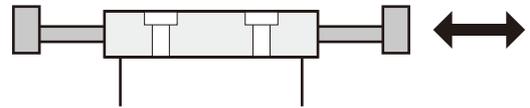


SPACE-SAVING

These space-saving, high-precision, advanced-performance actuators combine 2 air cylinders within a compact thin body pneumatic device. The flat, square shape achieves twice the cylinder thrust, for maximum utilization of the limited space.

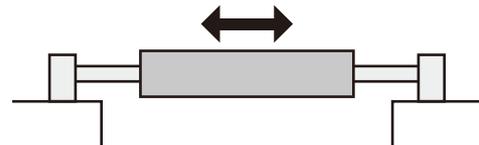
In addition, the cylinder's piston rods act as guides to improve non-rotating accuracy and positioning accuracy, demonstrating great effectiveness in reducing design hours and costs for mechanical devices.

Fixed Table Type SUT



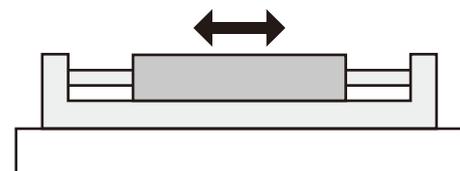
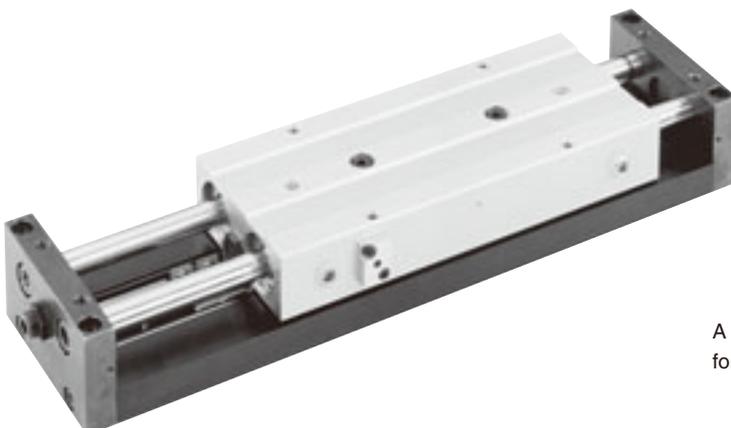
Because the piston rod moves, it can be used as a non-rotating cylinder, and both end plates can be used as sliding tables.

Fixed End Plate Type SUP



By fixing both end plates, it can be used as a sliding table. Piping connections are possible from either of the 2 end plates.

Fixed Rail-on Plate Type SUL



A slide bearing is installed under the table of the fixed end plate type for heavy loads and/or longer strokes.

With End Keep Mechanism

- Fixed table type SUTK
- Fixed end plate type SUPK
- Fixed rail-on plate type SULK

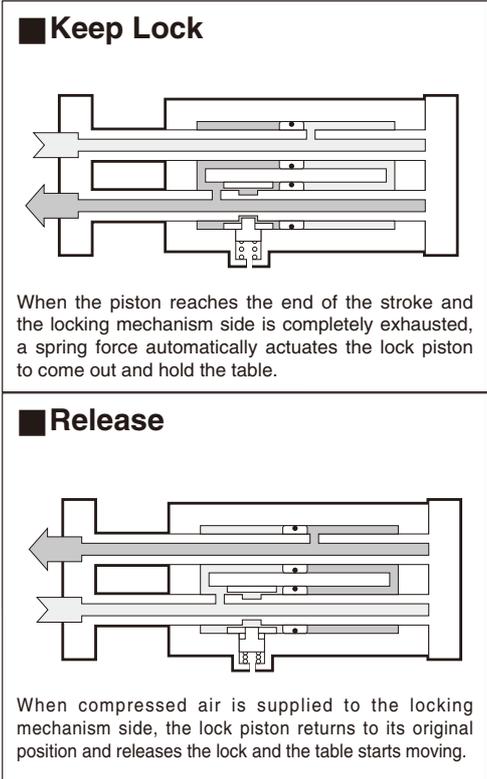


A lock mechanism, with proven performance on the Slim cylinders, prevents the table from falling in the event of pressure loss or failure.

Can select either the solid state type sensor switch or the reed type sensor switch.

The stroke adjusting bolt provides an adjustment range of $\pm 5\text{mm}$ [$\pm 0.197\text{in.}$].

Optional shock absorber is installed in the table and achieves space savings.



Air Consumption and Air Flow Rate

The figures in the table below show the air consumption when a Slide Unit makes 1 reciprocation with stroke of 1mm [0.0394in.].
 The air flow rate and consumption actually required is found by the following calculations below.

Air consumption for each 1mm [0.0394in.] stroke

cm³ [in.³]/Reciprocation (ANR)

Bore size mm [in.]	Air pressure MPa [psi.]								
	0.1 [15]	0.2 [29]	0.3 [44]	0.4 [58]	0.5 [73]	0.6 [87]	0.7 [102]	0.8 [116]	0.9 [131]
10 [0.394]	(0.40) [0.0244]	0.59 [0.0360]	0.79 [0.0482]	0.98 [0.0598]	1.18 [0.0720]	1.37 [0.0836]	1.57 [0.0958]	1.76 [0.1074]	1.96 [0.1196]
16 [0.630]	(1.19) [0.0726]	1.77 [0.1080]	2.36 [0.1440]	2.94 [0.1794]	3.53 [0.2154]	4.12 [0.2514]	4.70 [0.2868]	5.29 [0.3228]	5.87 [0.3582]
25 [0.984]	2.98 [0.1819]	4.44 [0.2709]	5.91 [0.3607]	7.38 [0.4504]	8.84 [0.5395]	10.31 [0.6292]	11.78 [0.7189]	13.24 [0.8080]	14.71 [0.8977]

● Finding the air consumption

Example 1. When operating a Slide Unit with bore size of 16mm [0.630in.] and stroke of 50mm [1.97in.], and under air pressure of 0.5MPa [73psi.], for 1 reciprocation

$$\frac{3.53 \times 50 \times 10^{-3}}{\text{From the table}} = 0.1765 \text{ l [0.00623ft}^3\text{]}/\text{Reciprocation (ANR)}^{**}$$

From the table

Example 2. When operating a Slide Unit with bore size of 16mm [0.630in.] and stroke of 50mm [1.97in.], and under air pressure of 0.5MPa [73psi.], for 20 reciprocations per minute

$$\frac{3.53 \times 50 \times 20 \times 10^{-3}}{\text{From the table}} = 3.53 \text{ l [0.125ft}^3\text{]}/\text{min (ANR)}^{**}$$

From the table

● Finding the air flow rate (for selecting F.R.L., valves, etc.)

