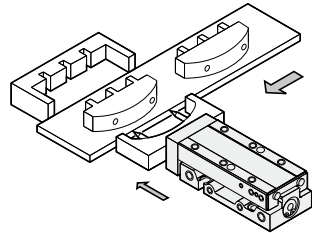
Refer to PPUH (with end lock).

Application Examples : PICO UNIT

Insertion for Positioning Pin



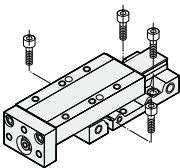
Feeding for Products



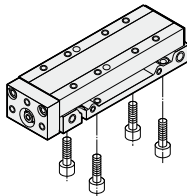
MAIN BODY INSTALLATION

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

Top Mounting
(Thru Hole used)



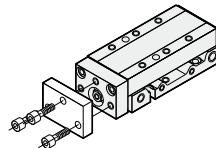
Bottom Mounting
(Body Tap)



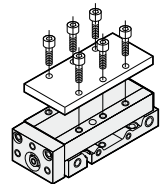
MOUNTING

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

Front Mounting



Top Mounting



Model Code Example

PPUS-SD12-30-TP-QS-RB12LA

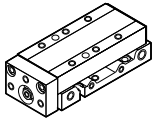
Series Name ●

Cable Length ●

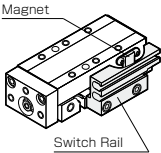
No Code	1 m
LA	3 m

Magnet and Switch Rail ●

No Code	None
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S Magnet and Switch Rail

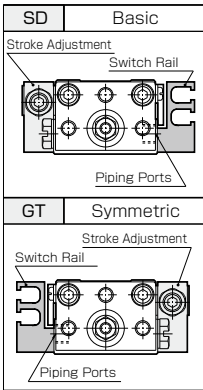


A magnet and switch rail is required when mounting switches.

● Bore Size

10	φ10
12	φ12

● Location of Switch and Stroke Adjustment



When switch rail and stroke adjustment is not necessary, select SD.

Stroke ●

Bore size	Standard Stroke (mm)				
	15	20	30	45	60
φ10	●	—	●	●	—
φ12	—	●	●	●	●

For an intermediate stroke, select a model with stroke adjustment

● Piping

TP	Side Ported
----	-------------

● Number of Switches

1	1
2	2

Switch ●

No Code	None	
RB1	Straight	DC12~24V 2 Wires Reed Switch
RC1	Angle	DC12~24V 2 Wires Reed Switch
RB2	Straight	DC12~24V 2 Wires Solid State Switch
RC2	Angle	DC12~24V 2 Wires Solid State Switch
RB4	Straight	DC12~24V 2 Wires Solid State Switch
RC4	Angle	DC12~24V 2 Wires Solid State Switch
RB5	Straight	DC5~24V 3 Wires Solid State Switch
RC5	Angle	DC5~24V 3 Wires Solid State Switch

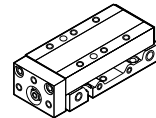
Direction of Cable Outlet For details ☞ Page 1066, 1067

RB... Straight Outlet Cable RC... Angle Outlet Cable



● Stroke Adjustment Mechanism

No Code	Without Stroke Adjustment
---------	---------------------------



QS	Outstroke Side Stroke Adjustment, Rubber Stopper	QN	Outstroke Side Stroke Adjustment, Metal Stopper	QL	Outstroke Side Stroke Adjustment, Shock Absorber
				Shock Absorber is converted to new type. ☞ Page 319, 330	
QT	Both Sides Stroke Adjustment, Rubber Stopper	QR	Both Sides Stroke Adjustment, Metal Stopper	QM	Both Sides Stroke Adjustment, Shock Absorber
				Shock Absorber is converted to new type. ☞ Page 319, 330	

For details of stroke adjustment range ☞ Page 317

Option code is converted shock absorber conversion to new type. (QY→QL, QZ→QM)

SPECIFICATIONS

Bore Size		ϕ 10mm	ϕ 12mm
Rod Diameter		ϕ 4mm	ϕ 5mm
Maximum Load Mass	Without Stroke Adjustment	0.8kg	1.2kg
	With Metal Stopper	0.3kg	0.5kg
	With Rubber Stopper	0.8kg	1.2kg
	With Shock Absorber	1.6kg	2.0kg
Port Size		M5×0.8	
Guide Mechanism		Precision Linear Ball Bearing	
Type of Operation		Double Acting	
Fluid		Air	
Maximum Operating Pressure		0.7 MPa	
Minimum Operating Pressure		0.15MPa	
With Shock Absorber		0.2 MPa	
Proof Pressure		1.05MPa	
Operating Temperature		5~60°C	
Operating Speed		50~400mm/s	
Lubrication		Not required	
Cushioning	Basic	Rubber Cushion (build in)	
	Option	Rubber Stopper, Shock Absorber	

*PPU should be used within operating speed. Using out of operating speed may cause poor life or give damage to components.

THE TYPE OF LINEAR BEARING

Model	Type
PPU10	IKO LWL12
PPU12	IKO LWL15

Pre-load:Zero or slightly pre-loaded

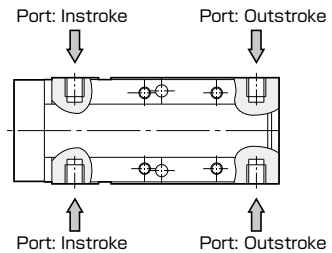
STROKE ADJUSTMENT RANGE

Model	Metal Stopper		Rubber Stopper		Shock Absorber	
	QN	QR	QS	QT	QL	QM
PPU10	Outstroke:15mm	Outstroke:15mm Instroke:5mm	Outstroke:15mm	Outstroke:15mm Instroke:5mm	Outstroke:19mm	Outstroke:19mm Instroke:16mm
	Outstroke:15mm	Outstroke:15mm Instroke:5mm	Outstroke:15mm	Outstroke:15mm Instroke:5mm	Outstroke:18mm	Outstroke:18mm Instroke:16mm

PIPING PORT

The ports can be used properly according to the usage because ports are located on both sides of the body. However, note that the port position might be not changed according to the option. The direction of the port should be determined by SD or GT, make sure the relation between the direction of the port and SD or GT on catalog.

Modification of port position  Page 321



Option which can be exchange the position of ports


Model	Without option (Basic)	Type of Option						
		With Magnet Switch Rail (PPUS)	Outstroke Side Rubber Stopper (QS)	Both Sides Rubber Stopper (QT)	Outstroke Side Metal Stopper (QN)	Both Sides Metal Stopper (QR)	Outstroke Side Shock Absorber (QL)	Both Sides Shock Absorber (QM)
PPU10	●	●	●	×	●	×	×	×
PPU12	●	●	●	×	●	×	×	×

OPTIONAL PARTS CODES


Name


Switch Fixture

PARTS CODE
Note
PARTS CODE
Note
Content


BE(PPU)
Screw, nut



Reed Switch(2 Wires, with Indicator Light)
Straight Outlet Cable Angle Outlet Cable

RB1 (PPU)
Cable Length:1m
RB1LA(PPU)
Cable Length:3m

with fixture

RC1 (PPU)
Cable Length:1m
RC1LA(PPU)
Cable Length:3m

with fixture

Reed Switch(2 Wires, without Indicator Light)
Straight Outlet Cable Angle Outlet Cable

RB2(PPU)
Cable Length:1m
RB2LA(PPU)
Cable Length:3m

with fixture

RC2(PPU)
Cable Length:1m
RC2LA(PPU)
Cable Length:3m

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 Angle Outlet Cable

RB4(PPU)
Cable Length:1m
RB4LA(PPU)
Cable Length:3m

with fixture


RC4(PPU)
Cable Length:1m
RC4LA(PPU)
Cable Length:3m

with fixture

Solid State Switch(3 Wires, with Indicator Light)
Straight Outlet Cable Angle Outlet Cable

RB5(PPU)
Cable Length:1m
RB5LA(PPU)
Cable Length:3m

with fixture

RC5(PPU)
Cable Length:1m
RC5LA(PPU)
Cable Length:3m

with fixture

Switch Rail

RJ(PPU- [A] [B]-[C])
[A]:SD or GT, [B]:Bore size, [C]:Stroke Example: For PPUS-GT10-15-TP, RJ(PPU-GT10-15)

with fixing bolts

Magnet

RK(PPU)
Before mounting, apply anaerobic adhesive to the screws.

with M2 mounting screws

Plug

BS-M5	BR-M5
with gasket	Coat BR-M5 with seal tapes or sealing liquid when using it.
	

CPU

PICO UNIT

OPTIONAL PARTS CODES

Adjuster Bolt

Object	PARTS CODE
PPU10 for outstroke	AJ(M5-30)
PPU10 for instroke	AJ(M5-22)
PPU12 for outstroke	AJ(M6-30)
PPU12 for instroke	AJ(M6-22)



with nut

Stroke Adjustment(Outstroke Side Rubber Stopper)

QS(PPU- [A] [B]-[C])
[A]:SD or GT, [B]:Bore size, [C]:Stroke Example: For PPU-GT10-15-TP, QS(PPU-GT10-15)



with fixing bolts

Stroke Adjustment(Both Sides Rubber Stopper)

QT(PPU [B]-[C])
[B]:Bore size, [C]:Stroke Example: For PPU10 with 15 stroke, QT(PPU10-15)



with fixing bolts

Adjuster Bolt with Rubber

Object	PARTS CODE
PPU10 for outstroke	AR(M5-30)
PPU10 for instroke	AR(M5-22)
PPU12 for outstroke	AR(M6-30)
PPU12 for instroke	AR(M6-22)



with nut

Stroke Adjustment(Outstroke Side Metal Stopper)

QN(PPU-[A] [B]-[C])
[A]:SD or GT, [B]:Bore size, [C]:Stroke Example: For PPU-GT10-15-TP, QN(PPU-GT10-15)



with fixing bolts

Stroke Adjustment(Both Sides Metal Stopper)

QR(PPU [B]-[C])
[B]:Bore size, [C]:Stroke Example: For PPU10 with 15 stroke, QR(PPU10-15)



with fixing bolts

Lock Nut for Adjustment Bolt

Object	PARTS CODE
M5(M5×0.8)	NTA(M5)
M6(M6×1)	NTA(M6)



Common use for Adjustment Bolt and Rubber Adjustment Bolt.

Stroke Adjustment(Outstroke Side Shock Absorber)

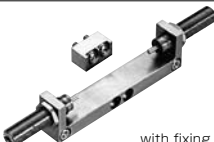
QL(PPU-[A] [B]-[C])
[A]:SD or GT, [B]:Bore size, [C]:Stroke Example: For PPU-GT10-15-TP, QL(PPU-GT10-15)



with fixing bolts

Stroke Adjustment(Both Sides Shock Absorber)

QM(PPU [B]-[C])
[B]:Bore size, [C]:Stroke Example: For PPU10 with 15 stroke, QM(PPU10-15)



with fixing bolts

Lock Nut for Shock Absorber

Object	PARTS CODE
ABK8(M8×0.75)	NTS(M8)



Shock Absorber

ABK8
M8×0.75
with nut

- Shock absorber is replaced to new type.
- It can be replaced to conventional shock absorber.

⚠ Caution

Before mounting, apply an anaerobic adhesive to the bolt.

MASS OF PPU

● MASS OF PPU

Unit: g

Model	Stroke	Basic Mass	Additional Mass for Magnet and Switch Rail	Additional Mass for Stroke Adjustment					
				Outstroke Side Metal Stopper (QN)	Both Side Metal Stopper (QR)	Outstroke Side Rubber Stopper (QS)	Both Side Rubber Stopper (QT)	Outstroke Side Shock Absorber (QL)	Both Side Shock Absorber (QM)
PPU10	15	230	15	35	55	35	55	45	75
	30	270	20	45	65	45	65	55	85
	45	320	25	55	75	55	75	65	95
PPU12	20	320	17	45	80	45	80	55	95
	30	370	20	55	90	55	90	65	105
	45	425	25	70	105	70	105	75	115
	60	495	30	85	120	85	120	90	130

Note: The same mass for SD and GT.

METHOD TO CALCULATE THE MASS

Ex. PPU5-GT10-45-TPQM-RB12LA

Basic Mass..... 320g
 Magnet, Switch Rail..... 25g
 Shock Absorber..... 95g
 Switch..... 35×2=70g

$$320+25+95+35 \times 2 = 510\text{g}$$

MASS OF SWITCH

Unit: g

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

THEORETICAL THRUST

Unit: N

Bore Size (mm)	Operating Direction	Operating Pressure MPa					
		0.2	0.3	0.4	0.5	0.6	0.7
φ10	Outstroke	16	24	31	39	47	55
	Instroke	13	20	26	33	40	46
φ12	Outstroke	23	34	45	57	68	79
	Instroke	19	28	37	47	56	65

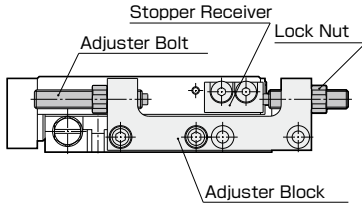
1MPa=10.2kgf/cm²
 1N=0.102kgf

CTUD

PICO UNIT

ADJUSTMENT OF STROKE AND REPLACEMENT OF STOPPER

■ Metal Stopper And Rubber Stopper



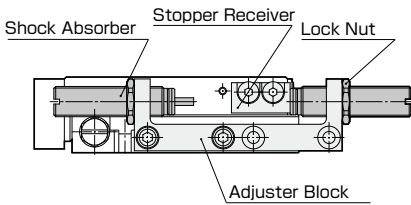
● Adjustment of Stroke

1. Loosen the fixing nut.
2. Turn the adjuster bolt until desired stroke is reached.
3. Tighten lock nut keeping not to turn the adjuster bolt.

● Replacement of Stopper

1. Loosen the fixing nut.
2. Turn out the adjuster bolt from adjuster block.
3. Turn in the replacement adjuster bolt and adjust stroke.
4. Tighten lock nut keeping not to turn the adjuster bolt.

■ Shock Absorber



● Adjustment of Stroke

1. Loosen the fixing nut.
2. Turn the shock absorber until desired stroke is reached.
3. Tighten lock nut keeping not to turn the shock absorber.

● Replacement of Shock Absorber

1. Turn out the shock absorber from adjuster block, turn in the replacement shock absorber to the adjuster block.
2. Turn the shock absorber until desired stroke is reached.
3. Tighten lock nut keeping not to turn the adjuster bolt.

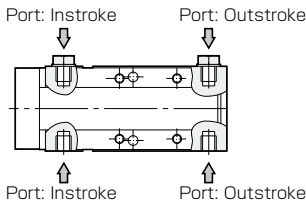
Refer to torque below to tighten the lock nut.

Lock Nut	Tightening Torque
M8×0.75	3.9N·m

⚠ Caution

- ① Abnormal noise of collision or vibration is recognized when the shock absorber or rubber stopper are used, it may mean the time to replace them because of their life. It will become the cause of breakage if it is then used.
- ② In case of the metal stoppers are used, rust may be generated on the contact surface during collision. Therefore periodic cleaning is recommended, not to give influence to accuracy of stop point position.

MODIFICATION OF PORT POSITION



When PPU is delivered, the plugs (BS-M5) are attached to the ports.

A gasket is provided on the washer face of BS-M5. Since BS-M5 can be easily mounted and removed with a wrench or a screw driver. You can freely change the position in accordance to your application such as symmetrical mounting.

If flat side surface is desired, the plug BR-M5 (hexagon socket set screw) is recommended.

In this case, it is necessary to apply seal tape or sealing agent on the thread portion.

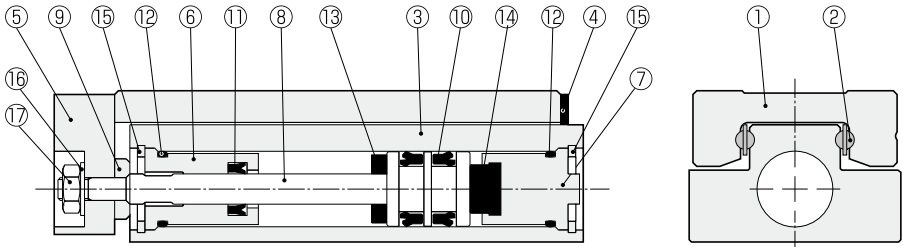
NOTE

About QT, QR, QL, QM, it is NOT available to exchange the position of ports like the figure above.

The position of the ports should be determined according to SD or GT in code.

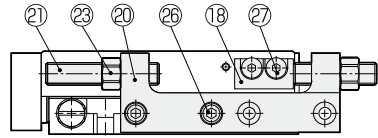
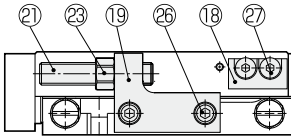
Option which can be exchange the position of ports. page 317

STRUCTURE AND PRINCIPAL COMPONENTS



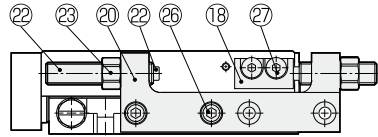
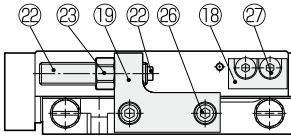
Metal Stopper: Outstroke Adjustment

Metal Stopper: Both Sides Stroke Adjustment



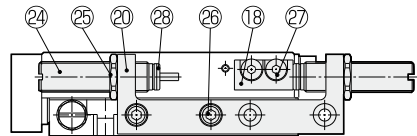
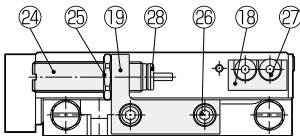
Rubber Stopper: Outstroke Adjustment

Rubber Stopper: Both Sides Stroke Adjustment



Shock Absorber: Outstroke Adjustment

Shock Absorber: Both Sides Stroke Adjustment

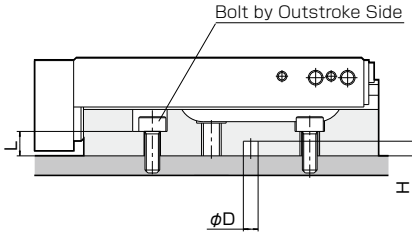


PPU series can not be disassembled for repair.

