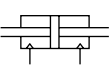
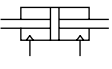
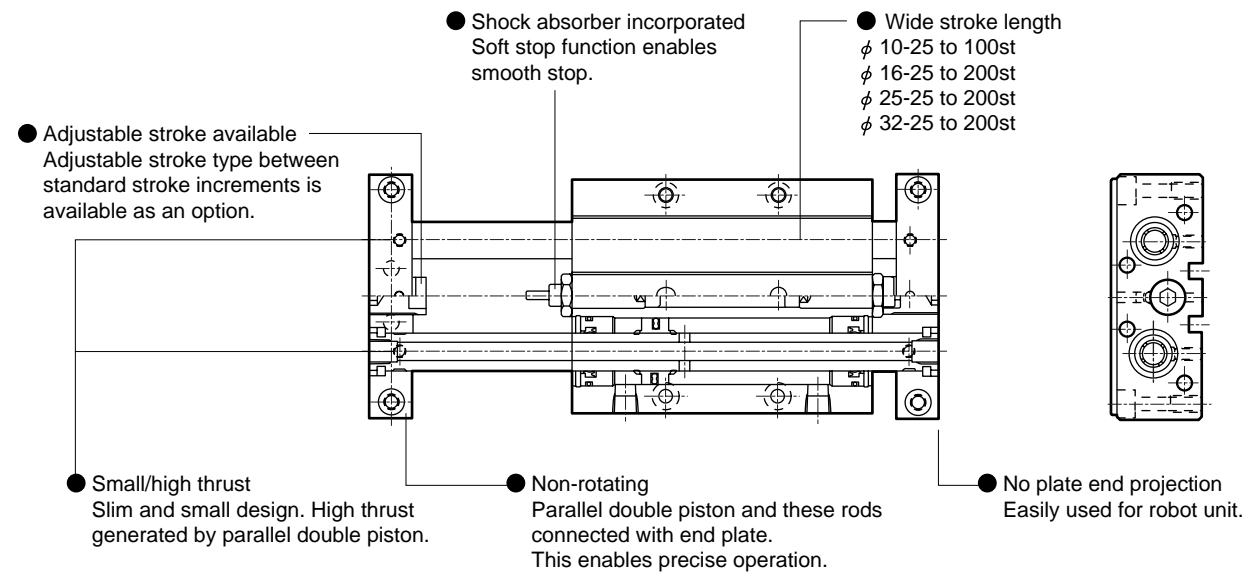


●: Standard, ◎: Option, ■: Not available

Variation	Model no. JIS symbol	Bore size (mm)	Standard stroke length (mm)										Min. stroke length (mm)	Max. stroke length (mm)	Fixing method		Option				Switch	Page
			25	50	75	100	125	150	175	200	Body mount	End plate mount			Single adjustable stopper plate A side	Single adjustable stopper plate B side	Both sides adjustable stopper	Copper and PTFE free				
			X	Y	P1A	P1B	P2	P6														
Metal bush bearing type with switch	UCA2 UCA2-L (With switch) 	φ 10	●	●	●	●	■	■	■	■	■	■	25	100	●	●	◎	◎	◎	●	◎	1924
		φ 16, φ 25, φ 32	●	●	●	●	●	●	■	■	■	■	200	200	●	●	◎	◎	◎	●	◎	
Ball bearing type with switch	UCA2-B UCA2-BL (With switch) 	φ 10	●	●	●	●	■	■	■	■	■	25	100	●	●	◎	◎	◎	●	◎	1934	
		φ 16, φ 25, φ 32	●	●	●	●	●	●	■	■	■	■	200	200	●	●	◎	◎	◎	●	◎	

## Product introduction



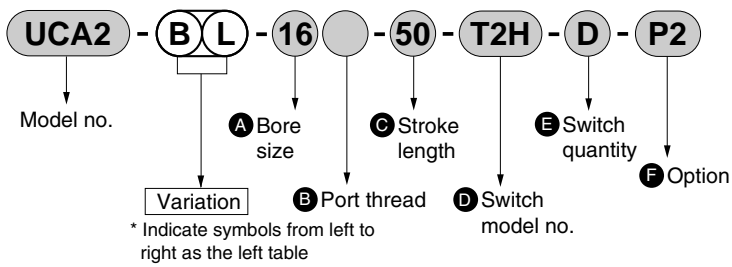
Unit cylinder  
Combined functions

## Variation and option selection table

- : Standard
- ◎ : Option
- : Available (custom order)
- △ : Available depending on conditions (consult with CKD.)
- X : Not available

Code	Code	Variation			Port thread		Option					
		Symbol	Metal bush bearing type	Ball bearing type	With cylinder switch	NPT	G	Adjustable stroke stopper	Adjustment depth on both sides 5mm	Adjustment depth on both sides 12.5mm	Adjustment depth on both sides 25mm	Adjustment depth on both sides 25mm
			No	B	L		N	G		No	P2	P1A
USC	Metal bush bearing type	Blank	X	◎		○	○		●	◎	◎	◎
JSB3	Ball bearing type	B		◎		○	○		●	◎	◎	◎
LMB	With cylinder switch	L				○	○		●	◎	◎	◎
STG												
STS/L												
LCS	NPT	N					X		○	○	○	○
LCG	G	G							○	○	○	○
LCM												
LCT												
LCY	Adjustable stroke stopper											
STR2	On both sides Adjustment depth 5 mm single	Blank								X	X	X
UCA2	Adjustment depth 12.5mm single	P2									X	X
HCM	On side A Adjustment depth 25 mm	P1A										X
HCA	On side B Adjustment depth 25 mm	P1B										
SRL2												
SRG												
SRM												
SRT	Cylinder switch	Listed on Ending	◎	◎	◎		○	○		◎	◎	◎
MRL2												
MRG2												

### <Example of model number>



Model no.: Unit cylinder

● Variation: Ball bearing type, with switch

- A Bore size :  $\phi$  16mm
- B Port thread type : Rc thread
- C Stroke length : 50mm
- D Switch model no. : Proximity T2H switch, lead wire 1m
- E Switch quantity : Two
- F Option : Adjustment width 12.5mm single with both sides adjustable stopper

SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
<b>UCA2</b>
HCM
HCA
SRL2
SRG
SRM
SRT
MRL2
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

Unit cylinder  
Combined functions



# Pneumatic components

## Safety precautions

Always read this section before starting use.

Refer to Intro 71 for general precautions of the cylinder, and to Intro 78 for general precautions of the cylinder switch.

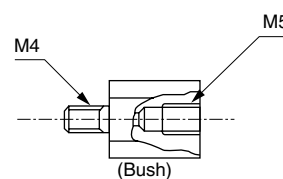
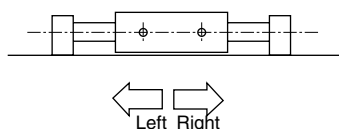
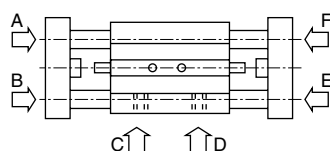
### Unit cylinder UCA2 Series

## Installation & Adjustment

### 1. Piping

#### CAUTION

#### End plate fixing (model: UCA2- (B)-Y)



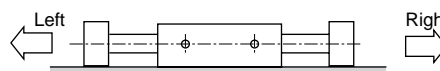
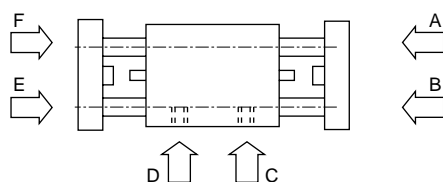
When fixed on the end late, the relationship of the pressure port and direction of movement is as shown at right. Plug the piping ports that are not in use.

When using the UCA2-(B)-Y-10, attach the enclosed bushing to the pressure port.

Recommended tightening torque: 1.0 to 1.4N·m

Pressure port	A	B	C	D	E	F
Body operating direction	Left	Right	Embedded	Embedded	Right	Left

#### Body mount, (model: UCA2- (B)-X)



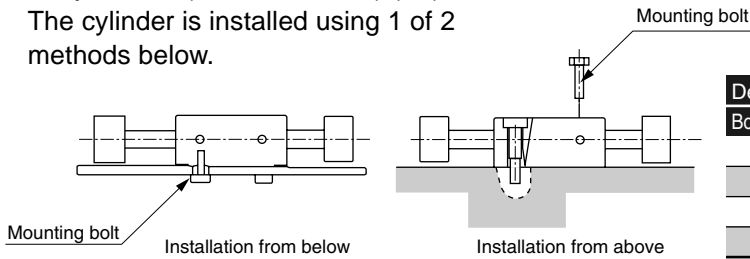
When mounting on the body, the relation of the pressurized port and piston rod movement direction will be as shown on the right. Plug the piping ports that are not in use.

Pressure port	A	B	C	D	E	F
Piston rod operating direction	Embedded	Embedded	Left	Right	Embedded	Embedded

## 2. Installation

### CAUTION

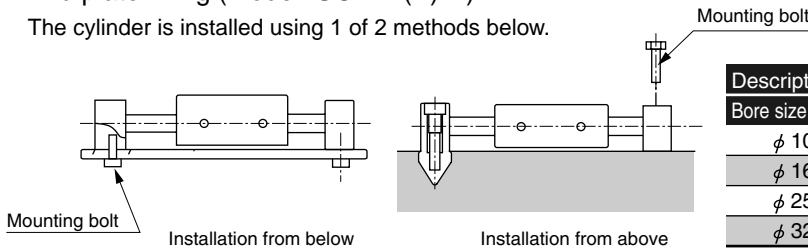
- **Body mount, (model: UCA2- (B)-X)**  
The cylinder is installed using 1 of 2 methods below.



Descriptions Bore size (mm)	Hexagon socket head screw size	Quantity
φ 10	M3 x 22 ℓ	4
φ 16	M4 x 30 ℓ	4
φ 25	M5 x 35 ℓ	4
φ 32	M6 x 40 ℓ	4

Use the hexagon socket head cap bolt.  
Refer to the table at right and select the hexagon socket head cap screw.

- **End plate fixing (model: UCA2- (B)-Y)**  
The cylinder is installed using 1 of 2 methods below.



Descriptions Bore size (mm)	Hexagon socket head screw size	Quantity
φ 10	M3 x 22 ℓ	4
φ 16	M4 x 30 ℓ	4
φ 25	M5 x 35 ℓ	4
φ 32	M6 x 40 ℓ	4

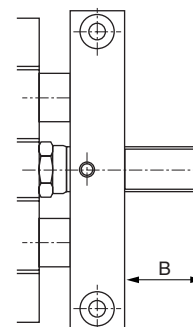
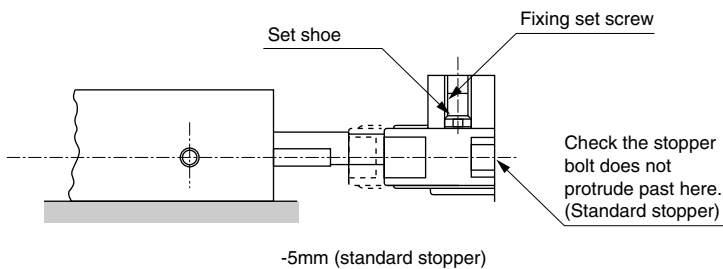
Use the hexagon socket head cap bolt.  
Refer to the table at right and select the hexagon socket head cap screw.

### Stopper adjustment method

- Adjust the stroke by loosening the fixing setscrew and then turning the stopper bolt. Tighten the fixing setscrew after adjustment.  
Recommended tightening torque of fixing set screw: 1.4N·m
- Refer to the table A to adjust amount of a stopper.
- Using with an extended stroke can cause operation faults. Make sure that the standard stopper does not protrude from the outer side of the end plate.  
When using the single-side adjustment stopper P1 or double-side adjustment stopper P2, do not protrude the stopper more than the default amount.

Table A

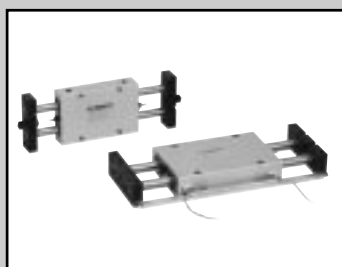
Descriptions	Adjustable stroke length	Default protrusion amount B
Standard stopper	Both sides each -5mm	0mm
Single adjustable stopper P1A	Plate A side -30mm Plate B side -5mm	P1: 25mm Standard: 0mm
Single adjustable stopper P1B	Plate B side -30mm Plate A side -5mm	
Both sides adjustable stopper P2	Both sides each -17.5mm	12.5mm



- The CKD shock absorber is treated as a consumable.  
Replace the shock absorber if energy absorption performance drops or if movement is no longer smooth.