Example: When operating a Slide Unit with bore size of 16mm [0.630in.] at speed of 100mm/s [3.94in./sec.] and under air pressure of 0.5MPa [73psi.]

$$\frac{3.53 \times 100 \times \frac{1}{2} \times 10^{-3}}{\text{From the table}} = 0.1765 \text{ l/s [0.00623ft}^3\text{/sec.]} \text{ (ANR)}^{**}$$

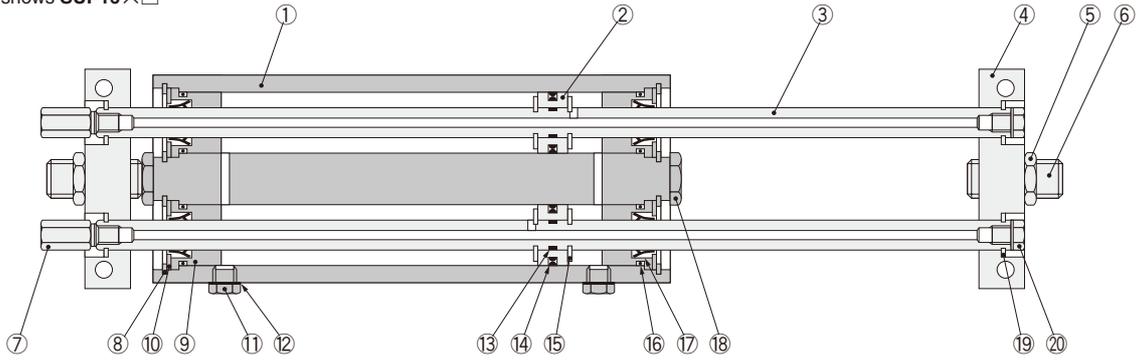
From the table

(At this time, the flow rate per minute is $0.1765 \times 60 = 10.59 \text{ l/min [0.374ft}^3\text{/min.]} \text{ (ANR)}^{**}$.)

** Refer to p.54 for an explanation of ANR.

Inner Construction

The diagram shows SUP16×□



Major Parts and Materials

No.	Parts	Bore size mm [in.]	10 [0.394]	16 [0.630]	25 [0.984]
①	Table (cylinder body)		Aluminum alloy (anodized)		
②	Piston		Aluminum alloy (anodized)		
③	Piston rod		Steel (hard chrome plated)		
④	End plate		Steel (nickel plated)		
⑤	Lock nut		Steel (nickel plated)		
⑥	Stroke adjusting bolt				
⑦	Port adapter		Stainless steel	Brass (nickel plated)	—
⑧	Snap ring		Steel (nickel plated)		
⑨	Seal case		Aluminum alloy (special wear-resistant treatment)		
⑩	Seal holder		Mild steel (nickel plated)		
⑪	Plug		Brass (nickel plated) ^{Note}	Steel (nickel plated)	

Note: For non-ion specification, SUS is used.

No.	Parts	Bore size mm [in.]	10 [0.394]	16 [0.630]	25 [0.984]
⑫	Plug gasket		Synthetic rubber (NBR) baked to steel		—
⑬	O-ring		Synthetic rubber (NBR)		
⑭	Piston seal				
⑮	Snap ring		Steel (black oxide)		
⑯	O-ring		Synthetic rubber (NBR)		
⑰	Rod seal				
⑱	Striker		Steel	Steel (nickel plated)	
⑲	Snap ring		Steel (black chromating)	Steel (black oxide)	
⑳	Plug		Steel (nickel plated)	Brass (nickel plated)	Steel (nickel plated)
	Magnet		Rare earth magnet (for sensor type only)		

Seals

Item	Rod seal	Piston seal	Seal case gasket	Piston gasket	Plug gasket ^{Note}	Striker gasket
Bore size mm	Quantity					
10	PIU-6	PWP-10	12×9×1.5	6×4.4×0.8	89-14	—
16	PIU-8	COP-16L	16×13×1.5	8×6×1	89-14	11.8×9.8×1
25	PIU-12	COP-25	25×22×1.5	12×9×1.5	—	13.2×11.2×1

Note: Not available in the fixed table type.

Mass

Model	Body mass								Additional mass		
	Stroke mm								Shock absorber	Mass of 1 sensor switch	
	25	50	75	100	125	150	175	200		For 2 pcs.	CS9H,ZB430
SUT10×□ SUP10×□	0.27 [0.60] (0.28 [0.62])	0.31 [0.68] (0.33 [0.73])	0.36 [0.79] (0.38 [0.84])	0.41 [0.90] (0.43 [0.95])	—	—	—	—	—	0.04 [0.09]	0.03 [0.07]
SUL10×□	—	—	—	1.00 [2.21] (1.02 [2.25])	—	—	—	—			
SUT16×□ SUP16×□	0.55 [1.21] (0.56 [1.23])	0.64 [1.41] (0.65 [1.43])	0.72 [1.59] (0.74 [1.63])	0.81 [1.79] (0.83 [1.83])	0.89 [1.96] (0.91 [2.01])	0.98 [2.16] (1.00 [2.21])	1.07 [2.36] (1.09 [2.40])	1.15 [2.54] (1.18 [2.60])	0.02 [0.04]	0.04 [0.09]	0.03 [0.07]
SUL16×□	—	—	—	1.63 [3.59] (1.65 [3.64])	1.84 [4.06] (1.86 [4.10])	2.05 [4.52] (2.07 [4.56])	2.25 [4.96] (2.28 [5.03])	2.46 [5.42] (2.49 [5.49])			
SUT25×□ SUP25×□	1.25 [2.76] (1.26 [2.78])	1.43 [3.15] (1.44 [3.18])	1.61 [3.55] (1.63 [3.59])	1.79 [3.95] (1.81 [3.99])	1.97 [4.34] (1.99 [4.39])	2.15 [4.74] (2.17 [4.78])	2.32 [5.12] (2.35 [5.18])	2.50 [5.51] (2.53 [5.58])	0.03 [0.07]	0.04 [0.09]	0.03 [0.07]
SUL25×□	—	—	—	3.09 [6.81] (3.11 [6.86])	3.44 [7.59] (3.46 [7.63])	3.80 [8.38] (3.82 [8.42])	4.15 [9.15] (4.18 [9.22])	4.51 [9.94] (4.54 [10.01])			

