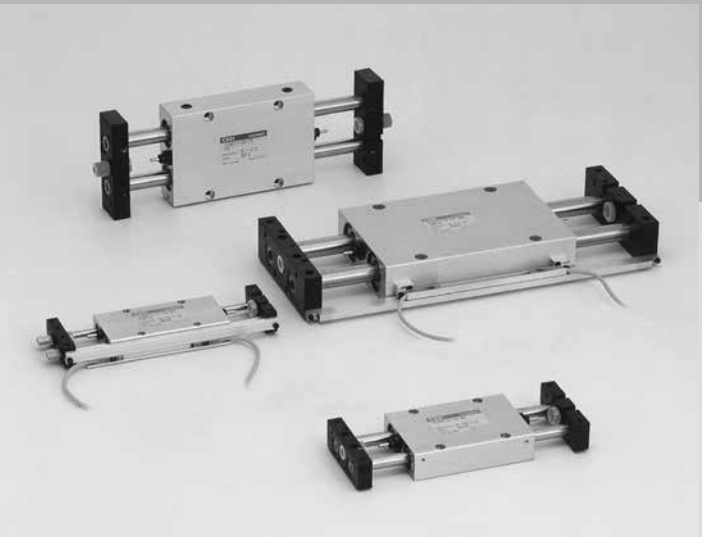
UCA2

Unit cylinder

ø10/ø16/ø25/ø32



Overview

The twin rod and double rod structure with integrated shock absorber has provided the cylinder with high position accuracy ideal for simple robots.

Features

Ideal for simple robots

Modular design enables easy in-house production of simple robots for assembling and conveying.

Two fixing methods

Two fixing methods are available: body fixing and end plate fixing.

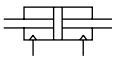
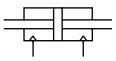
High position accuracy

The twin double rod has excellent track position accuracy. Using the ball bearing further improves accuracy and service life.

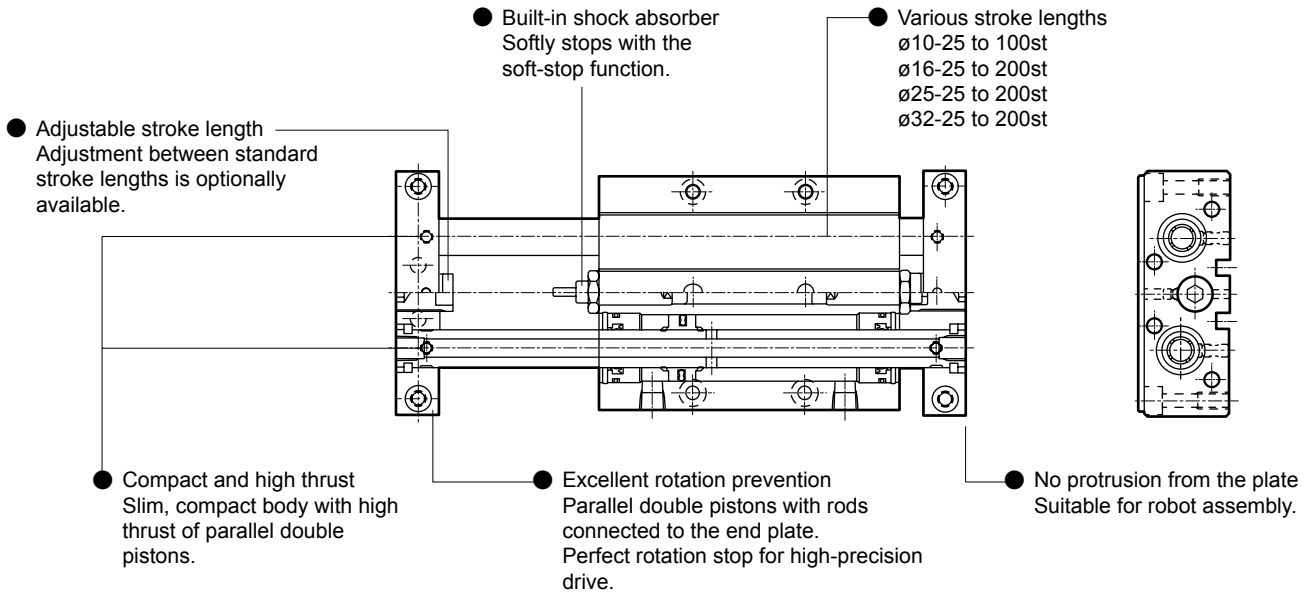
CONTENTS

Series variation

Unit cylinder UCA2 Series

Variation	Model No. JIS symbol	Bore size (mm)	Standard stroke length (mm) 25	50	75	100	125	150
Metal bush bearing with switch	UCA2 UCA2-L (with switch) 	ø10	●	●	●	●			
		ø16/ø25/ø32	●	●	●	●	●	●	
Ball bearing with switch	UCA2-B UCA2-BL (with switch) 	ø10	●	●	●	●			
		ø16/ø25/ø32	●	●	●	●	●	●	

Product introduction



●: Standard, ◎: Option, : Not available

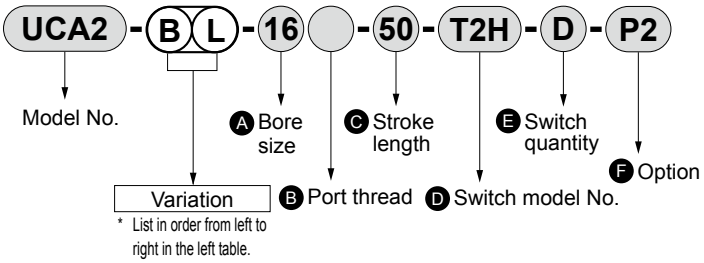
Standard stroke length (mm)		Min. stroke length	Max. stroke length	Fixing method		Option				Switch	Page
				Body fixing	Plate fixing	Single adjusting stopper plate A side	Single adjusting stopper plate B side	Double adjusting stoppers	Copper and PTFE free		
175	200			X	Y	P1A	P1B	P2	P6		
		25	100	●	●	◎	◎	◎	●	◎	640
●	●		200	●	●	◎	◎	◎	●		
		25	100	●	●	◎	◎	◎	●	◎	650
●	●		200	●	●	◎	◎	◎	●		

Variation and option combination selection table

●: Standard
◎: Option
○: Available (made-to-order product)
△: Available depending on conditions (Contact CKD.)
×: Not available

		Category	Variation				Port thread			Option					
			Metal bush bearing	Ball bearing	With cylinder switch		NPT	G		Stroke adjusting stopper	Adjustable range of double stoppers 5 mm	Adjustable range of double stoppers 12.5 mm	Adjustable range of A side stopper 25 mm	Adjustable range of B side stopper 25 mm	
		Code	Blank	B	L		N	G			Blank	P2	P1A	P1B	
Variation	Metal bush bearing	Blank		×	◎		○	○			●	◎	◎	◎	
	Ball bearing	B			◎		○	○			●	◎	◎	◎	
	With cylinder switch	L					○	○			●	◎	◎	◎	
Port thread	NPT	N						×			○	○	○	○	
	G	G									○	○	○	○	
Option	Stroke adjusting stopper														
	Both sides Double stoppers Adjustable range 5 mm / side	Blank										×	×	×	
	Double stoppers Adjustable range 12.5 mm /side	P2											×	×	
	With A side Adjustable range 25 mm	P1A												×	
	With B side Adjustable range 25 mm	P1B													
Accessory	Cylinder switch	Listed separately	◎	◎	◎		○	○			◎	◎	◎	◎	

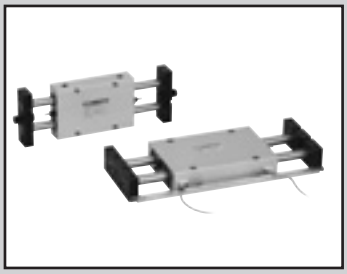
[Example of model No.]



Model No.: Unit cylinder

● Variation: Ball bearing, with switch

Ⓐ Bore size : ø16 mm
Ⓑ Port thread : Rc thread
Ⓒ Stroke length : 50 mm
Ⓓ Switch model No. : Proximity T2H switch, lead wire 1 m
Ⓔ Switch quantity : 2
Ⓕ Option : Double adjusting stoppers, adjustable range 12.5 mm per side

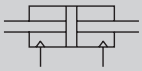


Unit cylinder Metal bush bearing/with switch

UCA2 Series

● Bore size: ø10/ø16/ø25/ø32

JIS symbol



RoHS CAD

Specifications

Item	UCA2 UCA2-L (with switch)			
Bore size mm	ø10	ø16	ø25	ø32
Actuation	Double acting			
Working fluid	Compressed air			
Max. working pressure MPa	1.0 (≈150 psi, 10 bar)			
Min. working pressure MPa	0.15 (≈22 psi, 1.5 bar)		0.1 (≈15 psi, 1 bar)	
Proof pressure MPa	1.5 (≈220 psi, 15 bar)			
Ambient temperature °C	-10 (14°F) to 60 (140°F) (no freezing)			
Port size	M5		Rc1/8	
Stroke tolerance mm	+1.0 0			
Working piston speed mm/s	30 to 300			
Non-rotating accuracy Note	±0.1°	±0.05°		±0.02°
Max. operating frequency Cycle/min.	30			
Cushion	Shock absorber integrated			
Lubrication	Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)			
Allowable absorbed energy J	0.25	0.65	2.4	4.5

Note: Values of when the stroke is 0 mm (excluding deflection of the piston rod)

Stroke

Bore size (mm)	Standard stroke (mm)	Max. stroke (mm)	Min. stroke (mm)	Min. stroke with switch (mm)
ø10	25/50/75/100	100	25	10: With 1 switch (*2) 20: With 2 switches (*2) 75: With 3 switches
ø16	25/50/75/100 125/150/175/200	200		
ø25		200		
ø35		200		

*1: Products with stroke other than standard stroke are not available.
*2: Min. stroke when adjusted with the stopper.

Theoretical thrust table

(Unit: N)

Bore size (mm)	Operating direction	Working pressure MPa										
		0.1	0.15	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
ø10	Push	-	15.1	20.1	30.2	40.2	50.3	60.3	70.4	80.4	90.5	$1.01x10^2$
	Pull	-	15.1	20.1	30.2	40.2	50.3	60.3	70.4	80.4	90.5	$1.01x10^2$
ø16	Push	-	36.8	49.0	73.5	98.0	$1.23x10^2$	$1.47x10^2$	$1.72x10^2$	$1.96x10^2$	$2.21x10^2$	$2.45x10^2$
	Pull	-	36.8	49.0	73.5	98.0	$1.23x10^2$	$1.47x10^2$	$1.72x10^2$	$1.96x10^2$	$2.21x10^2$	$2.45x10^2$
ø25	Push	67.4	$1.01x10^2$	$1.35x10^2$	$2.02x10^2$	$2.70x10^2$	$3.37x10^2$	$4.04x10^2$	$4.72x10^2$	$5.39x10^2$	$6.06x10^2$	$6.74x10^2$
	Pull	67.4	$1.01x10^2$	$1.35x10^2$	$2.02x10^2$	$2.70x10^2$	$3.37x10^2$	$4.04x10^2$	$4.72x10^2$	$5.39x10^2$	$6.06x10^2$	$6.74x10^2$
ø32	Push	$1.21x10^2$	$1.81x10^2$	$2.41x10^2$	$3.62x10^2$	$4.83x10^2$	$6.03x10^2$	$7.24x10^2$	$8.44x10^2$	$9.65x10^2$	$1.09x10^3$	$1.21x10^3$
	Pull	$1.21x10^2$	$1.81x10^2$	$2.41x10^2$	$3.62x10^2$	$4.83x10^2$	$6.03x10^2$	$7.24x10^2$	$8.44x10^2$	$9.65x10^2$	$1.09x10^3$	$1.21x10^3$

Switch specifications

●1-color/2-color LED

Item	Reed 2-wire				Proximity 2-wire		Proximity 3-wire		
	T0H/T0V		T5H/T5V		T2H/T2V	T2WH/ T2WV	T3H/ T3V	T3PH/ T3PV	T3WH/ T3WV
Applications	For programmable controller, relay		For programmable controller, relay, IC circuit (no indicator lamp), serial connection		Dedicated for programmable controller		For programmable controller, relay		
Output method	-		-		-		NPN output	PNP output	NPN output
Power supply voltage	-		-		-		10 to 28 VDC		
Load voltage	12/24 VDC	110 VAC	5/12/24 VDC	110 VAC	10 to 30 VDC	24 VDC ±10%	30 VDC or less		
Load current	5 to 50mA	7 to 20 mA	50 mA or less	20 mA or less	5 to 20 mA (*3)		100 mA or less		50 mA or less
Indicator lamp	LED (Lit when ON)		No indicator lamp		LED (Lit when ON)	Red/green LED (Lit when ON)	LED (Lit when ON)	Yellow LED (Lit when ON)	Red/green LED (Lit when ON)
Leakage current	0mA				1 mA or less		10 μA or less		
Weight g	1 m: 18 3 m: 49 5 m: 80				1 m: 18 3 m: 49 5 m: 80		1 m: 18 3 m: 49 5 m: 80		

*1 : Refer to Ending Page 1 for detailed switch specifications and dimensions.
*2 : Switches other than the above models, such as switches with connectors, are also available. Refer to Ending Page 1.
*3 : The max. load current is 20 mA at 25°C. The current is lower than 20 mA if the operating ambient temperature around the switch is higher than 25°C.

Cylinder weight (X: body fixing)

——Values in ( ) include the switch mounting rail.

[Unit: kg]

Model No.	Stroke (mm)								Switch weight per 1 pc
	25	50	75	100	125	150	175	200	
UCA2-X-10	0.30 (0.35)	0.37 (0.42)	0.43 (0.49)	0.49 (0.55)	-	-	-	-	Refer to the weight in the switch specifications.
UCA2-X-16	0.53 (0.56)	0.66 (0.71)	0.78 (0.84)	0.91 (0.98)	1.04 (1.12)	1.17 (1.25)	1.30 (1.39)	1.42 (1.52)	
UCA2-X-25	1.00 (1.04)	1.20 (1.26)	1.41 (1.47)	1.61 (1.68)	1.81 (1.89)	2.02 (2.11)	2.22 (2.32)	2.43 (2.53)	
UCA2-X-32	1.65 (1.69)	1.95 (2.01)	2.25 (2.31)	2.55 (2.62)	2.85 (2.93)	3.15 (3.24)	3.45 (3.55)	3.75 (3.85)	

Cylinder weight (Y: plate fixing)

——Values in ( ) include the switch mounting rail.

[Unit: kg]

Model No.	Stroke (mm)								Switch weight per 1 pc
	25	50	75	100	125	150	175	200	
UCA2-Y-10	0.30 (0.33)	0.37 (0.40)	0.43 (0.46)	0.49 (0.52)	-	-	-	-	Refer to the weight in the switch specifications.
UCA2-Y-16	0.53 (0.56)	0.66 (0.69)	0.78 (0.82)	0.91 (0.95)	1.04 (1.08)	1.17 (1.21)	1.30 (1.34)	1.42 (1.47)	
UCA2-Y-25	1.00 (1.03)	1.20 (1.23)	1.41 (1.44)	1.61 (1.65)	1.81 (1.85)	2.02 (2.06)	2.20 (2.27)	2.43 (2.47)	
UCA2-Y-32	1.65 (1.68)	1.95 (1.98)	2.25 (2.29)	2.55 (2.59)	2.85 (2.89)	3.15 (3.19)	3.45 (3.50)	3.75 (3.80)	

How to order

Without switch (without magnet for switch)

UCA2 - X - 10 ( ) - 25 ——— P1A

With switch (built-in magnet for switch)

UCA2-L - X - 10 ( ) - 25 - T2H - RA - P1A

Ⓐ Fixing method

Ⓑ Bore size

Ⓒ Port thread

Ⓓ Stroke
Refer to page 640 for the min. stroke.

Ⓔ Switch model No.
*1

Ⓕ Switch quantity
*2

Ⓖ Option
*3

Code	Description
Ⓐ Fixing method	
X	Body fixing
Y	Plate fixing

Ⓑ Bore size (mm)	
10	ø10
16	ø16
25	ø25
32	ø32

Ⓒ Port thread	
Blank	Rc thread
NN	NPT thread (ø25 and over) (Made-to-order product)
GN	G thread (ø25 and over) (made-to-order product)

Ⓓ Stroke (mm)

Bore size (ø)		10	16	25	32
25	25	●	●	●	●
50	50	●	●	●	●
75	75	●	●	●	●
100	100	●	●	●	●
125	125		●	●	●
150	150		●	●	●
175	175		●	●	●
200	200		●	●	●

Ⓔ Switch model No.

Straight Lead wire	L-shaped Lead wire	Contact	Voltage AC	Voltage DC	Indicator	Lead wire
T0H*	**T0V***	Reed	●	●	1-color LED	2-wire
T5H*	**T5V***		●	●	No indicator lamp	
T2H*	**T2V***	Prox.		●	1-color LED	2-wire
T3H*	**T3V***			●		3-wire
T3PH*	**T3PV***			●	1-color LED (PNP output)	3-wire
T2WH*	**T2WV***	Prox.		●	2-color LED	2-wire
T3WH*	**T3WV***			●		3-wire

*** Lead wire length**	
Blank	1m (Standard)
3	3m (Option)
5	5m (Option)

Ⓕ Switch quantity		
RA	1	Plate A side
RB		Plate B side
D	2	
T	3	

Ⓖ Option		
P1A	Single adjusting stopper	Plate A side
P1B		Plate B side
P2	Double adjusting stoppers	

⚠ Precautions for model No. selection

*1 : Magnet is not built into the type without switch. For specifications with switch but without switch installed, a magnet and magnet rail are mounted but a switch rail is not.
*2 : Min. stroke with three switches: 75 (mm)
*3 : Difference between side A and side B is described in the dimensions.