SCP\*2  
CMK2  
CMA2  
SCM  
SCG  
SCA2  
SCS  
CKV2  
CA/OV2  
SSD  
CAT  
MDC2  
MVC  
SMD2  
MSD\*  
FC\*  
STK  
ULK\*  
JSK/M2  
JSG  
JSC3  
USSD  
USC  
JSB3  
LMB  
STG  
STS/L  
LCS  
LCG  
LCM  
LCT  
LCY  
STR2  
UCA2  
HCM  
HCA  
SRL2  
SRG  
SRM  
SRT  
MRL2  
MRG2  
SM-25  
CAC3  
UCAC  
RCC2  
MFC  
SHC  
GLC  
Ending

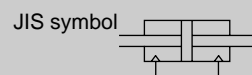
Unit cylinder  
Combined functions



Unit cylinder Metal bush bearing type with switch

# UCA2 Series

● Bore size:  $\phi$  10,  $\phi$  16,  $\phi$  25,  $\phi$  32



## Specifications

Descriptions	UCA2 UCA2-L (with switch)			
	$\phi$ 10	$\phi$ 16	$\phi$ 25	$\phi$ 32
Bore size mm	$\phi$ 10	$\phi$ 16	$\phi$ 25	$\phi$ 32
Actuation	Double acting			
Working fluid	Compressed air			
Max. working pressure MPa	1.0			
Min. working pressure MPa	0.15		0.1	
Withstanding pressure MPa	1.5			
Ambient temperature °C	-10 to 60 (no freezing)			
Port size	M5		Rc1/8	
Stroke tolerance mm	+1.0 0			
Working piston speed mm/s	30 to 300			
Revolvable angle tolerance Note	$\pm 0.1^\circ$	$\pm 0.05^\circ$		$\pm 0.02^\circ$
Max. repeating cycle Time/min.	30			
Cushion	Shock absorber integrated			
Lubrication	Not required (when lubricating, use turbine oil Class 1 ISOVG 32.)			
Allowable energy absorption J	0.25	0.65	2.4	4.5

Note: The value when stroke length 0 ( deflection of position rod excluded).

## Stroke length

Bore size (mm)	Standard stroke length (mm)	Max. stroke length (mm)	Min. stroke length (mm)	Min. stroke length with switch (mm)
$\phi$ 10	25, 50, 75, 100	100	25	10: With switch 1 piece (Note 2) 20: With switch 2 pieces (Note 2) 75: With switch 3 pieces
$\phi$ 16	25, 50, 75, 100,	200		
$\phi$ 25	125, 150, 175, 200	200		
$\phi$ 32		200		

Note 1: Not available except standard stroke length.

Note 2: Minimum stroke when stroke is adjusted with stopper.

## Switch specifications

● 1 color indicator type

\* The T0/T5 switch can be used with 220 VAC.  
Consult with CKD for working conditions.

Descriptions	Proximity 2 wire	Proximity 3 wire		Reed 2 wire			
	T2H/T2V	T3H/T3V		T0H/T0V		T5H/T5V	
Applications	Programmable controller	Programmable controller, relay		Programmable controller, relay		Programmable controller, relay IC circuit (without indicator light), serial connection	
Output method	-	NPN output		-			
Power voltage	-	10 to 28 VDC		-			
Load voltage	10 to 30 VDC	30 VDC or less		12/24 VDC	110 VAC	5/12/24 VDC	110 VAC
Load current	5 to 20mA (Note 1)	100mA or less	50mA or less	5 to 50mA	7 to 20mA	50mA or less	20mA or less
Light	LED (ON lighting)	LED (ON lighting)		LED (ON lighting)			
Leakage current	1mA or less	10 $\mu$ A or less		0mA			

Note 1: Maximum load current above: 20mA applies at 25°C. When ambient temperature around a switch is higher than 25°C, the value is lower than 20mA. (5 to 10mA. when 60°C)

Cylinder weight (X: Body mount) - Number in ( ) includes switch rail.

Model no.	Stroke length (mm)								Switch weight per 1 piece
	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)	-	-	-	-	0.03
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: End plate mount) - Number in ( ) includes switch rail.

Model no.	Stroke length (mm)								Switch weight per 1 piece
	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)	-	-	-	-	0.03
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)	

SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
<b>UCA2</b>
HCM
HCA
SRL2
SRG
SRM
SRT
MRL2
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

Unit cylinder  
Combined functions

## How to order

Without switch

UCA2 - X - 10 - 25 - P1A

With switch

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

A Fixing method

B Bore size

C Port thread type

D Stroke length  
Refer to Page 1924 for minimum stroke.

E Switch model no.  
Note 1

F Switch quantity  
Note 2

G Option  
Note 3

Symbol	Descriptions				
<b>A Fixing method</b>					
X	Body mount				
Y	End plate mount				
<b>B Bore size (mm)</b>					
10	φ 10				
16	φ 16				
25	φ 25				
32	φ 32				
<b>C Port thread type</b>					
Blank	Rc thread				
NN	NPT thread (φ 25 and over) is custom order.				
GN	G thread (φ 25 and over) is custom order.				
<b>D Stroke length (mm)</b>					
	Bore size (φ)	10	16	25	32
25	25	●	●	●	●
50	50	●	●	●	●
75	75	●	●	●	●
100	100	●	●	●	●
125	125		●	●	●
150	150		●	●	●
175	175		●	●	●
200	200		●	●	●
<b>E Switch model no.</b>					
Axial lead wire	Radial lead wire	Contact	Indicator	Lead wire	
T0H*	T0V*	Reed	1 color indicator type	2-wire	
T5H*	T5V*		Without indicator light		
T2H*	T2V*	Proximity	1 color indicator type	2-wire	
T3H*	T3V*			3-wire	
<b>*Lead wire length</b>					
Blank	1m (standard)				
3	3m (option)				
5	5m (option)				
<b>F Switch quantity</b>					
RA	One	Plate A side			
RB	One	Plate B side			
D	Two				
T	Three				
<b>G Option</b>					
P1A	Single adjustable stopper	Plate A side			
P1B	stopper	Plate B side			
P2	Both sides adjustable stopper				

### Note on model no. selection

Note 1: For types without switch, magnet is not integrated.

For types without switch, magnet and magnet rail are installed but not switch rail.

Note 2: 3 switches minimum stroke length 75 (mm)

Note 3: Distinction of A or B side is listed in the dimensional drawing.

<Example of model number>

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

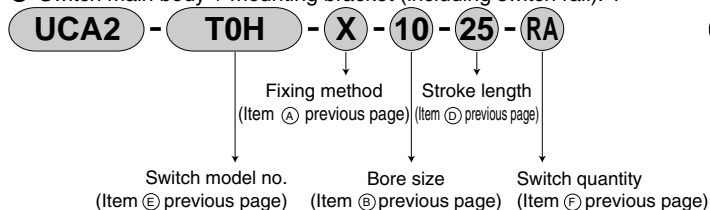
Model: Unit cylinder, metal bush bearing type

- A Fixing method : Body mount
- B Bore size : φ 10mm
- C Port thread type : Rc thread
- D Stroke length : 25mm
- E Switch model no. : Proximity switch T2H, lead wire length 1m
- F Switch quantity : One (plate A side)
- G Option : Single adjustable stopper (plate A side)

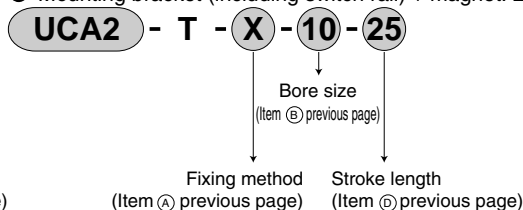


### How to order switch discrete

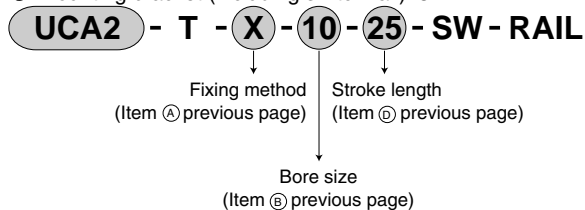
- Switch main body + mounting bracket (including switch rail): 1



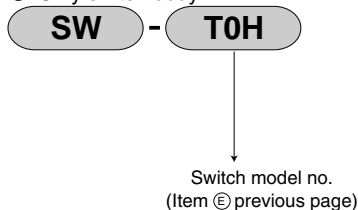
- Mounting bracket (including switch rail) + magnet: 2



- Mounting bracket (including switch rail): 3



- Only switch body: 4



1) When changing from type with no switch to type with T-type switch.

Descriptions	Switch necessary	Switch not required
UCA2-(XY) → UCA2-L-(XY)	2 + 4	2

\* If the switch is unnecessary, the switch can be retrofit later. (Such as when customer already has T-type)

2) When mounting only magnet for T-type switch.

Descriptions	Switch necessary	Switch not required
UCA2-L-(XY) → UCA2-L-(XY) Without switch    With switch	1	3

When switch could not be mounted with the UCA2-L and higher types. (Only magnet is mounted)

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

Descriptions	Switch necessary	Switch not required
S type switch → T type switch	2 + 4	—

\* The switch rail, mounting bracket and switch unit must be replaced.

### How to order shock absorber kit model number

- $\phi 10$

**UCA2-10-NCK**

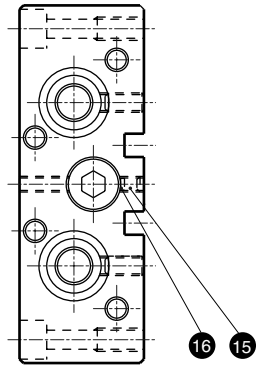
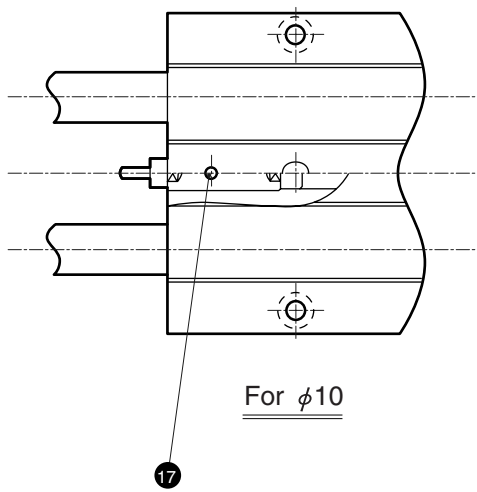
- $\phi 16$  to  $\phi 32$  (common)

**UCA2-16-NCK**

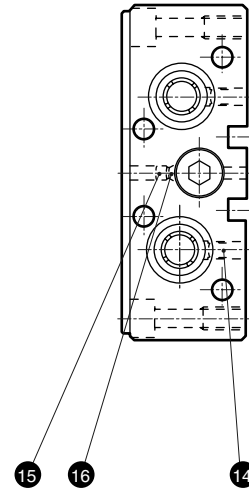
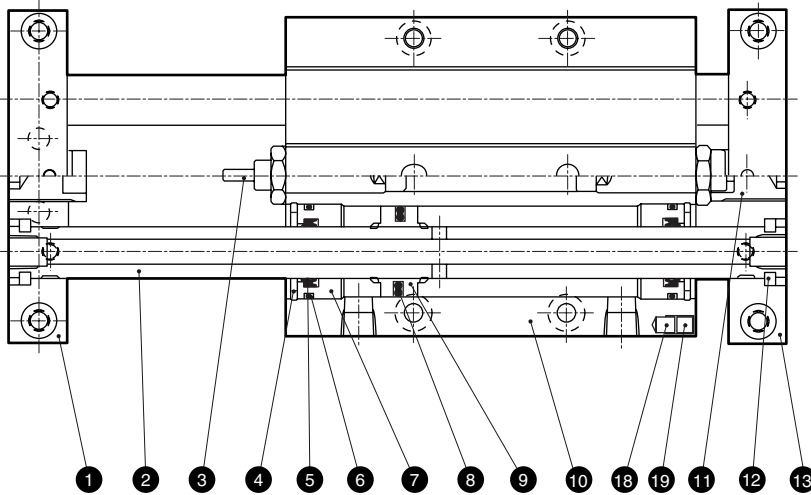
SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
<b>UCA2</b>
HCM
HCA
SRL2
SRG
SRM
SRT
MRL2
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

Unit cylinder  
Combined functions

## Internal structure and parts list



When UCA2-X-25, 32



No.	Parts name	Material	Remarks	No.	Parts 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		φ 10: UCA2-10-NCK φ 16 to 32: UCA2-16-NCK	12	Split ring	Steel	Blackening
4	C type snap ring for hole	Steel	Blackening	13	End plate (B)	Aluminum alloy	Alumite
5	Rod packing seal	Nitrile rubber		14	Hexagon socket head set screw	Alloy steel	Blackening
6	Rod metal gasket	Nitrile rubber		15	Hexagon socket head set screw	Alloy steel	
7	Rod bushing	Aluminum alloy	Alumite	16	Set shoe	Aluminum alloy	
8	Piston packing seal	Nitrile rubber		17	Hexagon socket head set screw	Alloy steel	
9	Piston	Aluminum alloy		18	Magnet	Special alloy	Only UCA2-L-Y
				19	Hexagon socket head set screw	Stainless steel	Only UCA2-L-Y

## Repair parts list

Bore size (mm)	Kit No.	Repair parts number
φ 10	UCA2-10K	5 6 8 14
φ 16	UCA2-16K	
φ 25	UCA2-25K	
φ 32	UCA2-32K	