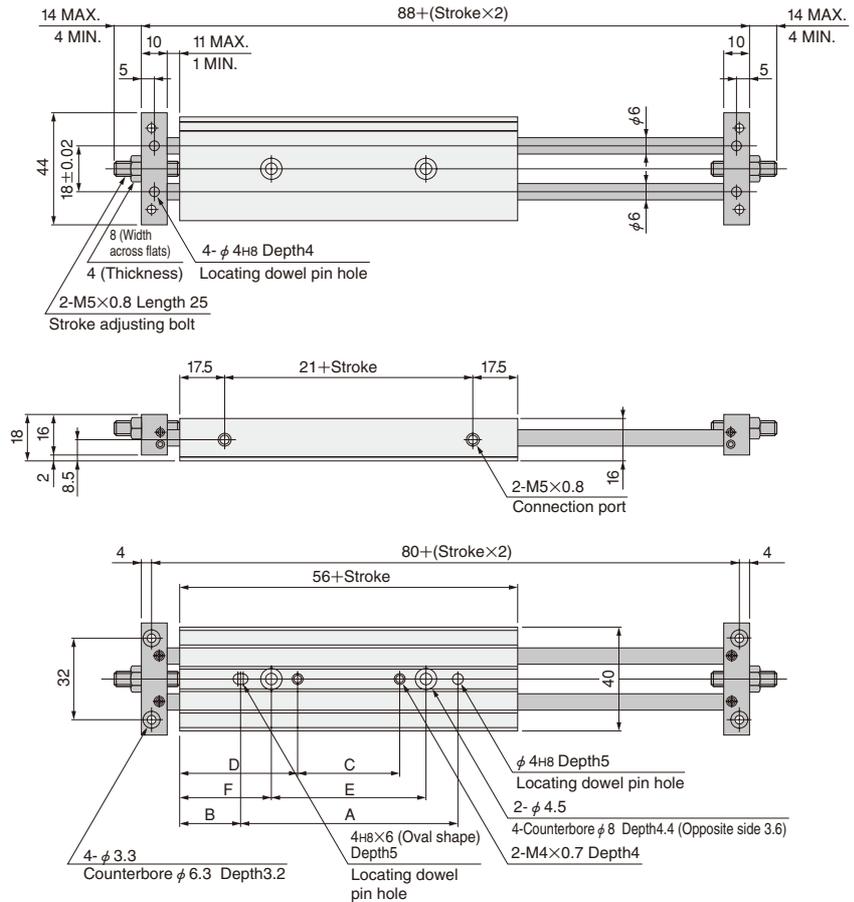
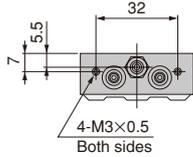
Remark : Figures in parentheses () are for sensor type.

Dimensions of Fixed Table Type (SUT) (mm)

● SUT 10 × Stroke



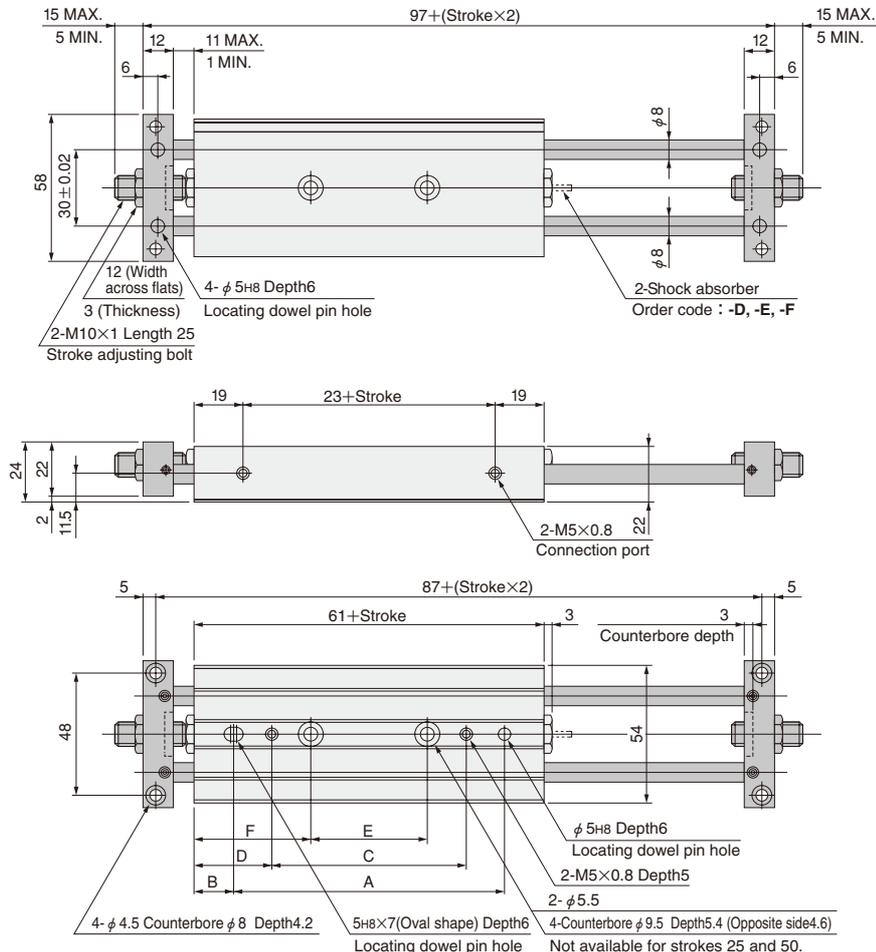
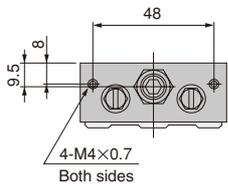
SUT-10