[Example of model No.]

UCA2-L-X-10-25-T2H-RA-P1A

Model: Unit cylinder metal bush bearing
Ⓐ Fixing method : Body fixing
Ⓑ Bore size : ø10 mm
Ⓒ Port thread : Rc thread
Ⓓ Stroke : 25mm
Ⓔ Switch model No. : Proximity switch T2H, lead wire length 1 m
Ⓕ Switch quantity : 1 (plate A side)
Ⓖ Option : Single adjusting stopper (plate A side)

How to order switch

●Switch body + mounting bracket set (including switch rail)... ①

UCA2 - T0H - X - 10 - 25 - RA

- T0H: Switch model No. (Item Ⓔ on page 642)
- X: Fixing method (Item Ⓐ on page 642)
- 10: Bore size (Item Ⓑ on page 642)
- 25: Stroke (Item Ⓓ on page 642)
- RA: Switch quantity (Item Ⓕ on page 642)

● Mounting bracket set (including switch rail) + magnet...②

UCA2 - T - X - 10 - 25

- X: Fixing method (Item Ⓐ on page 642)
- 10: Bore size (Item Ⓑ on page 642)
- 25: Stroke (Item Ⓓ on page 642)

●Mounting bracket set (including switch rail)... ③

UCA2 - T - X - 10 - 25 - SW - RAIL

- X: Fixing method (Item Ⓐ on page 642)
- 10: Bore size (Item Ⓑ on page 642)
- 25: Stroke (Item Ⓓ on page 642)

● Switch body only...④

SW - T0H

- T0H: Switch model No. (Item Ⓔ on page 642)

1) When changing from the type without switch to the type with T-switch

Changed content	Switch required	Switch not required
UCA2-[X.Y] → UCA2-L-[X.Y]	② + ④	②

* A switch can be installed separately even if “switch not required” is selected. (when you already have a T-switch, etc.)

2) When only the magnet for T-switch is installed

Changed content	Switch required	Switch not required
UCA2-L-[X.Y] → UCA2-L-[X.Y] Without switch With switch	①	③

When it was not possible to install a switch in UCA2-L and up models. (Magnet only installed)

3) When changing from the type with S type switch to the type with T-switch

Changed content	Switch required	Switch not required
S type switch → T-switch	② + ④	-

* Set of switch rail, mounting bracket and switch body will be replaced.

How to order shock absorber set

● For ø10
UCA2-10-NCK

● For ø16 to ø32 (common)
UCA2-16-NCK

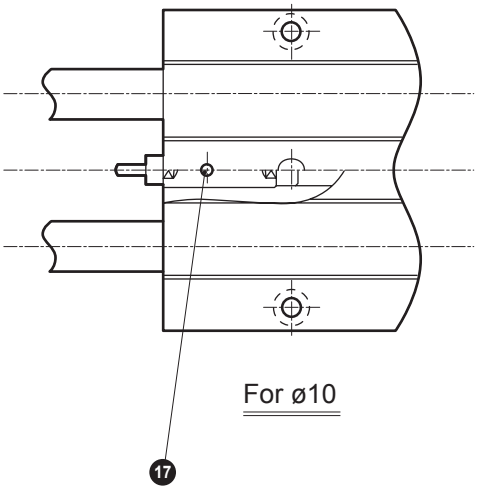
Specifications for rechargeable battery

(Catalog No. CC-1226A)

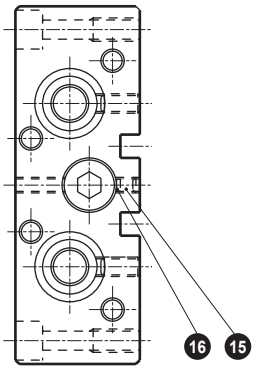
● Design compatible with rechargeable battery manufacturing process.

UCA2-……-P4*

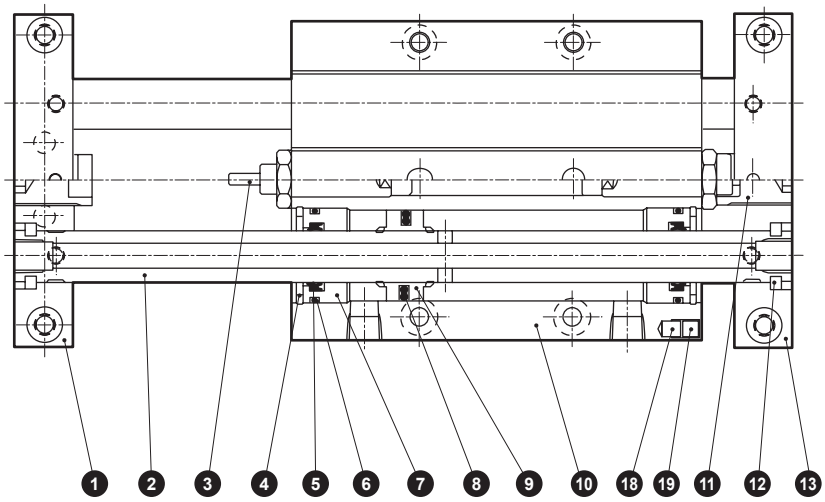
Internal structure and parts list

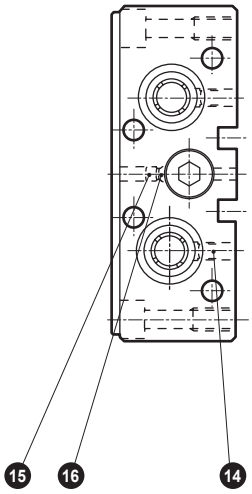


For ø10



[For UCA2-X-25, 32]





No.	Part name	Material	Remarks	No.	Part name	Material	Remarks
1	End plate (A)	Aluminum alloy	Alumite	10	Cylinder body	Aluminum alloy	Hard alumite
2	Piston rod	Steel	Industrial chrome plating	11	Stopper	Steel	Chromate
3	Shock absorber		ø10:UCA2-10-NCK ø16 to 32:UCA2-16-NCK	12	Split ring	Steel	Black finish
				13	End plate (B)	Aluminum alloy	Alumite
4	C-snap ring for hole	Steel	Zinc phosphate	14	Hexagon socket set screw	Alloy steel	Black finish
5	Rod packing	Nitrile rubber		15	Hexagon socket set screw	Alloy steel	
6	Rod metal gasket	Nitrile rubber		16	Set shoe	Aluminum alloy	
7	Rod metal	Aluminum alloy	Alumite	17	Hexagon socket set screw	Alloy steel	
8	Piston packing	Nitrile rubber		18	Magnet	Special alloy	UCA2-L-Y only
9	Piston	Aluminum alloy		19	Hexagon socket set screw	Stainless steel	UCA2-L-Y only

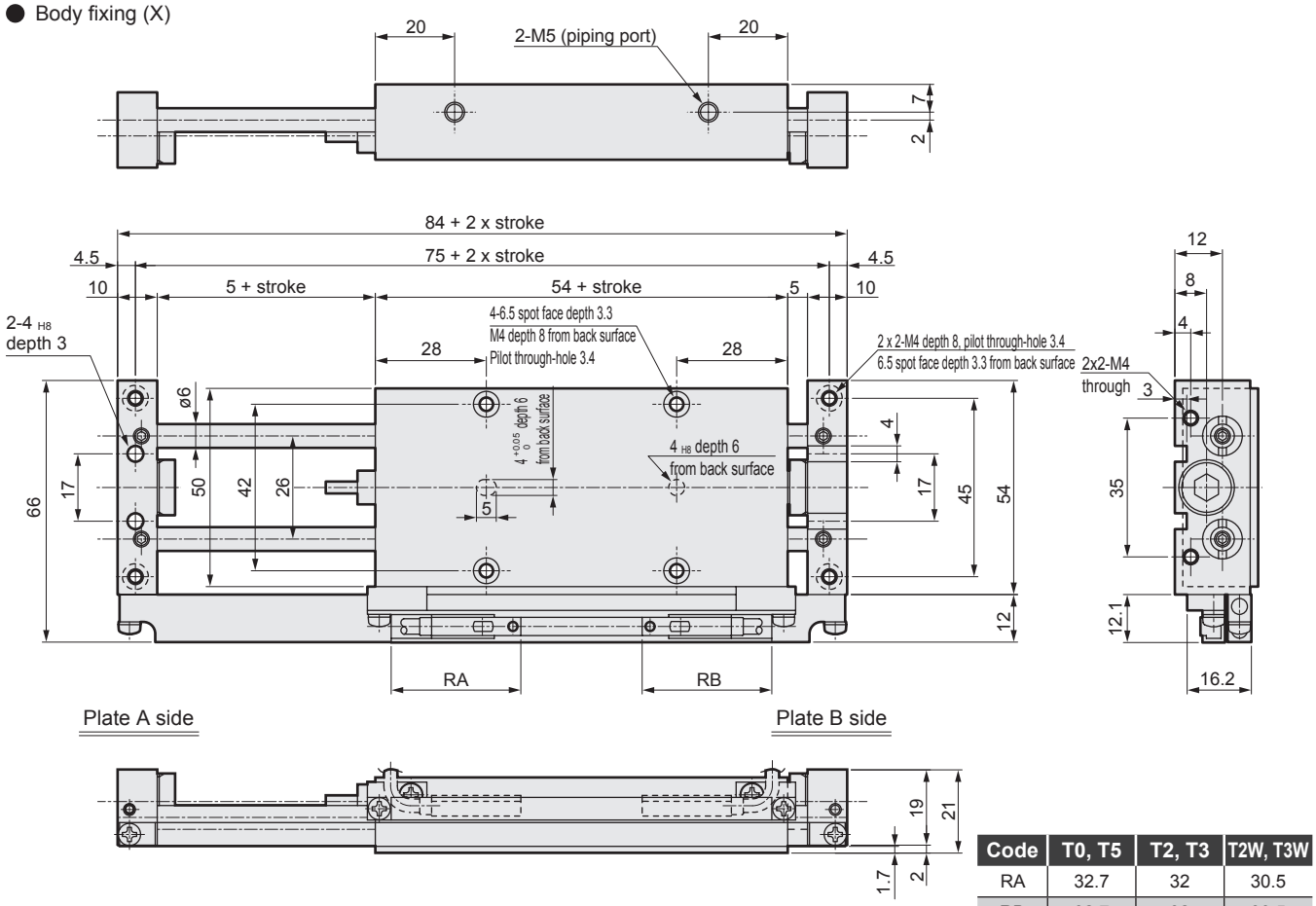
Repair parts list

Bore size (mm)	Kit No.	Repair parts No.
ø10	UCA2-10K	❺ ❻ ❽ ⓮
ø16	UCA2-16K	
ø25	UCA2-25K	
ø32	UCA2-32K	

Note: The repair parts are common between the metal bush bearing and ball bearing.

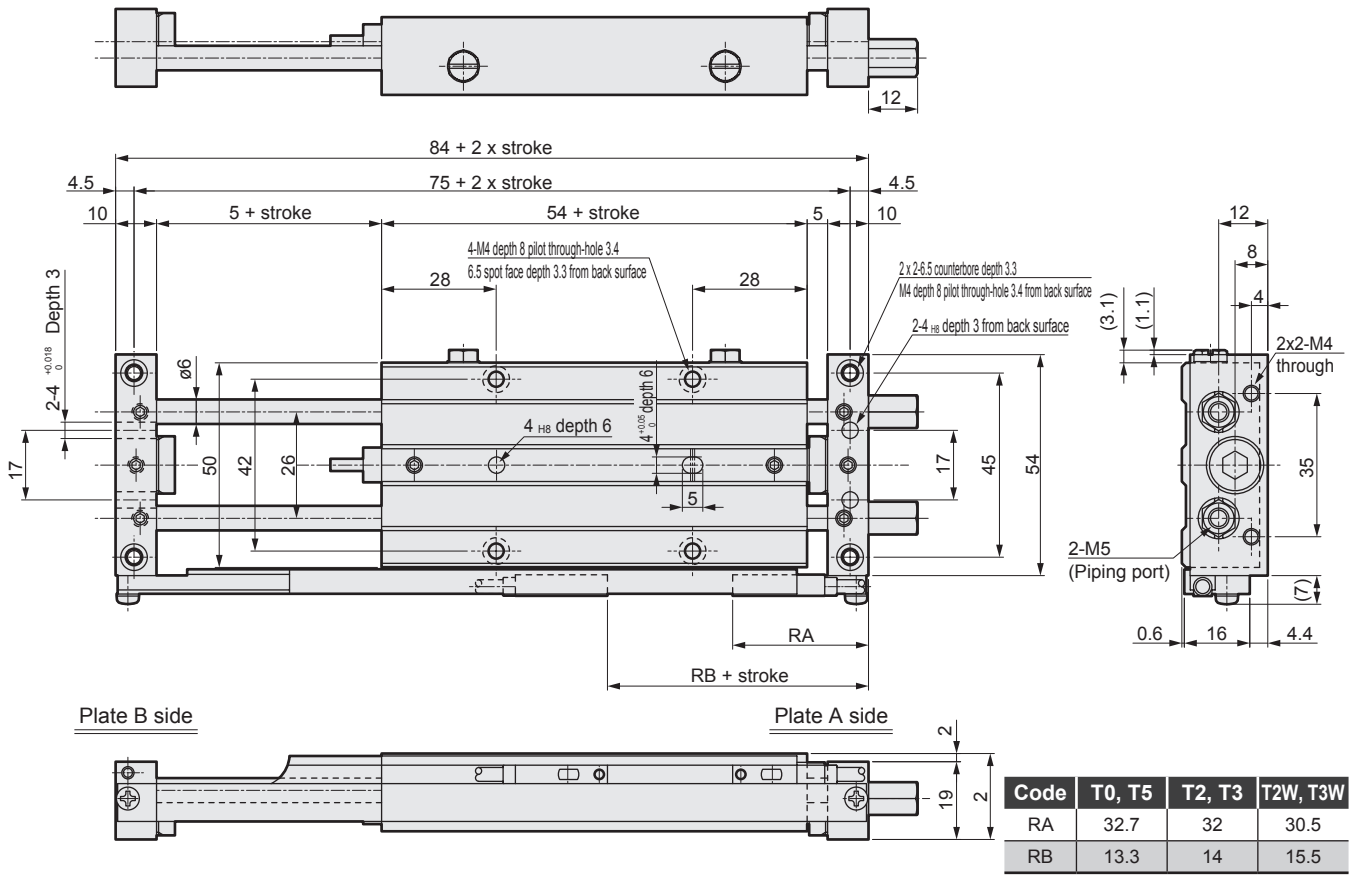
Dimensions: ø10 CAD

● Body fixing (X)



Code	T0, T5	T2, T3	T2W, T3W
RA	32.7	32	30.5
RB	32.7	32	30.5

● Plate fixing (Y)

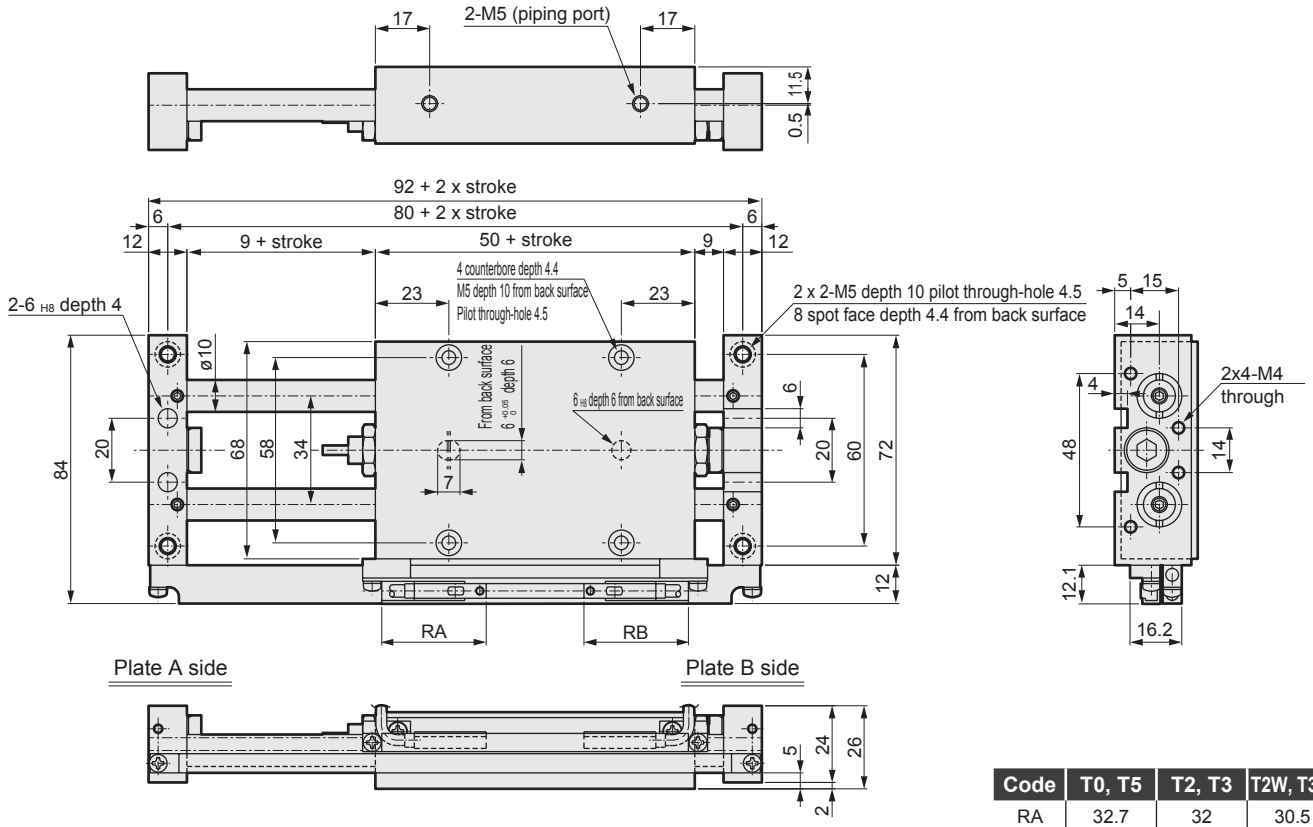


Code	T0, T5	T2, T3	T2W, T3W
RA	32.7	32	30.5
RB	13.3	14	15.5

* Adjusting to a longer stroke with the stopper may cause malfunction.
Refer to page 667 for details.