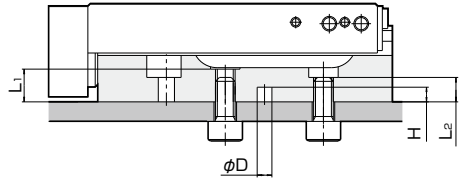
No.	Name	Material	Remarks	No.	Name	Material	Remarks
1	Guide Table	Stainless Steel (Heat Treatment)		15	Circlip	Carbon Steel	Nickel Plating
2	Ball	Stainless Steel (Heat Treatment)	With Retainer	16	Washer	Carbon Steel	Nickel Plating
3	Body	Stainless Steel (Heat Treatment)		17	Nut	Carbon Steel	Nickel Plating
4	Dust Seal	NBR, Stainless Steel		18	Stopper Receiver	Tool Steel(Heat Treatment)	Electroless Nickel Plating
5	End Plate	Carbon Steel	Electroless Nickel Plating	19	Adjuster Block (for Outstroke)	Carbon Steel	Electroless Nickel Plating
6	Rod Cover	Aluminum Alloy		20	Adjuster Block (for Both Sides)	Carbon Steel	Electroless Nickel Plating
7	End Cover	Aluminum Alloy		21	Adjuster Bolt	Carbon Steel(Heat Treatment)	
8	Piston Rod	Stainless Steel		22	Adjuster Bolt (for Rubber)	Stainless Steel, Urethane Rubber	Nickel Plating
9	Plate Washer	Stainless Steel		23	Lock Nut	Carbon Steel	Electroless Nickel Plating
10	Piston Seal	NBR		24	Shock Absorber	Copper Alloy	Electroless Nickel Plating
11	Rod Seal	NBR		25	Lock Nut	Carbon Steel	Nickel Plating P10
12	O-ring	NBR		26	Bolt	Structural Alloy Steel	Nickel Plating
13	Cushioning Rubber	Urethane Rubber		27	Bolt	Structural Alloy Steel	Nickel Plating
14	Cushioning Rubber	Urethane Rubber		28	Metal Stopper	Carbon Steel	Heat Treatment (Nitriding)

BODY INSTALLATION

Top Mounting(Thru Hole used)



Bottom Mounting(Body Tap)



Caution: Insert the two bolts by outstroke side from the side of body.

⚠ Caution

When mounting or removing the four bolts, tighten or loosen them carefully on average. If you tighten or loosen a specific bolt in the four bolts too much, the linear guide will receive excess load and might be broken.

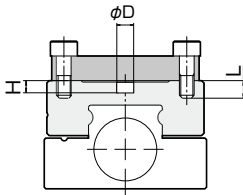
Model	Bolt Size	Thru hole length L(mm)	Fastening Torque N·m	Pin Holes for Positioning $\phi D \times H$ (mm)
PPU10	M3	5	1.1	$\phi 3^{+0.05}_0$ depth3
PPU12	M4	4.5	2.5	$\phi 3^{+0.05}_0$ depth3

Model	Bolt Size	Screw depth L ₁ (mm)	Screw depth L ₂ (mm)	Fastening Torque N·m	Pin Holes for Positioning $\phi D \times H$ (mm)
PPU10	M4×0.7	6.7	5	2.5	$\phi 3^{+0.05}_0$ depth3
PPU12	M5×0.8	8.2	4.5	5.1	$\phi 3^{+0.05}_0$ depth3

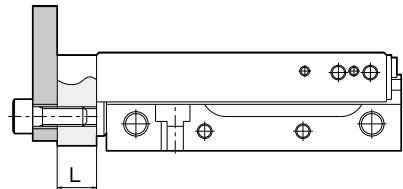
PICO UNIT

MOUNTING ON TABLE

Top Mounting



Front Mounting

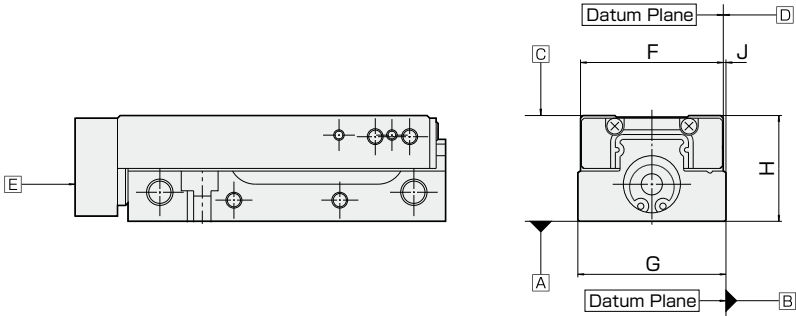


Model	Bolt Size	Screw depth L(mm)	Fastening Torque N·m	Pin Holes for Positioning $\phi D \times H$ (mm)
PPU10	M3×0.5	3	1.1	$\phi 3^{+0.05}_0$ depth2
PPU12	M3×0.5	4	1.1	$\phi 3^{+0.05}_0$ depth2.5

Model	Bolt Size	Screw depth L(mm)	Fastening Torque N·m
PPU10	M4×0.7	8	2.5
PPU12	M4×0.7	8	2.5

ACCURACY

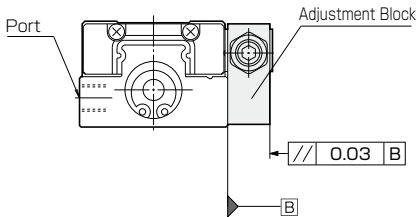
Linear Bearing Accuracy



Unit: mm

Model		PPU10			PPU12			
Stroke		15	30	45	20	30	45	60
Parallelism	Plane C with respect to plane A	0.02			0.02			
	Plane D with respect to plane B	0.02			0.02			
Running Parallelism	Plane C with respect to plane A	0.004			0.004			0.006
	Plane D with respect to plane B	0.004			0.004			0.006
Squareness	Plane E with respect to plane A	0.15			0.15			
	Plane E with respect to plane B	0.15			0.15			
Tolerance of Dimension F		±0.2			±0.2			
Tolerance of Dimension G		±0.2			±0.2			
Tolerance of Dimension H		±0.05			±0.05			
Tolerance of Dimension J		±0.025			±0.025			

Parallelism of Adjustment Block (only SD)

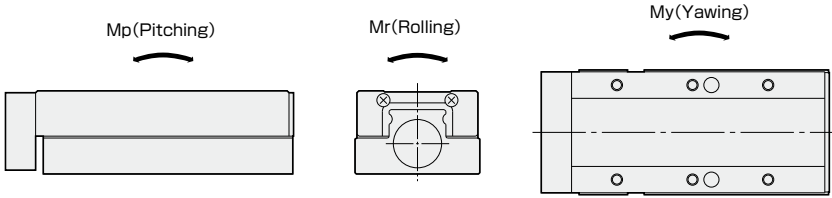


In case of with stroke adjustment type, side plane of adjustment block can be used as datum plane for installation. "Parallelism 0.03mm"

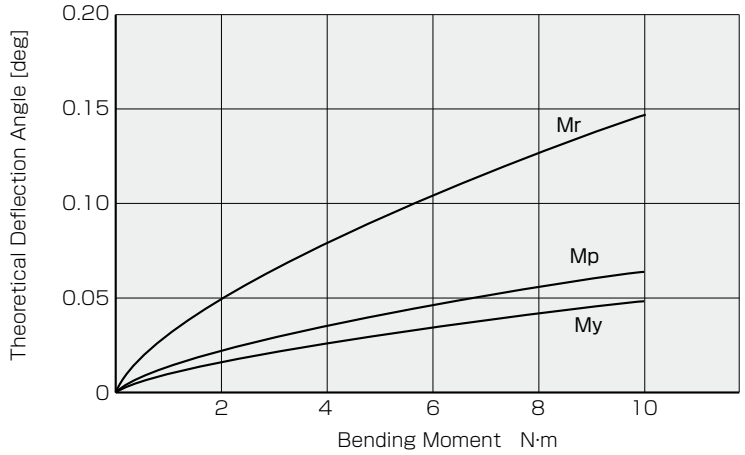
THEORETICAL DIFLECTION OF GUIDE TABLE BY MOMENT

Linear bearing used for PPU are preloaded, however, the elastic deformation of balls and races may occur due to the moment by external force.

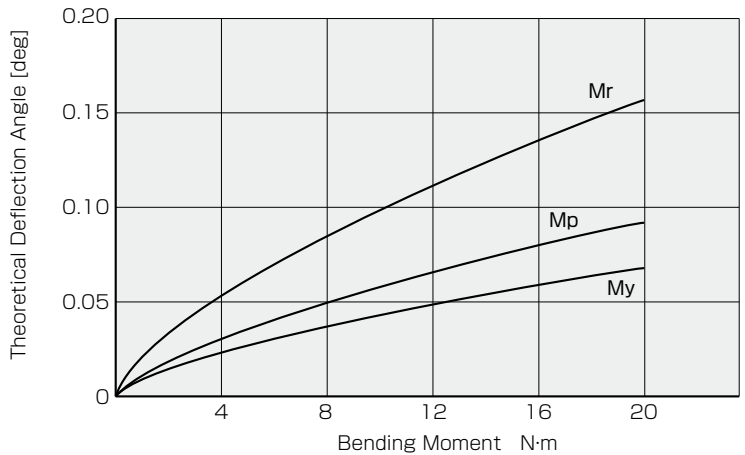
Graphs below show the theoretical deflection angle of the guide table in relation to each moment.



PPU10




PPU12



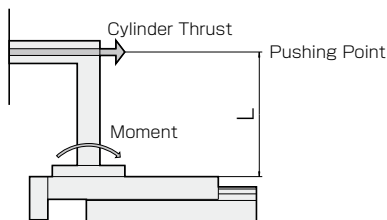
PRECAUTIONS FOR DESIGN AND USE

⚠ Caution

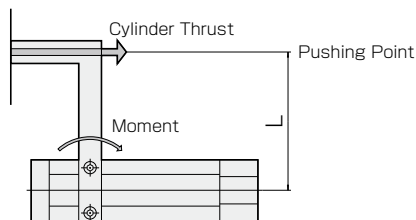
Moment by Thrust of Cylinder at Offset Pushing

As the following figure, if cylinder will push work or so at the offset point in the middle of stroke, a large moment will be generated by the thrust of cylinder itself.
 Static moment rating  page 33


Pitching Moment



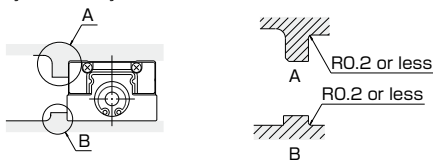
Yawing Moment



Mounting Surface Accuracy

① At the top, side of table and the bottom of body, the surfaces of PICO UNIT are ground up accurately. Stable and smooth movement highly accuracy can be obtained by proper installation to mounting surface machined high accurately. An irregular mounting surface or incorrect mounting may result in inaccurate movement, instability or poor service life.
 Datum plane (body and guide table)  page 324

② It is recommended to make relief at the corner of mating reference mounting surfaces. Besides, corner radius shown in the following figure can also be used.
 If the corner profile is curved smoothly, compared to the chamfer profile of the body and guide table, it may not closely contact its reference surface.



③ Check the reference mounting corner to an exact right angle between the mounting surface and the surface against which body or table is pressed.
 If the angle is not right-angled, they cannot contact the surface properly.



④ When designing a reference surface, carefully examine the height and thickness of the section.
 If a reference section is too thin, precision may deteriorate, as a thin ridge lacks rigidity against lateral load due to the movement of the body or guide table and the force exerted by the lateral mounting bolts.

Rigidity of Mounting Base (Fixed Part)

If the method of fixing the body and the rigidity of the mounting base are not correct, high rigidity and the high accuracy PICO UNIT has in kind could not be effective.
 Consider it for design about also the rigidity of devices itself such as an attachment base.

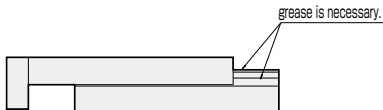
Arranging Position of Shock Absorber

Pay attention to below about the position in the stroke end when mounted load mass will be larger than the one without shock absorber.
 In order to stop the guide table, use stopper receiver and the metal on the top of shock absorber.
 If the center pin in a table makes it stop in a body, by the mass of a loading thing is large, it causes breakdown.

Lubrication

Lithium soap grease is applied on ball rolling surfaces before dispatch the unit. According to operation, time and condition for use, grease would be deteriorated and this cause the bearing to shorten its life because of wear on rolling surfaces.

Although the grease feeding interval depends on the service conditions and environment, as a rule, feeding should be performed every 100km of travel under normal usage or one month. Feed on raceway of the body as for lithium soap grease after wiping off old grease completely. The chemical change and poor performance by feeding the different grease would cause defective operation and the breakdown. Instead of grease, turbine oil can be used for lubrication. Never lubricate spindle oil machine oil because they give damage to the seals inside of the unit.



Feeling of Linear Guide Rolling

When the table is moved by hand without air pressure, discontinuous feeling of rolling balls on strange feeling of rolling resistance do not effect its performance.

Magnetization of Table and Body

Martensite stainless steel, as material of table and body, must be magnetized easily by contacting magnet and magnetic thing. Once that steel is magnetized, it keeps this state.

Note that there is a possibility that the switch might not work correctly by this magnetization.

Pin Hole of Table and Body for Positioning

Excessive load or transformation of raceway due to press-fitting the pin into the pin hole would cause the breakdown. Moreover, to press-fit would cause the crack and damage because of hardness of material by heat treated at the pin hole part.

Confirm the clearance between pin and pin hole.

ALLOWABLE MOUNTED LOAD MASS, ALLOWABLE LOAD FORCE AND ALLOWABLE MOMENT

⚠ Caution

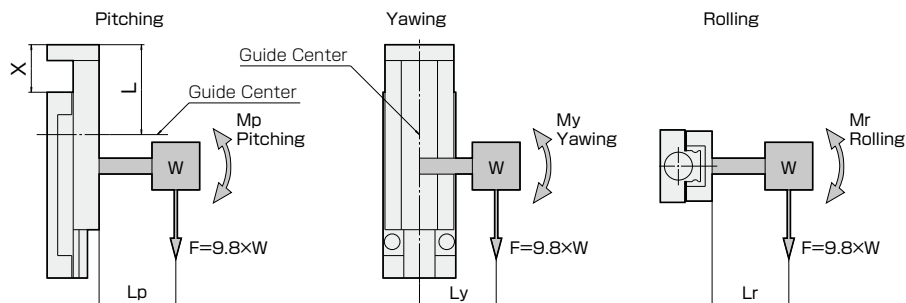
Before using this unit, check that the applied load is within the allowable load. Using out of allowable limit may cause bad influence for movement, accuracy and life. At the worst, the actuators would be broken.

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

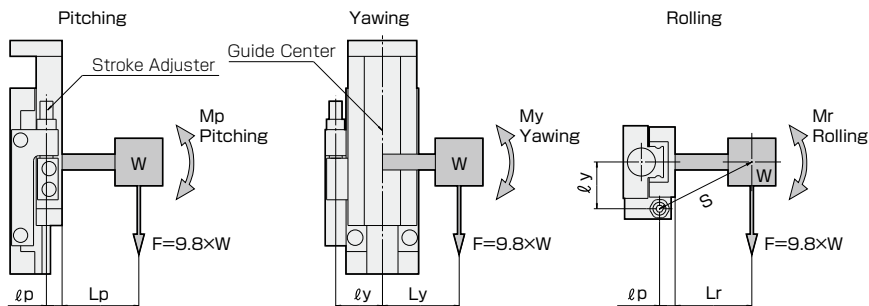
■ Direction of Moment and Guide Center Line and/or Stopper or Stroke Adjuster

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

● Without Stroke Adjustment



● With Stroke Adjustment



Position of Guide Center

Unit: m

Model	Stroke	Guide Center L
PPU(H)10	15	$(X/2)+0.035$
	30	$(X/2)+0.043$
	45	$(X/2)+0.050$
PPU(H)12	20	$(X/2)+0.039$
	30	$(X/2)+0.044$
	45	$(X/2)+0.052$
	60	$(X/2)+0.059$

Position of Stopper Bolt/Shock Absorber

Unit: m

Model	Adjuster Bolt		Shock Absorber	
	lp	ly	lp	ly
PPU(H)10	0.0060	0.0180	0.0065	0.0200
PPU(H)12	0.0060	0.0215	0.0065	0.0225

W.....Mounted load mass(kg)
 F.....Gravity applied on load(N)
 L.....Distance between front of guide table and guide center line(m)
 X.....Distance between front of guide table and front of body(m)
 Lp,Ly,Lr.....Distance between guide center line and center of gravity of mounted load(m)
 lp, ly.....Distance between guide center line and stopper bolt/shock absorber(m)
 S.....Distance between center of gravity of mounted load and stopper bolt/shock absorber(m)

PICO UNIT

■ Allowable mounted load mass, Allowable mounted load moment, Allowable inertia mass, Shock absorber collision energy


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		PPU10	PPU12	PPUH10	PPUH12
Allowable Load Mass	None	0.8	1.2	0.8	1.2
	Metal Stopper (QN, QR)	0.3	0.5	0.3	0.5
	Rubber Stopper (QS, QT)	0.8	1.2	0.8	1.2
	Shock Absorber (QL, QM)	1.6	2.0	—	

⚠ 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. Theoretical thrust  page 320

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.