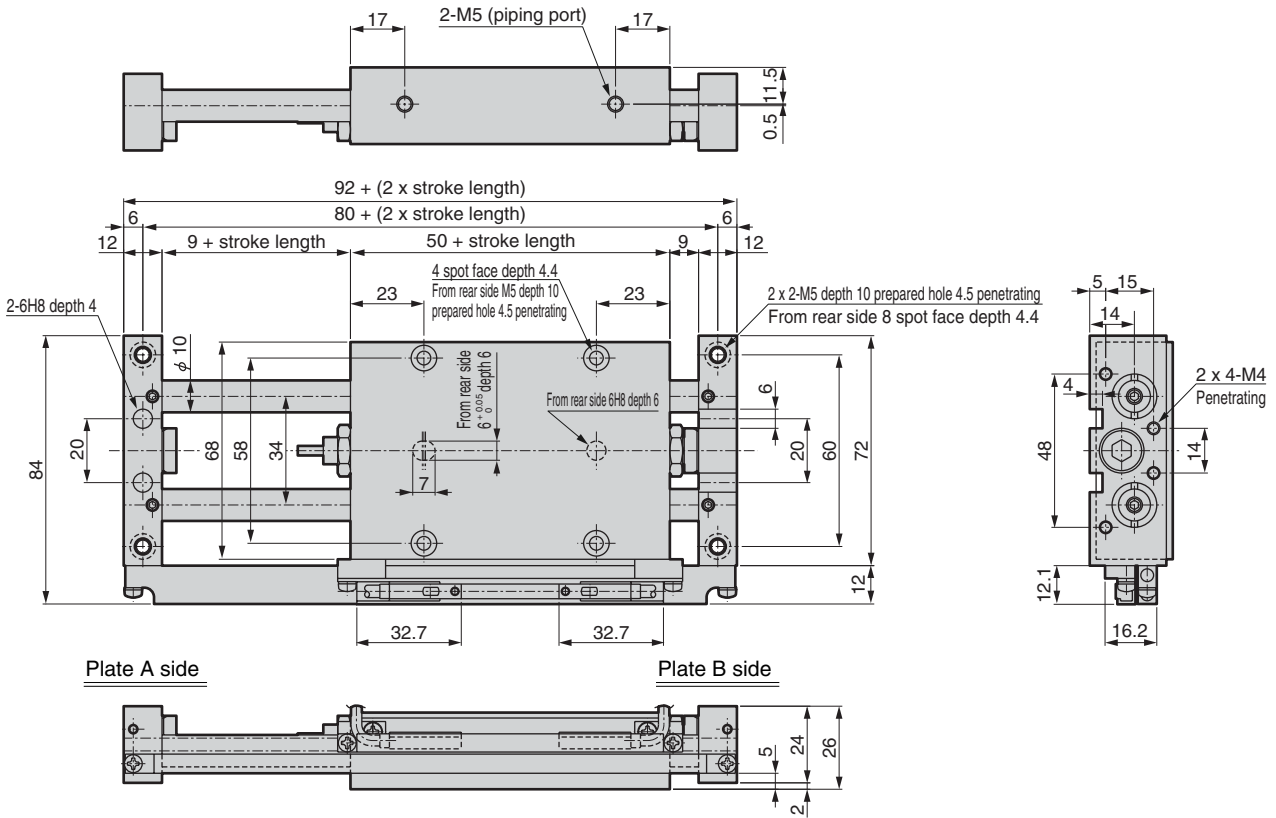
Note: Repair parts of metal bush bearing type and ball bearing type are same.



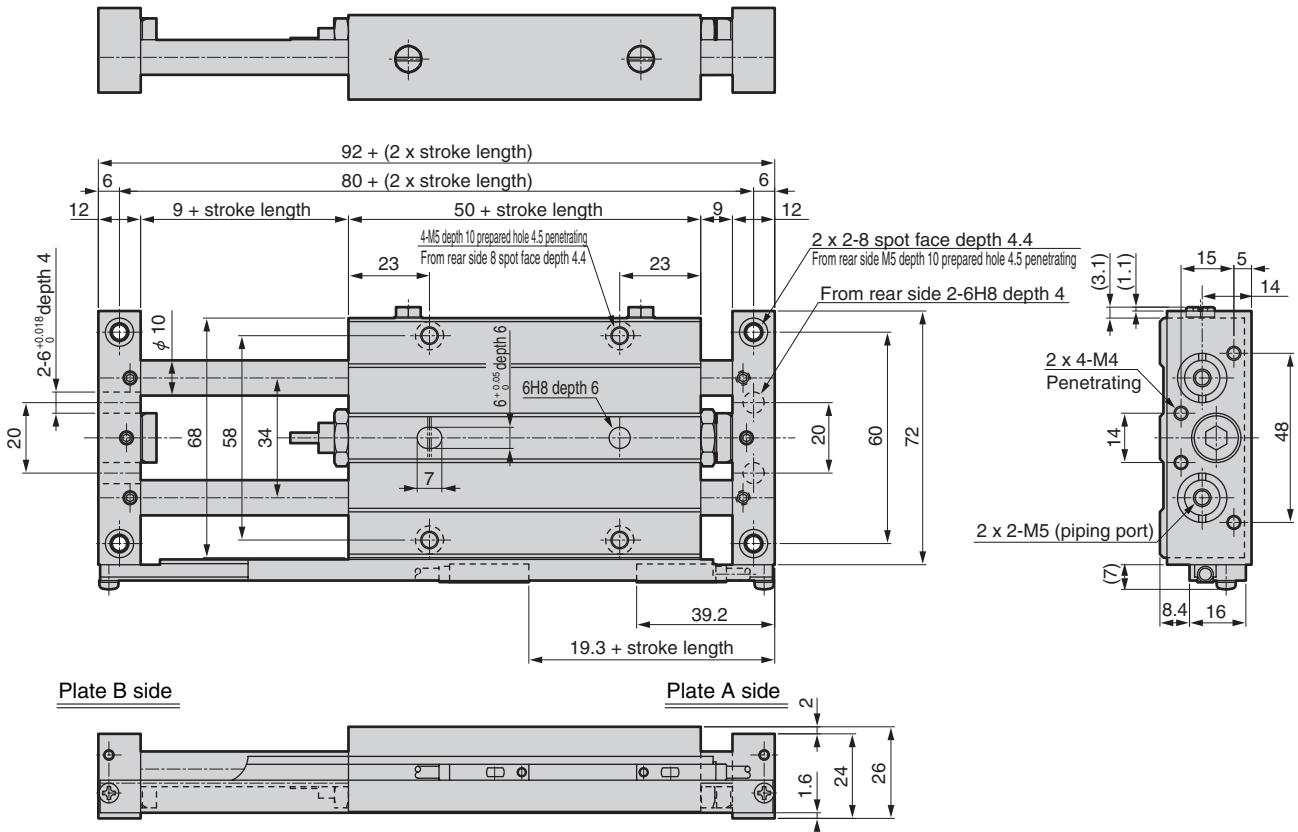


Dimensions:  $\phi 16$

● Body mount method (X)



● End plate mount method (Y)



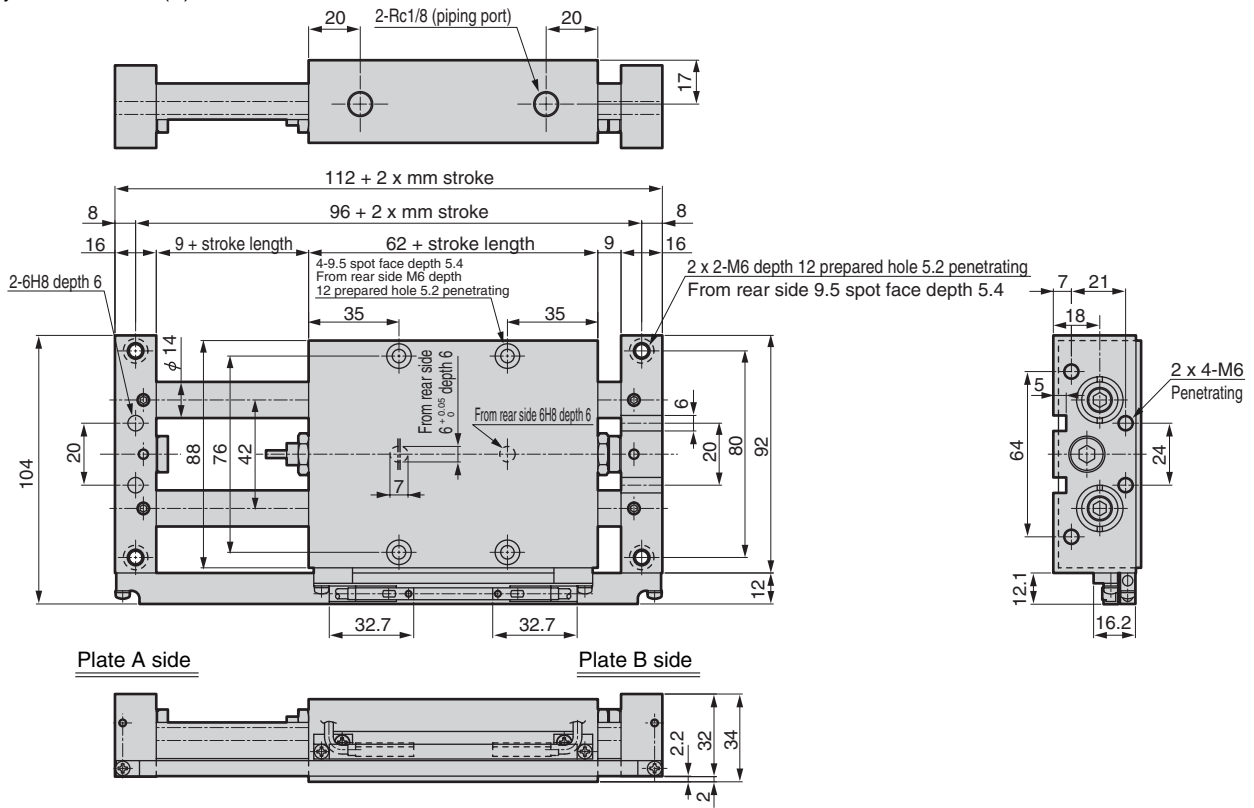
\* Faults can occur if the stroke is lengthened by adjusting the stopper. Refer to page 1923 for details.

- SCP\*2
- CMK2
- CMA2
- SCM
- SCG
- SCA2
- SCS
- CKV2
- CA/OV2
- SSD
- CAT
- MDC2
- MVC
- SMD2
- MSD\*
- FC\*
- STK
- ULK\*
- JSK/M2
- JSG
- JSC3
- USSD
- USC
- JSB3
- LMB
- STG
- STS/L
- LCS
- LCG
- LCM
- LCT
- LCY
- STR2
- UCA2**
- HCM
- HCA
- SRL2
- SRG
- SRM
- SRT
- MRL2
- MRG2
- SM-25
- CAC3
- UCAC
- RCC2
- MFC
- SHC
- GLC
- Ending

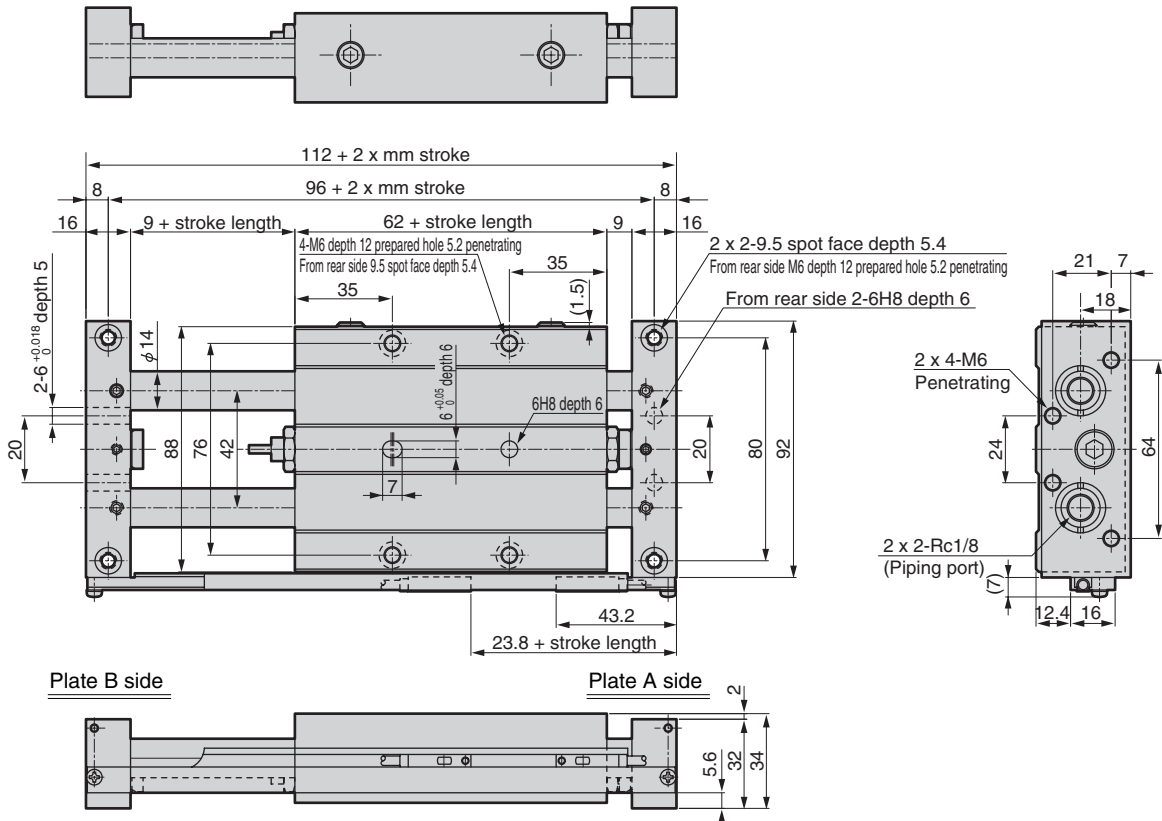
Dimensions:  $\phi$  25



● Body mount method (X)



● End plate mount method (Y)



\* Faults can occur if the stroke is lengthened by adjusting the stopper. Refer to page 1923 for details.