● SUT 16 × Stroke



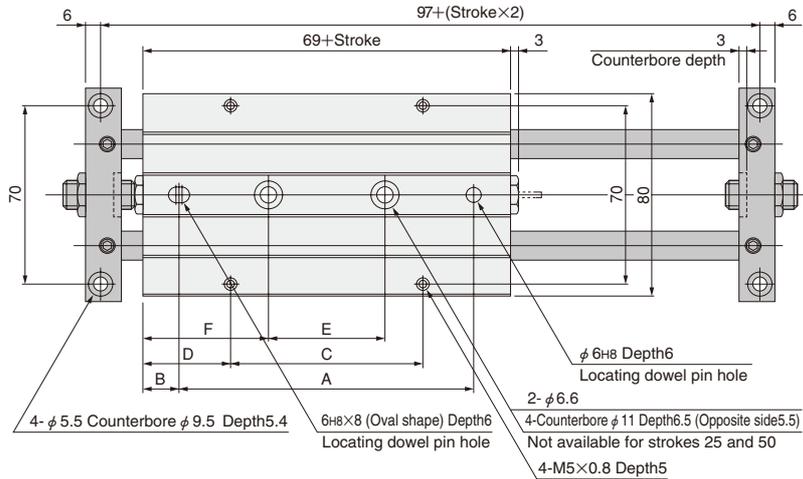
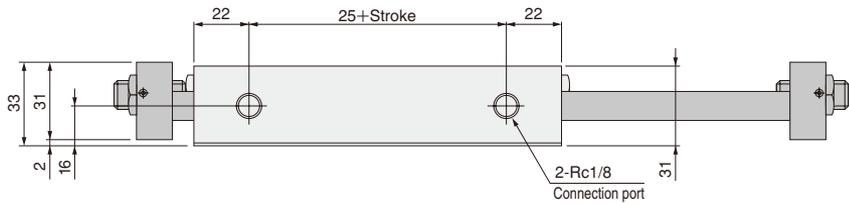
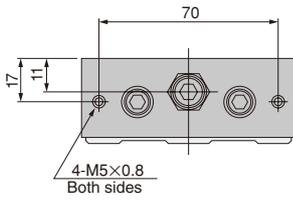
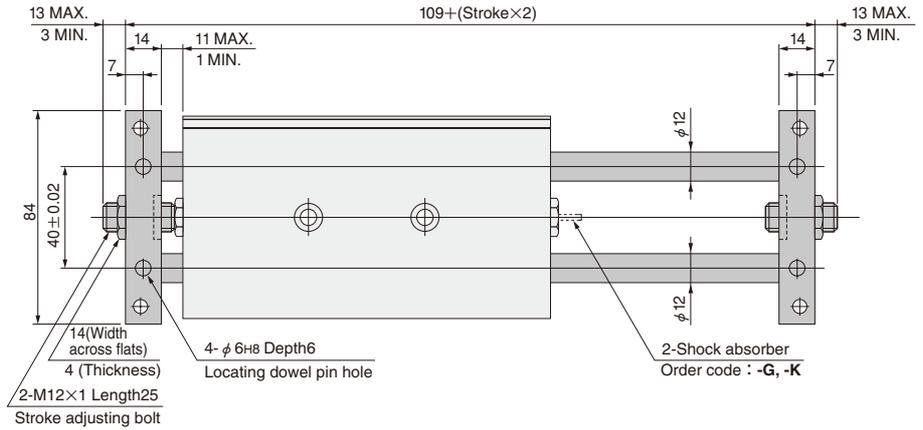
SUT-16
SL-ABSO



Dimensions of Fixed Table Type (SUT) (mm)

● SUT 25 × Stroke

 SUT-25
SL-ABSO

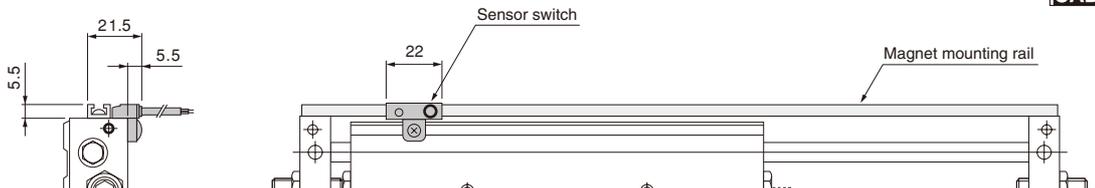


Bore size mm [in.] Stroke	10 [0.394]						16 [0.630]						25 [0.984]					
	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F
25	65	8	15	33	35	23	55	15.5	25	30.5	—	—	65	14.5	25	34.5	—	—
50	85	10.5	40	33	60	23	80	15.5	50	30.5	—	—	90	14.5	50	34.5	—	—
75	85	23	40	45.5	60	35.5	105	15.5	75	30.5	45	45.5	115	14.5	75	34.5	45	49.5
100	85	35.5	40	58	60	48	130	15.5	100	30.5	70	45.5	140	14.5	100	34.5	70	49.5
125	—	—	—	—	—	—	150	18	120	33	90	48	140	27	100	47	95	49.5
150	—	—	—	—	—	—	150	30.5	120	45.5	90	60.5	140	39.5	100	59.5	100	59.5
175	—	—	—	—	—	—	150	43	120	58	90	73	140	52	100	72	100	72
200	—	—	—	—	—	—	150	55.5	120	70.5	90	85.5	140	64.5	100	84.5	100	84.5