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

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

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

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

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

Allowable Mounted Load Moment

Unit :N·m

Model	Allowable Mounted Load Moment N·m		
	Mp	My	Mr
PPU10/PPUH10	1.8	2.0	1.9
PPU12/PPUH12	3.0	3.4	3.8

1N·m=0.102kgf·m

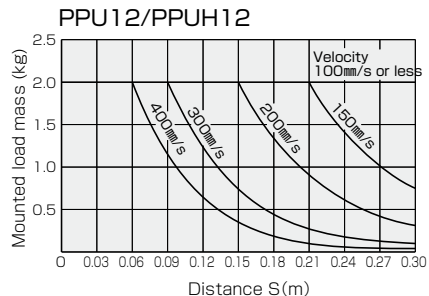
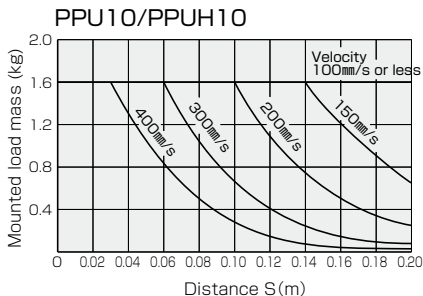
③ Allowable Inertia Mass

When a 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.



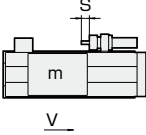
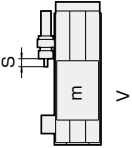
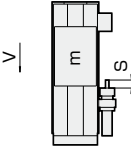
⚠ Caution: Mounted load mass should not exceed the allowable mounted load mass specified for every option.

④ Shock Absorber Collision Energy

The energy that the shock absorber of the stopper must absorb consists of three elements: 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.

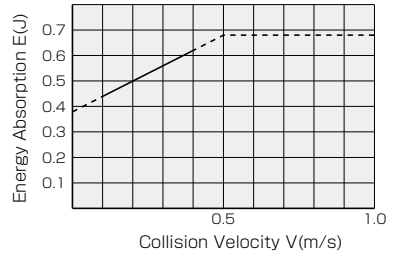
	Horizontal Use	Vertical Upward Use	Vertical Downward Use
Usage Condition Example			
Collision Energy E	$E = 1/2(mV^2) + Fs$	$E = 1/2(mV^2) + Fs - mgs$	$E = 1/2(mV^2) + Fs + mgs$

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	ABK8
Max Energy Absorption	0.68J
Stroke	5mm
Energy Absorption Per Minute	22.8J/min
Max. Collision Velocity	1m/s
Usage Frequency	60c.p.m or less
Operating temperature Range	-5 ~ 70°C
Piston Rod Return Force	4.9N

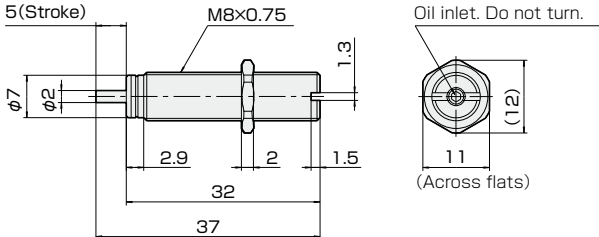
Energy Absorption Graph



Dimension of Shock Absorber

MODEL: ABK8

- Shock absorber is replaced to new type.
- It can be replaced to conventional shock absorber.



■ 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

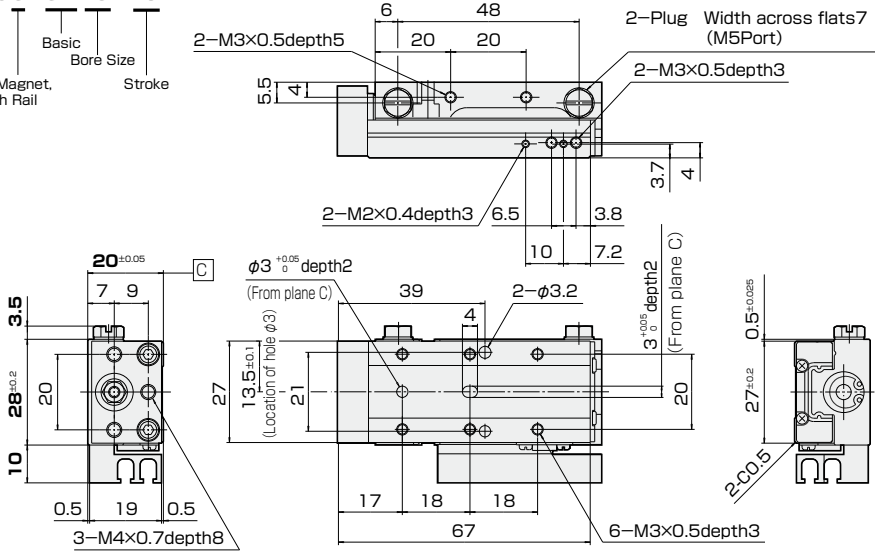
Model	Basic Static Load Rating N	Static Moment Rating N·m		
		M_{p0}	M_{y0}	M_{r0}
PPU10/PPUH10	3430	20.5	24.5	22.5
PPU12/PPUH12	4900	32.3	38.2	41.1

1N·m=0.102kgf·m
1N=0.102kgf

DIMENSIONS(mm) PPU10-15 BASIC

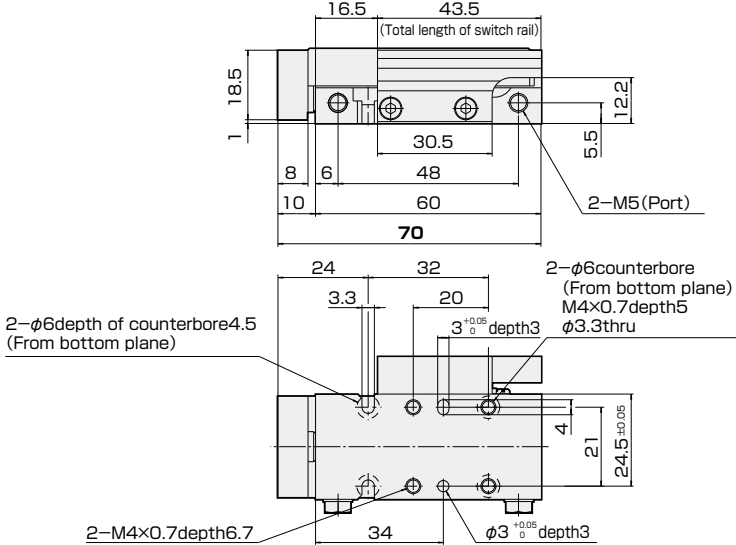
PPUS-SD10-15-TP

With Magnet, Switch Rail
 Basic Bore Size
 Stroke



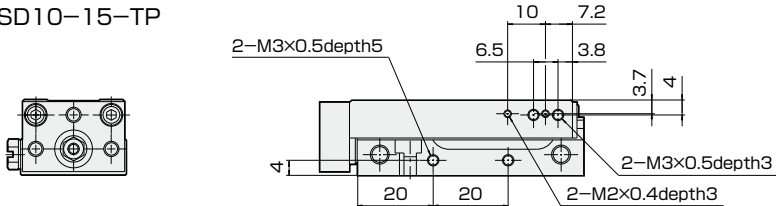
CTUD
 PICO UNIT

PPU-SD10-15



Without Magnet, Switch Rail

PPU-SD10-15-TP



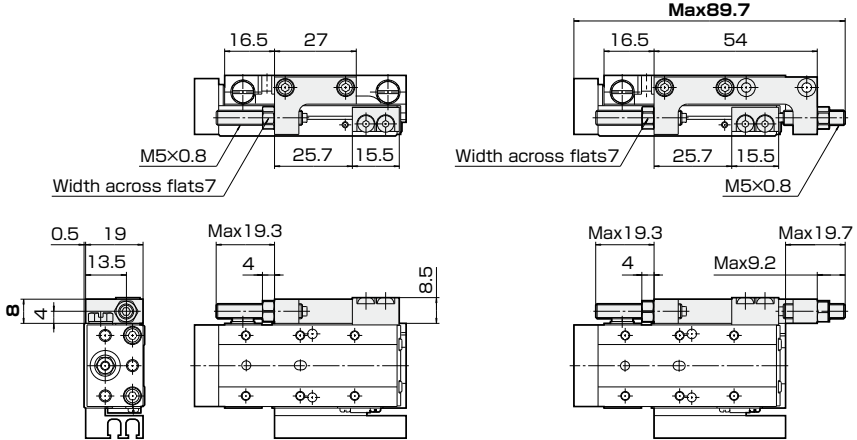
With Metal Stopper, with Rubber Stopper

PPU(S)-SD10-15-TP-QN

-QS
-QR
-QT

■QN: Outstroke Side Metal Stopper
QS: Outstroke Side Rubber Stopper
Stroke Adjustment Range: 15mm

■QR: Both Sides Metal Stopper
QT: Both Sides Rubber Stopper
Outstroke Adjustment Range: 15mm
Instroke Adjustment Range: 5mm



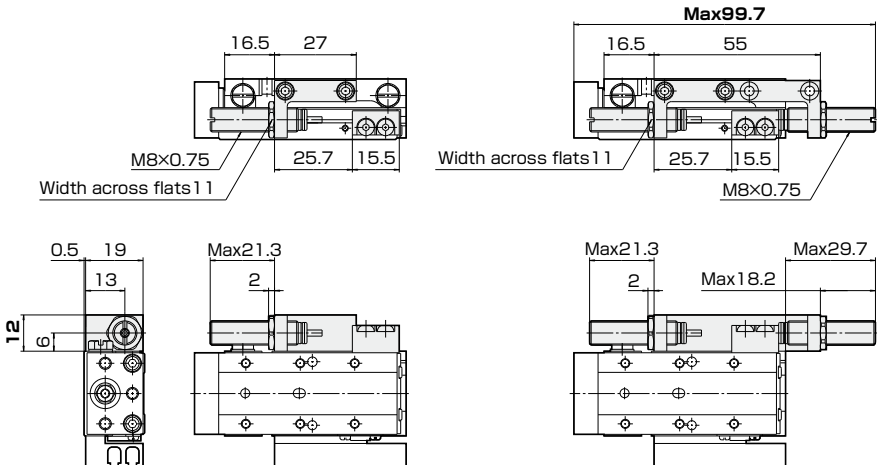
With Shock Absorber

PPU(S)-SD10-15-TP-QL

-QM

■QL: Outstroke Side
Stroke Adjustment Range: 15mm

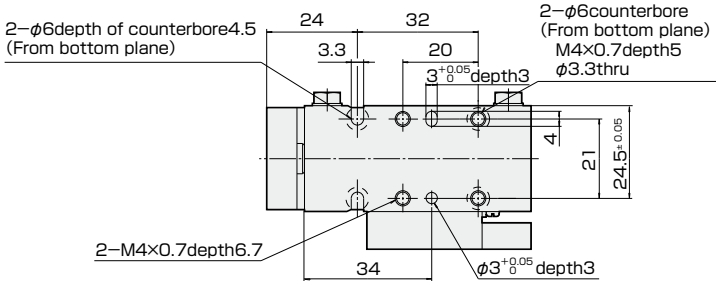
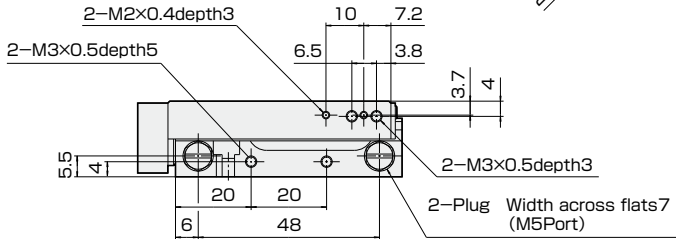
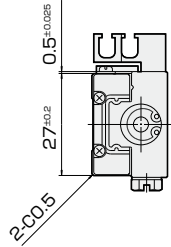
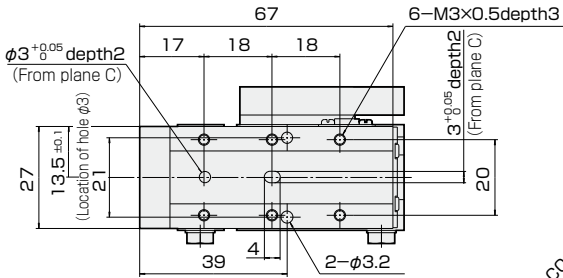
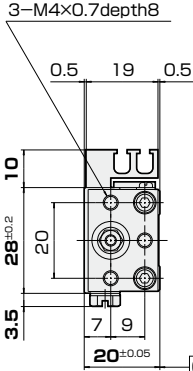
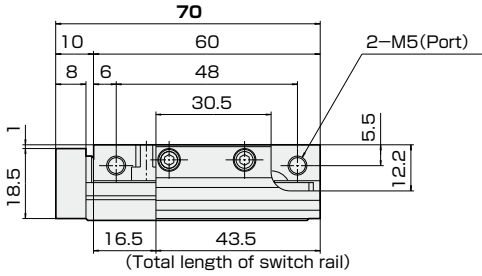
■QM: Both Sides
Outstroke Adjustment Range: 15mm
Instroke Adjustment Range: 15mm



DIMENSIONS(mm) PPU10-15 SYMMETRIC

PPUS-GT10-15-TP

Symmetric
Bore Size
Stroke
With Magnet,
Switch Rail



Without Magnet, Switch Rail

GT can be converted from SD by changing the port position of SD without magnet and switch rail. When magnet, switch rail and stroke adjustment is not necessary, select SD.

CTUD PICO UNIT PPU-GT10-15

With Metal Stopper, with Rubber Stopper

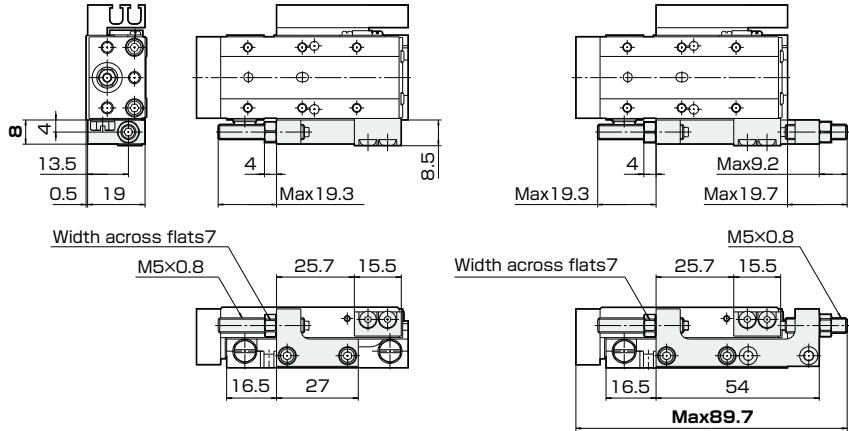
PPU(S)-GT10-15-TP-QN
-QS
-QR
-QT

■QN: Outstroke Side Metal Stopper
QS: Outstroke Side Rubber Stopper

Stroke Adjustment Range: 15mm

■QR: Both Sides Metal Stopper
QT: Both Sides Rubber Stopper

Outstroke Adjustment Range: 15mm
Instroke Adjustment Range: 5mm



With Shock Absorber

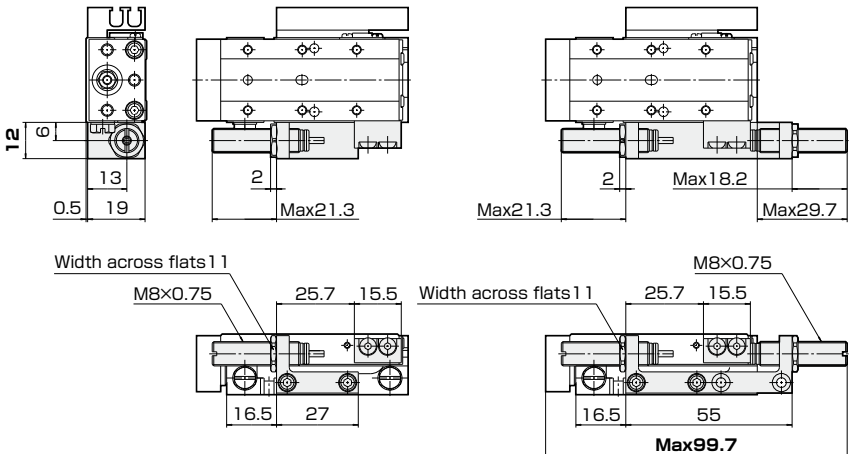
PPU(S)-GT10-15-TP-QL
-QM

■QL: Outstroke Side

Stroke Adjustment Range: 15mm

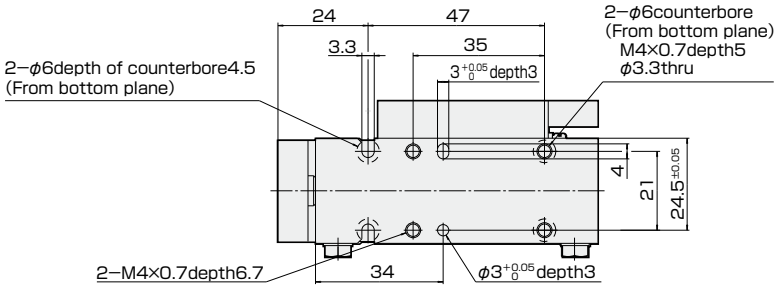
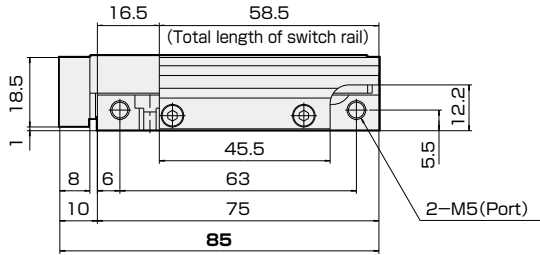
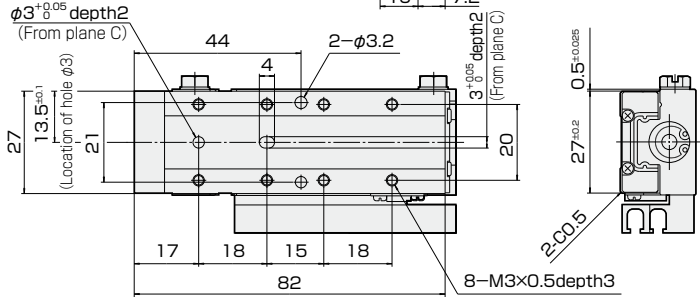
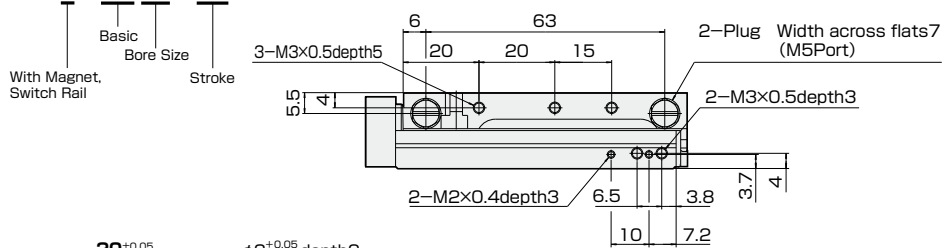
■QM: Both Sides