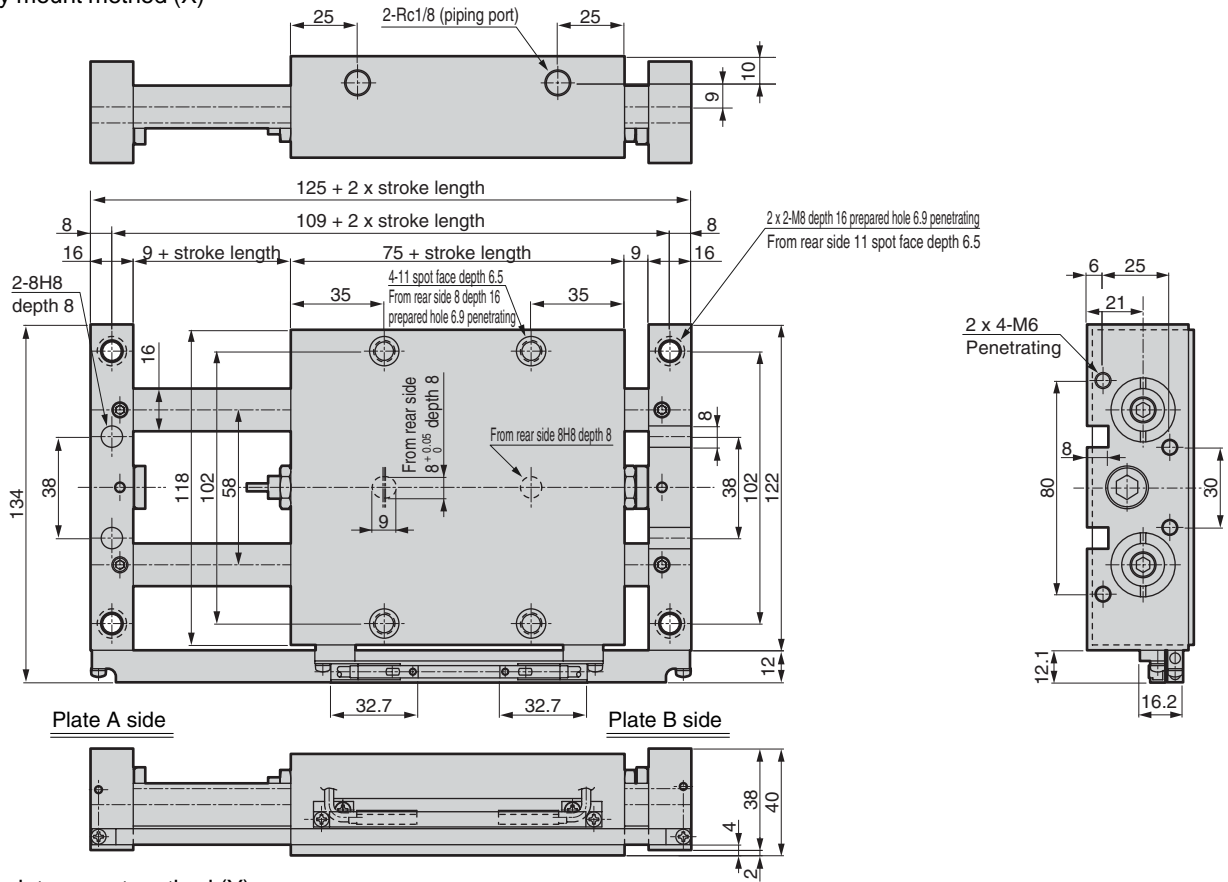
SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
<b>STG</b>
<b>STS/L</b>
LCS
LCG
LCM
LCT
LCY
STR2
<b>UCA2</b>
HCM
HCA
SRL2
SRG
SRM
SRT
MRL2
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

Unit cylinder  
Combined functions

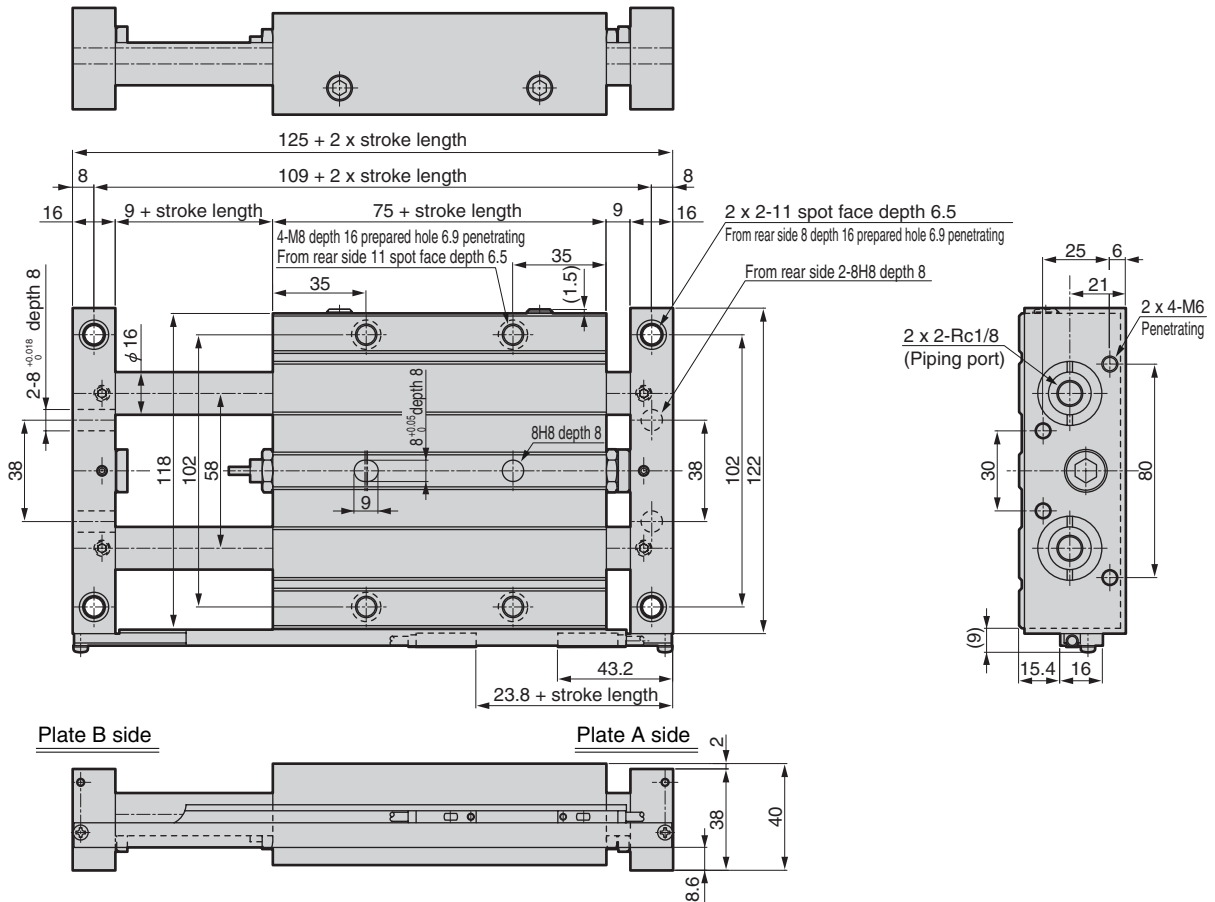


Dimensions:  $\phi 32$

● Body mount method (X)



● End plate mount method (Y)

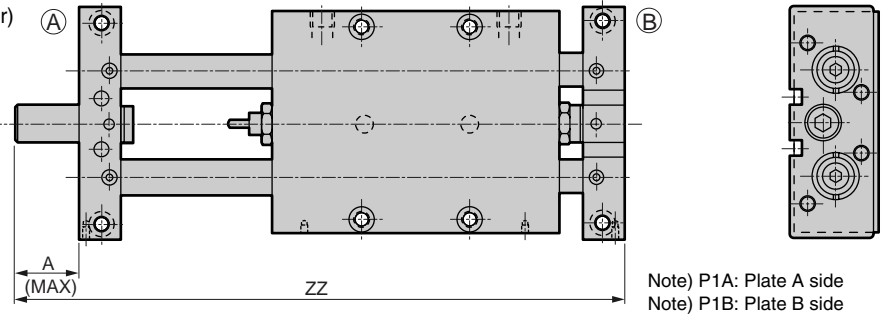


\* Faults can occur if the stroke is lengthened by adjusting the stopper.  
Refer to page 1923 for details.

- SCP\*2
- CMK2
- CMA2
- SCM
- SCG
- SCA2
- SCS
- CKV2
- CA/OV2
- SSD
- CAT
- MDC2
- MVC
- SMD2
- MSD\*
- FC\*
- STK
- ULK\*
- JSK/M2
- JSG
- JSC3
- USSD
- USC
- JSB3
- LMB
- STG
- STS/L
- LCS
- LCG
- LCM
- LCT
- LCY
- STR2
- UCA2**
- HCM
- HCA
- SRL2
- SRG
- SRM
- SRT
- MRL2
- MRG2
- SM-25
- CAC3
- UCAC
- RCC2
- MFC
- SHC
- GLC
- Ending

### Dimensions: Adjustable stopper

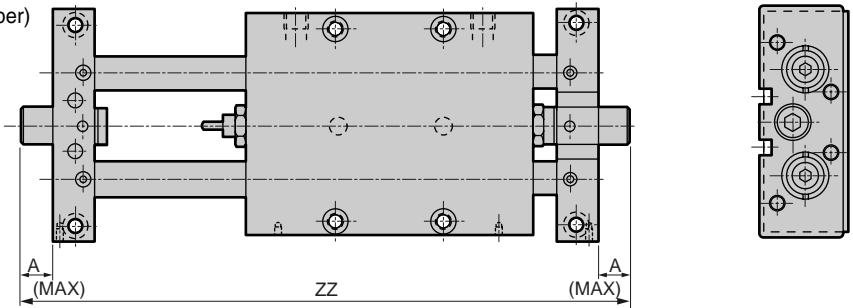
- UCA2- $\begin{matrix} 10 \\ X \\ Y \end{matrix}$ - $\begin{matrix} 16 \\ 25 \\ 32 \end{matrix}$ -\* \*P1\* (single adjustable stopper)



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

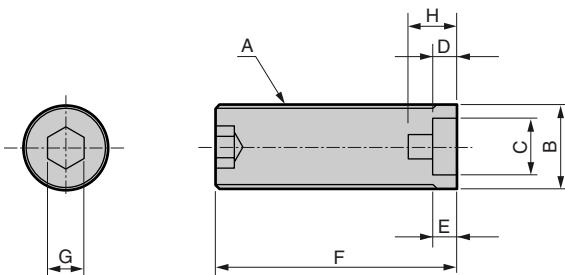
Model no.	A (Max.)	ZZ							
		25st	50st	75st	100st	125st	150st	175st	200st
UCA2-10	25	159	209	259	309	-	-	-	-
UCA2-16		167	217	267	317	367	417	467	517
UCA2-25		187	237	287	337	387	437	487	537
UCA2-32		200	250	300	350	400	450	500	550

- UCA2- $\begin{matrix} 10 \\ X \\ Y \end{matrix}$ - $\begin{matrix} 16 \\ 25 \\ 32 \end{matrix}$ -\* \*P2\* (both sides adjustable stopper)



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 dimension



Symbol	A	B	C	D	E	F	G	H	
Bore size (mm)	M14 x 1	phi 14	phi 10	4	4	Standard	14.5	6	8
						P2	27		
						P1	39.5		
phi 16	M14 x 1	phi 14	phi 10	8	4	Standard	17	6	-
						P2	29.5		
						P1	42		
phi 25	M14 x 1	phi 14	phi 10	6.5	4	Standard	21	6	-
						P2	33.5		
						P1	46		
phi 32	M16 x 1	phi 16	phi 10	5.5	4	Standard	21	8	-
						P2	33.5		
						P1	46		

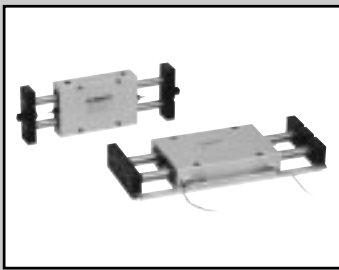
### Discrete adjustable stopper model no.