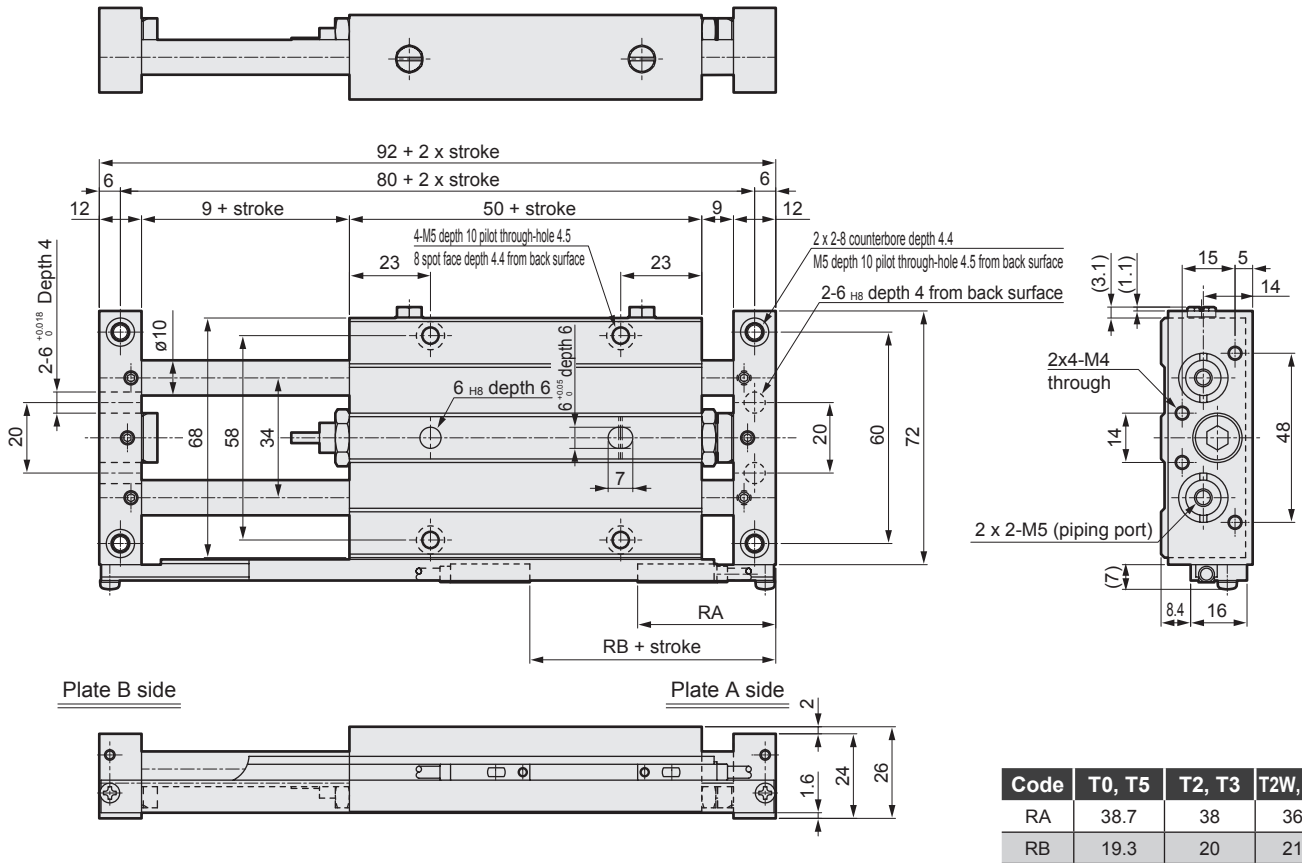
Dimensions: ø16 CAD

● Body fixing (X)



Code	T0, T5	T2, T3	T2W, T3W
RA	32.7	32	30.5
RB	32.7	32	30.5

● Plate fixing (Y)

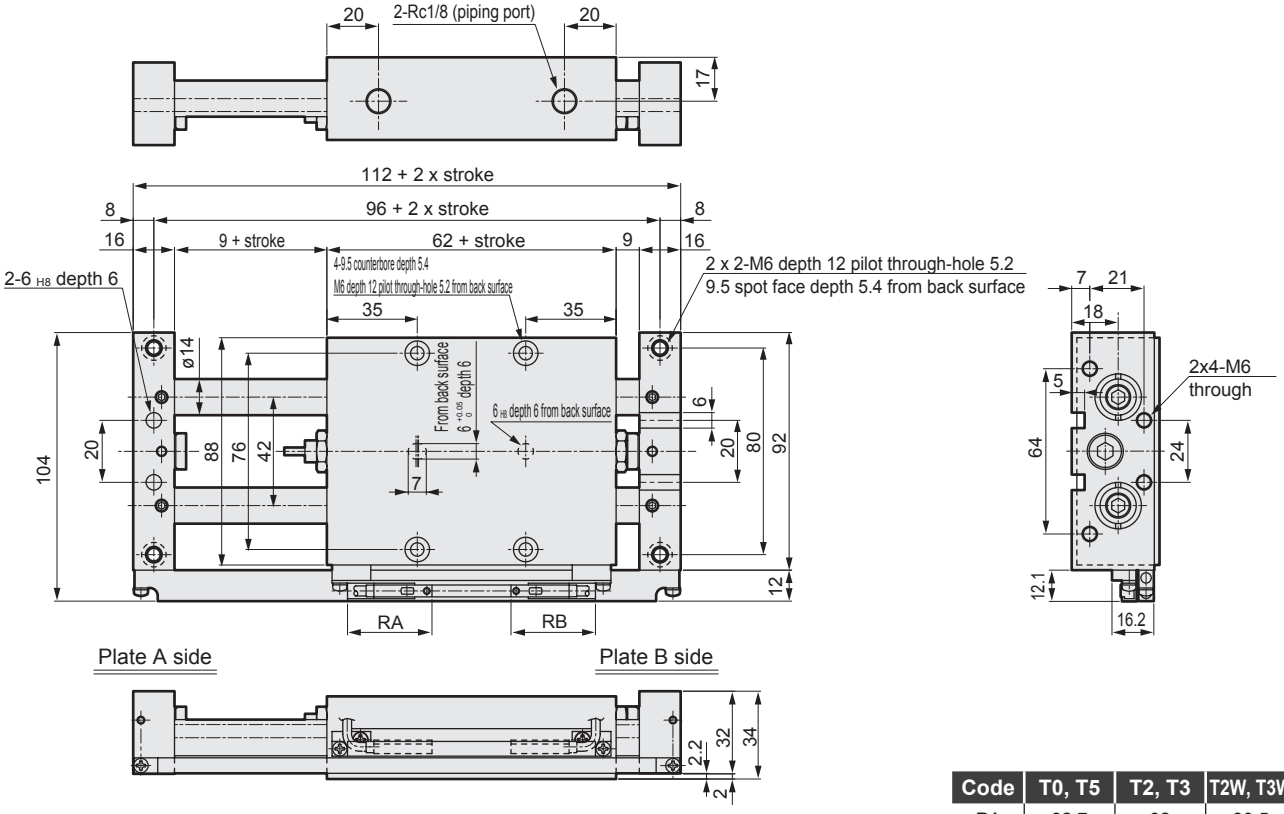


Code	T0, T5	T2, T3	T2W, T3W
RA	38.7	38	36.5
RB	19.3	20	21.5

* Adjusting to a longer stroke with the stopper may cause malfunction.
Refer to page 667 for details.

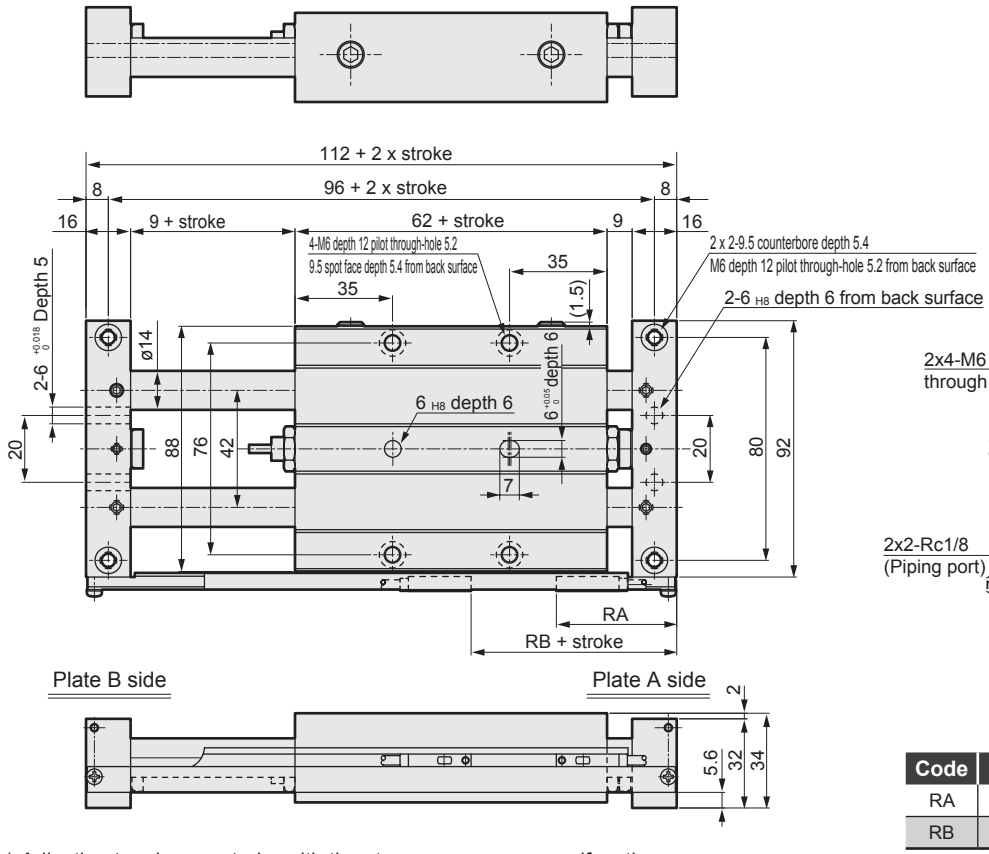
Dimensions: ø25

● Body fixing (X)



Code	T0, T5	T2, T3	T2W, T3W
RA	32.7	32	30.5
RB	32.7	32	30.5

● Plate fixing (Y)

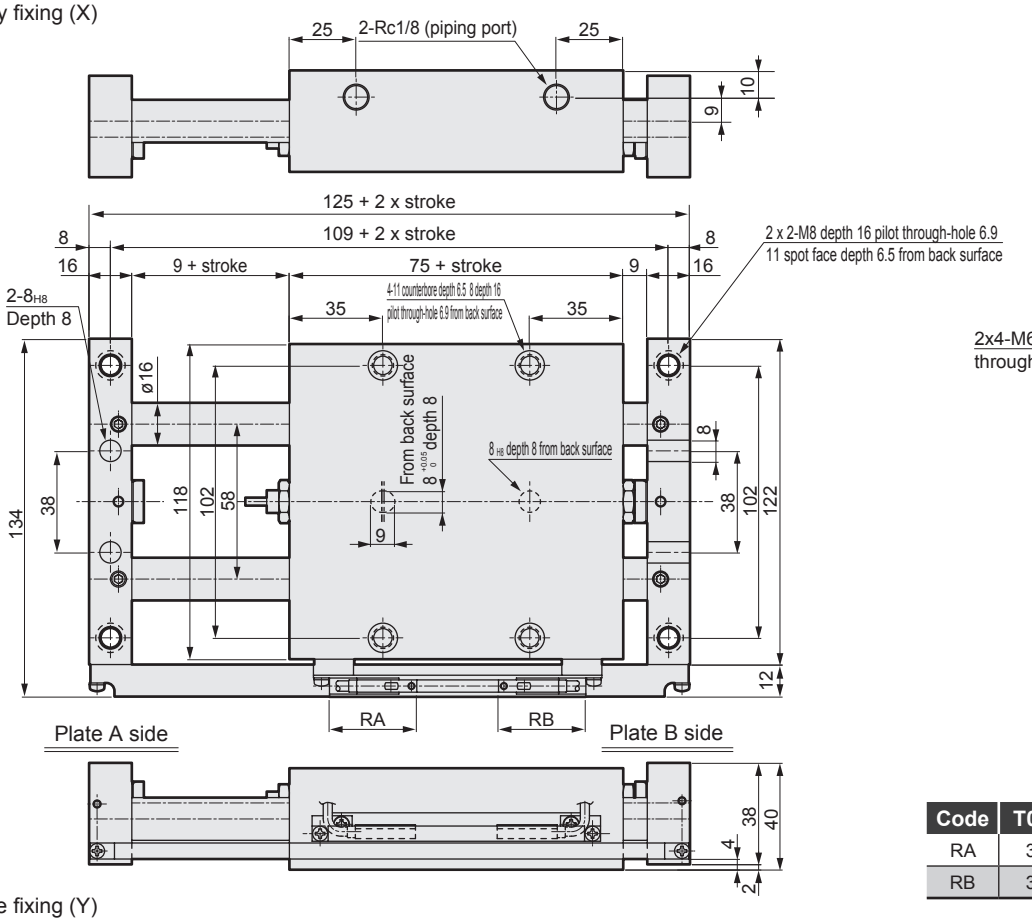


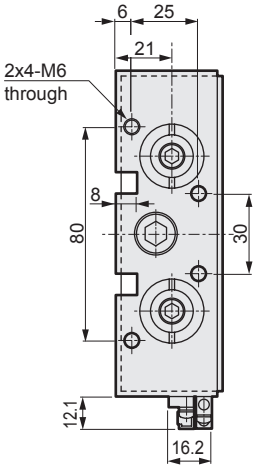
Code	T0, T5	T2, T3	T2W, T3W
RA	42.7	42	40.5
RB	23.3	24	25.5

* Adjusting to a longer stroke with the stopper may cause malfunction.
Refer to page 667 for details.