Outstroke Adjustment Range: 15mm
Instroke Adjustment Range: 15mm



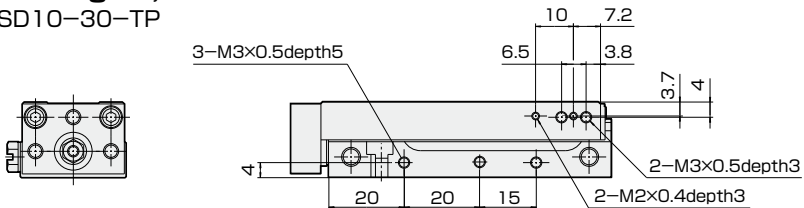
DIMENSIONS(mm) PPU10-30 BASIC

PPUS-SD10-30-TP



Without Magnet, Switch Rail

PPU-SD10-30-TP



CTUD

PICO UNIT

PPU-SD10-30

With Metal Stopper, with Rubber Stopper

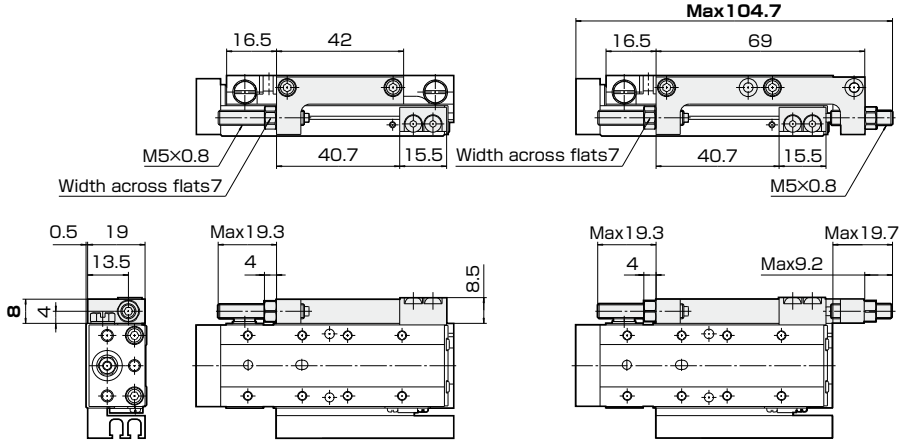
PPU(S)-SD10-30-TP-QN
-QS
-QR
-QT

■QN: Outstroke Side Metal Stopper
QS: Outstroke Side Rubber Stopper

Stroke Adjustment Range: 15mm

■QR: Both Sides Metal Stopper
QT: Both Sides Rubber Stopper

Outstroke Adjustment Range: 15mm
Instroke Adjustment Range: 5mm



With Shock Absorber

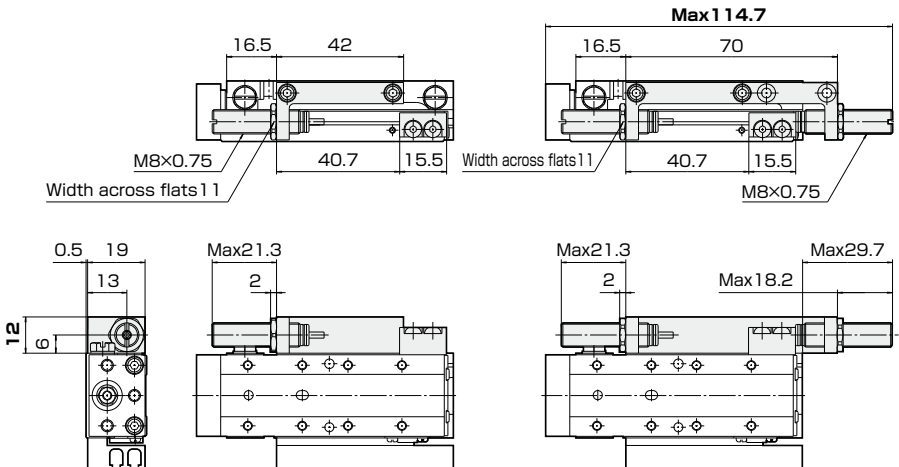
PPU(S)-SD10-30-TP-QL
-QM

■QL: Outstroke Side

Stroke Adjustment Range: 19mm

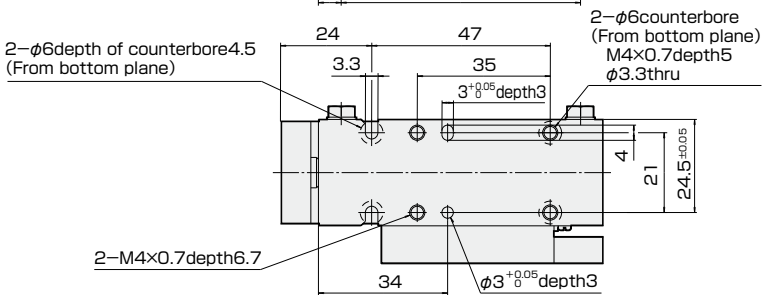
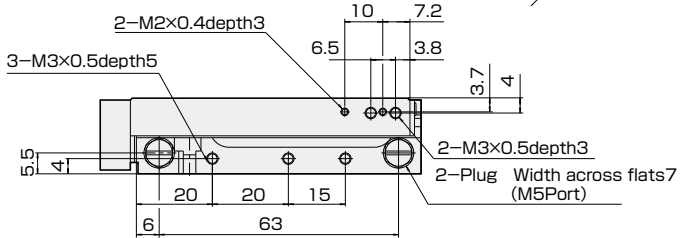
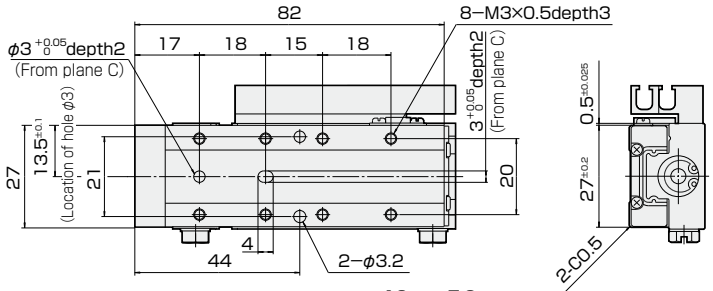
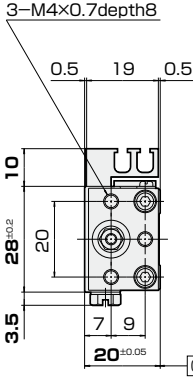
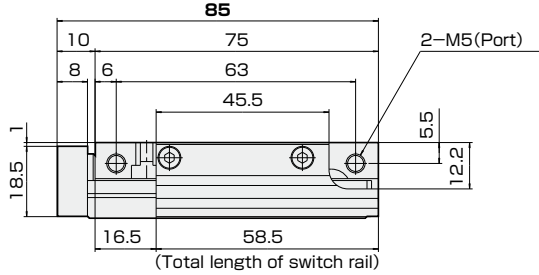
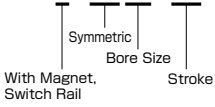
■QM: Both Sides

Outstroke Adjustment Range: 19mm
Instroke Adjustment Range: 16mm



DIMENSIONS(mm) PPU10-30 SYMMETRIC

PPUS-GT10-30-TP



Without Magnet, Switch Rail

GT can be converted from SD by changing the port position of SD without magnet and switch rail. When magnet, switch rail and stroke adjustment is not necessary, select SD.

With Metal Stopper, with Rubber Stopper

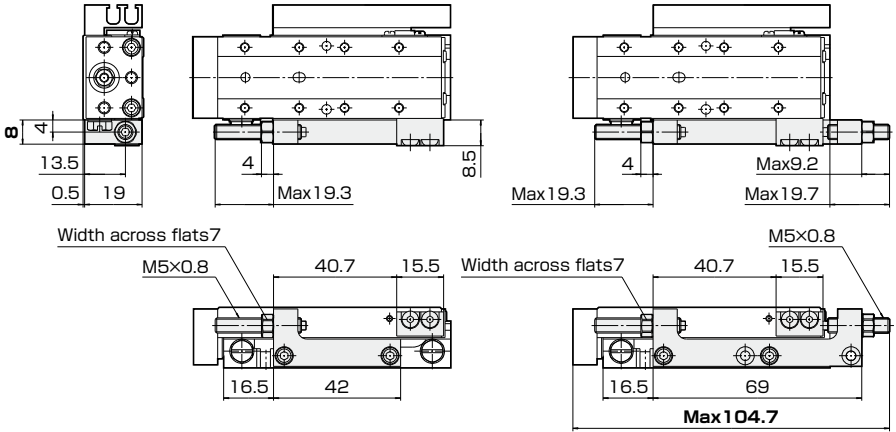
PPU(S)-GT10-30-TP-QN
-QS
-QR
-QT

■QN: Outstroke Side Metal Stopper
QS: Outstroke Side Rubber Stopper

Stroke Adjustment Range: 15mm

■QR: Both Sides Metal Stopper
QT: Both Sides Rubber Stopper

Outstroke Adjustment Range: 15mm
Instroke Adjustment Range: 5mm



With Shock Absorber

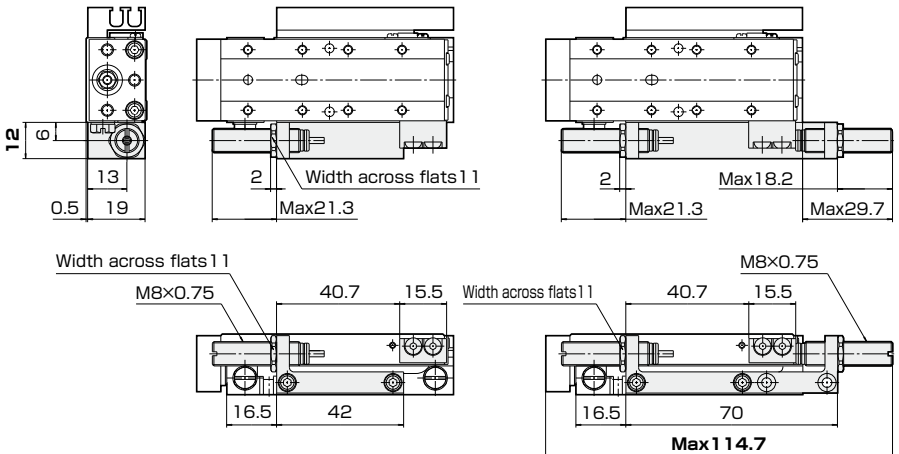
PPU(S)-GT10-30-TP-QL
-QM

■QL: Outstroke Side

Stroke Adjustment Range: 19mm

■QM: Both Sides

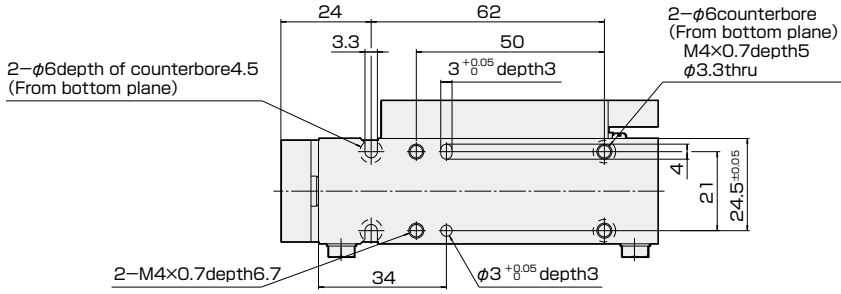
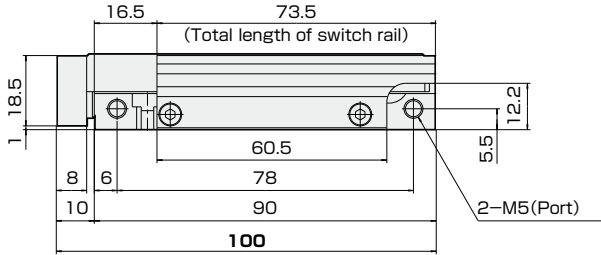
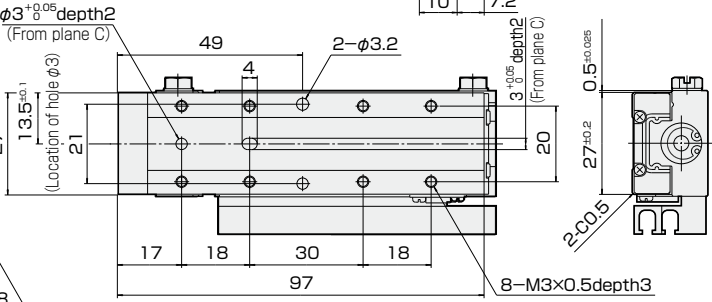
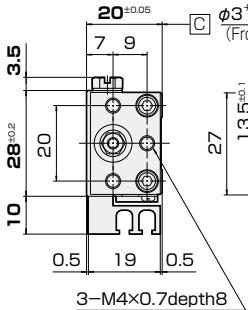
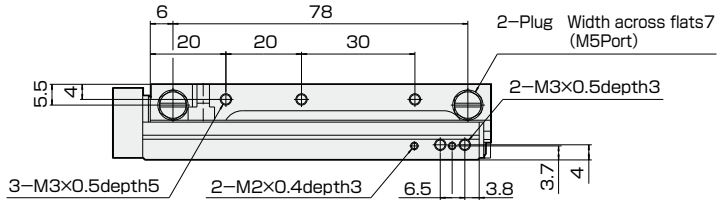
Outstroke Adjustment Range: 19mm
Instroke Adjustment Range: 16mm