Option

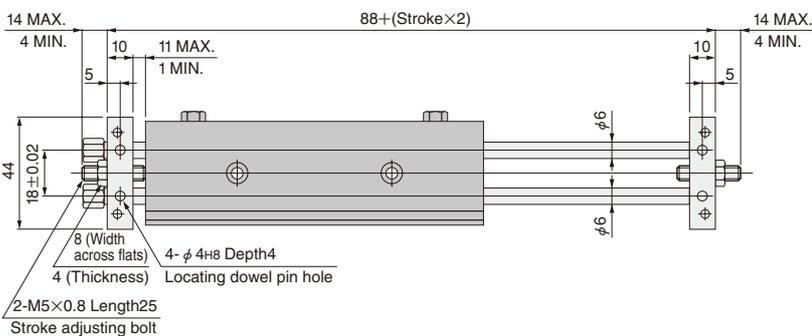
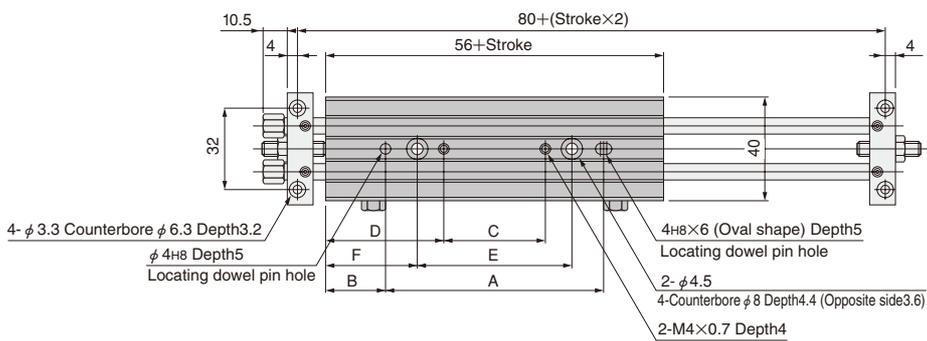
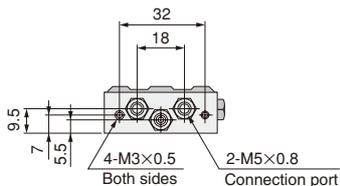
● Sensor switches : CS9H, ZB430, CS3H, CS4H, CS5H

 SLIDE-SW

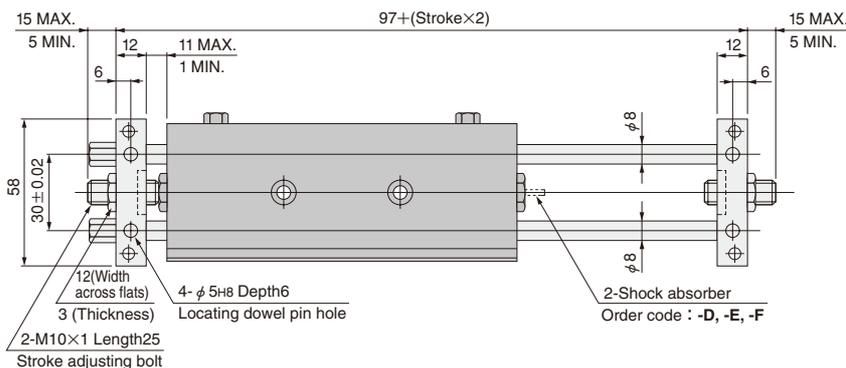
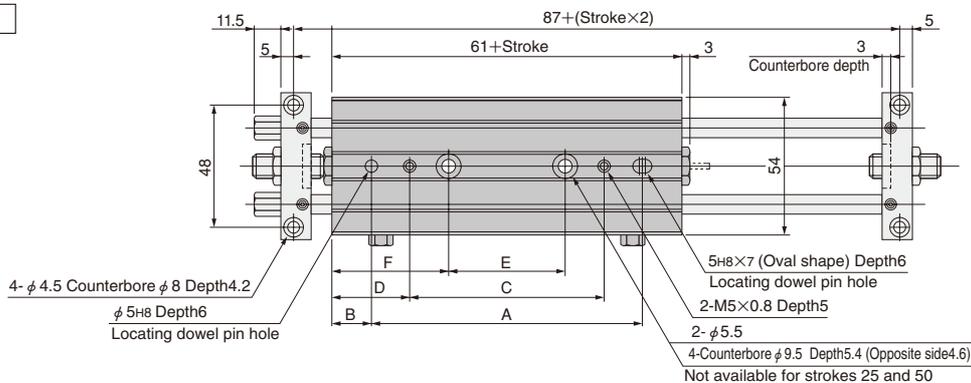
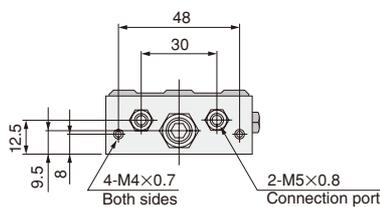


Dimensions of Fixed End Plate Type (SUP) (mm)