Dimensions: ø32 CAD

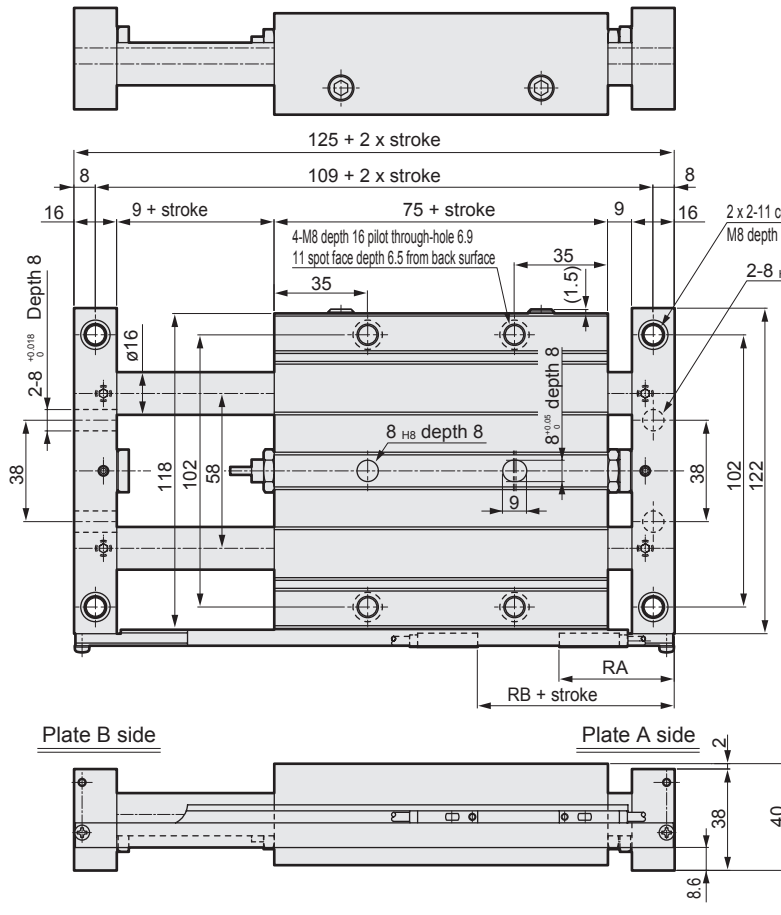
● Body fixing (X)

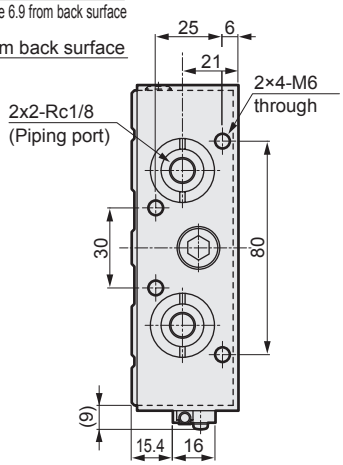




Code	T0, T5	T2, T3	T2W, T3W
RA	32.7	32	30.5
RB	32.7	32	30.5

● Plate fixing (Y)



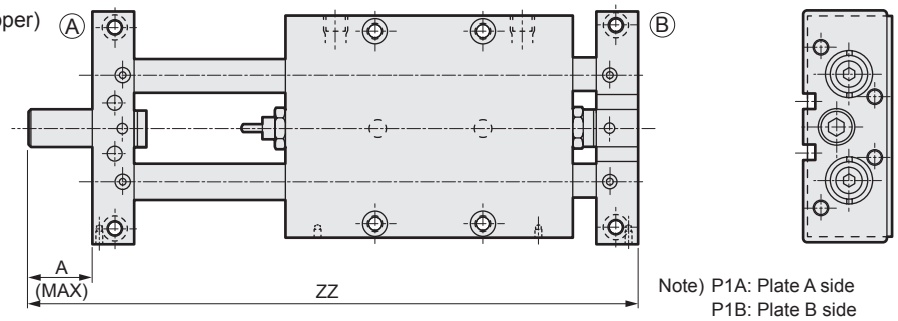


Code	T0, T5	T2, T3	T2W, T3W
RA	42.7	42	40.5
RB	23.3	24	25.5

* Adjusting to a longer stroke with the stopper may cause malfunction.
Refer to page 667 for details.

Dimensions: Adjusting stopper

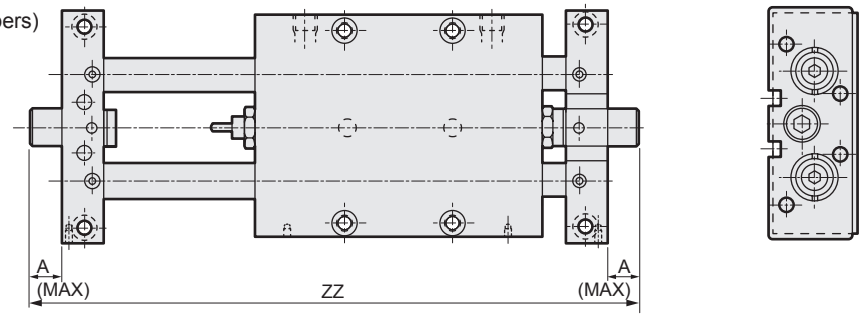
● UCA2-X/Y(10/16/25/32)-* *-P1* (single adjusting stopper)



Note) P1A: Plate A side
P1B: Plate B side

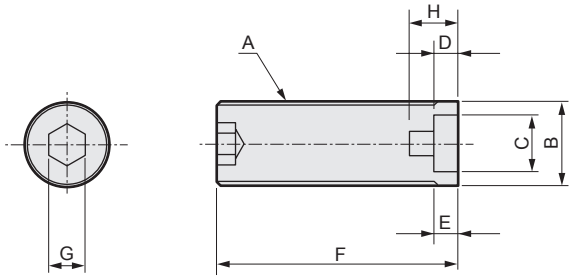
Model No.	A (MAX)	ZZ							
		25st	50st	75st	100st	125st	150st	175st	200st
UCA2-10	25	159	209	259	309	-	-	-	-
UCA2-16		167	217	267	317	367	417	467	517
UCA2-25		187	237	287	337	387	437	487	537
UCA2-32		200	250	300	350	400	450	500	550

● UCA2-X/Y(10/16/25/32)-* *-P2* (double adjusting stoppers)



Model No.	A (MAX)	ZZ							
		25st	50st	75st	100st	125st	150st	175st	200st
UCA2-10	12.5	159	209	259	309	-	-	-	-
UCA2-16		167	217	267	317	367	417	467	517
UCA2-25		187	237	287	337	387	437	487	537
UCA2-32		200	250	300	350	400	450	500	550

Stopper dimensions

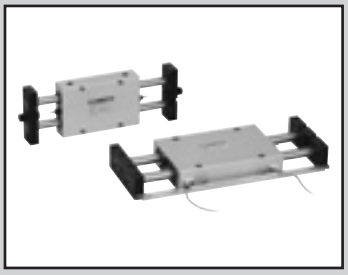


Code / Bore size (mm)	A	B	C	D	E	F		G	H
ø10	M14x1	ø14	ø10	4	4	Standard	14.5	6	8
						P2	27		
						P1	39.5		
ø16	M14x1	ø14	ø10	8	4	Standard	17	6	-
						P2	29.5		
						P1	42		
ø25	M14x1	ø14	ø10	6.5	4	Standard	21	6	-
						P2	33.5		
						P1	46		
ø32	M16x1	ø16	ø10	5.5	4	Standard	21	8	-
						P2	33.5		
						P1	46		

Model No. of discrete adjusting stoppers

● Standard

Part/part name / Bore size (mm)	Standard stopper		Single stopper		Double stoppers	
	Model No.	Weight g	Model No.	Weight g	Model No.	Weight g
ø10	UCA2-P-10	12	UCA2-P1-10	38	UCA2-P2-10	25
ø16	UCA2-P-16	12	UCA2-P1-16	38	UCA2-P2-16	25
ø25	UCA2-P-25	17	UCA2-P1-25	44	UCA2-P2-25	30
ø32	UCA2-P-32	22	UCA2-P1-32	58	UCA2-P2-32	40

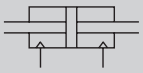


Unit cylinder Ball bearing/with switch

UCA2-B Series

● Bore size: ø10/ø16/ø25/ø32

JIS symbol



RoHS CAD

Specifications

Item	UCA2-B UCA2-BL (with switch)			
Bore size mm	ø10	ø16	ø25	ø32
Actuation	Double acting			
Working fluid	Compressed air			
Max. working pressure MPa	1.0 (≈150 psi, 10 bar)			
Min. working pressure MPa	0.15 (≈22 psi, 1.5 bar)		0.1 (≈15 psi, 1 bar)	
Proof pressure MPa	1.5 (≈220 psi, 15 bar)			
Ambient temperature °C	-10 (14°F) to 60 (140°F) (no freezing)			
Port size	M5		Rc1/8	
Stroke tolerance mm	+1.0 0			
Working piston speed mm/s	30 to 300			
Non-rotating accuracy *1	±0.04°	±0.03°	±0.015°	±0.015°
Max. operating frequency Cycle/min.	30			
Cushion	Shock absorber integrated			
Lubrication	Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)			
Allowable absorbed energy J	0.25	0.65	2.4	4.5

*1: Values of when the stroke is 0 mm (excluding deflection of the piston rod)

Stroke

Bore size (mm)	Standard stroke (mm)	Max. stroke (mm)	Min. stroke (mm)	Min. stroke with switch (mm)
ø10	25/50/75/100	100	25	10: With 1 switch 20: With 2 switches 75: With 3 switches
ø16	25/50/75/100 125/150/175/200	200		
ø25				
ø35				

Note: Products with stroke other than standard stroke are not available.

Theoretical thrust table

(Unit: N)

Bore size (mm)	Operating direction	Working pressure MPa										
		0.1	0.15	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
ø10	Push	-	15.1	20.1	30.2	40.2	50.3	60.3	70.4	80.4	90.5	$1.01x10^2$
	Pull	-	15.1	20.1	30.2	40.2	50.3	60.3	70.4	80.4	90.5	$1.01x10^2$
ø16	Push	-	36.8	49.0	73.5	98.0	$1.23x10^2$	$1.47x10^2$	$1.72x10^2$	$1.96x10^2$	$2.21x10^2$	$2.45x10^2$
	Pull	-	36.8	49.0	73.5	98.0	$1.23x10^2$	$1.47x10^2$	$1.72x10^2$	$1.96x10^2$	$2.21x10^2$	$2.45x10^2$
ø25	Push	67.4	$1.01x10^2$	$1.35x10^2$	$2.02x10^2$	$2.70x10^2$	$3.37x10^2$	$4.04x10^2$	$4.72x10^2$	$5.39x10^2$	$6.06x10^2$	$6.74x10^2$
	Pull	67.4	$1.01x10^2$	$1.35x10^2$	$2.02x10^2$	$2.70x10^2$	$3.37x10^2$	$4.04x10^2$	$4.72x10^2$	$5.39x10^2$	$6.06x10^2$	$6.74x10^2$
ø32	Push	$1.21x10^2$	$1.81x10^2$	$2.41x10^2$	$3.62x10^2$	$4.83x10^2$	$6.03x10^2$	$7.24x10^2$	$8.44x10^2$	$9.65x10^2$	$1.09x10^3$	$1.21x10^3$
	Pull	$1.21x10^2$	$1.81x10^2$	$2.41x10^2$	$3.62x10^2$	$4.83x10^2$	$6.03x10^2$	$7.24x10^2$	$8.44x10^2$	$9.65x10^2$	$1.09x10^3$	$1.21x10^3$

Switch specifications

● 1-color/2-color LED

Item	Reed 2-wire				Proximity 2-wire		Proximity 3-wire		
	T0H/T0V		T5H/T5V		T2H/T2V	T2WH/T2WV	T3H/T3V	T3PH/T3PV	T3WH/T3WV
Applications	For programmable controller, relay		For programmable controller, relay, IC circuit (no indicator lamp), serial connection		Dedicated for programmable controller		For programmable controller, relay		
Output method	-		-		-		NPN output	PNP output	NPN output
Power supply voltage	-		-		-		10 to 28 VDC		
Load voltage	12/24 VDC	110 VAC	5/12/24 VDC	110 VAC	10 to 30 VDC	24 VDC ±10%	30 VDC or less		
Load current	5 to 50mA	7 to 20 mA	50 mA or less	20 mA or less	5 to 20 mA (*3)		100 mA or less		50 mA or less
Indicator lamp	LED (Lit when ON)		No indicator lamp		LED (Lit when ON)	Red/green LED (Lit when ON)	LED (Lit when ON)	Yellow LED (Lit when ON)	Red/green LED (Lit when ON)
Leakage current	0mA				1 mA or less		10 μA or less		
Weight g	1 m: 18 3 m: 49 5 m: 80				1 m: 18 3 m: 49 5 m: 80		1 m: 18 3 m: 49 5 m: 80		

*1 : Refer to Ending Page 1 for detailed switch specifications and dimensions.
*2 : Switches other than the above models, such as switches with connectors, are also available. Refer to Ending Page 1.
*3 : The max. load current is 20 mA at 25°C. The current is lower than 20 mA if the operating ambient temperature around the switch is higher than 25°C. (5 to 10 mA at 60°C)

Cylinder weight (X: body fixing) —

Values in ( ) include the switch mounting rail.

[Unit: kg]

Model No.	Stroke (mm)								Switch weight per 1 pc.
	25	50	75	100	125	150	175	200	
UCA2-B-X-10	0.36 (0.41)	0.42 (0.47)	0.48 (0.54)	0.54 (0.61)	-	-	-	-	Refer to the weight in the switch specifications.
UCA2-B-X-16	0.80 (0.85)	0.92 (0.98)	1.05 (1.11)	1.18 (1.25)	1.31 (1.38)	1.44 (1.51)	1.56 (1.65)	1.69 (1.78)	
UCA2-B-X-25	1.32 (1.37)	1.53 (1.58)	1.73 (1.79)	1.94 (2.01)	2.14 (2.22)	2.35 (2.43)	2.55 (2.75)	2.76 (2.85)	
UCA2-B-X-32	2.21 (2.26)	2.51 (2.57)	2.81 (2.87)	3.11 (3.18)	3.41 (3.49)	3.71 (3.79)	4.01 (4.10)	4.31 (4.40)	

Cylinder weight (Y: plate fixing) —

Values in ( ) include the switch mounting rail.

[Unit: kg]

Model No.	Stroke (mm)								Switch weight per 1 pc.
	25	50	75	100	125	150	175	200	
UCA2-B-Y-10	0.36 (0.39)	0.42 (0.46)	0.48 (0.54)	0.54 (0.60)	-	-	-	-	Refer to the weight in the switch specifications.
UCA2-B-Y-16	0.80 (0.83)	0.92 (0.96)	1.05 (1.09)	1.18 (1.22)	1.31 (1.35)	1.44 (1.48)	1.56 (1.61)	1.69 (1.74)	
UCA2-B-Y-25	1.32 (1.36)	1.53 (1.56)	1.73 (1.77)	1.94 (1.98)	2.14 (2.18)	2.35 (2.39)	2.55 (2.60)	2.76 (2.80)	
UCA2-B-Y-32	2.21 (2.24)	2.51 (2.54)	2.81 (2.85)	3.11 (3.15)	3.41 (3.45)	3.71 (3.75)	4.01 (4.06)	4.31 (4.36)	

How to order

Without switch (without magnet for switch)

UCA2-B — X - 10 ○ - 25 ——— P1A

With switch (built-in magnet for switch)

UCA2-BL - X - 10 ○ - 25 - T2H - RA - P1A

Ⓐ Fixing method

Ⓑ Bore size

Ⓒ Port thread

Ⓓ Stroke
Refer to page 650 for the min. stroke.

Ⓔ Switch model No.
*1

Ⓕ Switch quantity
*2

Ⓖ Option
*3

Code	Description
Ⓐ Fixing method	
X	Body fixing
Y	Plate fixing
Ⓑ Bore size (mm)	
10	ø10
16	ø16
25	ø25
32	ø32
Ⓒ Port thread	
Blank	Rc thread
NN	NPT thread (ø25 and over) (made-to-order product)
GN	G thread (ø25 and over) (made-to-order product)

Ⓓ Stroke (mm)

Bore size (ø)		10	16	25	32
25	25	●	●	●	●
50	50	●	●	●	●
75	75	●	●	●	●
100	100	●	●	●	●
125	125		●	●	●
150	150		●	●	●
175	175		●	●	●
200	200		●	●	●

Ⓔ Switch model No.

Straight lead wire	L-shaped lead wire	Contact	Voltage AC	Voltage DC	Indicator	Lead wire
T0H*	**T0V***	Reed	●	●	1-color LED	2-wire
T5H*	**T5V***		●	●	no indicator lamp	
T2H*	**T2V***	Prox.		●	1-color LED	2-wire
T3H*	**T3V***			●		3-wire
T3PH*	**T3PV***			●	1-color LED (PNP output)	3-wire
T2WH*	**T2WV***	Prox.		●	2-color	2-wire
T3WH*	**T3WV***			●	LED	3-wire

*** Lead wire length**	
Blank	1 m (standard)
3	3 m (option)
5	5 m (option)

Ⓕ Switch quantity		
RA	1	Plate A side
RB		Plate B side
D	2	
T	3	

Ⓖ Option		
P1A	Single adjusting stopper	Plate A side
P1B		Plate B side
P2	Double adjusting stoppers	

⚠ Precautions for model No. selection

*1 : Magnet is not built into the type without switch. For specifications with switch but without switch installed, a magnet and magnet rail are mounted but a switch rail is not.
*2 : Min. stroke with three switches: 75 (mm)
*3 : Difference between side A and side B is described in the dimensions.

[Example of model No.]

UCA2-BL-X-25-25-T2H-RA-P1A

Model: Unit cylinder ball bearing
Ⓐ Fixing method : Body fixing
Ⓑ Bore size : ø25 mm
Ⓒ Port thread : Rc thread
Ⓓ Stroke : 25 mm
Ⓔ Switch model No.: Proximity switch T2H, lead wire length 1 m
Ⓕ Switch quantity : 1 (plate A side)
Ⓖ Option : Single adjusting stopper (plate A side)

How to order switch

● Switch body + mounting bracket set (including switch rail)...①

UCA2-B - T0H - X - 10 - 25 - RA

- T0H: Switch model No. (Item Ⓔ on page 652)
- X: Fixing method (Item Ⓐ on page 652)
- 10: Bore size (Item Ⓑ on page 652)
- 25: Stroke (Item Ⓓ on page 652)
- RA: Switch quantity (Item Ⓕ on page 652)

● Mounting bracket set (including switch rail) + magnet...②

UCA2-B - T - X - 10 - 25

- X: Fixing method (Item Ⓐ on page 652)
- 10: Bore size (Item Ⓑ on page 652)
- 25: Stroke (Item Ⓓ on page 652)

● Mounting bracket set (including switch rail)...③

UCA2-B - T - X - 10 - 25 - SW - RAIL

- X: Fixing method (Item Ⓐ on page 652)
- 25: Stroke (Item Ⓓ on page 652)
- 10: Bore size (Item Ⓑ on page 652)

● Switch body only...④

SW - T0H

- T0H: Switch model No. (Item Ⓔ on page 652)

1) When changing from the type without switch to the type with T-switch

Changed content	Switch required	Switch not required
UCA2-B-[X.Y] → UCA2-BL-[X.Y]	② + ④	②

* A switch can be installed separately even if “switch not required” is selected. (when you already have a T-switch, etc.)