DIMENSIONS(mm) PPU10-45 BASIC

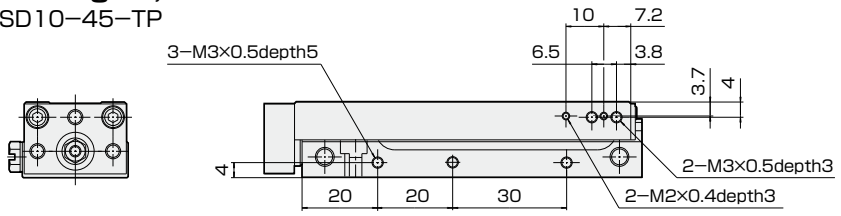
PPUS-SD10-45-TP

With Magnet, Switch Rail
 Basic Bore Size
 Stroke



Without Magnet, Switch Rail

PPU-SD10-45-TP



CTD

PICO UNIT

PPU-SD10-45

With Metal Stopper, with Rubber Stopper

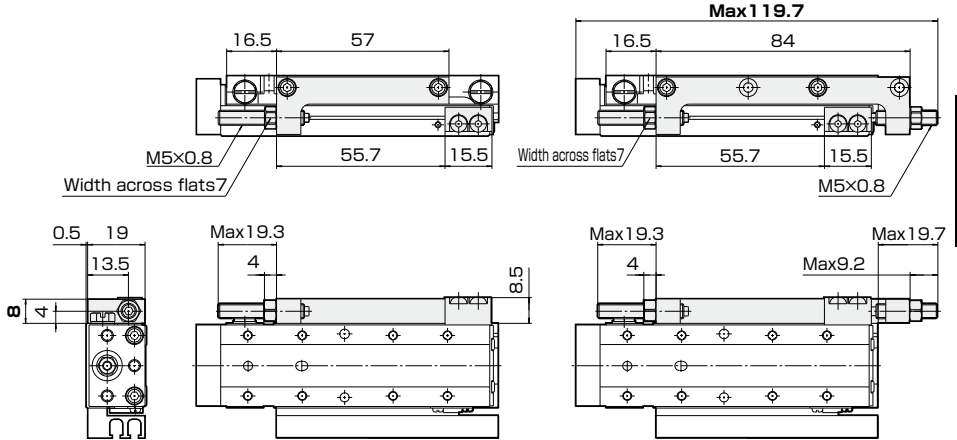
PPU(S)-SD10-45-TP-QN
-QS
-QR
-QT

■QN: Outstroke Side Metal Stopper
QS: Outstroke Side Rubber Stopper

Stroke Adjustment Range: 15mm

■QR: Both Sides Metal Stopper
QT: Both Sides Rubber Stopper

Outstroke Adjustment Range: 15mm
Instroke Adjustment Range: 5mm



With Shock Absorber

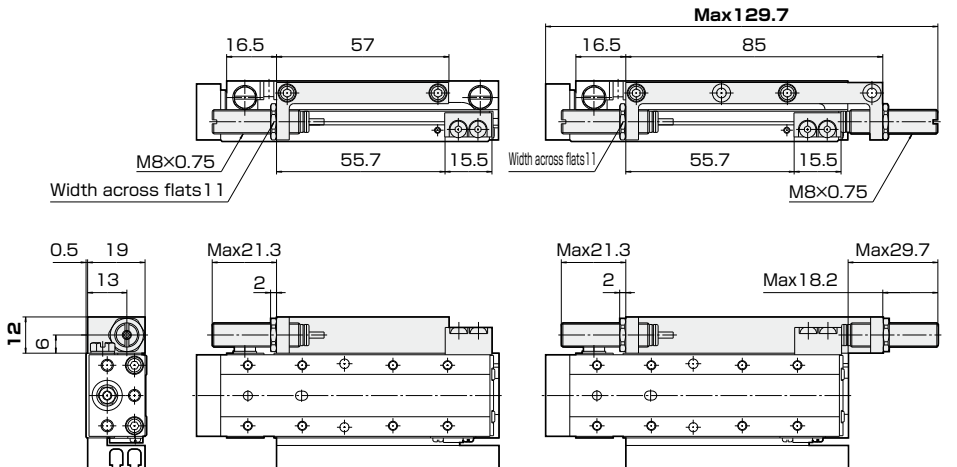
PPU(S)-SD10-45-TP-QL
-QM

■QL: Outstroke Side

Stroke Adjustment Range: 19mm

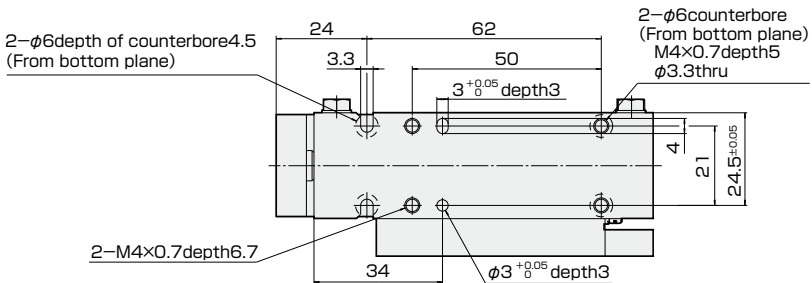
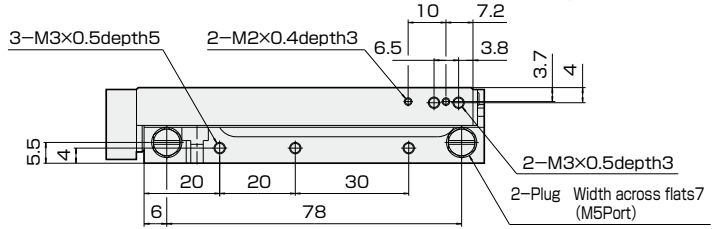
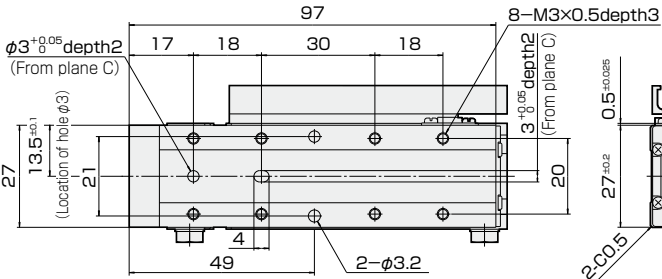
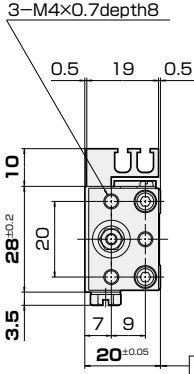
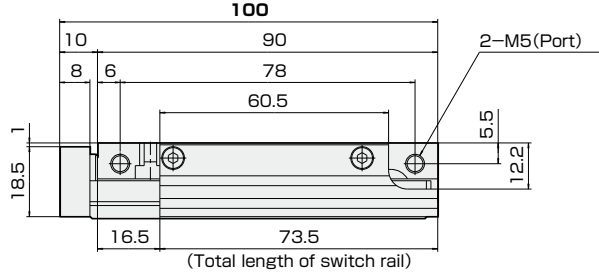
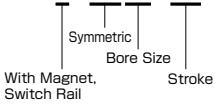
■QM: Both Sides

Outstroke Adjustment Range: 19mm
Instroke Adjustment Range: 16mm



DIMENSIONS(mm) PPU10-45 SYMMETRIC

PPUS-GT10-45-TP



Without Magnet, Switch Rail

GT can be converted from SD by changing the port position of SD without magnet and switch rail. When magnet, switch rail and stroke adjustment is not necessary, select SD.

With Metal Stopper, with Rubber Stopper

PPU(S)-GT10-45-TP-QN

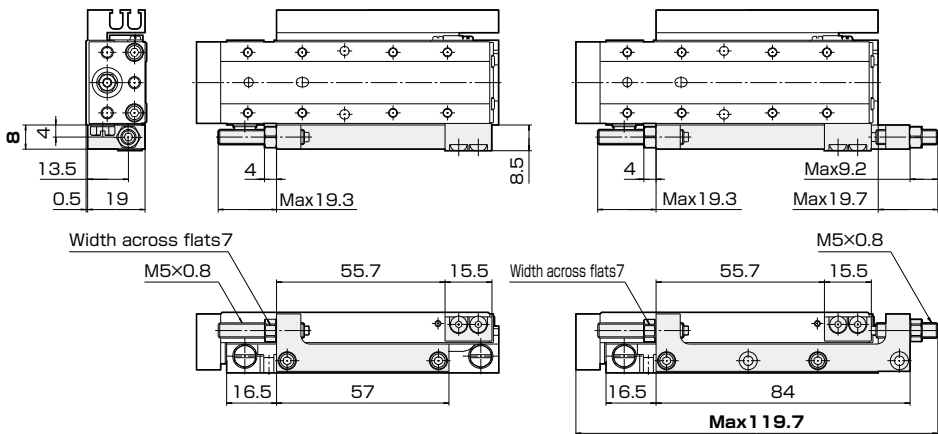
-QS
-QR
-QT

■QN: Outstroke Side Metal Stopper
QS: Outstroke Side Rubber Stopper

Stroke Adjustment Range: 15mm

■QR: Both Sides Metal Stopper
QT: Both Sides Rubber Stopper

Outstroke Adjustment Range: 15mm
Instroke Adjustment Range: 5mm



TP

PPU-GT10-45 PICO UNIT

With Shock Absorber

PPU(S)-GT10-45-TP-QL

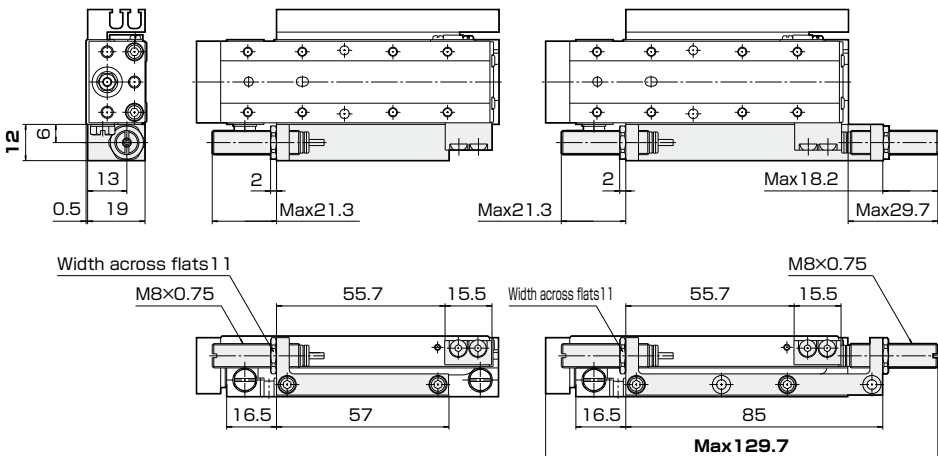
-QM

■QL: Outstroke Side

Stroke Adjustment Range: 19mm

■QM: Both Sides

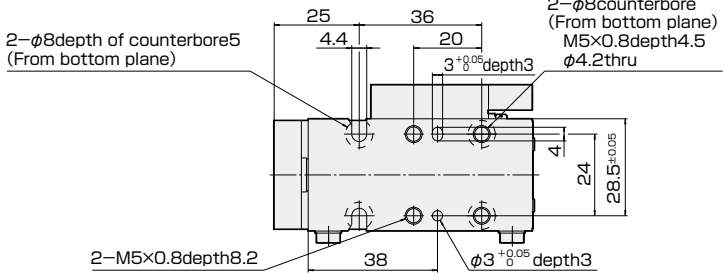
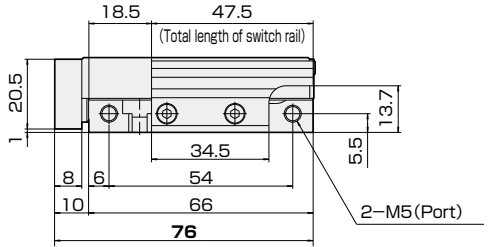
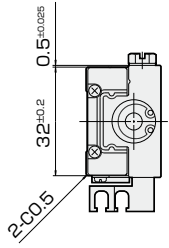
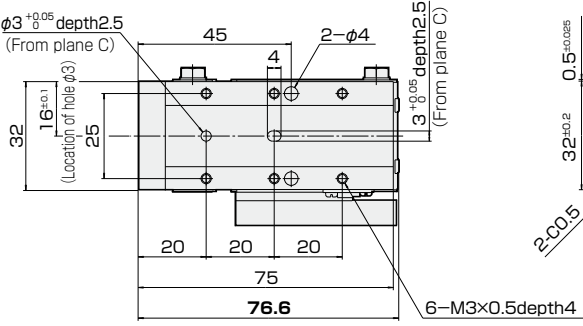
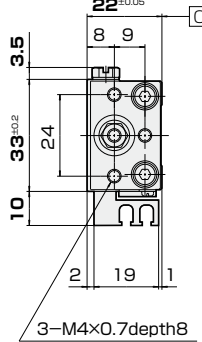
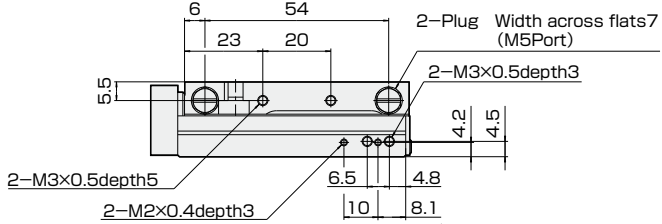
Outstroke Adjustment Range: 19mm
Instroke Adjustment Range: 16mm



DIMENSIONS(mm) PPU12-20 BASIC

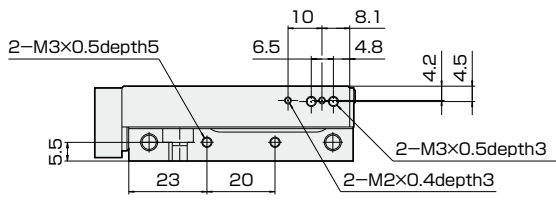
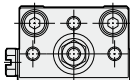
PPUS-SD12-20-TP

With Magnet, Switch Rail
 Basic Bore Size
 Stroke



Without Magnet, Switch Rail

PPU-SD12-20-TP



CTU

PICO UNIT

PPU-SD12-20

With Metal Stopper, with Rubber Stopper

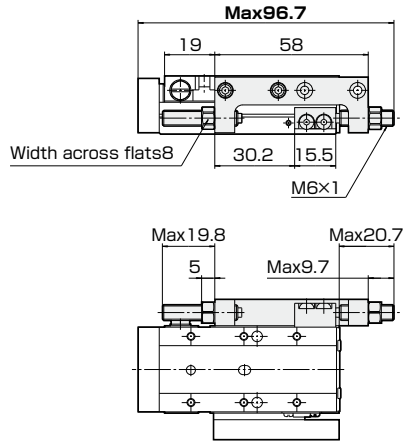
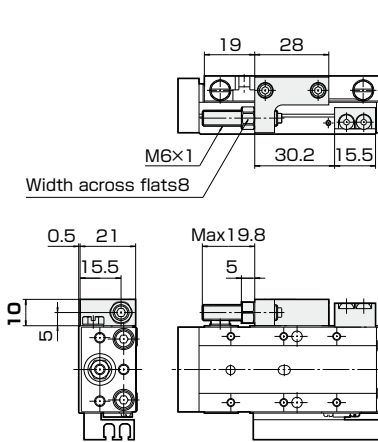
PPU(S)-SD12-20-TP-QN
-QS
-QR
-QT

■QN: Outstroke Side Metal Stopper
QS: Outstroke Side Rubber Stopper

Stroke Adjustment Range: 15mm

■QR: Both Sides Metal Stopper
QT: Both Sides Rubber Stopper

Outstroke Adjustment Range: 15mm
Instroke Adjustment Range: 5mm



With Shock Absorber

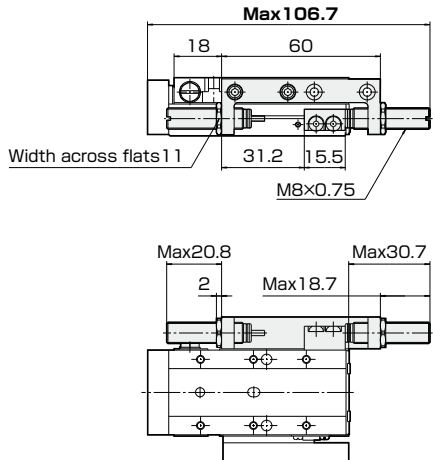
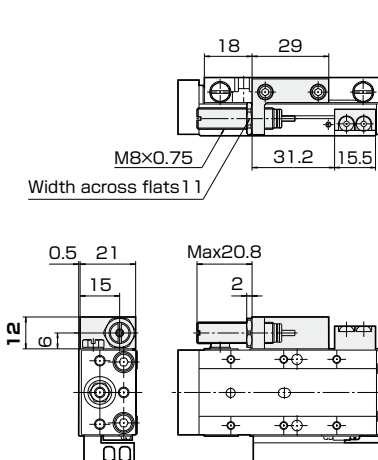
PPU(S)-SD12-20-TP-QL
-QM

■QL: Outstroke Side

Stroke Adjustment Range: 18mm

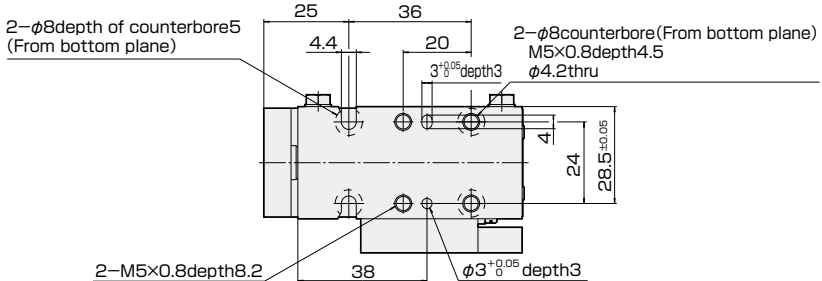
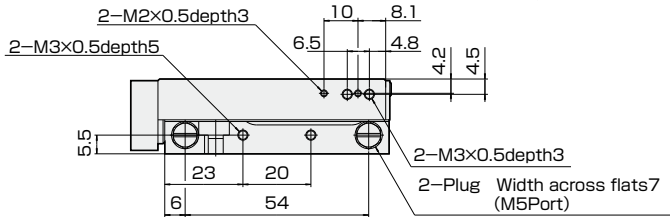
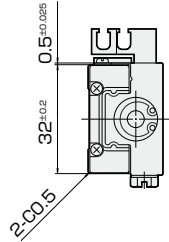
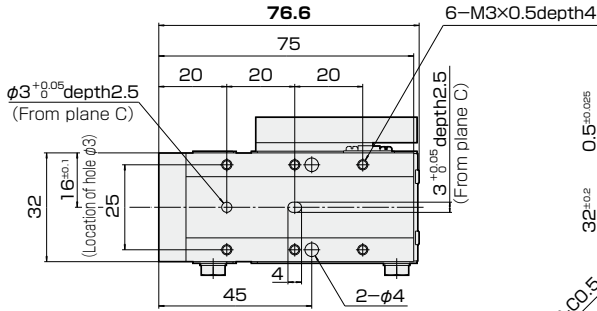
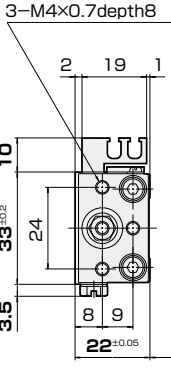
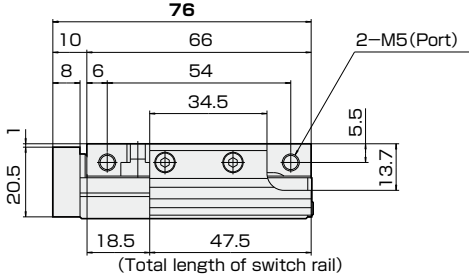
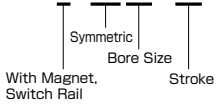
■QM: Both Sides

Outstroke Adjustment Range: 18mm
Instroke Adjustment Range: 16mm



DIMENSIONS(mm) PPU12-20 SYMMETRIC

PPUS-GT12-20-TP



Without Magnet, Switch Rail

GT can be converted from SD by changing the port position of SD without magnet and switch rail. When magnet, switch rail and stroke adjustment is not necessary, select SD.