- Standard type

No. and part name	Standard stopper	Single adjustable stopper	Both sides adjustable stopper
Bore size (mm)			
phi 10	UCA2-P-10	UCA2-P1-10	UCA2-P2-10
phi 16	UCA2-P-16	UCA2-P1-16	UCA2-P2-16
phi 25	UCA2-P-25	UCA2-P1-25	UCA2-P2-25
phi 32	UCA2-P-32	UCA2-P1-32	UCA2-P2-32

SCP\*2  
CMK2  
CMA2  
SCM  
SCG  
SCA2  
SCS  
CKV2  
CA/OV2  
SSD  
CAT  
MDC2  
MVC  
SMD2  
MSD\*  
FC\*  
STK  
ULK\*  
JSK/M2  
JSG  
JSC3  
USSD  
USC  
JSB3  
LMB  
STG  
STS/L  
LCS  
LCG  
LCM  
LCT  
LCY  
STR2  
**UCA2**  
HCM  
HCA  
SRL2  
SRG  
SRM  
SRT  
MRL2  
MRG2  
SM-25  
CAC3  
UCAC  
RCC2  
MFC  
SHC  
GLC  
Ending

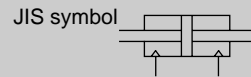
Unit cylinder  
Combined functions



Unit cylinder Ball bearing type with switch

# UCA2-B Series

● Bore size:  $\phi 10$ ,  $\phi 16$ ,  $\phi 25$ ,  $\phi 32$



## Specifications

Descriptions		UCA2-B UCA2-BL (with switch)			
Bore size	mm	$\phi 10$	$\phi 16$	$\phi 25$	$\phi 32$
Actuation		Double acting			
Working fluid		Compressed air			
Max. working pressure	MPa	1.0			
Min. working pressure	MPa	0.15		0.1	
Withstanding pressure	MPa	1.5			
Ambient temperature	°C	-10 to 60 (no freezing)			
Port size		M5		Rc1/8	
Stroke tolerance	mm	+1.0 0			
Working piston speed	mm/s	30 to 300			
Revolvable angle tolerance	Note 1	$\pm 0.04^\circ$	$\pm 0.03^\circ$	$\pm 0.015^\circ$	$\pm 0.015^\circ$
Max. repeating cycle	Time/min.	30			
Cushion		Shock absorber integrated			
Lubrication		Not required (when lubricating, use turbine oil Class 1 ISOVG 32.)			
Allowable energy absorption	J	0.25	0.65	2.4	4.5

Note 1: The value when stroke length 0 (deflection of piston rod excluded).

## Stroke length

Bore size (mm)	Standard stroke length (mm)	Max. stroke length (mm)	Min. stroke length (mm)	Min. stroke length with switch (mm)
$\phi 10$	25, 50, 75, 100	100	25	10: With switch 1 piece 20: With switch 2 pieces 75: With switch 3 pieces
$\phi 16$	25, 50, 75, 100, 125, 150, 175, 200	200		
$\phi 25$				
$\phi 35$				

Note: Not available except standard stroke length.

## Switch specifications

● 1 color indicator type

\* The T0/T5 switch can be used with 220 VAC.  
Consult with CKD for working conditions.

Descriptions	Proximity 2 wire	Proximity 3 wire		Reed 2 wire			
	T2H/T2V	T3H/T3V		T0H/T0V		T5H/T5V	
Applications	Programmable controller	Programmable controller, relay		Programmable controller, relay		Programmable controller, relay IC circuit (without indicator light), serial connection	
Output method	-	NPN output		-			
Power voltage	-	10 to 28 VDC		-			
Load voltage	10 to 30 VDC	30 VDC or less		12/24 VDC	110 VAC	5/12/24 VDC	110 VAC
Load current	5 to 20mA (Note 1)	100mA or less	50mA or less	5 to 50mA	7 to 20mA	50mA or less	20mA or less
Light	LED (ON lighting)	LED (ON lighting)		LED (ON lighting)			
Leakage current	1mA or less	10 $\mu$ A or less		0mA			

Note 1: Maximum load current above: 20mA applies at 25°C. When ambient temperature around a switch is higher than 25°C, the value is lower than 20mA. (5 to 10mA. when 60°C)



# UCA2-B Series

## Specifications

Cylinder weight (X: Body mount) - Number in ( ) includes switch rail.

Model no.	Stroke length (mm)								Switch weight per 1 piece
	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)	-	-	-	-	0.03
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: End plate mount) - Number in ( ) includes switch rail.

Model no.	Stroke length (mm)								Switch weight per 1 piece
	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)	-	-	-	-	0.03
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)	

SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
<b>UCA2</b>
HCM
HCA
SRL2
SRG
SRM
SRT
MRL2
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

Unit cylinder  
Combined functions

# UCA2-B Series

## How to order

Without switch

**UCA2-B** - **X** - **10** - **25** - **P1A**

With switch

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

**A** Fixing method

**B** Bore size

**C** Port thread type

**D** Stroke length  
Refer to Page 1934 for minimum stroke.

**E** Switch model no.  
Note 1

**F** Switch quantity  
Note 2

**G** Option  
Note 3

Symbol	Descriptions
<b>A Fixing method</b>	
X	Body mount
Y	End plate mount

<b>B Bore size (mm)</b>	
10	φ 10
16	φ 16
25	φ 25
32	φ 32

<b>C Port thread type</b>	
Blank	Rc thread
NN	NPT thread (φ 25 and over) is custom order.
GN	G thread (φ 25 and over) is custom order.

<b>D Stroke length (mm)</b>				
Bore size (φ)	10	16	25	32
25	25	●	●	●
50	50	●	●	●
75	75	●	●	●
100	100	●	●	●
125	125		●	●
150	150		●	●
175	175		●	●
200	200		●	●

<b>E Switch model no.</b>				
Axial lead wire	Radial lead wire	Contact	Indicator	Lead wire
T0H*	T0V*	Reed	1 color indicator type Without indicator light	2-wire
T5H*	T5V*			
T2H*	T2V*	Proximity	1 color indicator type	2-wire 3-wire
T3H*	T3V*			

<b>*Lead wire length</b>	
Blank	1m (standard)
3	3m (option)
5	5m (option)

<b>F Switch quantity</b>	
RA	Plate A side
RB	One Plate B side
D	Two
T	Three

<b>G Option</b>	
P1A	Single adjustable stopper Plate A side
P1B	Plate B side
P2	Both sides adjustable stopper

### Note on model no. selection

Note 1: A magnet is not incorporated in the type without switch.  
A magnet and magnet rail are enclosed with the specified switch without switch, but the switch rail is not enclosed.

Note 2: 3 switches minimum stroke length 75 (mm)

Note 3: Distinction of A or B side is listed in the dimensional drawing.

<Example of model number>

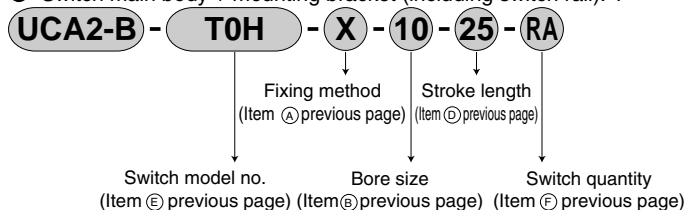
**UCA2-BL-X-10-25-T2H-RA-P1A**

Model: Unit cylinder ball bearing type

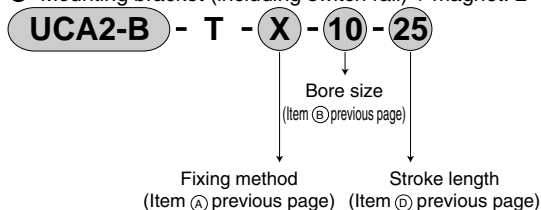
- A** Fixing method : Body mount,
- B** Bore size : φ 10mm
- C** Port thread type : Rc thread
- D** Stroke length : 25mm
- E** Switch model no. : Proximity switch T2H, lead wire length 1m
- F** Switch quantity : One (plate A side)
- G** Option : Single adjustable stopper (plate A side)

### How to order switch discrete

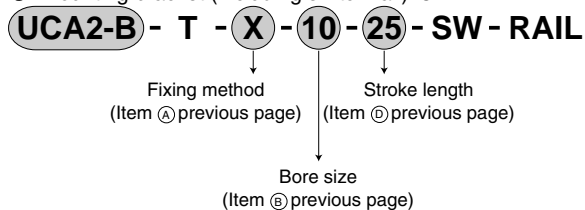
- Switch main body + mounting bracket (including switch rail): 1



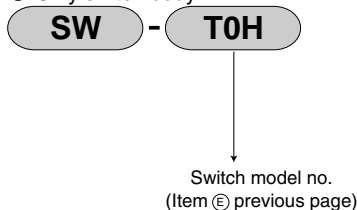
- Mounting bracket (including switch rail) + magnet: 2



- Mounting bracket (including switch rail): 3



- Only switch body: 4



1) When changing from type with no switch to type with T-type switch.

Descriptions	Switch necessary	Switch not required
UCA2-B-(XY) → UCA2-BL-(XY)	2 + 4	2

\* If the switch is unnecessary, the switch can be retrofit later. (Such as when customer already has T-type)

2) When mounting only magnet for T-type switch.

Descriptions	Switch necessary	Switch not required
UCA2-BL-(XY) → UCA2-BL-(XY) Without switch    with switch	1	3

When switch could not be mounted with the UCA2-BL and higher types. (Only magnet is mounted)

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

Descriptions	Switch necessary	Switch not required
S switch → T types switch	2 + 4	—

\* The switch rail, mounting bracket and switch unit must be replaced

### How to order shock absorber kit model number

- φ 10

**UCA2-10-NCK**

- φ 16 to φ 32 (common)

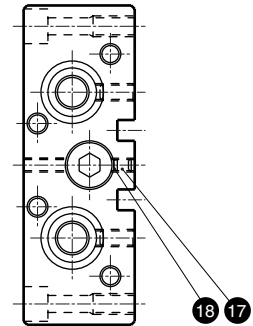
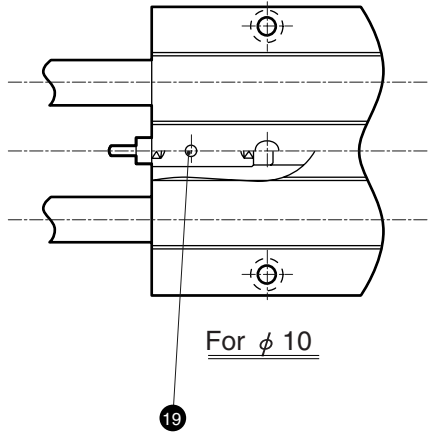
**UCA2-16-NCK**

SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
<b>UCA2</b>
HCM
HCA
SRL2
SRG
SRM
SRT
MRL2
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

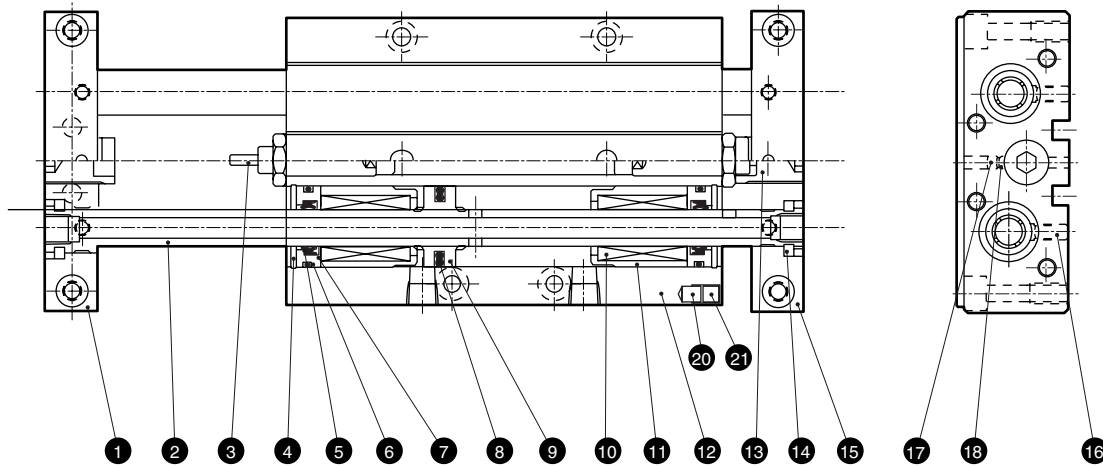
Unit cylinder  
Combined functions

## Internal structure and parts list

- SCP\*2
- CMK2
- CMA2
- SCM
- SCG
- SCA2
- SCS
- CKV2
- CA/OV2
- SSD
- CAT
- MDC2
- MVC
- SMD2
- MSD\*
- FC\*
- STK
- ULK\*
- JSK/M2
- JSG
- JSC3
- USSD
- USC
- JSB3
- LMB
- STG
- STS/L
- LCS
- LCG
- LCM
- LCT
- LCY
- STR2
- UCA2**
- HCM
- HCA
- SRL2
- SRG
- SRM
- SRT
- MRL2
- MRG2
- SM-25
- CAC3
- UCAC
- RCC2
- MFC
- SHC
- GLC
- Ending



<<UCA2-B-X-25, 32>>



No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	End plate (A)	Aluminum alloy	Alumite	11	Housing	Aluminum alloy	Only $\phi$ 25.32
2	Piston rod	Steel	Industrial chrome plating	12	Cylinder body	Aluminum alloy	Hard alumite
3	Shock absorber		$\phi$ 10: UCA2-10-NCK $\phi$ 16 to 32: UCA2-16-NCK	13	Stopper	Steel	Chromate
4	C type not go shaft for hole	Steel	Blackening	14	Split ring	Steel	Blackening
5	Rod packing seal	Nitrile rubber		15	End plate (B)	Aluminum alloy	Alumite
6	Rod metal gasket	Nitrile rubber		16	Hexagon socket head set screw	Alloy steel	Blackening
7	Rod bushing	Aluminum alloy	Chromate	17	Hexagon socket head set screw	Alloy steel	
8	Piston packing seal	Nitrile rubber		18	Set shoe	Aluminum alloy	
9	Piston	Aluminum alloy		19	Hexagon socket head set screw	Alloy steel	
10	Ball bearing			20	Magnet	Special alloy	Only UCA2-L-Y
				21	Hexagon socket head set screw	Stainless steel	Only UCA2-L-Y

### Repair parts list

Bore size (mm)	Kit No.	Repair parts number
$\phi$ 10	UCA2-10K	5 6 8 16
$\phi$ 16	UCA2-16K	
$\phi$ 25	UCA2-25K	
$\phi$ 32	UCA2-32K	

Note: Repair parts of metal bush bearing type and ball bearing type are same.