2) When only the magnet for T-switch is installed

Changed content	Switch required	Switch not required
UCA2-BL-[X.Y] → UCA2-BL-[X.Y] Without switch With switch	①	③

When it was not possible to install a switch in UCA2-BL and up models. (Magnet only installed)

3) When changing from the type with S type switch to the type with T-switch

Changed content	Switch required	Switch not required
S type switch → T-switch	② + ④	-

* Set of switch rail, mounting bracket and switch body will be replaced.

How to order shock absorber set

● For ø10

UCA2-10-NCK

● For ø16 to ø32 (common)

UCA2-16-NCK

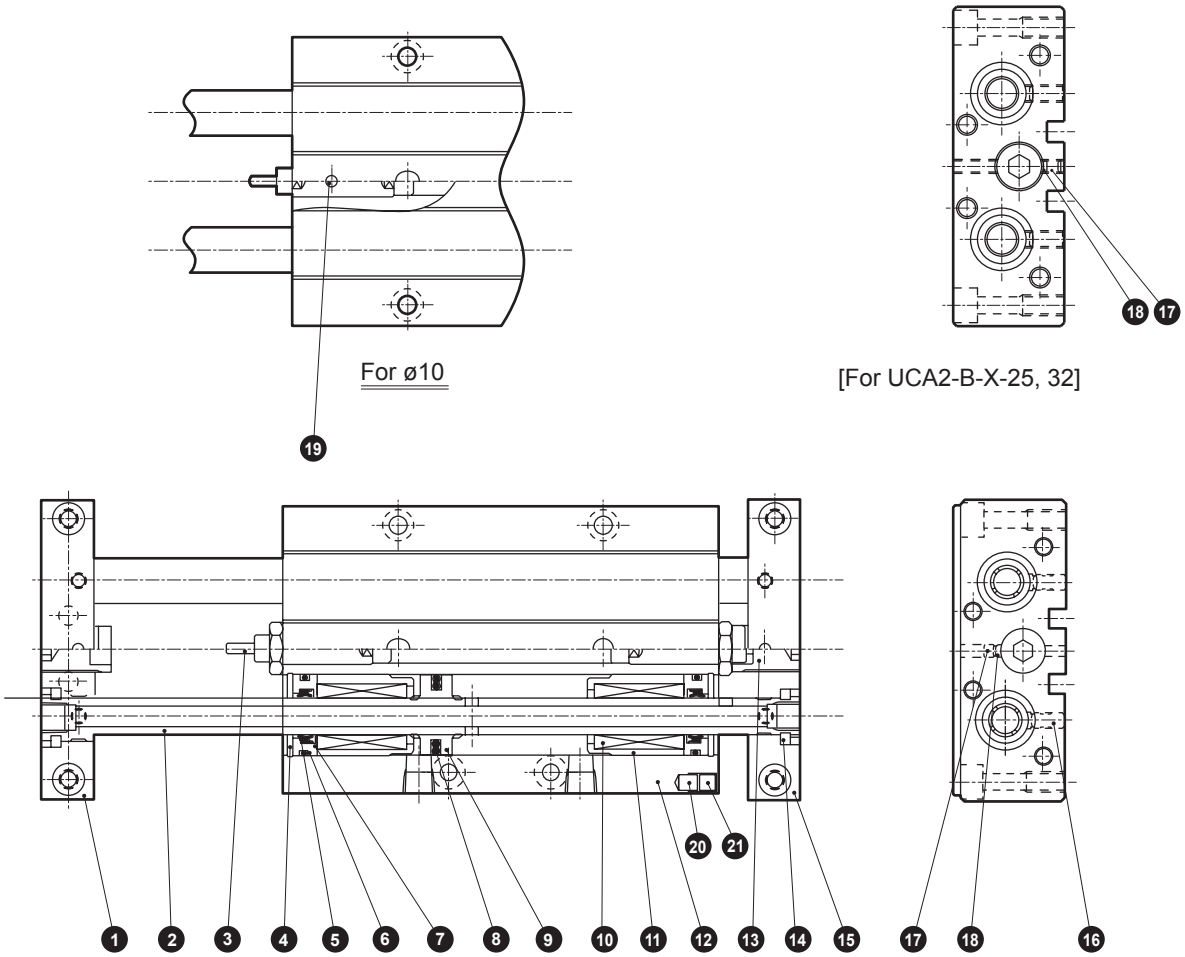
Specifications for rechargeable battery

(Catalog No. CC-1226A)

● Design compatible with rechargeable battery manufacturing process.

UCA2-B - …… - P4*

Internal structure and parts list



No.	Part name	Material	Remarks	No.	Part name	Material	Remarks
1	End plate (A)	Aluminum alloy	Alumite	11	Housing	Aluminum alloy	ø25 and ø32 only
2	Piston rod	Steel	Industrial chrome plating	12	Cylinder body	Aluminum alloy	Hard alumite
3	Shock absorber		ø10:UCA2-10-NCK ø16 to 32:UCA2-16-NCK	13	Stopper	Steel	Chromate
				14	Split ring	Steel	Black finish
4	C-snap ring for hole	Steel	Zinc phosphate	15	End plate (B)	Aluminum alloy	Alumite
5	Rod packing	Nitrile rubber		16	Hexagon socket set screw	Alloy steel	Black finish
6	Rod metal gasket	Nitrile rubber		17	Hexagon socket set screw	Alloy steel	
7	Rod metal	Aluminum alloy	Chromate	18	Set shoe	Aluminum alloy	
8	Piston packing	Nitrile rubber		19	Hexagon socket set screw	Alloy steel	
9	Piston	Aluminum alloy		20	Magnet	Special alloy	UCA2-L-Y only
10	Ball bearing			21	Hexagon socket set screw	Stainless steel	UCA2-L-Y only

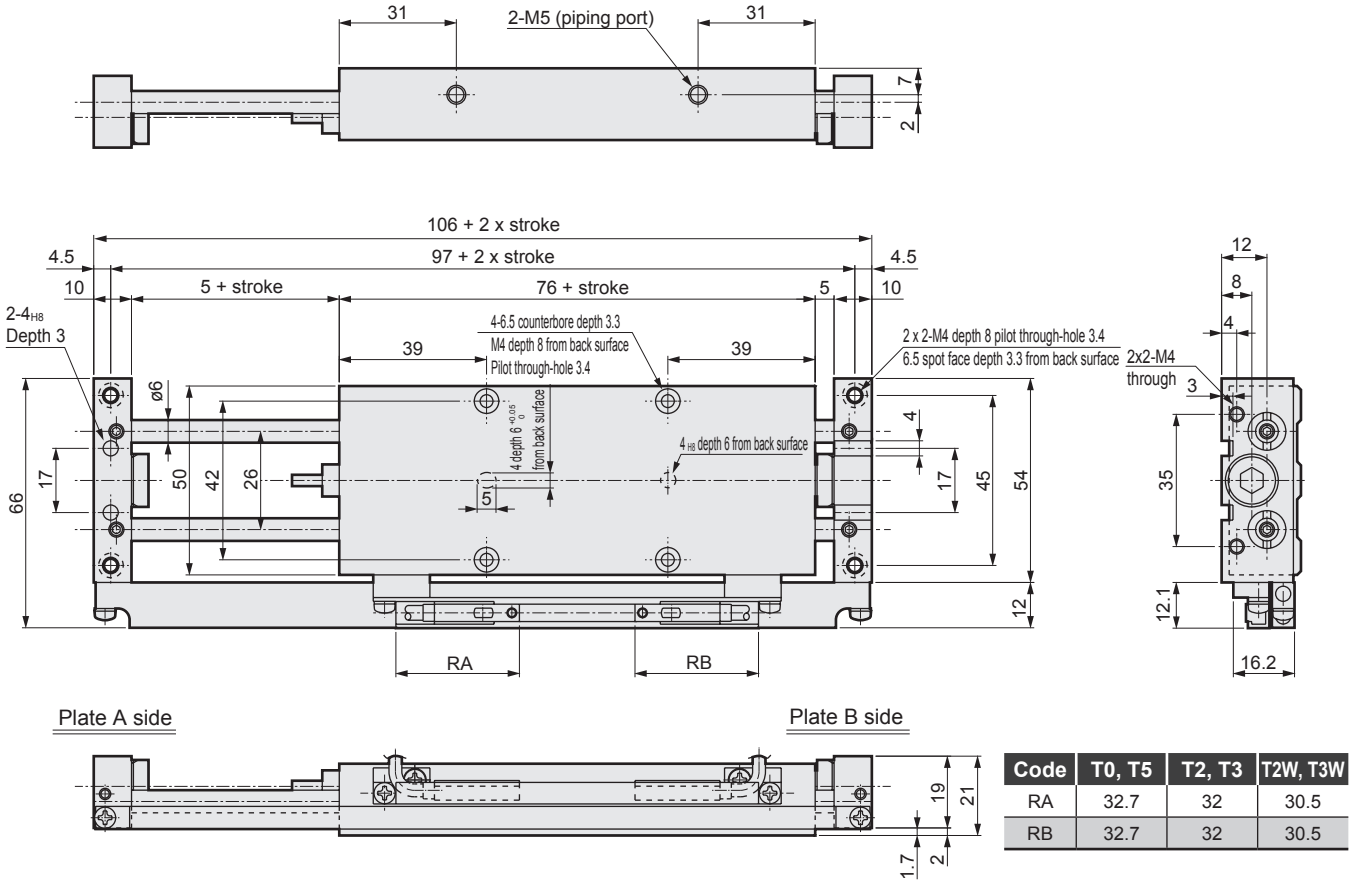
Repair parts list

Bore size (mm)	Kit No.	Repair parts No.
ø10	UCA2-10K	❺ ❻ ❽ ⓰
ø16	UCA2-16K	
ø25	UCA2-25K	
ø32	UCA2-32K	

Note: The repair parts are common between the metal bush bearing and ball bearing.

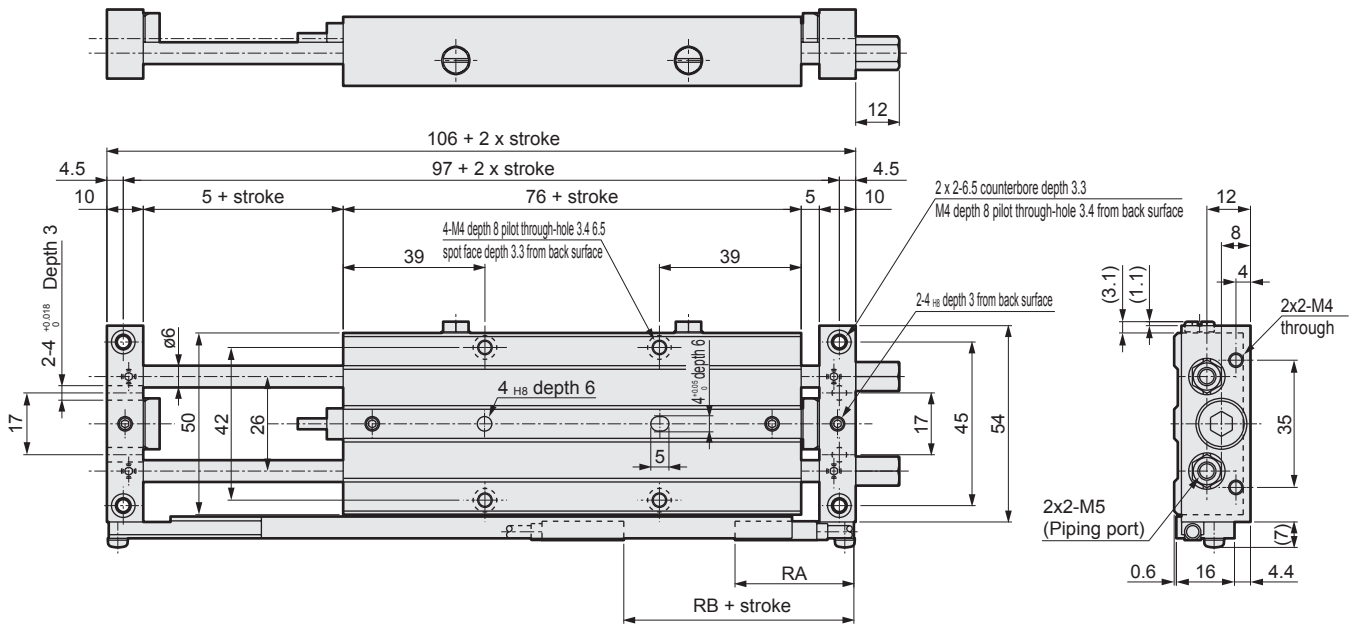
Dimensions: ø10 CAD

● Body fixing (X)



Code	T0, T5	T2, T3	T2W, T3W
RA	32.7	32	30.5
RB	32.7	32	30.5

● Plate fixing (Y)

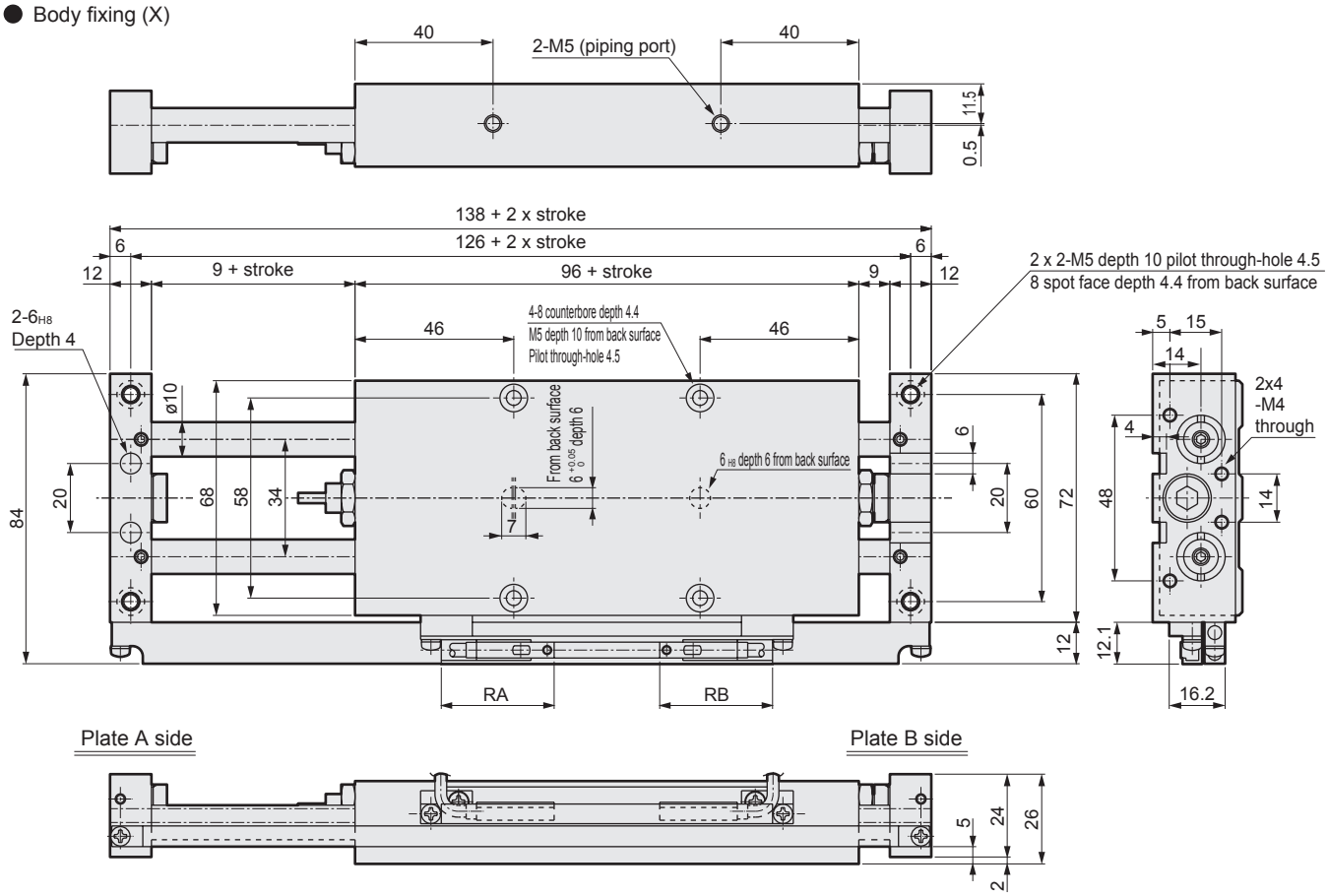


Code	T0, T5	T2, T3	T2W, T3W
RA	32.7	32	30.5
RB	13.3	14	15.5

* Adjusting to a longer stroke with the stopper may cause malfunction.
Refer to page 667 for details.