With Metal Stopper, with Rubber Stopper

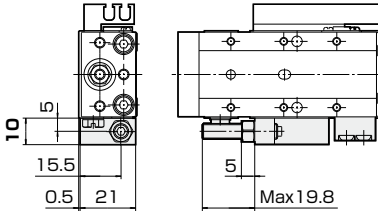
PPU(S)-GT12-20-TP-QN
-QS
-QR
-QT

■QN: Outstroke Side Metal Stopper
QS: Outstroke Side Rubber Stopper

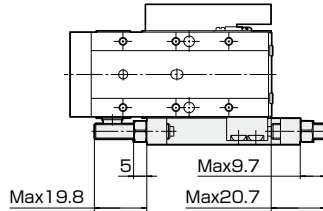
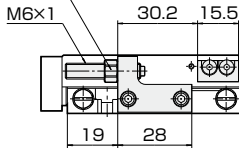
Stroke Adjustment Range: 15mm

■QR: Both Sides Metal Stopper
QT: Both Sides Rubber Stopper

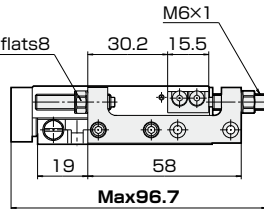
Outstroke Adjustment Range: 15mm
Instroke Adjustment Range: 5mm



Width across flats 8



Width across flats 8



With Shock Absorber

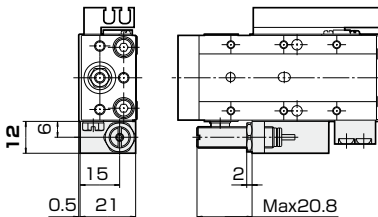
PPU(S)-GT12-20-TP-QL
-QM

■QL: Outstroke Side

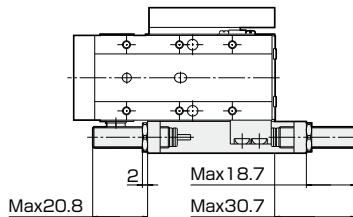
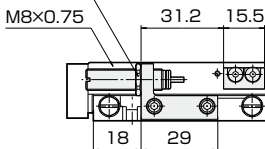
Stroke Adjustment Range: 18mm

■QM: Both Sides

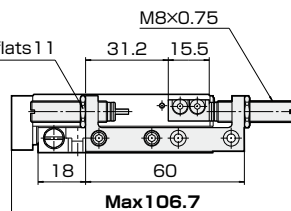
Outstroke Adjustment Range: 18mm
Instroke Adjustment Range: 16mm



Width across flats 11



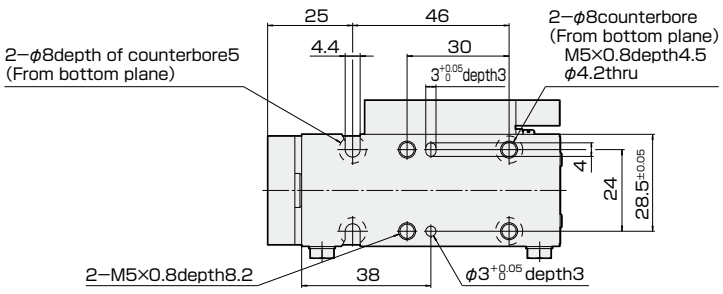
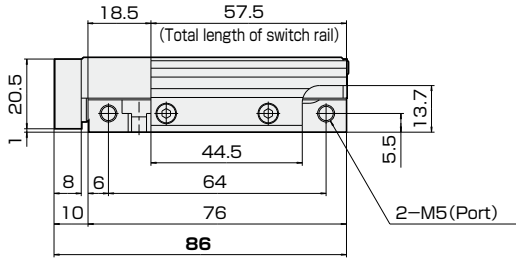
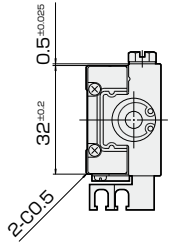
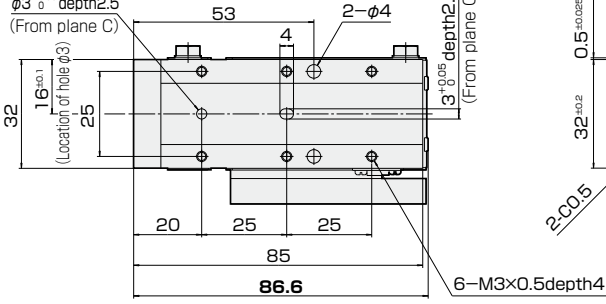
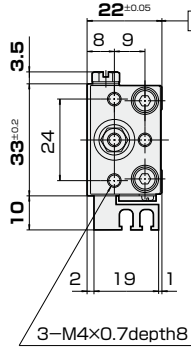
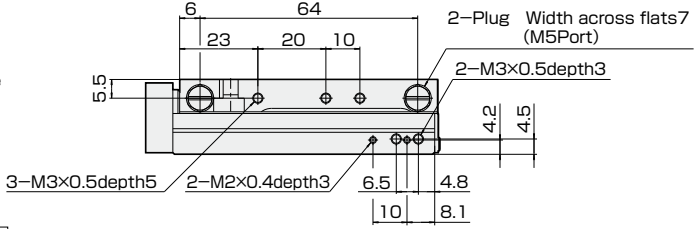
Width across flats 11



DIMENSIONS(mm) PPU12-30 BASIC

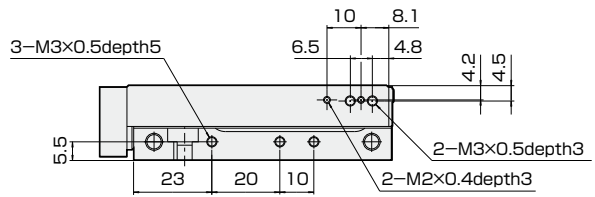
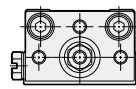
PPUS-SD12-30-TP

With Magnet, Switch Rail
 Basic Bore Size
 Stroke



Without Magnet, Switch Rail

PPU-SD12-30-TP



CTU

PICO UNIT

PPU-SD12-30

With Metal Stopper, with Rubber Stopper

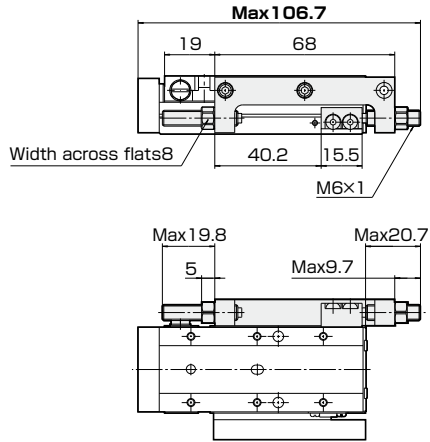
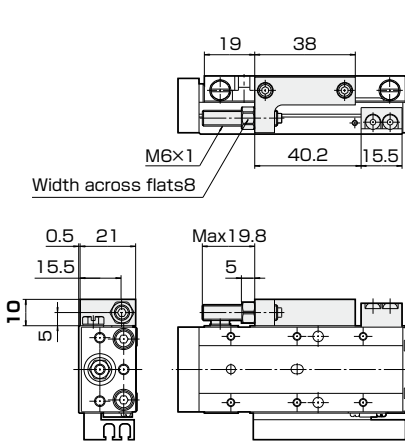
PPU(S)-SD12-30-TP-QN
-QS
-QR
-QT

■QN: Outstroke Side Metal Stopper
QS: Outstroke Side Rubber Stopper

Stroke Adjustment Range: 15mm

■QR: Both Sides Metal Stopper
QT: Both Sides Rubber Stopper

Outstroke Adjustment Range: 15mm
Instroke Adjustment Range: 5mm



With Shock Absorber

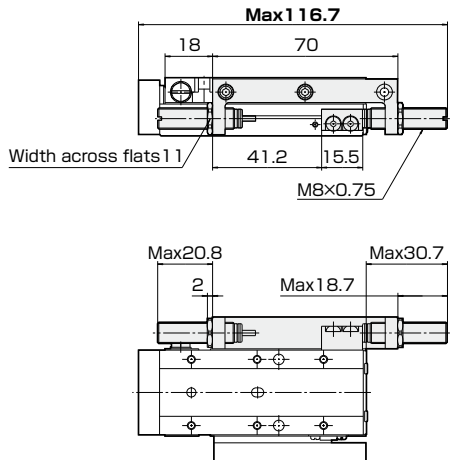
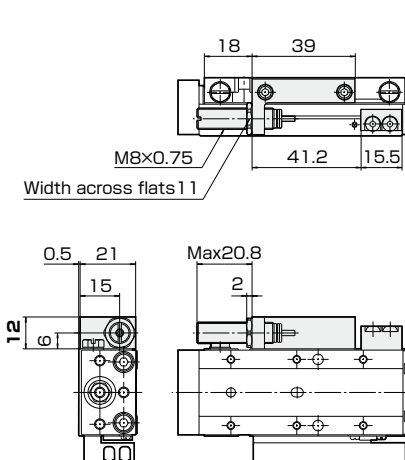
PPU(S)-SD12-30-TP-QL
-QM

■QL: Outstroke Side

Stroke Adjustment Range: 18mm

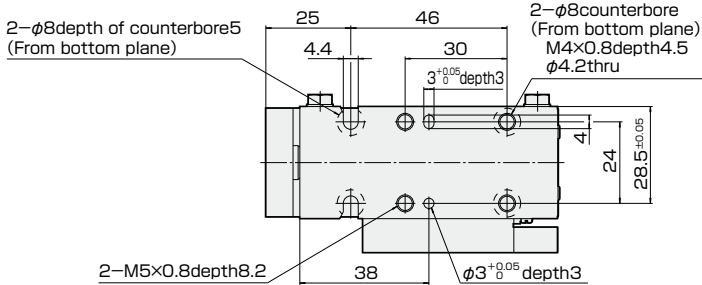
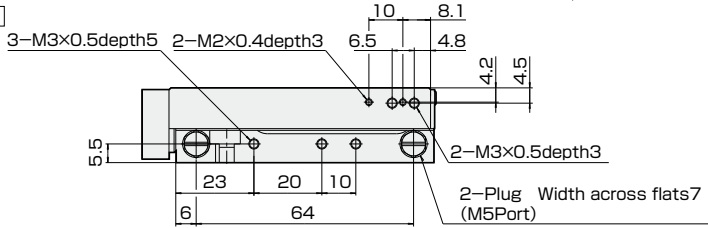
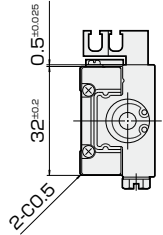
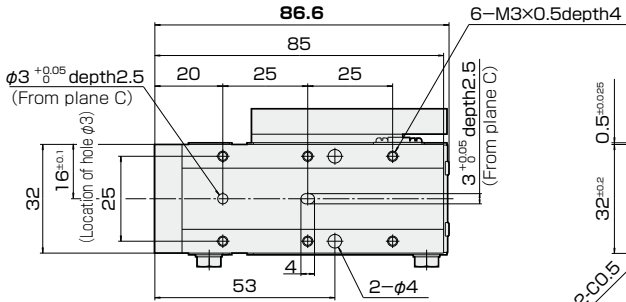
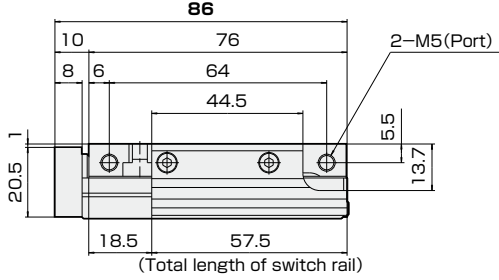
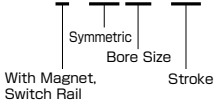
■QM: Both Sides

Outstroke Adjustment Range: 18mm
Instroke Adjustment Range: 16mm



DIMENSIONS(mm) PPU12-30 SYMMETRIC

PPUS-GT12-30-TP



Without Magnet, Switch Rail

GT can be converted from SD by changing the port position of SD without magnet and switch rail. When magnet, switch rail and stroke adjustment is not necessary, select SD.

With Metal Stopper, with Rubber Stopper

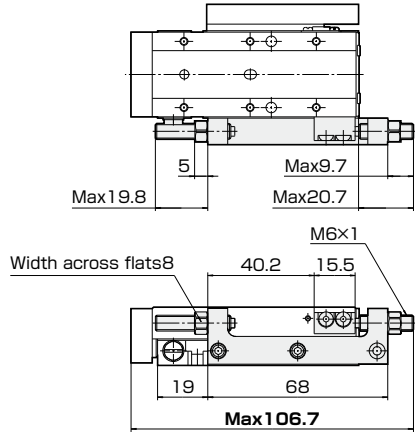
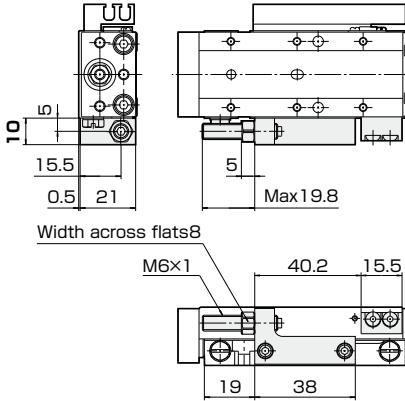
PPU(S)-GT12-30-TP-QN
-QS
-QR
-QT

■QN: Outstroke Side Metal Stopper
QS: Outstroke Side Rubber Stopper

Stroke Adjustment Range: 15mm

■QR: Both Sides Metal Stopper
QT: Both Sides Rubber Stopper

Outstroke Adjustment Range: 15mm
Instroke Adjustment Range: 5mm



With Shock Absorber

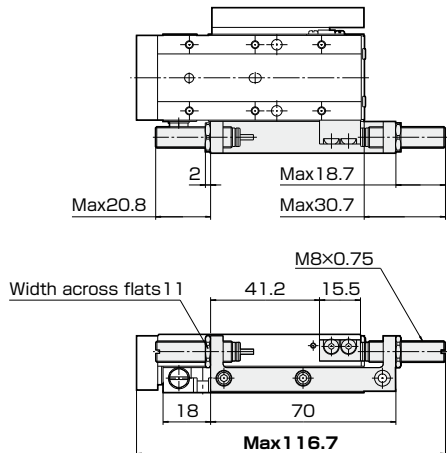
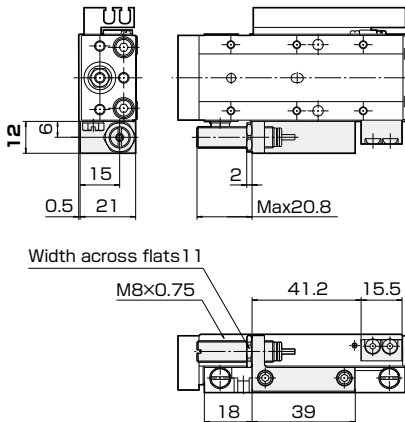
PPU(S)-GT12-30-TP-QL
-QM