● SUP 10 × Stroke



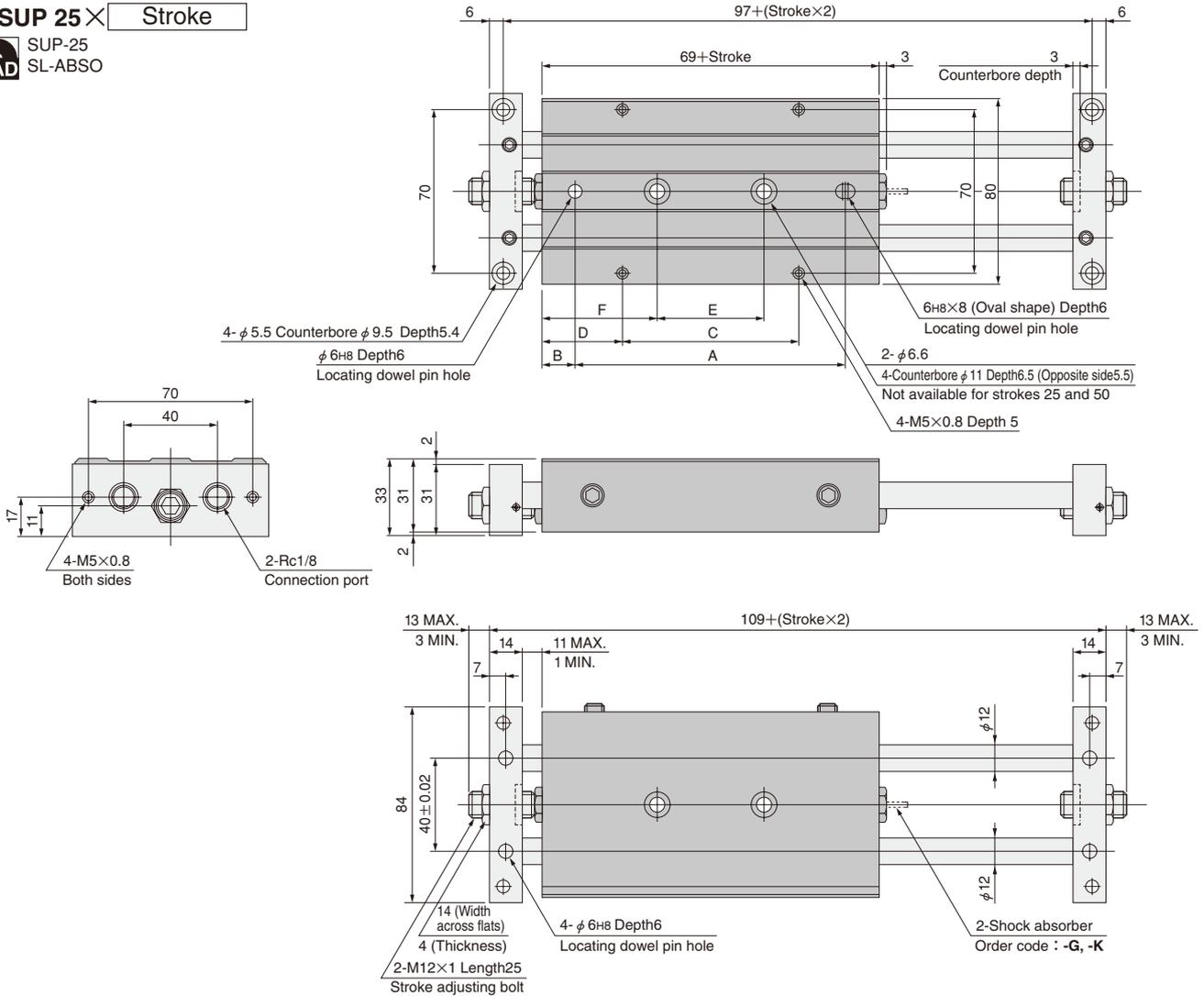
● SUP 16 × Stroke



Dimensions of Fixed End Plate Type (SUP) (mm)

● SUP 25 × Stroke

CAD SL-ABS0

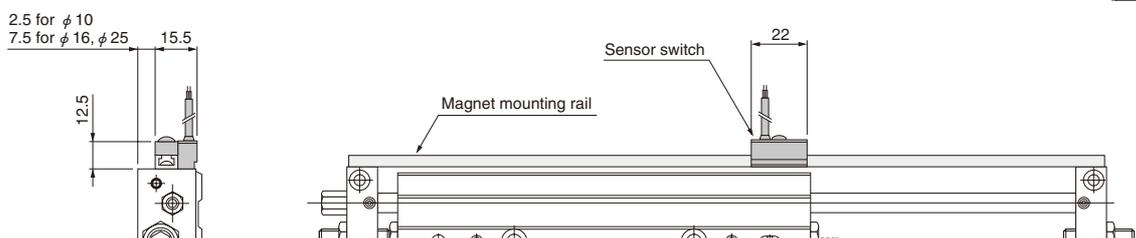


Bore size mm [in.]	10 [0.394]						16 [0.630]						25 [0.984]					
Stroke Code	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F
25	65	8	15	33	35	23	55	15.5	25	30.5	—	—	65	14.5	25	34.5	—	—
50	85	10.5	40	33	60	23	80	15.5	50	30.5	—	—	90	14.5	50	34.5	—	—
75	85	23	40	45.5	60	35.5	105	15.5	75	30.5	45	45.5	115	14.5	75	34.5	45	49.5
100	85	35.5	40	58	60	48	130	15.5	100	30.5	70	45.5	140	14.5	100	34.5	70	49.5
125	—	—	—	—	—	—	150	18	120	33	90	48	140	27	100	47	95	49.5
150	—	—	—	—	—	—	150	30.5	120	45.5	90	60.5	140	39.5	100	59.5	100	59.5
175	—	—	—	—	—	—	150	43	120	58	90	73	140	52	100	72	100	72
200	—	—	—	—	—	—	150	55.5	120	70.5	90	85.5	140	64.5	100	84.5	100	84.5