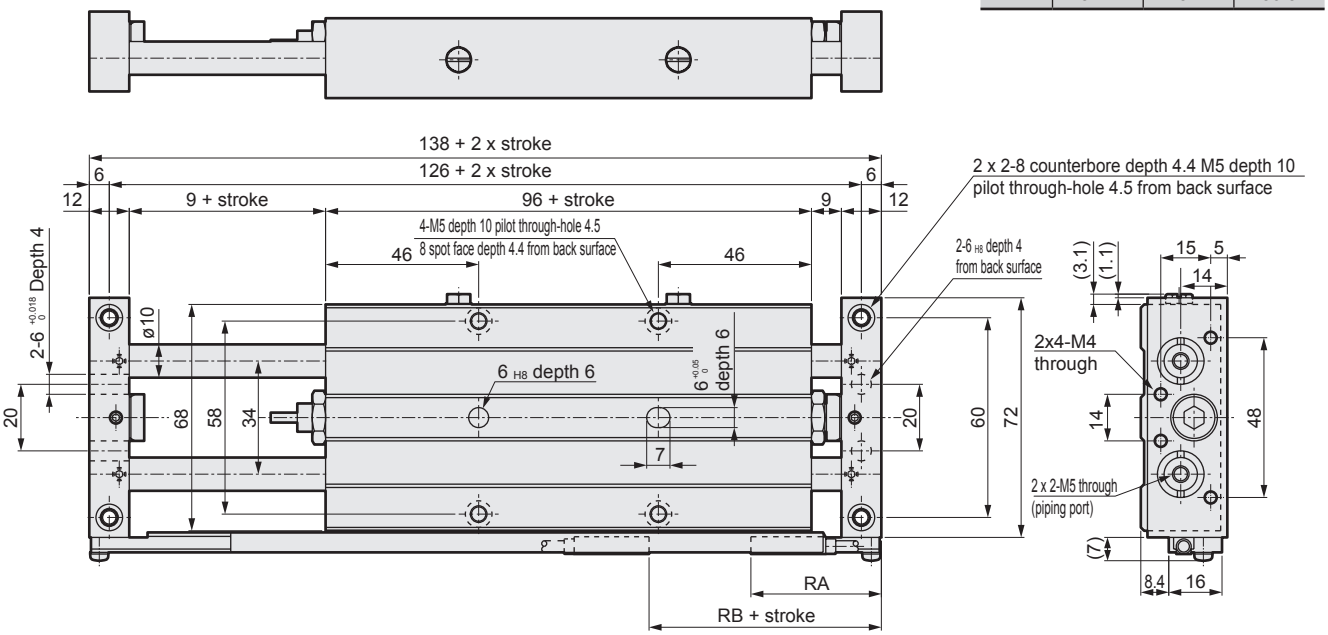
Dimensions: ø16 CAD

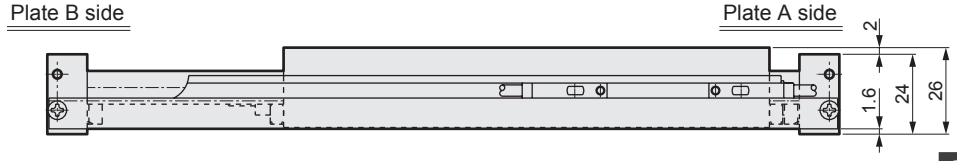
● Body fixing (X)



Code	T0, T5	T2, T3	T2W, T3W
RA	32.7	32	30.5
RB	32.7	32	30.5

● Plate fixing (Y)



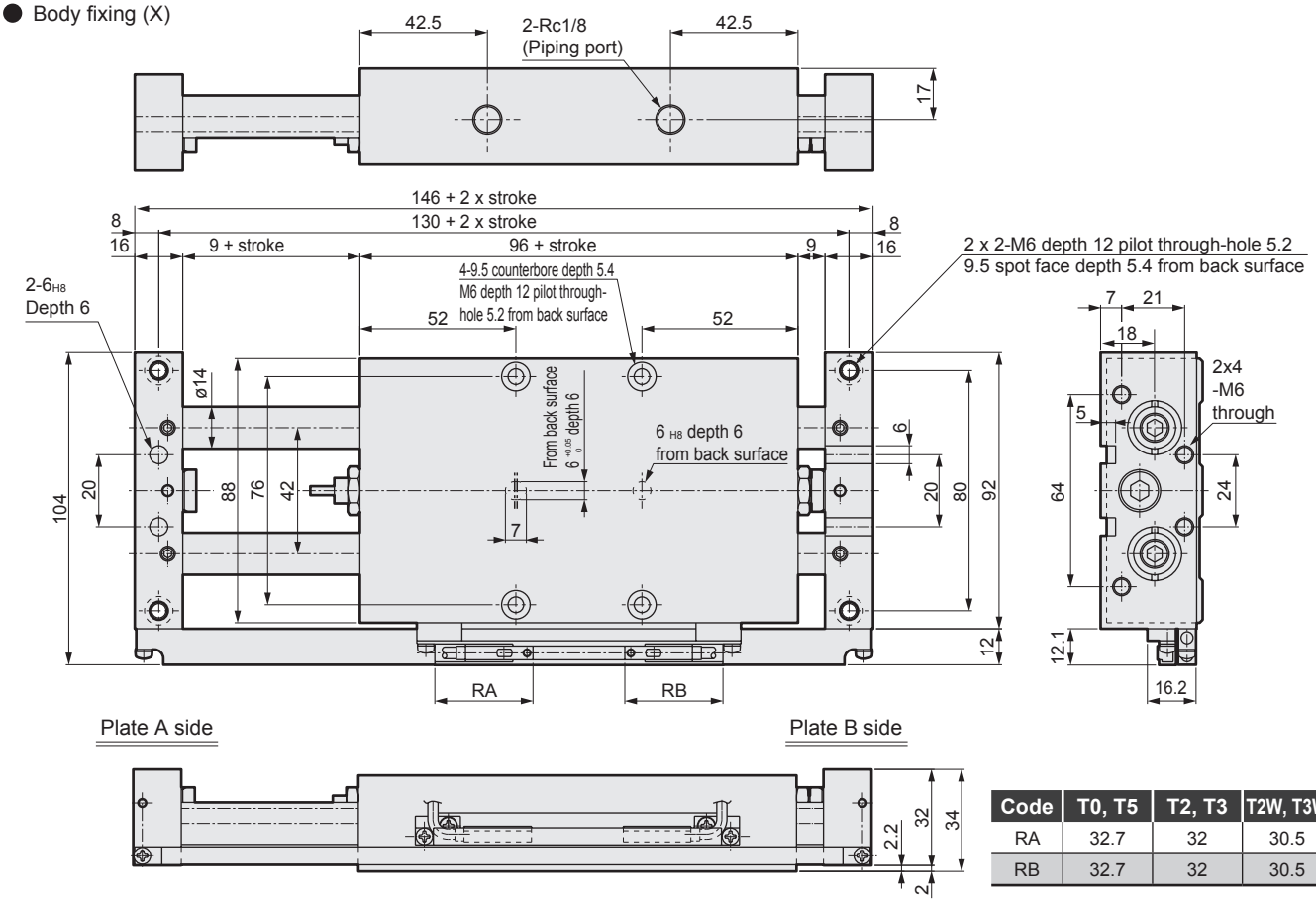


Code	T0, T5	T2, T3	T2W, T3W
RA	38.7	38	36.5
RB	19.3	20	21.5

* Adjusting to a longer stroke with the stopper may cause malfunction. Refer to page 667 for details.

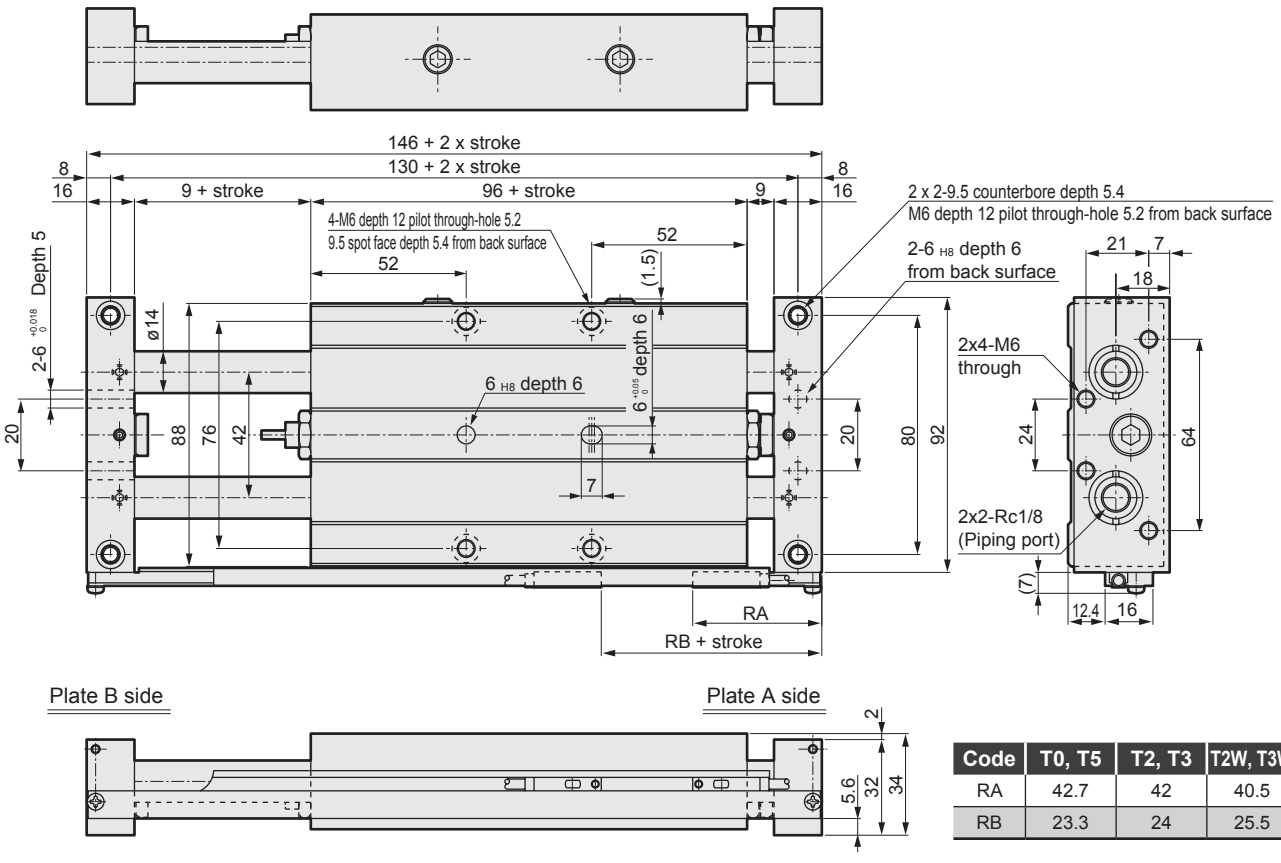
Dimensions: ø25 CAD

● Body fixing (X)



Code	T0, T5	T2, T3	T2W, T3W
RA	32.7	32	30.5
RB	32.7	32	30.5

● Plate fixing (Y)

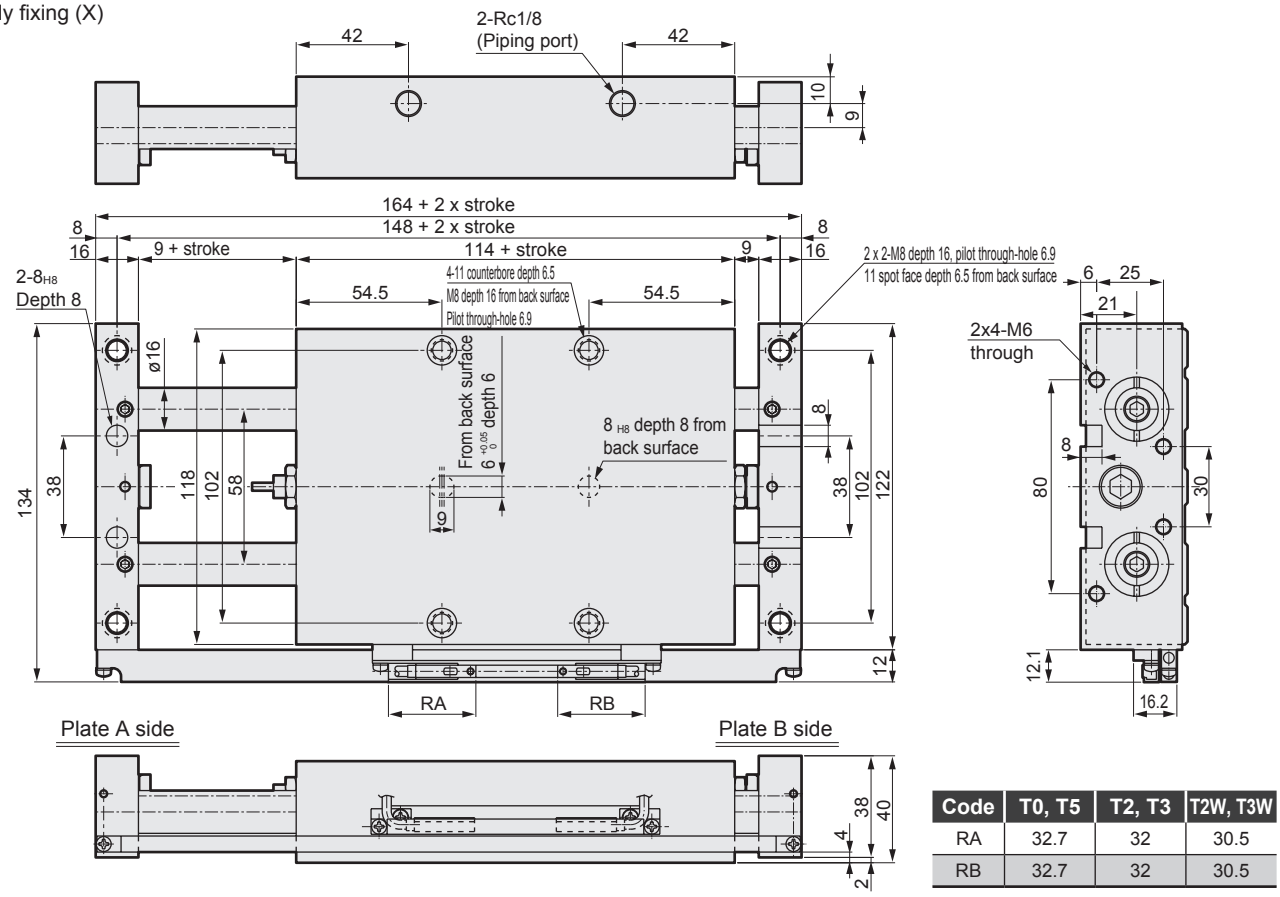


Code	T0, T5	T2, T3	T2W, T3W
RA	42.7	42	40.5
RB	23.3	24	25.5

* Adjusting to a longer stroke with the stopper may cause malfunction.
Refer to page 667 for details.

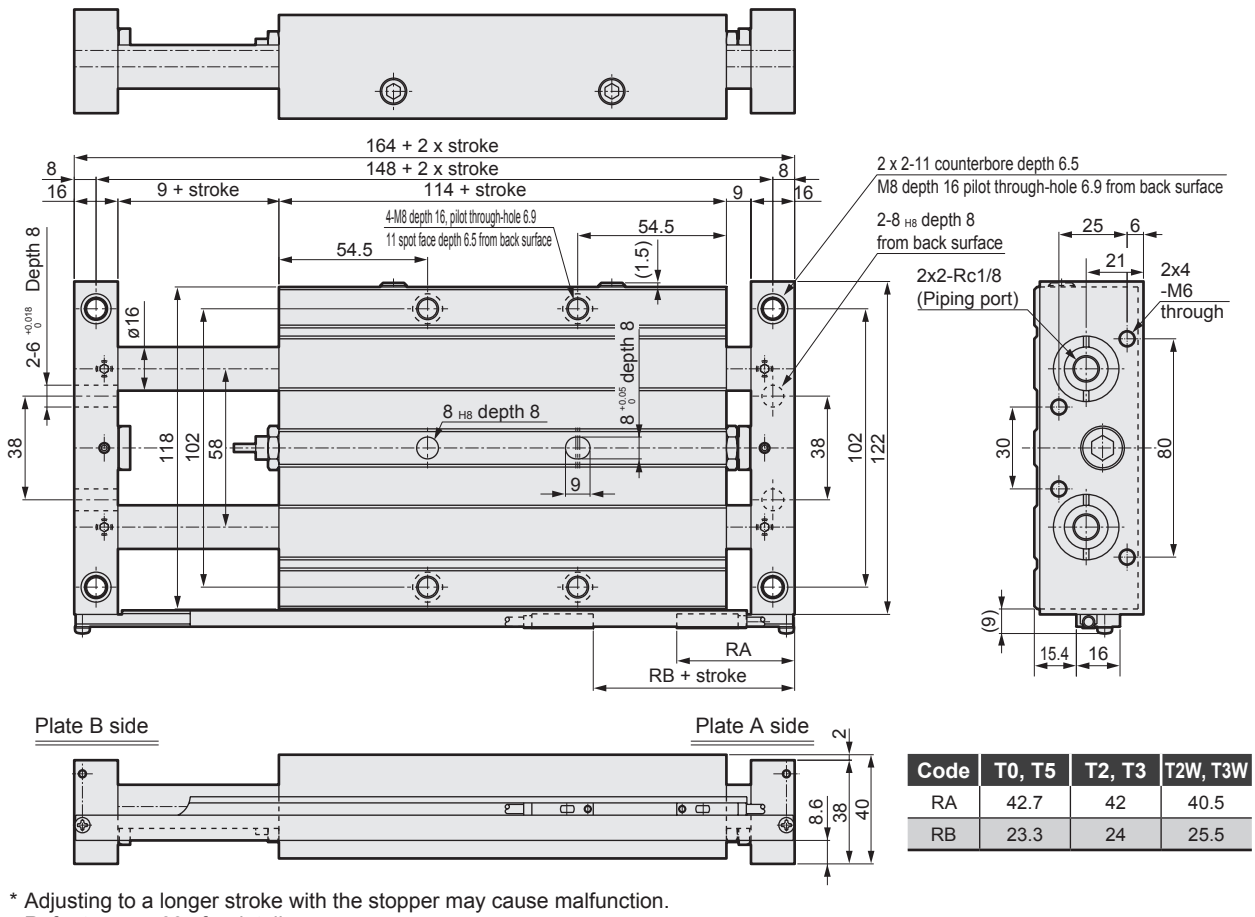
Dimensions: ø32 CAD

● Body fixing (X)



Code	T0, T5	T2, T3	T2W, T3W
RA	32.7	32	30.5
RB	32.7	32	30.5

● Plate fixing (Y)

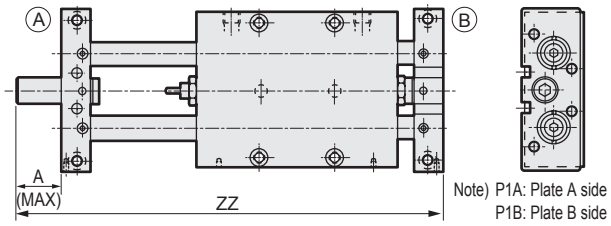


Code	T0, T5	T2, T3	T2W, T3W
RA	42.7	42	40.5
RB	23.3	24	25.5

* Adjusting to a longer stroke with the stopper may cause malfunction.
Refer to page 667 for details.