■QL: Outstroke Side

Stroke Adjustment Range: 18mm

■QM: Both Sides

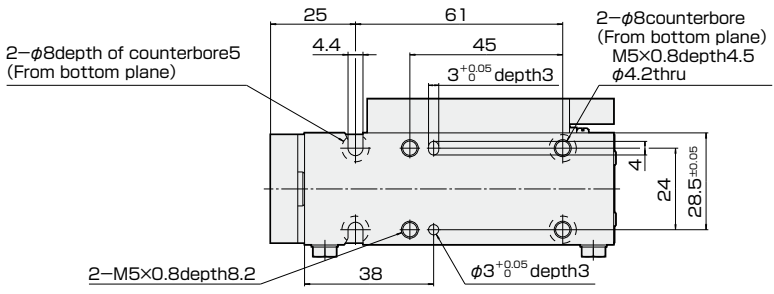
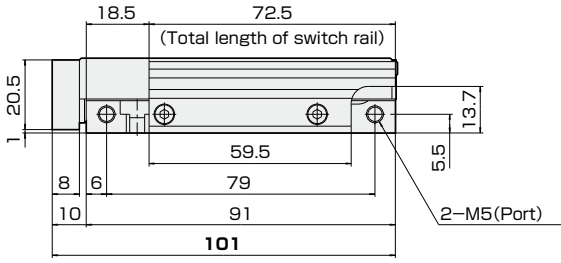
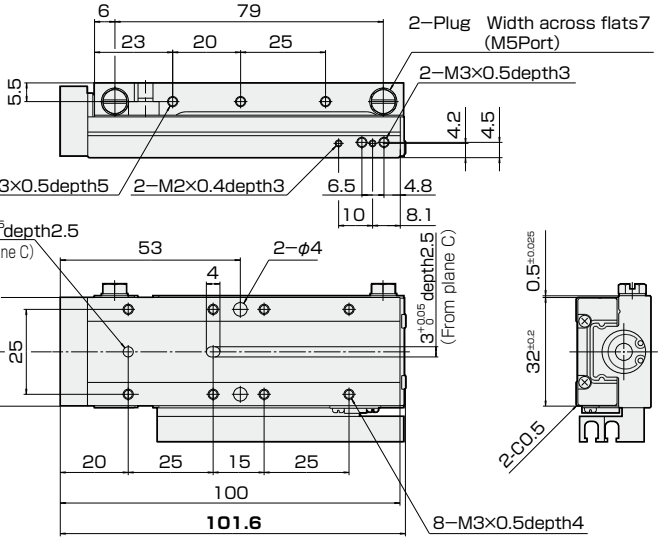
Outstroke Adjustment Range: 18mm
Instroke Adjustment Range: 16mm



DIMENSIONS(mm) PPU12-45 BASIC

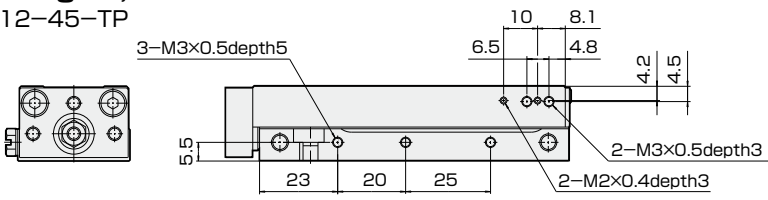
PPUS-SD12-45-TP

With Magnet, Switch Rail
 Basic Bore Size
 Stroke



Without Magnet, Switch Rail

PPU-SD12-45-TP



CTUD

PICO UNIT

PPU-SD12-45

With Metal Stopper, with Rubber Stopper

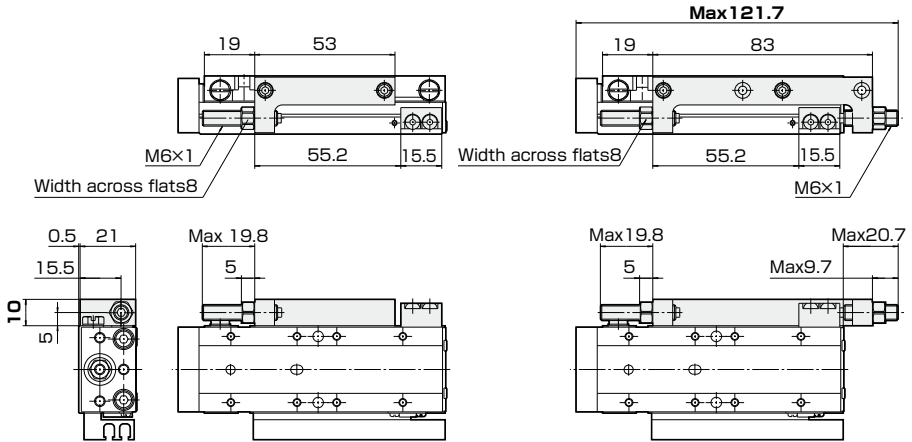
PPU(S)-SD12-45-TP-QN
-QS
-QR
-QT

■QN: Outstroke Side Metal Stopper
QS: Outstroke Side Rubber Stopper

Stroke Adjustment Range: 15mm

■QR: Both Sides Metal Stopper
QT: Both Sides Rubber Stopper

Outstroke Adjustment Range: 15mm
Instroke Adjustment Range: 5mm



With Shock Absorber

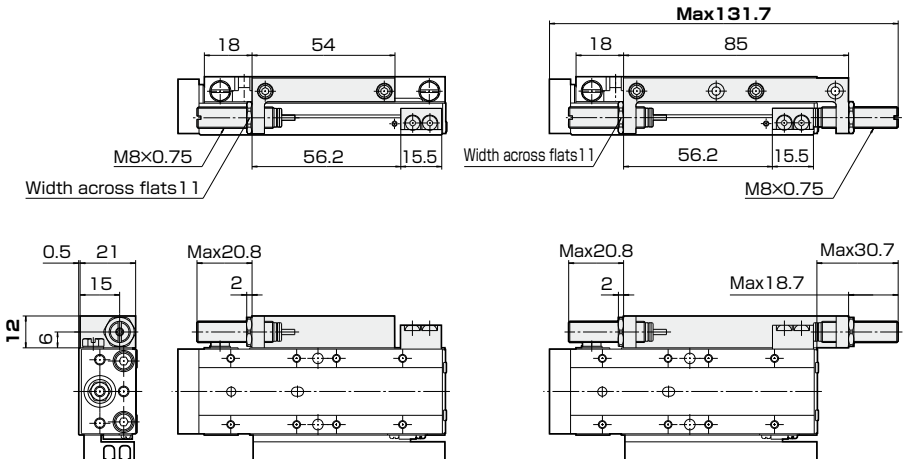
PPU(S)-SD12-45-TP-QL
-QM

■QL: Outstroke Side

Stroke Adjustment Range: 18mm

■QM: Both Sides

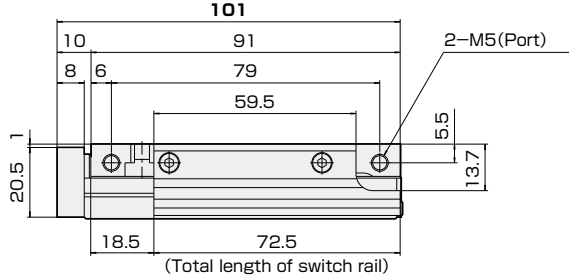
Outstroke Adjustment Range: 18mm
Instroke Adjustment Range: 16mm



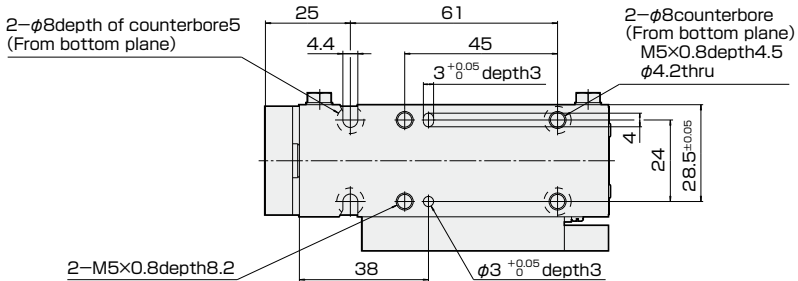
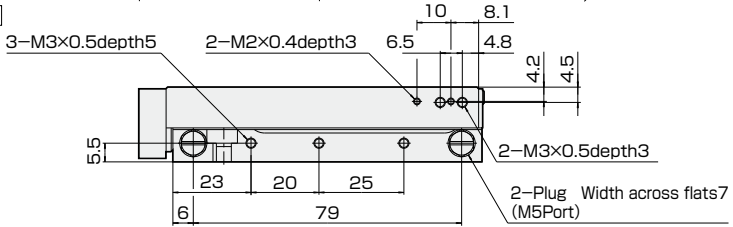
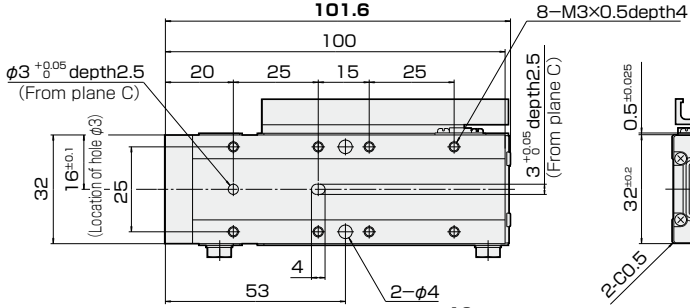
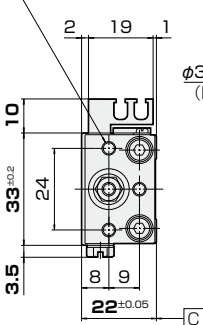
DIMENSIONS(mm) PPU12-45 SYMMETRIC

PPUS-GT12-45-TP

Symmetric
Bore Size
Stroke
With Magnet,
Switch Rail



3-M4×0.7depth8



Without Magnet, Switch Rail

GT can be converted from SD by changing the port position of SD without magnet and switch rail. When magnet, switch rail and stroke adjustment is not necessary, select SD.

With Metal Stopper, with Rubber Stopper

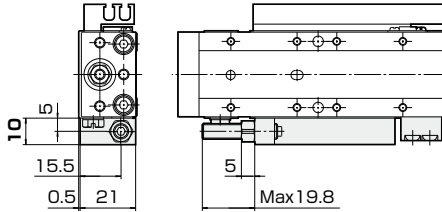
PPU(S)-GT12-45-TP-QN
-QS
-QR
-QT

■QN: Outstroke Side Metal Stopper
QS: Outstroke Side Rubber Stopper

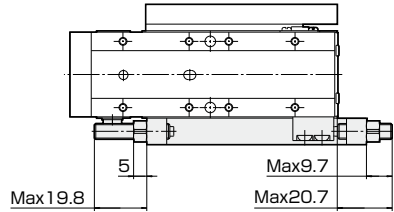
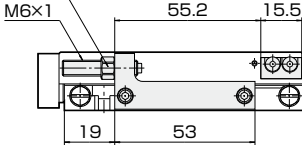
Stroke Adjustment Range: 15mm

■QR: Both Sides Metal Stopper
QT: Both Sides Rubber Stopper

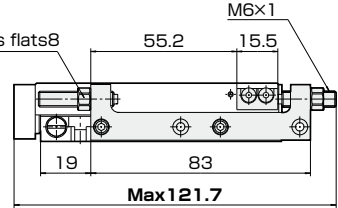
Outstroke Adjustment Range: 15mm
Instroke Adjustment Range: 5mm



Width across flats 8



Width across flats 8



With Shock Absorber

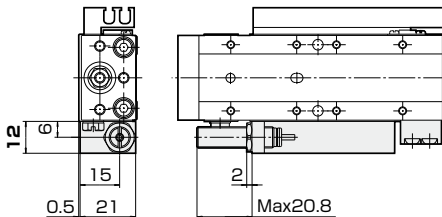
PPU(S)-GT12-45-TP-QL
-QM

■QL: Outstroke Side

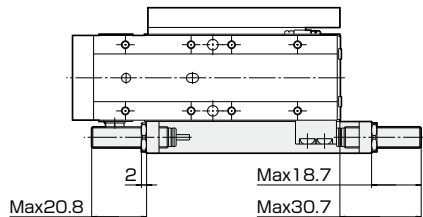
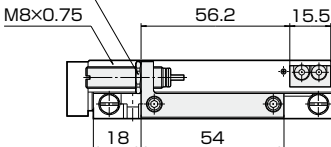
Stroke Adjustment Range: 18mm

■QM: Both Sides

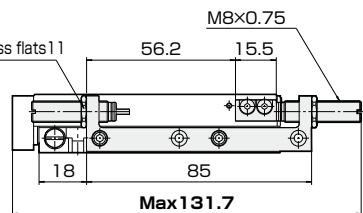
Outstroke Adjustment Range: 18mm
Instroke Adjustment Range: 16mm



Width across flats 11

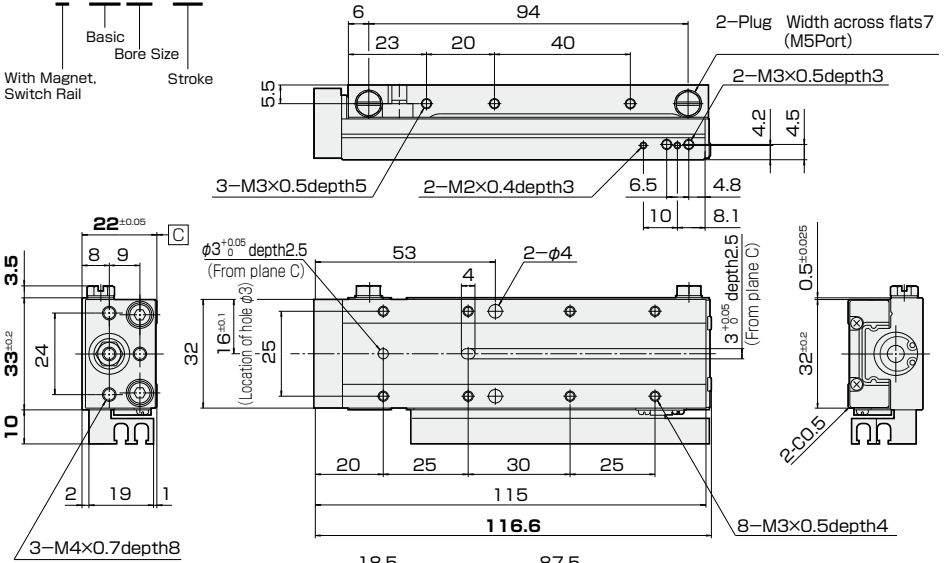


Width across flats 11

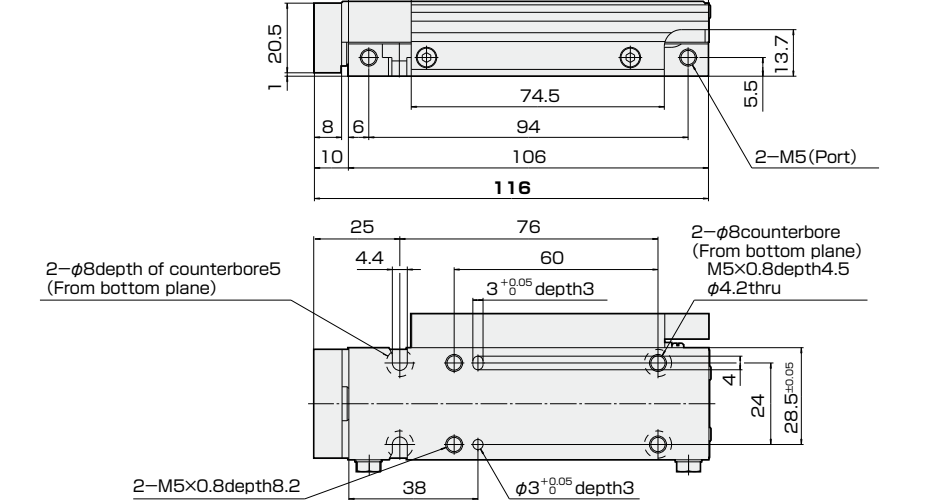


DIMENSIONS(mm) PPU12-60 BASIC

PPUS-SD12-60-TP



PPU-SD12-60



CTUD

PICO UNIT

With metal stopper, with rubber stopper

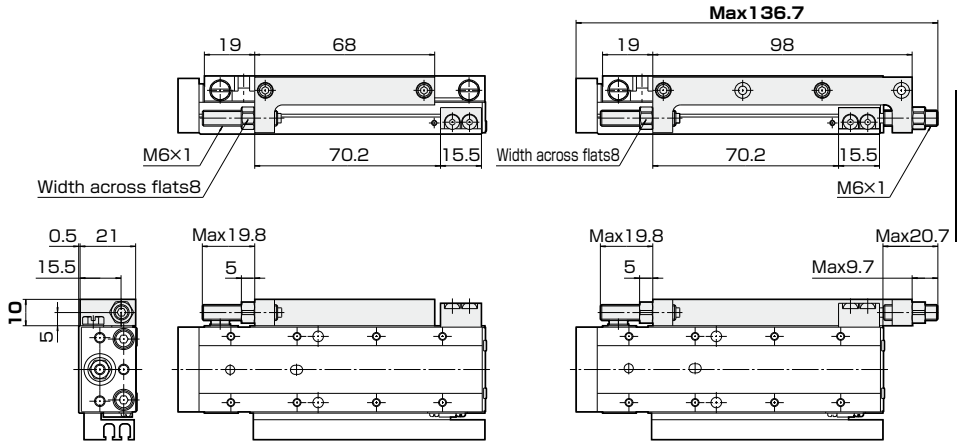
PPU(S)-SD12-60-TP-QN
 -QS
 -QR
 -QT

■QN: Outstroke Side Metal Stopper
 QS: Outstroke Side Rubber Stopper

Stroke Adjustment Range: 15mm

■QR: Both Sides Metal Stopper
 QT: Both Sides Rubber Stopper

Outstroke Adjustment Range: 15mm
 Instroke Adjustment Range: 5mm



With Shock Absorber

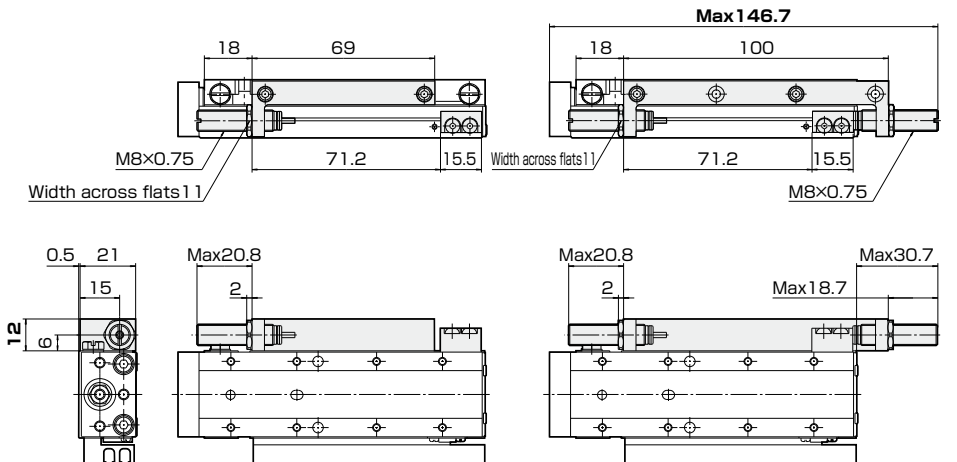
PPU(S)-SD12-60-TP-QL
 -QM

■QL: Outstroke Side

Stroke Adjustment Range: 18mm

■QM: Both Sides

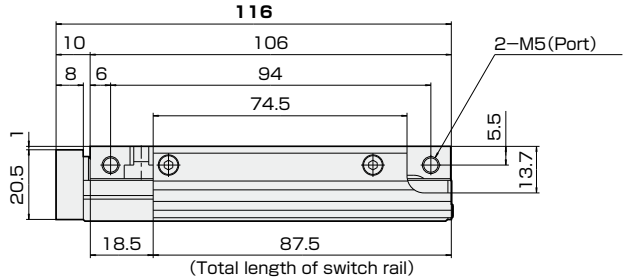
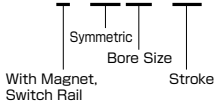
Outstroke Adjustment Range: 18mm
 Instroke Adjustment Range: 16mm