Dimensions:  $\phi 10$



● Body mount method (X)

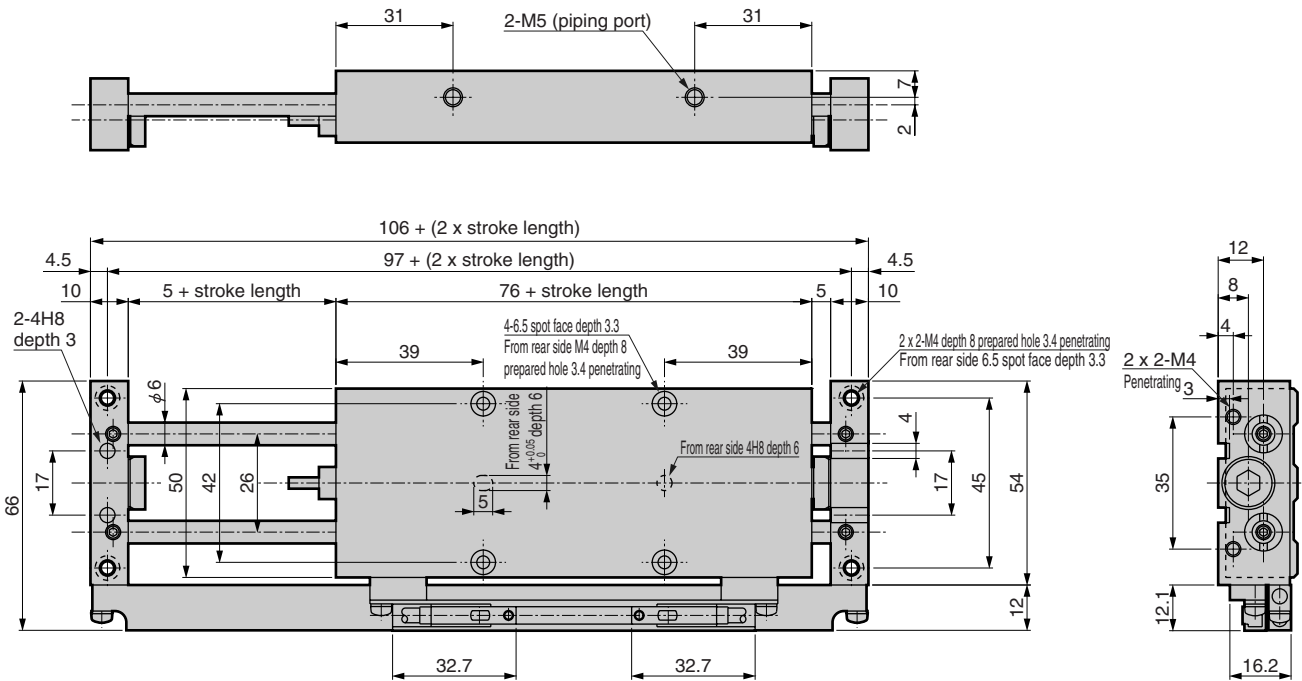
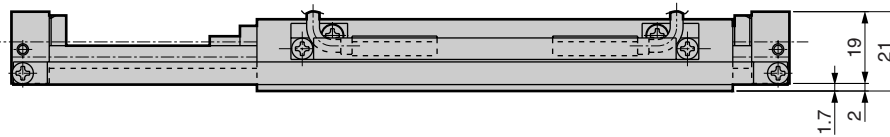


Plate A side

Plate B side



● End plate mount method (Y)

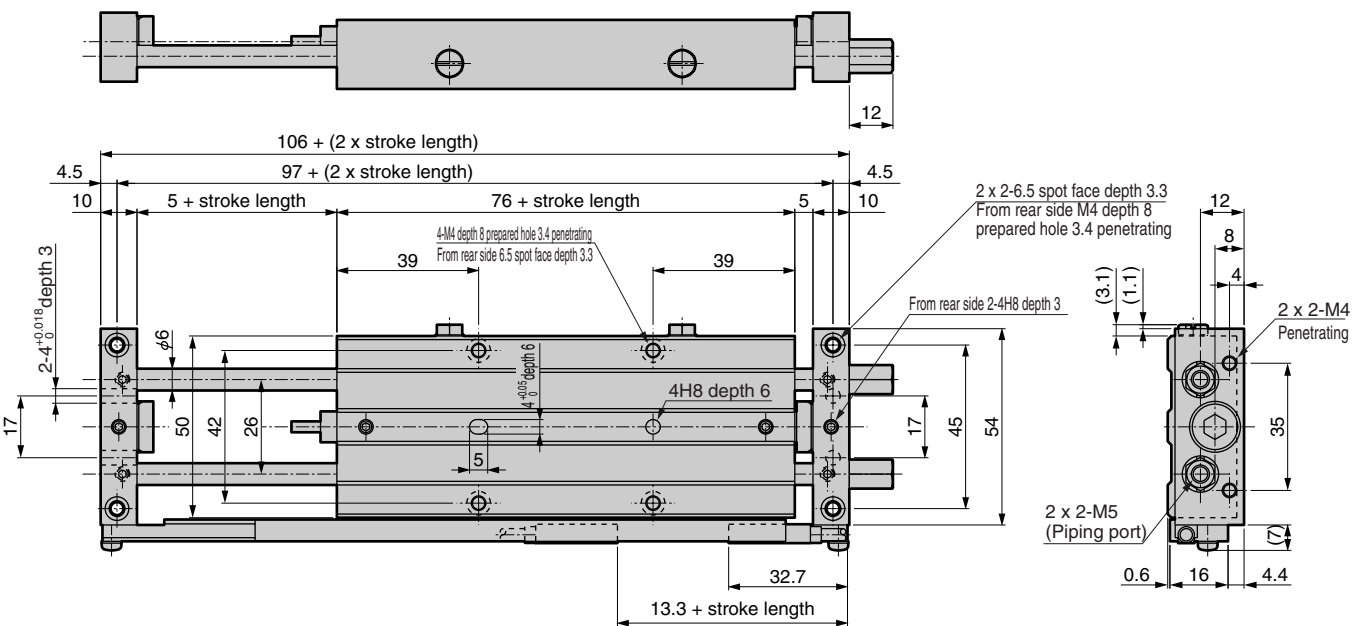
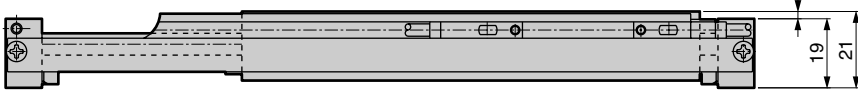


Plate B side

Plate A side



\* Faults can occur if the stroke is lengthened by adjusting the stopper. Refer to page 1923 for details.

SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
<b>UCA2</b>
HCM
HCA
SRL2
SRG
SRM
SRT
MRL2
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

Unit cylinder  
Combined functions



Dimensions:  $\phi 25$



● Body mount method (X)

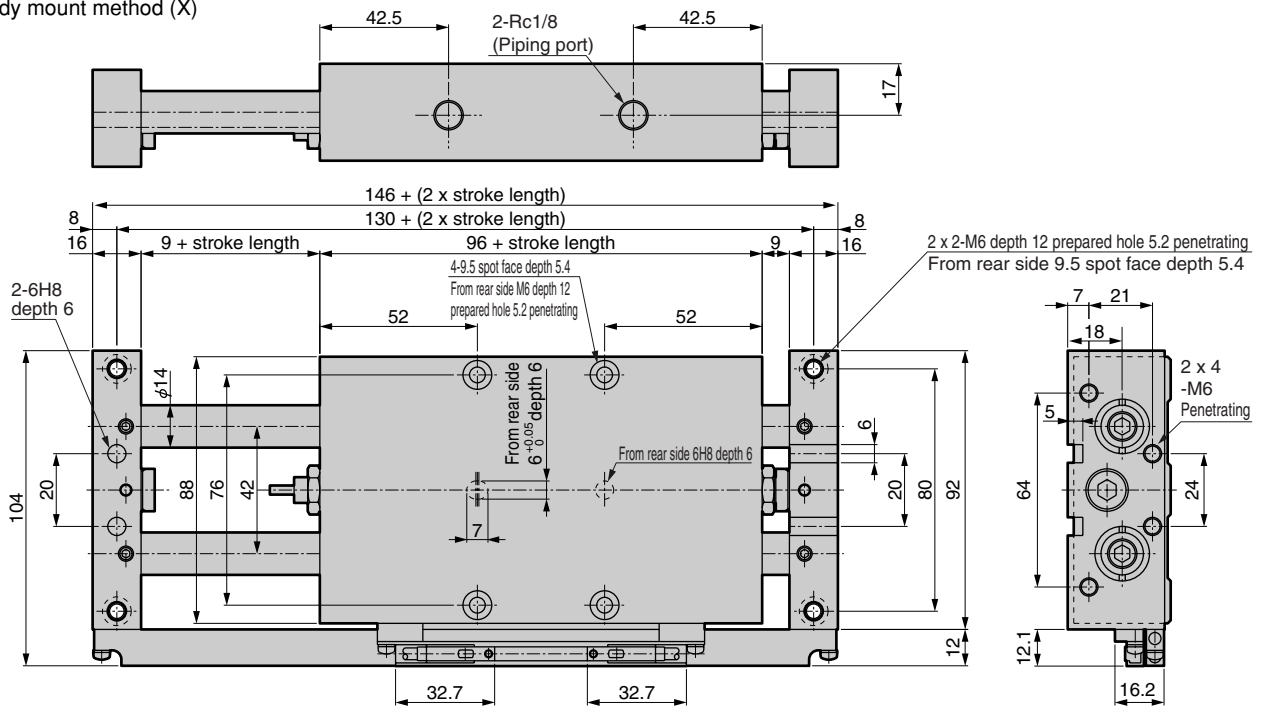
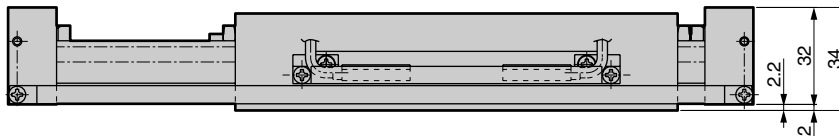


Plate A side

Plate B side



● End plate mount method (Y)

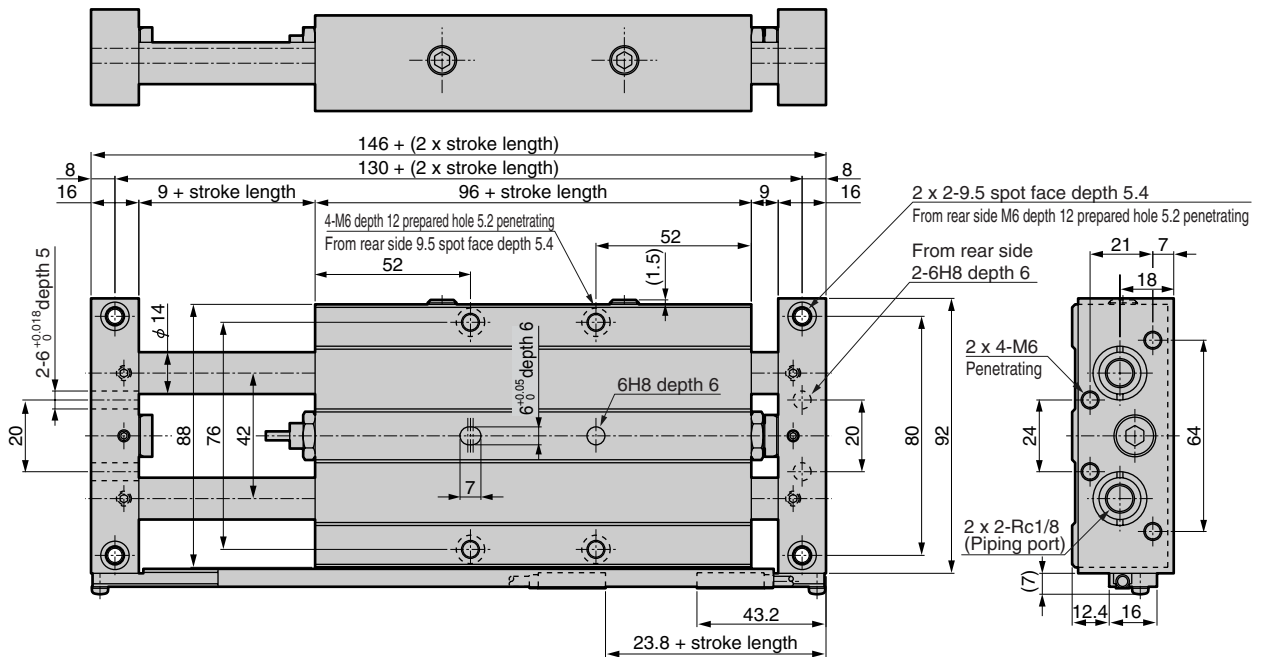
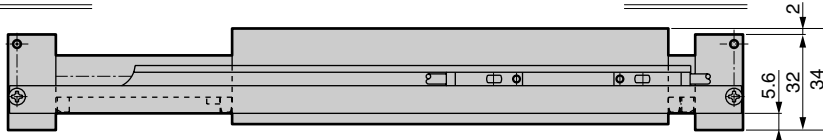


Plate B side

Plate A side



\* Faults can occur if the stroke is lengthened by adjusting the stopper. Refer to page 1923 for details.

SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
<b>UCA2</b>
HCM
HCA
SRL2
SRG
SRM
SRT
MRL2
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

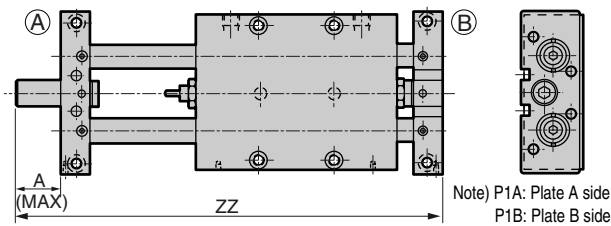
Unit cylinder  
Combined functions





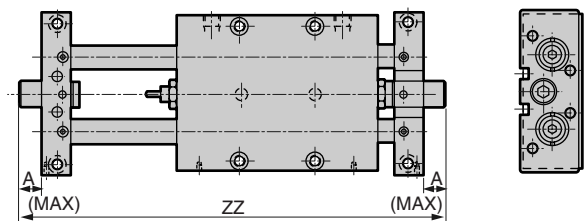
### Dimensions: Adjustable stopper

- UCA2-B-X<sub>10</sub>-Y<sub>16</sub>-Z<sub>25</sub>-\* \*P1\* (single adjustable stopper)



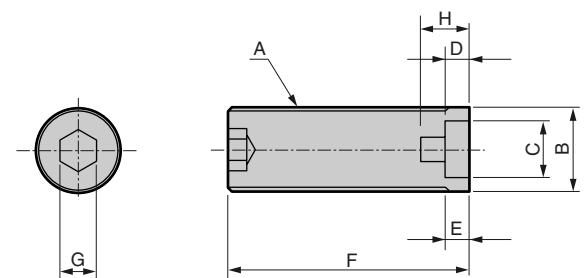
Model no.	A (Max.)	ZZ							
		25st	50st	75st	100st	125st	150st	175st	200st
UCA2-B-10	25	181	231	281	331	-	-	-	-
UCA2-B-16		213	263	313	363	413	463	513	563
UCA2-B-25		221	271	321	371	421	471	521	571
UCA2-B-32		239	289	339	389	439	489	539	589

- UCA2-B-X<sub>10</sub>-Y<sub>16</sub>-Z<sub>25</sub>-\* \*P2\* (both sides adjustable stopper)



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 dimension



Symbol	Bore size (mm)								
Bore size (mm)	A	B	C	D	E	F		G	H
φ10	M14 x 1	φ14	φ10	4	4	Standard	14.5	6	8
						P2	27		
						P1	39.5		
φ16	M14 x 1	φ14	φ9.4	8	4	Standard	17	6	-
						P2	29.5		
						P1	42		
φ25	M14 x 1	φ14	φ9.4	6.5	4	Standard	21	6	-
						P2	33.5		
						P1	46		
φ32	M16 x 1	φ16	φ9.4	5.5	4	Standard	21	8	-
						P2	33.5		
						P1	46		

### Discrete adjustable stopper model no.

- Standard type

Part name	Standard stopper	Single adjustable stopper	Both sides adjustable stopper
φ16	UCA2-P-10	UCA2-P1-10	UCA2-P2-10
φ20	UCA2-P-16	UCA2-P1-16	UCA2-P2-16
φ25	UCA2-P-25	UCA2-P1-25	UCA2-P2-25
φ32	UCA2-P-32	UCA2-P1-32	UCA2-P2-32

### Stopper adjustment method

- Adjust the stroke by loosening the fixing setscrew and then turning the stopper bolt. Tighten the fixing setscrew after adjustment. Recommended tightening torque of fixing set screw: 1.4N·m
- Refer to the table A to adjust amount of a stopper.
- Using with an extended stroke can cause operation faults. Make sure that the standard stopper does not protrude from the outer side of the end plate. When using the single-side adjustment stopper P1 or double-side adjustment stopper P2, do not protrude the stopper more than the default amount.

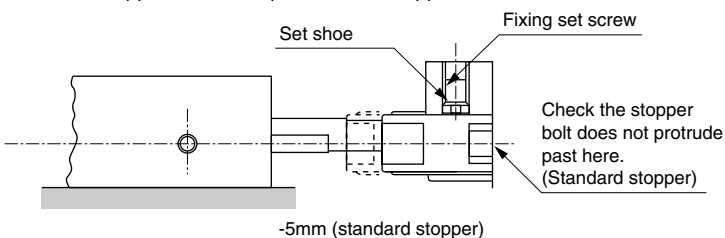
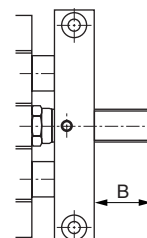


Table A

Descriptions	Adjustable stroke length	Default protrusion amount B
Standard stopper	Both sides each -5mm	0mm
Single adjustable stopper P1A	Plate A side -30mm Plate B side -5mm	P1: 25mm Standard: 0mm
Single adjustable stopper P1B	Plate B side -30mm Plate A side -5mm	
Both sides adjustable stopper P2	Both sides each -17.5mm	12.5mm



SCP\*2  
CMK2  
CMA2  
SCM  
SCG  
SCA2  
SCS  
CKV2  
CA/OV2  
SSD  
CAT  
MDC2  
MVC  
SMD2  
MSD\*  
FC\*  
STK  
ULK\*  
JSK/M2  
JSG  
JSC3  
USSD  
USC  
JSB3  
LMB  
STG  
STS/L  
LCS  
LCG  
LCM  
LCT  
LCY  
STR2  
**UCA2**  
HCM  
HCA  
SRL2  
SRG  
SRM  
SRT  
MRL2  
MRG2  
SM-25  
CAC3  
UCAC  
RCC2  
MFC  
SHC  
GLC  
Ending

Unit cylinder  
Combined functions

# UCA2/UCA2-B Series

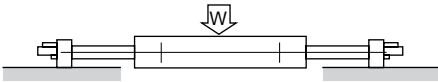
## Technical data ① Deflection of piston rod

### 1 Bent of piston rod by concentrated load (reference value)

Make center of gravity of load and center of unit cylinder as close as possible.

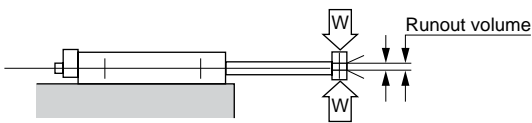
(Unit: mm)

Bore size (mm)	Stroke length (mm) Load (N)	75	100	125	150	175	200
		$\phi 10$	15	0.05	0.10	-	-
$\phi 16$	40	0.02	0.05	0.09	0.16	0.25	0.38
$\phi 25$	70	0.01	0.03	0.06	0.10	0.16	0.24
$\phi 32$	100	0.005	0.02	0.04	0.07	0.11	0.15



(Unit: mm)

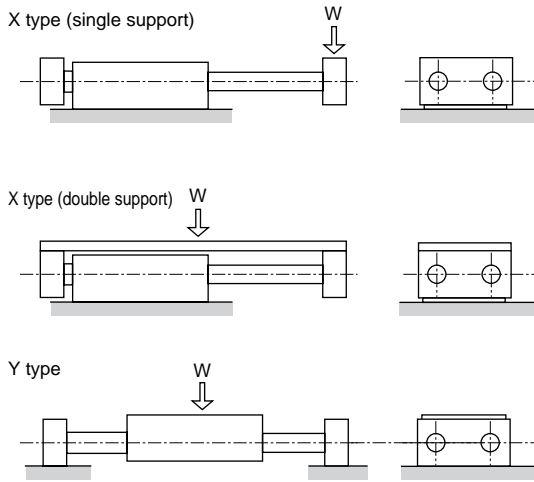
Bore size (mm)	Stroke length (mm) Load (N)	25	50	75	100	125	150	175	200
		$\phi 10$	7	0.04	0.10	0.18	0.27	-	-
$\phi 16$	20	0.03	0.07	0.12	0.20	0.28	0.37	0.48	0.60
$\phi 25$	35	0.02	0.04	0.08	0.13	0.17	0.24	0.32	0.41
$\phi 32$	50	0.01	0.03	0.06	0.10	0.14	0.21	0.29	0.38



- SCP\*2
- CMK2
- CMA2
- SCM
- SCG
- SCA2
- SCS
- CKV2
- CA/OV2
- SSD
- CAT
- MDC2
- MVC
- SMD2
- MSD\*
- FC\*
- STK
- ULK\*
- JSK/M2
- JSG
- JSC3
- USSD
- USC
- JSB3
- LMB
- STG**
- STS/L**
- LCS
- LCG
- LCM
- LCT
- LCY
- STR2
- UCA2**
- HCM
- HCA
- SRL2
- SRG
- SRM
- SRT
- MRL2
- MRG2
- SM-25
- CAC3
- UCAC
- RCC2
- MFC
- SHC
- GLC
- Ending

### 2 Judgment of allowable load

#### 1. For vertical load



(Unit: N)

Bore size (mm)	X type		Y type
	single support	double support	
φ 10	6.9	14.7	
φ 16	19.6	39.2	
φ 25	34.3	68.6	
φ 32	49	98	

W = Load N

#### 2. When overhang load is applied.

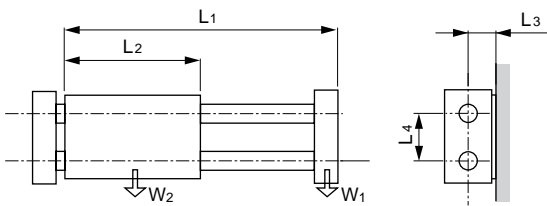
Select appropriate bore size according to the following load calculation method.

Overhang load (W) should be as same as vertical load on (1), while overhang length (L) should be 100 mm or less.

##### 2-1. Requirements to calculate allowable load.

- W = Load (N)
- L = Overhang length (mm)
- V = Working speed (mm/s)
- S = Stroke length (mm)
- F = Max. load per bearing unit (N)

- W<sub>1</sub> = End plate mass (kg)
- W<sub>2</sub> = Cylinder body mass (kg)
- L<sub>1</sub> = Length from end plate to main body (mm)
- L<sub>2</sub> = Cylinder main body length (mm)
- L<sub>3</sub> = Length from rod center to cylinder main body (mm)
- L<sub>4</sub> = Pitches between rods (mm)



Bore size (mm)	Symbol		L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	W <sub>1</sub>	W <sub>2</sub>
	Type							
φ 10	Metal		69 + 2·S	54 + S	9	26	0.099 + 7 × 10 <sup>-4</sup> /S	0.174 + 2 × 10 <sup>-3</sup> /S
	Bearing		91 + 2·S	76 + S	9	26	0.109 + 7 × 10 <sup>-4</sup> /S	0.214 + 2 × 10 <sup>-3</sup> /S
φ 16	Metal		71 + 2·S	50 + S	12	34	0.199 + 21 × 10 <sup>-4</sup> /S	0.334 + 3.2 × 10 <sup>-3</sup> /S
	Bearing		117 + 2·S	96 + S	12	34	0.239 + 21 × 10 <sup>-4</sup> /S	0.338 + 3.2 × 10 <sup>-3</sup> /S
φ 25	Metal		87 + 2·S	62 + S	16	42	0.456 + 36 × 10 <sup>-4</sup> /S	0.6 + 4.7 × 10 <sup>-3</sup> /S
	Bearing		121 + 2·S	96 + S	16	42	0.509 + 36 × 10 <sup>-4</sup> /S	0.615 + 4.7 × 10 <sup>-3</sup> /S
φ 32	Metal		100 + 2·S	75 + S	19	58	0.636 + 47 × 10 <sup>-4</sup> /S	0.92 + 7 × 10 <sup>-3</sup> /S
	Bearing		139 + 2·S	114 + S	19	58	0.714 + 47 × 10 <sup>-4</sup> /S	1.313 + 7 × 10 <sup>-3</sup> /S

SCP\*2  
CMK2  
CMA2  
SCM  
SCG  
SCA2  
SCS  
CKV2  
CA/OV2  
SSD  
CAT  
MDC2  
MVC  
SMD2  
MSD\*  
FC\*  
STK  
ULK\*  
JSK/M2  
JSG  
JSC3  
USSD  
USC  
JSB3  
LMB  
STG  
STS/L  
LCS  
LCG  
LCM  
LCT  
LCY  
STR2  
UCA2  
HCM  
HCA  
SRL2  
SRG  
SRM  
SRT  
MRL2  
MRG2  
SM-25  
CAC3  
UCAC  
RCC2  
MFC  
SHC  
GLC  
Ending