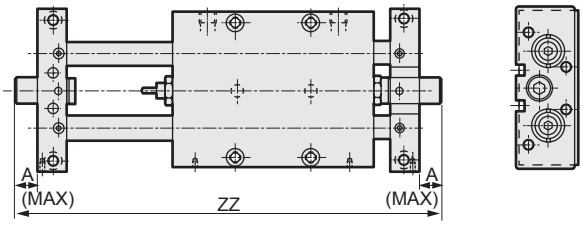
Dimensions: Adjusting stopper

● UCA2-B-$\begin{matrix}X\\Y\end{matrix}$-$\begin{matrix}10\\16\\25\\32\end{matrix}$-* *-P1* (single adjusting stopper)



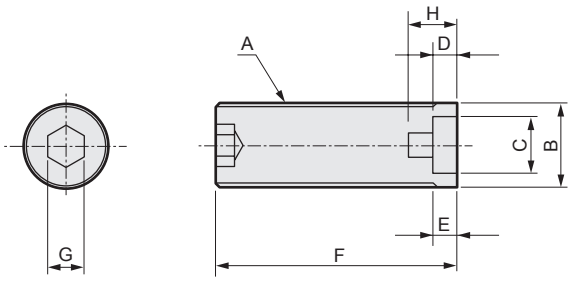
Model No.	A (MAX)	ZZ							
		25st	50st	75st	100st	125st	150st	175st	200st
UCA2-B-10	25	181	231	281	331	-	-	-	-
UCA2-B-16		213	263	313	363	413	463	513	563
UCA2-B-25		221	271	321	371	421	471	521	571
UCA2-B-32		239	289	339	389	439	489	539	589

● UCA2-B-$\begin{matrix}X\\Y\end{matrix}$-$\begin{matrix}10\\16\\25\\32\end{matrix}$-* *-P2* (double adjusting stoppers)



Model No.	A(MAX)	ZZ							
		25st	50st	75st	100st	125st	150st	175st	200st
UCA2-B-10	12.5	181	231	281	331	-	-	-	-
UCA2-B-16		213	263	313	363	413	463	513	563
UCA2-B-25		221	271	321	371	421	471	521	571
UCA2-B-32		239	289	339	389	439	489	539	589

Stopper dimensions



Code / Bore size (mm)	A	B	C	D	E	F		G	H
ø10	M14x1	ø14	ø10	4	4	Standard	14.5	6	8
						P2	27		
						P1	39.5		
ø16	M14x1	ø14	ø9.4	8	4	Standard	17	6	-
						P2	29.5		
						P1	42		
ø25	M14x1	ø14	ø9.4	6.5	4	Standard	21	6	-
						P2	33.5		
						P1	46		
ø32	M16x1	ø16	ø9.4	5.5	4	Standard	21	8	-
						P2	33.5		
						P1	46		

Model No. of discrete adjusting stoppers

● Standard

Part/part name / Bore size (mm)	Standard stopper		Single stopper		Double stoppers	
	Model No.	Weight g	Model No.	Weight g	Model No.	Weight g
ø10	UCA2-P-10	12	UCA2-P1-10	38	UCA2-P2-10	25
ø16	UCA2-P-16	12	UCA2-P1-16	38	UCA2-P2-16	25
ø25	UCA2-P-25	17	UCA2-P1-25	44	UCA2-P2-25	30
ø32	UCA2-P-32	22	UCA2-P1-32	58	UCA2-P2-32	40

■ Stopper adjustment method

- To adjust the stroke, loosen the fixing set screw and turn the stopper bolt. After adjustment, tighten the fixing set screw. Recommended tightening torque of set screw: 1.4 N·m
- Adjustable ranges of the stoppers are shown in Table A.
- Do not adjust to a longer stroke. Doing so may cause malfunction. Keep the standard stopper from protruding from the end plate.
  Keep the single adjusting stopper P1 and double adjusting stoppers P2 from protruding more than the initial state.

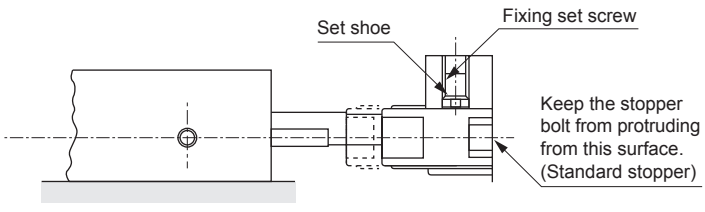
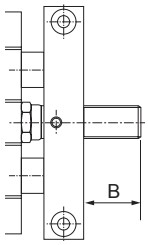


Table A

Item	Adjustable stroke		Initial protrusion B
Standard stopper	Each side	-5 mm	0 mm
Single adjusting stopper P1A	Plate A side	-30 mm	P1 : 25 mm Standard: 0 mm
	Plate B side	-5 mm	
Single adjusting stopper P1B	Plate B side	-30 mm	
	Plate A side	-5 mm	
Double adjusting stoppers P2	Each surface	-17.5 mm	12.5 mm

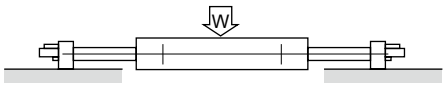


1 Sag of the piston rod due to concentrated load (reference value)

Put the center of gravity of load as close as possible to the center of the unit cylinder.

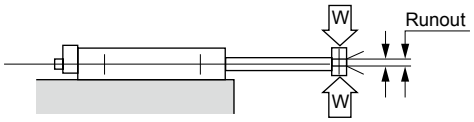
[Unit: mm]

Bore size (mm)	Load (N) \ Stroke length (mm)	75	100	125	150	175	200
ø10	15	0.05	0.10	—	—	—	—
ø16	40	0.02	0.05	0.09	0.16	0.25	0.38
ø25	70	0.01	0.03	0.06	0.10	0.16	0.24
ø32	100	0.005	0.02	0.04	0.07	0.11	0.15



[Unit: mm]

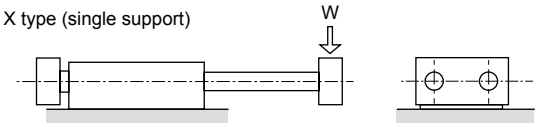
Bore size (mm)	Load (N) \ Stroke length (mm)	25	50	75	100	125	150	175	200
ø10	7	0.04	0.10	0.18	0.27	-	-	-	-
ø16	20	0.03	0.07	0.12	0.20	0.28	0.37	0.48	0.60
ø25	35	0.02	0.04	0.08	0.13	0.17	0.24	0.32	0.41
ø32	50	0.01	0.03	0.06	0.10	0.14	0.21	0.29	0.38



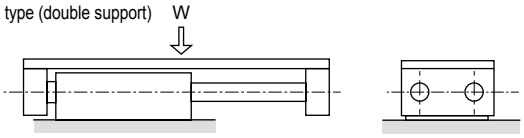
2 Determination of allowable load

1. Vertical load

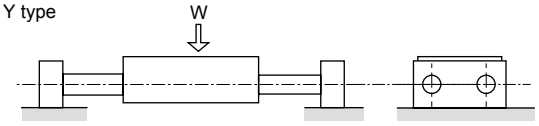
X type (single support)



X type (double support)



Y type



[Unit: N]

Type / Fixing method / Bore size (mm)	X type		Y type
	Single support	Double support	
ø10	6.9	14.7	
ø16	19.6	39.2	
ø25	34.3	68.6	
ø32	49	98	

W = Load N

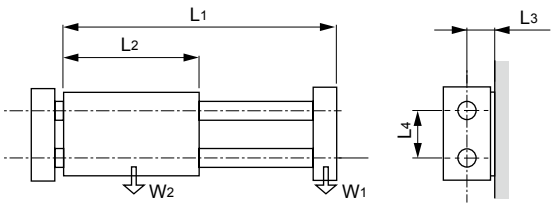
2. With overhang load applied

Calculate the load as described below to select the bore size.
However, the overhang load (W) should be equal to or less than the vertical load in 1 above and the overhang length (L) should be equal to or less than 100 mm.

2-1. Conditions and items required in calculation of the allowable load

W = Load (N)
L = Amount of overhang (mm)
V = Operating speed (mm/s)
S = Stroke length (mm)
F = Max. load applied to each bearing (N)

W_1 = End plate weight (kg)
W_2 = Cylinder body weight (kg)
L_1 = Length from the end plate to the body (mm)
L_2 = Cylinder body length (mm)
L_3 = Length from the rod center to the cylinder body (mm)
L_4 = Pitch between rods (mm)



Bore size (mm) / Type / Code	L_1	L_2	L_3	L_4	W_1	W_2
ø10 Metal	69 + 2·S	54+S	9	26	0.099 + 7 x 10^{-4}·S	0.174 + 2 x 10^{-3}·S
ø10 Bearing	91 + 2·S	76+S	9	26	0.109 + 7 x 10^{-4}·S	0.214 + 2 x 10^{-3}·S
ø16 Metal	71 + 2·S	50+S	12	34	0.199 + 21 x 10^{-4}·S	0.334 + 3.2 x 10^{-3}·S
ø16 Bearing	117 + 2·S	96+S	12	34	0.239 + 21 x 10^{-4}·S	0.338 + 3.2 x 10^{-3}·S
ø25 Metal	87 + 2·S	62+S	16	42	0.456 + 36 x 10^{-4}·S	0.6 + 4.7 x 10^{-3}·S
ø25 Bearing	121 + 2·S	96+S	16	42	0.509 + 36 x 10^{-4}·S	0.615 + 4.7 x 10^{-3}·S
ø32 Metal	100 + 2·S	75+S	19	58	0.636 + 47 x 10^{-4}·S	0.92 + 7 x 10^{-3}·S
ø32 Bearing	139 + 2·S	114+S	19	58	0.714 + 47 x 10^{-4}·S	1.313 + 7 x 10^{-3}·S

2-2. Calculation of allowable load

Calculate F from “Mounting orientation examples” and check that
Fk obtained with the following formula is within the allowable value in Table 3.

$F_K = F \times K$

F_K : Operating speed load (N)

K : Speed coefficient

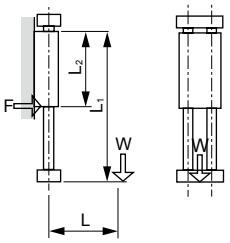
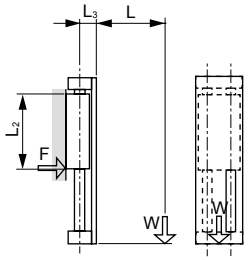
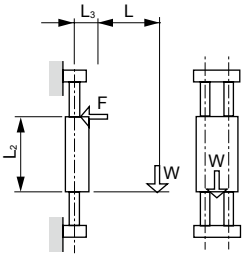
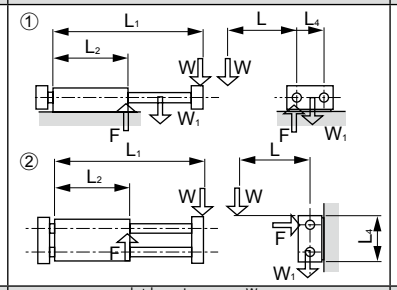
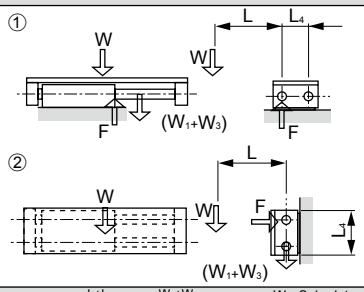
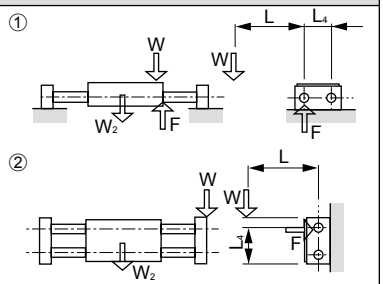
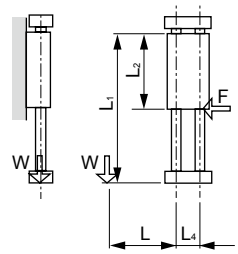
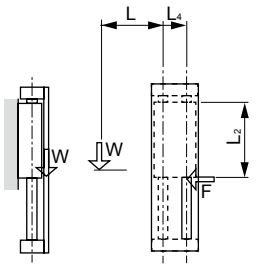
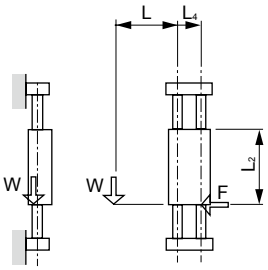
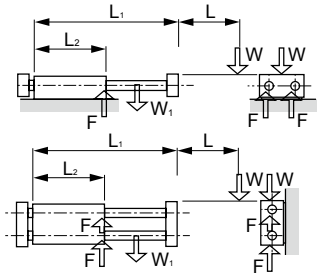
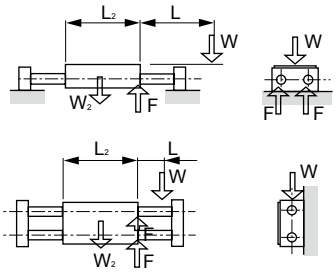
Table 3 Allowable operating speed load (F_K)

Bore size (mm)	Allowable Fk (N)
ø10	21.6
ø16	75.5
ø25	103.0
ø32	157.0

Speed coefficient

Operating speed (mm/s)	K
30 ≤ V < 100	1.0
100 ≤ V < 200	1.1
200 ≤ V < 300	1.2

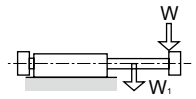
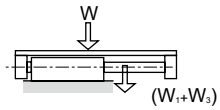
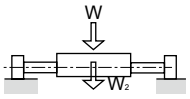
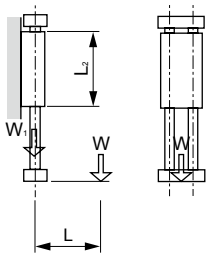
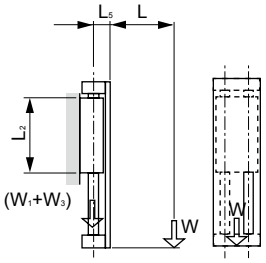
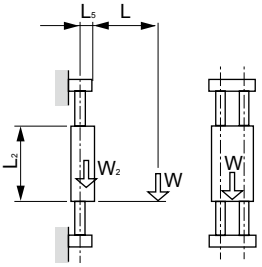
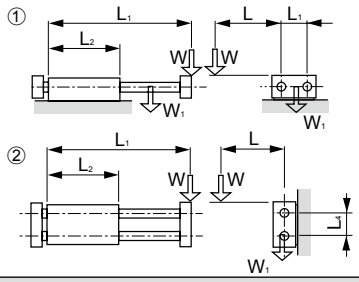
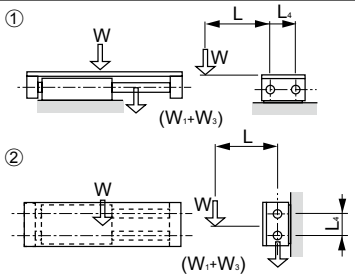
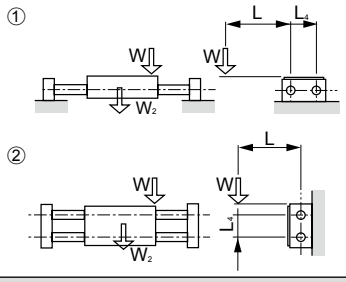
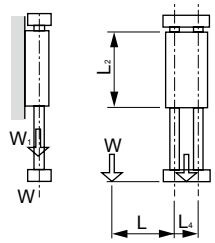
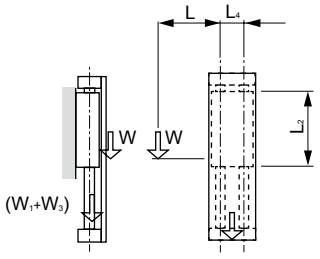
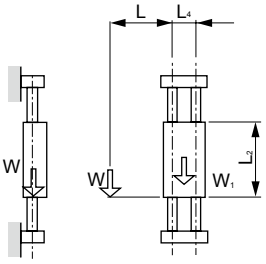
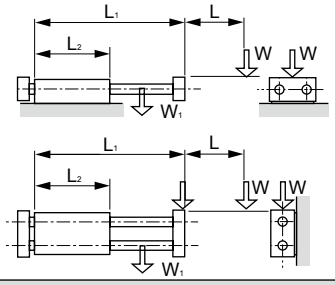
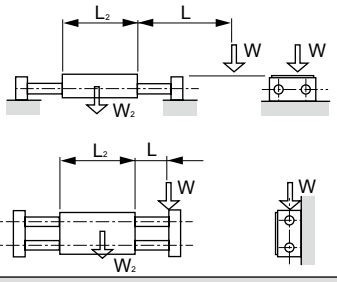
2-3. Mounting orientation examples