Option

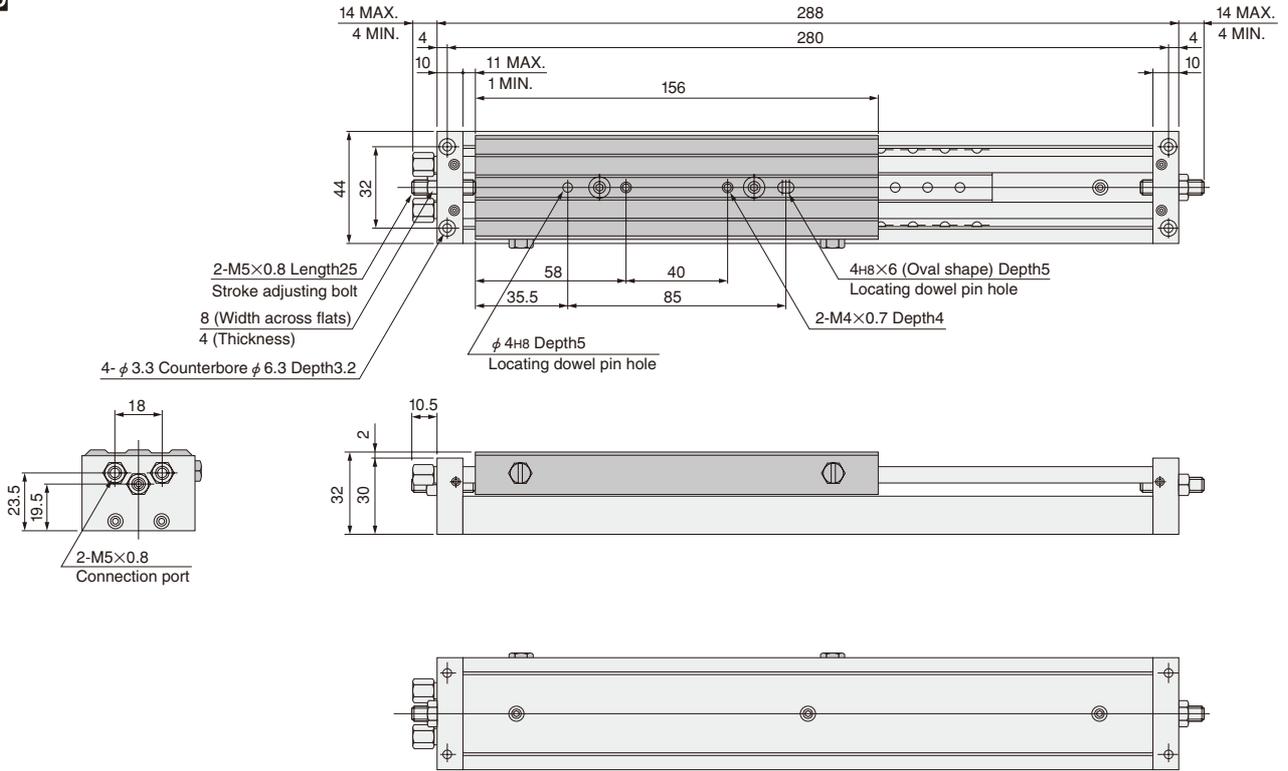
● Sensor switches : CS9H, ZB430, CS3H, CS4H, CS5H

CAD SLIDE-SW

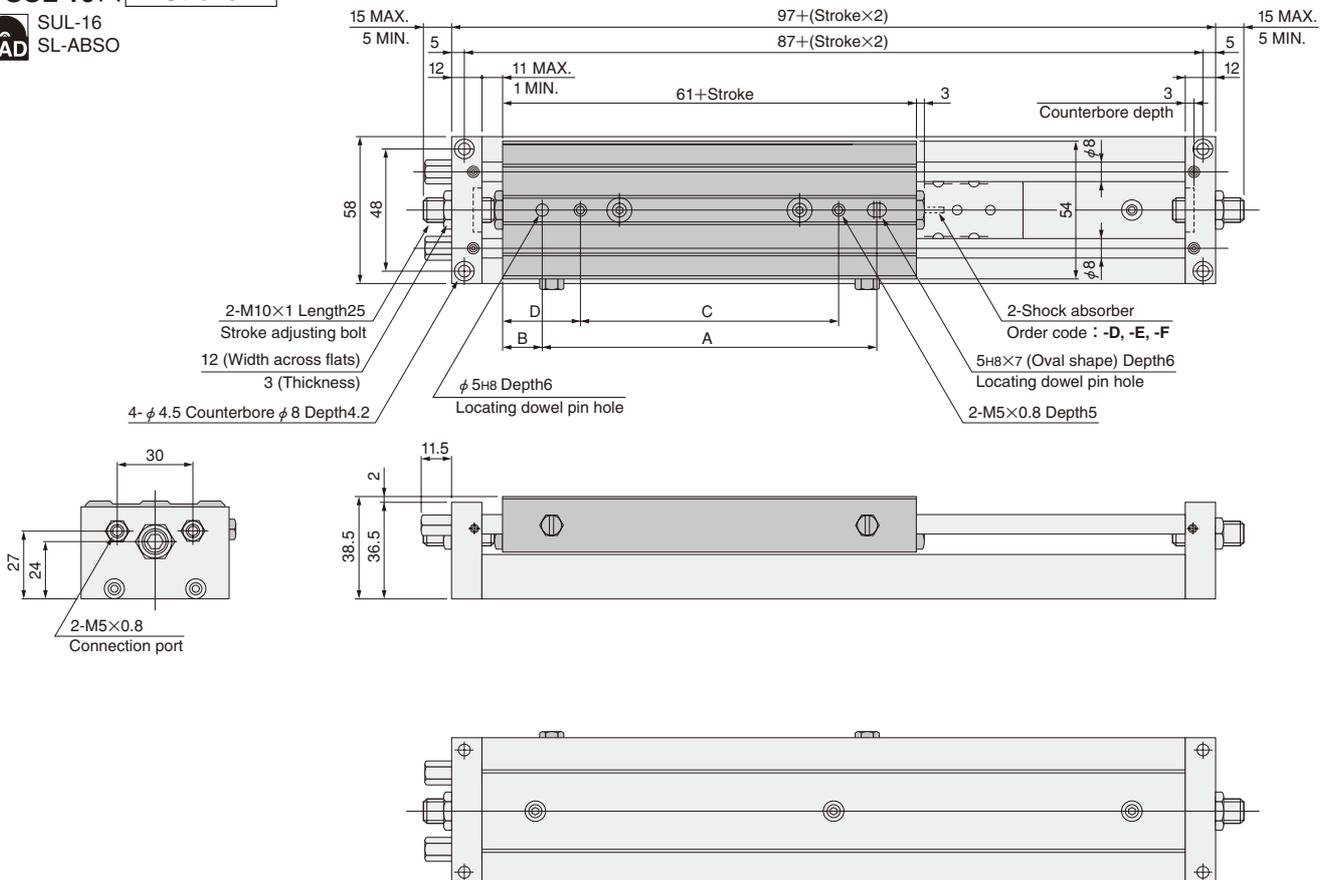


Dimensions of Fixed Rail-on Plate Type (SUL) (mm)