Unit cylinder  
Combined functions

# UCA2/UCA2-B Series

Technical data Judgment of allowable load

## 2-2. Calculation of allowable load

Find the value F according to "Example pattern of installation attitude", and the value of Fk found by the following formula should be allowable value or less on Table 3.

$$F_k = F \times K$$

Fk: Working speed load (N)

K : Speed coefficient

Table 3 Allowable value of working speed load (Fk)

Bore size (mm)	Allowable of Fk (N)
φ 10	21.6
φ 16	75.5
φ 25	103.0
φ 32	157.0

Speed coefficient

Working speed (mm/s)	K
$30 \leq V < 100$	1.0
$100 \leq V < 200$	1.1
$200 \leq V < 300$	1.2

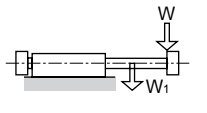
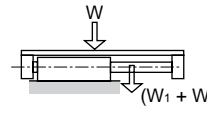
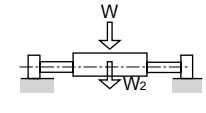
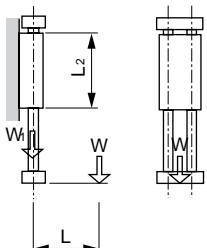
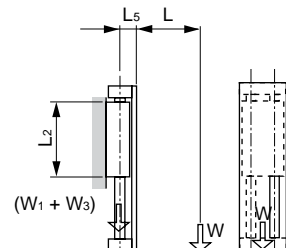
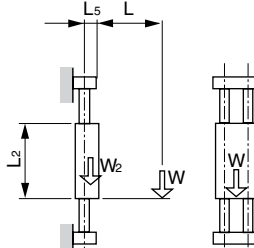
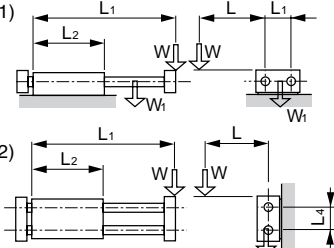
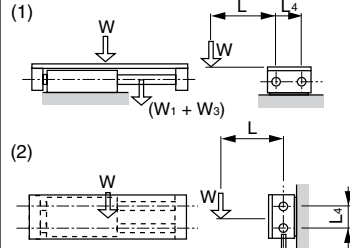
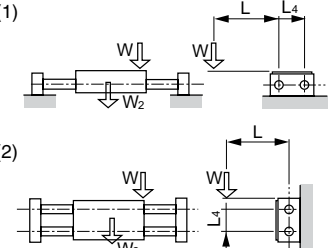
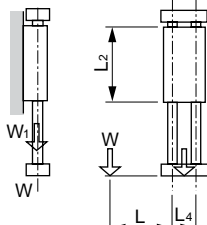
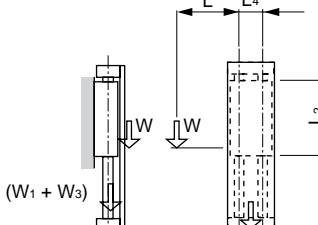
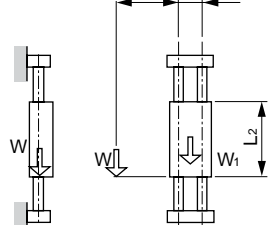
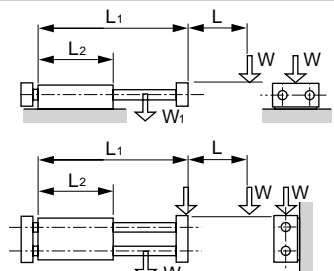
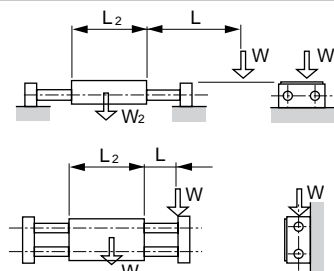
Fig. 2-3 Example of mounting attitude pattern

	X type (single support)	X type (double support)	Y type
Vertical installation (Vertical overhang load is applied)			
Max. load per bearing unit (N)	$F = \frac{L}{2L_2} W$	$F = \frac{L + L_3}{2L_2} W$	$F = \frac{L + L_3}{2L_2} W$
Horizontal installation (Overhang load is applied to vertical directions of stroke axis)	(1)	(1)	(1)
(2) Horizontal side installation	(2)	(2)	(2)
Max. load per bearing unit (N)	(1) $F = \left( \frac{L + L_4}{2L_4} + \frac{L_1}{2L_2} \right) W + \frac{W_1}{4}$ (2) $F = \sqrt{\left( \frac{L + L_4}{2L_4} \cdot W \right)^2 + \left( \frac{L_1}{2L_2} \cdot W + \frac{W_1}{4} \right)^2}$	(1) $F = \frac{L + L_4}{2L_4} W + \frac{W_1 + W_3}{4}$ (2) $F = \sqrt{\left( \frac{L + L_4}{2L_4} \cdot W \right)^2 + \left( \frac{W_1 + W_3}{4} \right)^2}$ <small>Ws: sub-plate weight (kg)</small>	(1) $F = \frac{L + L_4}{2L_4} W + \frac{W_1 + W_2}{4}$ (2) $F = \sqrt{\left( \frac{L + L_4}{2L_4} \cdot W \right)^2 + \left( \frac{W_2}{4} \right)^2}$
Vertical installation (Horizontal overhang load is applied)			
Max. load per bearing unit (N)	$F = \frac{L + L_4}{L_2} W$	$F = \frac{L + L_4}{L_2} W$	$F = \frac{L + L_4}{L_2} W$
Horizontal installation (Overhang load is applied to stroke direction)	(1)	(1)	(1)
Horizontal side installation	(2)	(2)	(2)
Max. load per bearing unit (N)	$F = \frac{L + L_1}{2L_2} W + \frac{W_1}{4}$		$F = \frac{L + L_2}{2L_2} W + \frac{W_2}{4}$

### 3 Calculation of load factor

1. Refer to Table 4 to find the required thrust according to size of load, direction, and installation attitude.

Table 4

	Body mount (single support)	Body mount (double support)	End plate mount
<p>( Load is applied to the cylinder center. )</p> <p>Horizontal installation</p> 			
Required thrust	$f = \mu (w + W_1)$	$f = \mu (w + W_1 + W_3)$	$f = \mu (w + W_2)$
<p>( Vertical overhang load is applied. )</p> <p>Vertical installation</p> 			
Required thrust	$f = \frac{2\mu}{L_2} / W + W + W_1$	$f = \frac{2\mu}{L_2} (L + L_5) / W + W + W_1 + W_3$	$f = \frac{2\mu}{L_2} (L + L_5) / W + W + W_2$
<p>( Overhang load is applied to vertical directions of stroke axis. )</p> <p>(1) Horizontal installation (2) Horizontal side installation</p> 			
Required thrust	$(1) f = \mu \left\{ \left( \frac{2L_1 + L_4}{L_4} + \frac{2L_1 - L_2}{L_2} \right) / W + W + W_1 \right\}$ $(2) f = \mu \cdot \sqrt{\left( \frac{2L_1}{L_4} \cdot W \right)^2 + \left( \frac{2L_1 - L_2}{L_2} \cdot W + W + W_1 \right)^2}$	$(1) f = \mu \left( \frac{2L_1 + L_4}{L_4} \cdot W + W + W_1 + W_3 \right)$ $(2) f = \mu \cdot \sqrt{\left( \frac{2L_1}{L_4} \cdot W \right)^2 + (W + W_1 + W_3)^2}$	$(1) f = \mu \left( \frac{2L_1 + L_4}{L_4} \cdot W + W + W_2 \right)$ $(2) f = \mu \cdot \sqrt{\left( \frac{2L_1}{L_4} \cdot W \right)^2 + (W + W_2)^2}$
<p>( Horizontal overhang load is applied )</p> <p>Vertical installation</p> 			
Required thrust	$f = \frac{\mu (2, L + L_4)}{L_2} / W + W + W_1$	$f = \frac{\mu (2, L + L_4)}{L_2} / W + W + W_1 + W_3$	$f = \frac{\mu (2, L + L_4)}{L_2} / W + W + W_2$
<p>( Overhang load is applied to stroke length direction )</p> <p>Horizontal installation</p> <p>Horizontal side installation</p> 	<p>Note) Ws: sub-plate weight (kg)</p>		
Required thrust	$f = \mu \left\{ \frac{2(L + L_1) - L_2}{L_2} / W + W + W_1 \right\}$		$f = \mu \left( \frac{2 \cdot L + L_2}{L_2} / W + W + W_2 \right)$

f : Required thrust N

$\mu$  : Friction coefficient Metal bush bearing type 0.3

Ball bearing type 0.1

Refer to "Judgment of allowable load" for other descriptions and dimensions.

# UCA2/UCA2-B Series

## Technical data ③ Calculation of load factor

2. Find the load factor according to the required thrust found at 1, theoretical thrust table and thrust efficiency table.  
(Load factor should be 50% or less.)

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

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

$\omega$  : Load factor (%)

f : Required thrust (N)

A : Theoretical thrust (N)

a : Thrust efficiency (%)

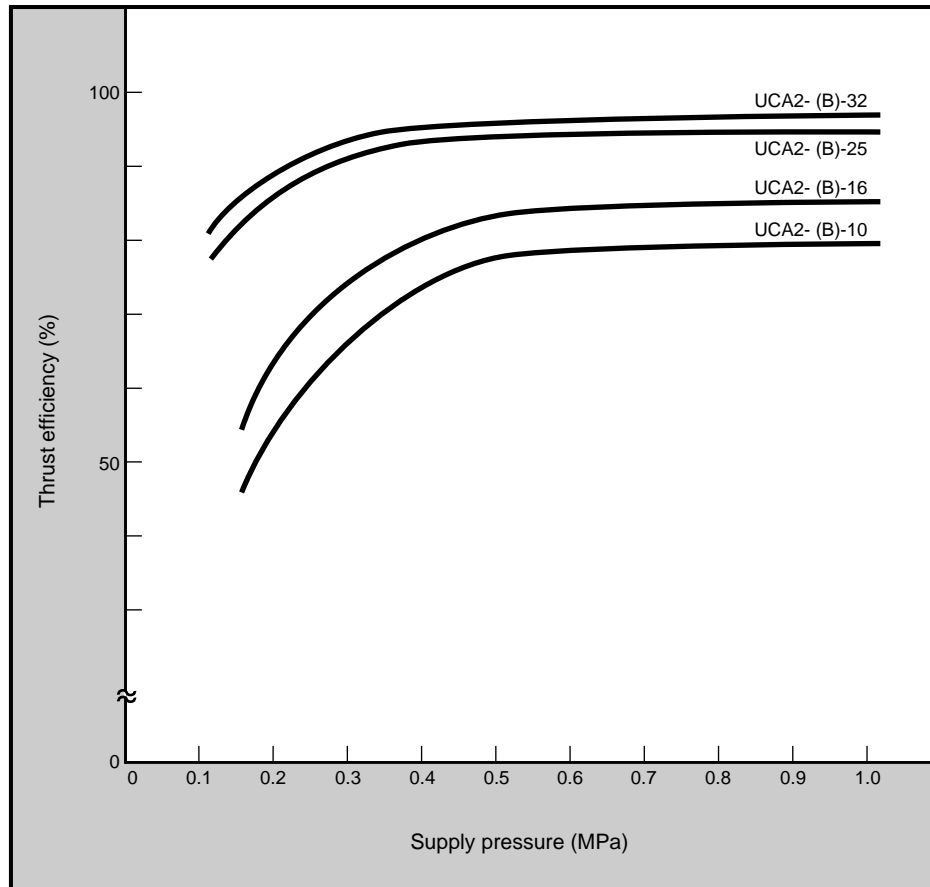
B : Effective thrust (N)

### 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 Calculation of kinetic energy

Find the kinetic energy according to load weight (W) and speed (V). The found value should be allowable value or less on Table 7. When exceeding the range of allowable energy, select a larger bore size cylinder or install an external shock absorber to meet the range of allowable energy.

The value of speed mentioned here is not average speed but speed rush into cushion. Find the speed rush into cushion according to formula (1).

$$E = \frac{1}{2} mV_2 + fS_1$$

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

$$V = V_a \times \left(1 + 1.5 \frac{\omega}{100}\right) \text{ --- (1)}$$

E : Kinetic energy (J)

m : Weight (kg)

V : Cushion rush speed (m/s)

f : Thrust (N)

S<sub>1</sub> : Shock absorber stroke length (m)

V<sub>a</sub> : Average speed (m/s)

S<sub>2</sub> : Cylinder stroke length (m)

t : Moving time (s)

ω : Load factor (%)

■ Table 7 Allowable energy absorption

Bore size (mm)	Allowable energy absorption (J)
φ 10	0.25
φ 16	0.65
φ 25	2.4
φ 32	4.5

■ Shock absorber stroke length

Bore size (mm)	Stroke length (mm)
φ 10	4.5
φ 16	5.0
φ 25	6.5
φ 32	7.0

SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
<b>UCA2</b>
HCM
HCA
SRL2
SRG
SRM
SRT
MRL2
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

Unit cylinder  
Combined functions