	X type (single support)	X type (double support)	Y type
Overhang load is applied vertically. Vertical direction			
Max. load applied to each bearing (N)	$F = \frac{L}{2L_2} \cdot W$	$F = \frac{L+L_3}{2 \cdot L_2} \cdot W$	$F = \frac{L+L_3}{2 \cdot L_2} \cdot W$
Overhang load is applied perpendicularly to the stroke length. ① Horizontal direction ② Horizontal side mount			
Max. load applied to each bearing (N)	① $F = (\frac{L+L_4}{2 \cdot L_4} + \frac{L_1}{2L_2})W + \frac{W_1}{4}$ ② $F = \sqrt{(\frac{L}{2 \cdot L_4} \cdot W)^2 + (\frac{L_1}{2L_2} \cdot W + \frac{W_1}{4})^2}$	① $F = \frac{L+L_4}{2 \cdot L_4} \cdot W + \frac{W_1+W_3}{4}$ ② $F = \sqrt{(\frac{L}{2 \cdot L_4} \cdot W)^2 + (\frac{W_1+W_3}{4})^2}$ W_3: Sub-plate Weight (kg)	① $F = \frac{L+L_4}{2 \cdot L_4} \cdot W + \frac{W_1+W_2}{4}$ ② $F = \sqrt{(\frac{L}{2 \cdot L_4} \cdot W)^2 + (\frac{W_2}{4})^2}$
Overhang load is applied laterally. Vertical direction			
Max. load applied to each bearing (N)	$F = \frac{L+L_4}{L_2} \cdot W$	$F = \frac{L+L_4}{L_2} \cdot W$	$F = \frac{L+L_4}{L_2} \cdot W$
Overhang load is applied along the stroke length. Horizontal direction Horizontal side mount			
Max. load applied to each bearing (N)	$F = \frac{L+L_1}{2 \cdot L_2} \cdot W + \frac{W_1}{4}$		$F = \frac{L+L_2}{2 \cdot L_2} \cdot W + \frac{W_2}{4}$

3 Calculation of load factor

1. Refer to Table 4 and calculate the necessary thrust according to the weight, direction and mounting orientation of the load.

Table 4

	Body fixing (single support)	Body fixing (double support)	Plate fixing
Load is applied to the cylinder center. Horizontal direction			
Required thrust	$f=\mu(W+W_1)$	$f=\mu(W+W_1+W_3)$	$f=\mu(W+W_2)$
Overhang load is applied vertically. Vertical direction			
Required thrust	$f=\frac{2\mu\cdot L}{L_2}\cdot W+W+W_1$	$f=\frac{2\mu\cdot(L+L_5)}{L_2}\cdot W+W+W_1+W_3$	$f=\frac{2\mu\cdot(L+L_5)}{L_2}\cdot W+W+W_2$
Overhang load is applied perpendicularly to the stroke length. ① Horizontal direction ② Horizontal side mount			
Required thrust	① $f=\mu\{(\frac{2\cdot L+L_4}{L_4}+\frac{2\cdot L+L_2}{L_2})\cdot W+W+W_1\}$ ② $f=\mu\cdot\sqrt{(\frac{2\cdot L}{L_4}\cdot W)^2+(\frac{2\cdot L_1-L_2}{L_2}\cdot W+W+W_1)^2}$	① $f=\mu\cdot(\frac{2\cdot L+L_4}{L_4}\cdot W+W+W_1+W_3)$ ② $f=\mu\cdot\sqrt{(\frac{2\cdot L}{L_4}\cdot W)^2+(W+W_1+W_3)^2}$	① $f=\mu(\frac{2\cdot L+L_4}{L_4}\cdot W+W+W_2)$ ② $f=\mu\cdot\sqrt{(\frac{2\cdot L}{L_4}\cdot W)^2+(W+W_2)^2}$
Overhang load is applied laterally. Vertical direction			
Required thrust	$f=\frac{\mu(2\cdot L+L_4)}{L_2}\cdot W+W+W_1$	$f=\frac{\mu(2\cdot L+L_4)}{L_2}\cdot W+W+W_1+W_4$	$f=\frac{\mu(2\cdot L+L_4)}{L_2}\cdot W+W+W_2$
Overhang load is applied along the stroke length. Horizontal direction Horizontal side mount		Note) W_3: Sub-plate weight (kg)	
Required thrust	$f=\mu\{\frac{2(L+L_1)-L_2}{L_2}\cdot W+W+W_1\}$		$f=\mu(\frac{2\cdot L+L_2}{L_2}\cdot W+W+W_2)$

f : Required thrust N

μ : Coefficient of friction Metal bush bearing 0.3

Ball bearing 0.1

For the other items and dimensions, refer to “Determination of allowable load”.

2.Calculate the load factor from the necessary thrust obtained in 1, the theoretical thrust table and the thrust efficiency graph.
(The load factor must be 50% or less.)

$$\omega = \frac{f}{B} \times 100 \leq 50$$

$$B = \frac{a}{100} \cdot A$$

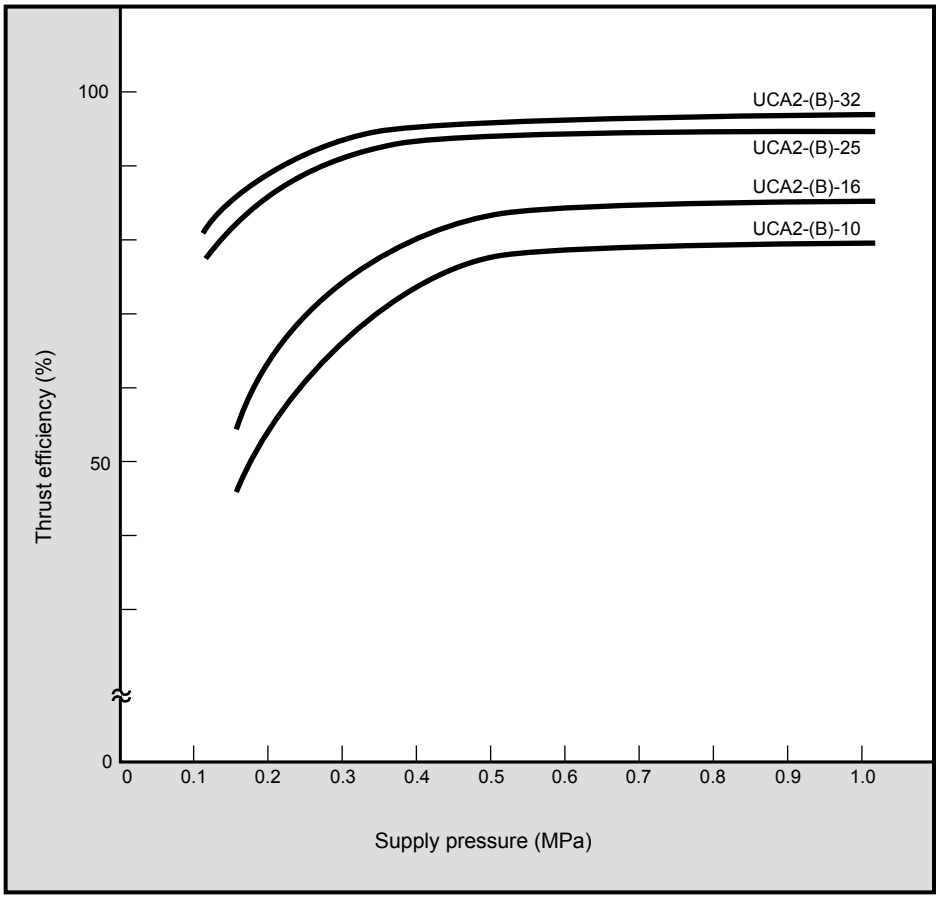
ω : Load factor (%)
f : Required thrust (N)
A : Theoretical thrust (N)
a : Thrust efficiency (%)
B : Effective thrust (N)

Theoretical thrust

[Unit: N]

Model No.	Working pressure MPa								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
UCA2-10	10	20	29	39	49	59	69	78	88
UCA2-16	25	48	73	96	121	145	169	193	217
UCA2-25	66	132	198	265	330	396	463	528	594
UCA2-32	119	236	355	474	591	710	828	846	1065
UCA2-B-10	10	20	29	39	49	59	69	78	88
UCA2-B-16	25	48	73	96	121	145	169	193	217
UCA2-B-25	66	132	198	265	330	396	463	528	594
UCA2-B-32	119	236	355	474	591	710	828	946	1065

Thrust efficiency



4 Formula for kinetic energy calculation

Calculate the kinetic energy from the load weight (W) and speed (V), and check that it is within the allowable value in Table 7. If it is more than the allowable value, use a larger cylinder or add an external shock absorber to keep it within the allowable value.

The speed mentioned here is the speed of the piston entering the cushion, not the average speed. Therefore, calculate the speed of the piston entering the cushion with the formula (1).

$$E = \frac{1}{2}mV^2 + f\,S_1$$

$$Va = \frac{S_2}{t}$$

$$V = Va \times (1+1.5\frac{\omega}{100}) \text{——(1)}$$

E : Kinetic energy (J)
m : Weight (kg)
V : Cushion entry speed (m/s)
f : Thrust (N)
S_1 : Shock absorber stroke length (m)
Va : Average speed (m/s)
S_2 : Cylinder stroke length (m)
t : Travel time (s)
ω : Load factor (%)

■ Table 7 Allowable absorbed energy value

Bore size (mm)	Allowable absorbed energy (J)
ø10	0.25
ø16	0.65
ø25	2.4
ø32	4.5

■ Shock absorber stroke length

Bore size (mm)	Stroke length (mm)
ø10	4.5
ø16	5.0
ø25	6.5
ø32	7.0

Pneumatic components

Safety Precautions

Be sure to read this section before use.

Refer to Intro Page 73 for general information of the cylinder, and to Intro Page 80 for general information of the cylinder switch.

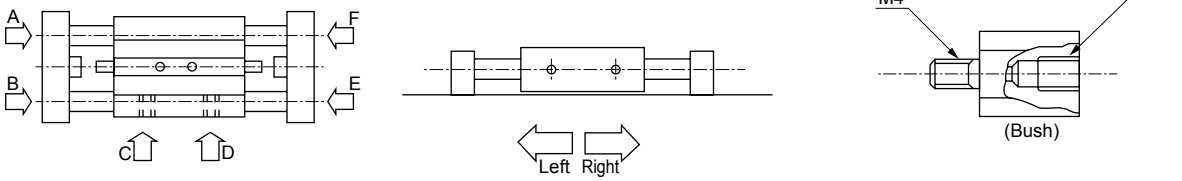
Product-specific cautions: Unit cylinder UCA2 Series

Mounting, installation and adjustment

1. Piping

⚠CAUTION

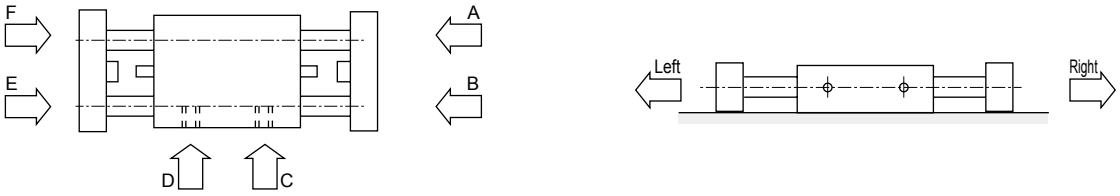
■ End plate fixing (model No.: UCA2-(B)-Y)



In end plate fixing, the pressurizing port and body operating direction will be as shown in the table on the right. Plug the unused piping ports before use.
Use a bush in the pressurizing port of UCA2-(B)-Y-10.
Recommended tightening torque: 1.0 to 1.4 N·m

Pressurization port	A	B	C	D	E	F
Body operating direction	Left	Right	Plugged	Plugged	Right	Left

■ Body fixing (model No.: UCA2-(B)-X)



In body fixing, the pressurizing port and piston rod operating direction are shown in the table on the right. Plug the unused piping ports before use.

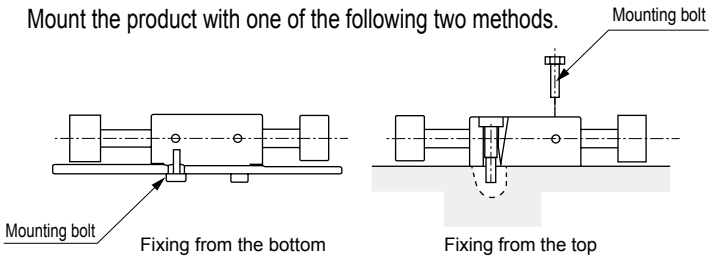
Pressurization port	A	B	C	D	E	F
Piston rod end operating direction	Plugged	Plugged	Left	Right	Plugged	Plugged

2. Installation

⚠ CAUTION

■ Body fixing (model No.: UCA2-(B)-X)

Mount the product with one of the following two methods.

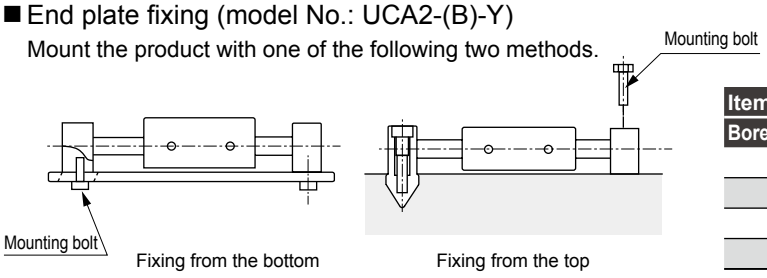


Item / Bore size (mm)	Hexagon socket head cap screw size	Quantity
ø10	M3×22 ℓ	4
ø16	M4×30 ℓ	4
ø25	M5×35 ℓ	4
ø32	M6×40 ℓ	4

Use hexagon socket head cap screws when fixing from the top.
Select appropriate hexagon socket head cap screws from the table on the right.

■ End plate fixing (model No.: UCA2-(B)-Y)

Mount the product with one of the following two methods.



Item / Bore size (mm)	Hexagon socket head screw bolt size	Quantity
ø10	M3×22 ℓ	4
ø16	M4×30 ℓ	4
ø25	M5×35 ℓ	4
ø32	M6×40 ℓ	4

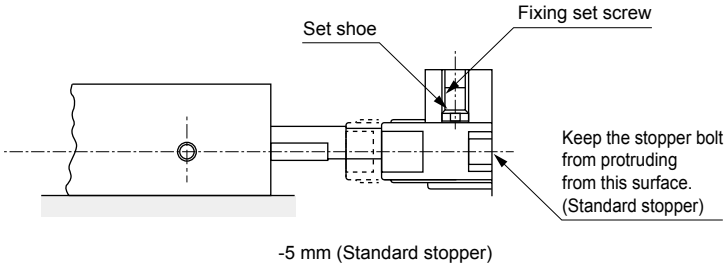
Use hexagon socket head cap screws when fixing from the top.
Select appropriate hexagon socket head cap screws from the table on the right.

■ Stopper adjustment method

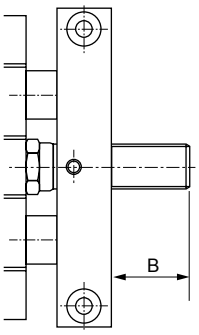
- To adjust the stroke length, loosen the fixing set screw and turn the stopper bolt. After adjustment, tighten the fixing set screw.
  Recommended tightening torque of set screw: 1.4 N·m
- Adjustable ranges of the stoppers are shown in Table A.
- Do not adjust to a longer stroke length. Doing so may cause malfunction. Keep the standard stopper from protruding from the end plate.
  Keep the single adjusting stopper P1 and double adjusting stoppers P2 from protruding more than the initial state.

Table A

Item	Adjustable stroke length	Initial protrusion B
Standard stopper	Each side -5 mm	0 mm
Single adjusting stopper P1A	Plate A side -30 mm Plate B side -5 mm	P1:25 mm Standard: 0 mm
Single adjusting stopper P1B	Plate B side -30 mm Plate A side -5 mm	
Double adjusting stoppers P2	Each surface -17.5 mm	12.5 mm



-5 mm (Standard stopper)



■ CKD's shock absorber is a repair part.

Replace it when the energy absorption performance has degraded or the operation is not smooth.