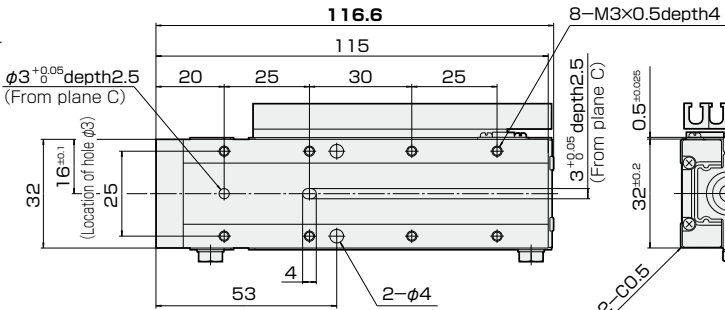
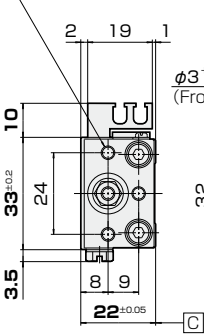
PICO UNIT
PICO UNIT
PICO UNIT

DIMENSIONS(mm) PPU12-60 SYMMETRIC

PPUS-GT12-60-TP

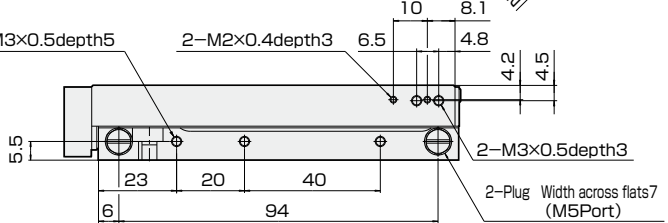


3-M4x0.7depth8

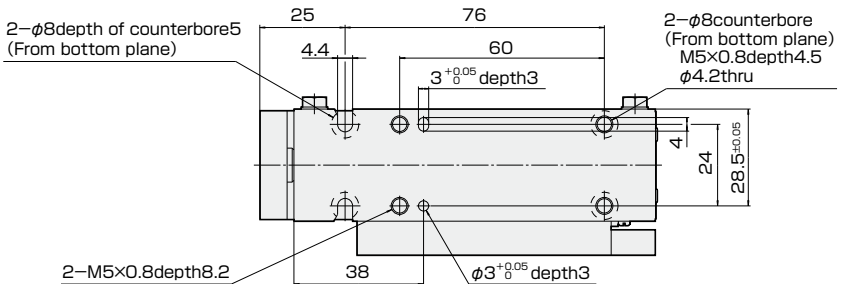


3-M3x0.5depth5

2-M2x0.4depth3



2-ø8depth of counterbore5 (From bottom plane)



Without Magnet, Switch Rail

GT can be converted from SD by changing the port position of SD without magnet and switch rail. When magnet, switch rail and stroke adjustment is not necessary, select SD.

With Metal Stopper, with Rubber Stopper

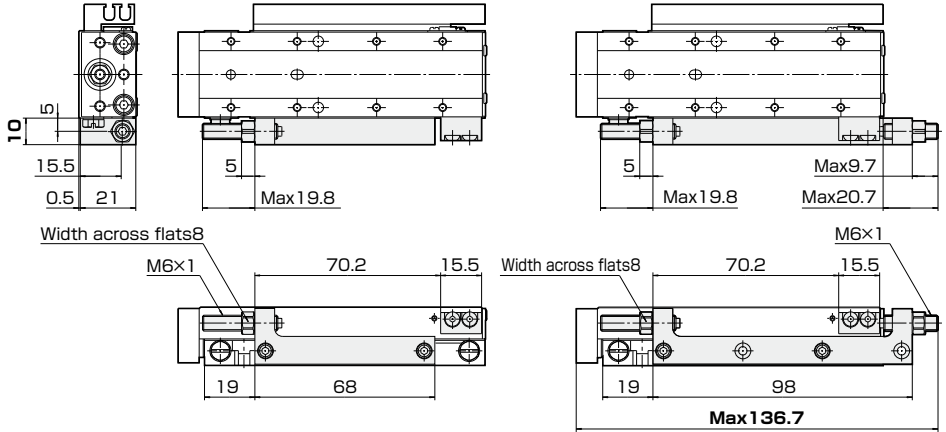
PPU(S)-GT12-60-TP-QN
-QS
-QR
-QT

■QN: Outstroke Side Metal Stopper
QS: Outstroke Side Rubber Stopper

Stroke Adjustment Range: 15mm

■QR: Both Sides Metal Stopper
QT: Both Sides Rubber Stopper

Outstroke Adjustment Range: 15mm
Instroke Adjustment Range: 5mm



With Shock Absorber

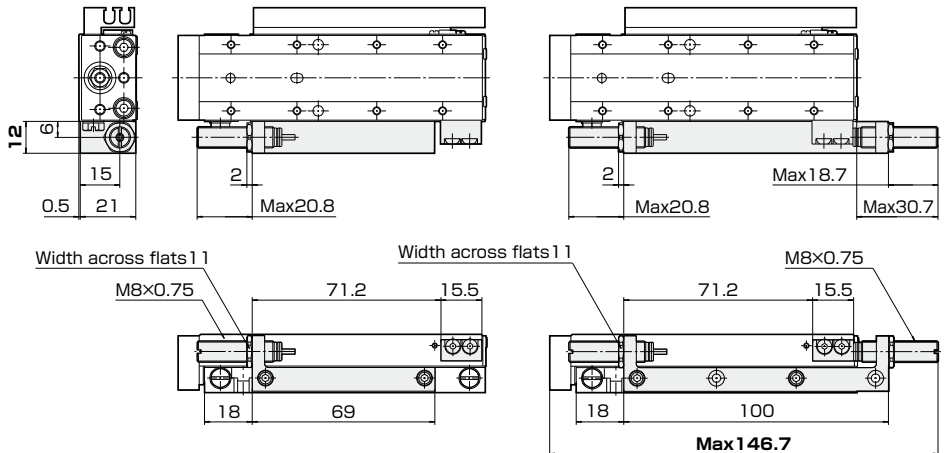
PPU(S)-GT12-60-TP-QL
-QM

■QL: Outstroke Side

Stroke Adjustment Range: 18mm

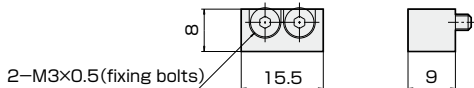
■QM: Both Sides

Outstroke Adjustment Range: 18mm
Instroke Adjustment Range: 16mm



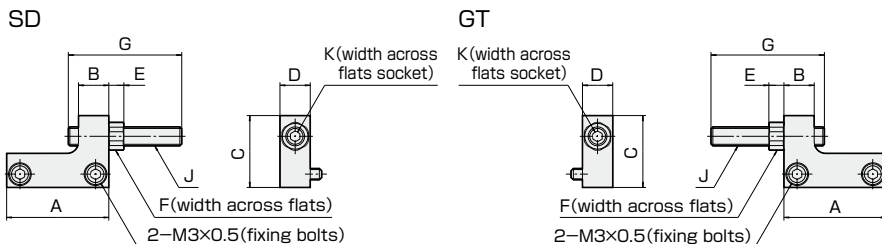
DIMENSION OF STROKE ADJUSTER

■ Stopper Receiver (Mount on Table)



■ Adjuster Block (Metal stopper) (Mount on body)

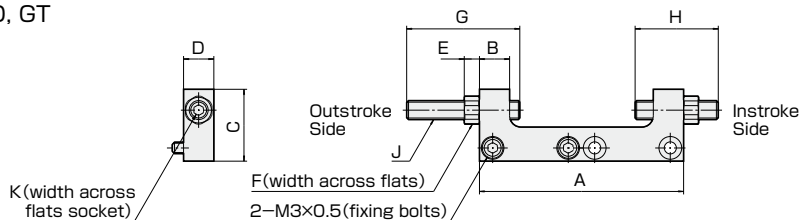
● For Outstroke Adjustment



Model	Stroke	Position	Parts Code	A	B	C	D	E	F	G	J	K
PPU10	15	SD	QN(PPU-SD10-15)	27	8	19	8	4	7	30	M5x0.8	2.5
		GT	QN(PPU-GT10-15)									
	30	SD	QN(PPU-SD10-30)									
		GT	QN(PPU-GT10-30)									
PPU12	20	SD	QN(PPU-SD12-20)	28	7.5	21	10	5	8	30	M6x1	3
		GT	QN(PPU-GT12-20)									
	30	SD	QN(PPU-SD12-30)									
		GT	QN(PPU-GT12-30)									
45	SD	QN(PPU-SD12-45)	53	68	7.5	21	10	5	8	30	M6x1	3
	GT	QN(PPU-GT12-45)										
60	SD	QN(PPU-SD12-60)										
	GT	QN(PPU-GT12-60)										

● For Both Sides Stroke Adjustment

SD, GT



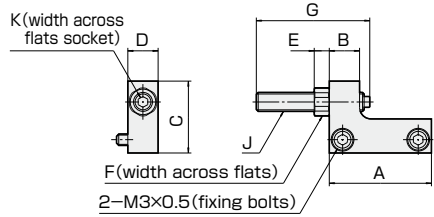
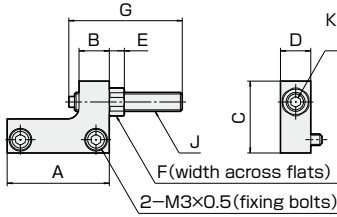
Model	Stroke	Parts Code	A	B	C	D	E	F	G	H	J	K
PPU10	15	QR(PPU10-15)	54	8	19	8	4	7	30	22	M5x0.8	2.5
	30	QR(PPU10-30)	69									
	45	QR(PPU10-45)	84									
PPU12	20	QR(PPU12-20)	58	7.5	21	10	5	8	30	22	M6x1	3
	30	QR(PPU12-30)	68									
	45	QR(PPU12-45)	83									
	60	QR(PPU12-60)	98									

■ Adjuster Block (Rubber Stopper) (Mount on Body)

● For Outstroke Adjustment

SD

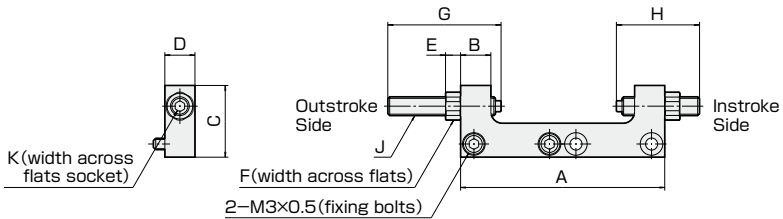
GT



Model	Stroke	Position	Parts Code	A	B	C	D	E	F	G	J	K
PPU10	15	SD	QS(PPU-SD10-15)	27	8	19	8	4	7	30	M5x0.8	2.5
		GT	QS(PPU-GT10-15)									
	30	SD	QS(PPU-SD10-30)	42								
		GT	QS(PPU-GT10-30)									
PPU12	20	SD	QS(PPU-SD12-20)	28	7.5	21	10	5	8	30	M6x1	3
		GT	QS(PPU-GT12-20)									
	30	SD	QS(PPU-SD12-30)	38								
		GT	QS(PPU-GT12-30)									
PPU12	45	SD	QS(PPU-SD12-45)	53	7.5	21	10	5	8	30	M6x1	3
		GT	QS(PPU-GT12-45)									
	60	SD	QS(PPU-SD12-60)	68								
		GT	QS(PPU-GT12-60)									

● For Both Sides Stroke Adjustment

SD, GT



Model	Stroke	Parts Code	A	B	C	D	E	F	G	H	J	K
PPU10	15	QT(PPU10-15)	54	8	19	8	4	7	30	22	M5x0.8	2.5
	30	QT(PPU10-30)	69									
	45	QT(PPU10-45)	84									
PPU12	20	QT(PPU12-20)	58	7.5	21	10	5	8	30	22	M6x1	3
	30	QT(PPU12-30)	68									
	45	QT(PPU12-45)	83									
	60	QT(PPU12-60)	98									

PICO UNIT

■ Adjuster Block(Shock Absorber) (Mount on Body)

● For Outstroke Adjustment

SD

GT

Model	Stroke	Position	Parts Code	A	B	C	D	E	F	G	J
PPU10	15	SD	QL(PPU-SD10-15)	27	4.2	19	12	2	11	32	M8x0.75
		GT	QL(PPU-GT10-15)								
	30	SD	QL(PPU-SD10-30)	42							
		GT	QL(PPU-GT10-30)								
PPU12	20	SD	QL(PPU-SD12-20)	29	4.7	21	12	2	11	32	M8x0.75
		GT	QL(PPU-GT12-20)								
	30	SD	QL(PPU-SD12-30)	39							
		GT	QL(PPU-GT12-30)								
45	SD	QL(PPU-SD12-45)	54								
	GT	QL(PPU-GT12-45)									
60	SD	QL(PPU-SD12-60)	69								
	GT	QL(PPU-GT12-60)									

● For Both Sides Stroke Adjustment

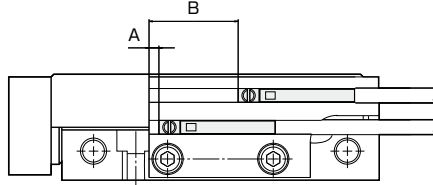
SD, GT

Model	Stroke	Parts Code	A	B	C	D	E	F	G	J
PPU10	15	QM(PPU10-15)	55	4.2	19	12	2	11	32	M8x0.75
	30	QM(PPU10-30)	70							
	45	QM(PPU10-45)	85							
PPU12	20	QM(PPU12-20)	60	4.7	21	12	2	11	32	M8x0.75
	30	QM(PPU12-30)	70							
	45	QM(PPU12-45)	85							
	60	QM(PPU12-60)	100							

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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		
PPU10-15	1.3	16.3	6	1
PPU10-30	1.3	31.3		
PPU10-45	1.3	46.3		
PPU12-20	1.4	21.4		
PPU12-30	1.4	31.4		
PPU12-45	1.4	46.4		
PPU12-60	1.4	61.4		

Note: In case of elbow tube fitting as a kind of speed controller is used, they may not turn their outlet position because of interference with the switch rail or stroke adjuster.

RB(RC) 4, 5 Switch

Unit: mm

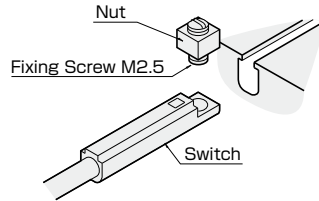
Model	Switch Setting Position		On hold distance (ℓ)	Hysteresis (c)
	A	B		
PPU10-15	3.3	18.3	2.5	1
PPU10-30	3.3	33.3		
PPU10-45	3.3	48.3		
PPU12-20	3.4	23.4		
PPU12-30	3.4	33.4		
PPU12-45	3.4	48.4		
PPU12-60	3.4	63.4		

Explanation of hysteresis and on hold distance. Switch catalog

PICO UNIT

■ 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.



Custom 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 part is lithium soap grease or fluorine grease.
- Grease of purchased item can not be exchanged.

Please ask us for more detailed information.

■ MEMO ■

■ MEMO ■

■ MEMO ■

■ MEMO ■

■ MEMO ■