● SUL 10×100

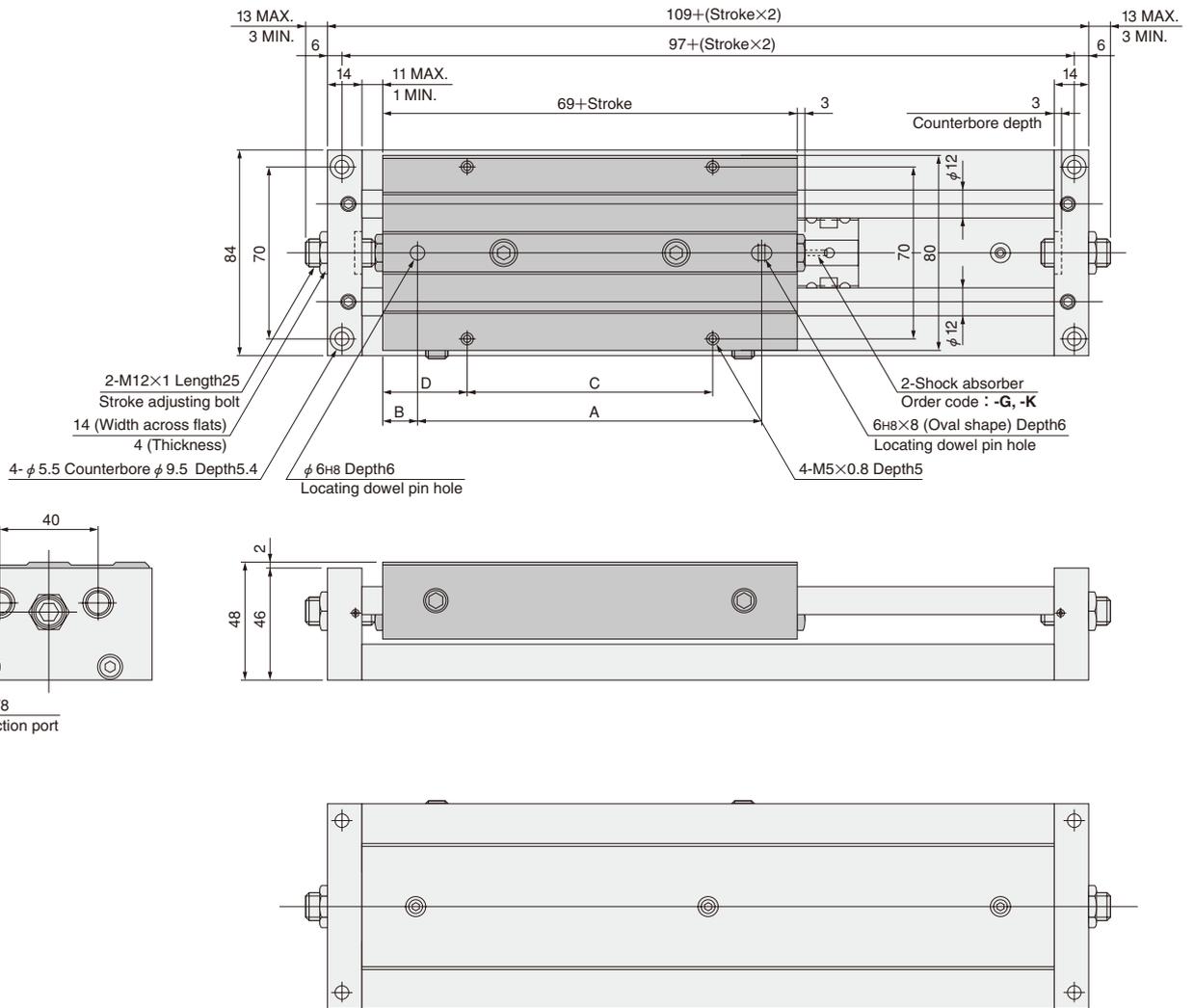


● SUL 16×



Dimensions of Fixed Rail-on Plate Type (SUL) (mm)

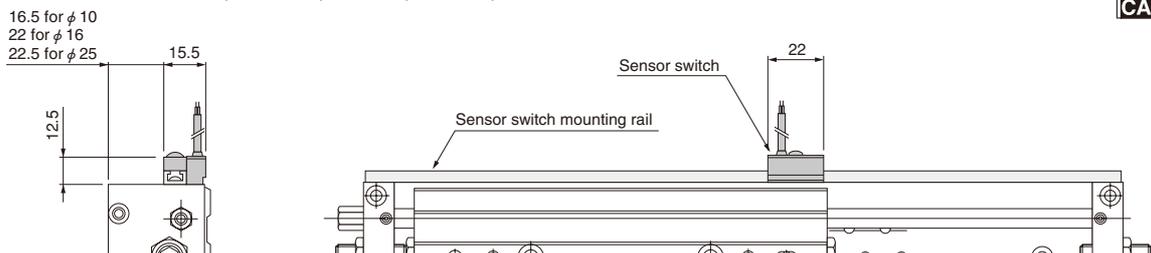
● **SUL 25** × Stroke



Bore size mm [in.]	16 [0.630]				25 [0.984]			
Stroke / Code	A	B	C	D	A	B	C	D
100	130	15.5	100	30.5	140	14.5	100	34.5
125	150	18	120	33	140	27	100	47
150	150	30.5	120	45.5	140	39.5	100	59.5
175	150	43	120	58	140	52	100	72
200	150	55.5	120	70.5	140	64.5	100	84.5

Option

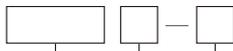
● **Sensor switches: CS9H, ZB430, CS3H, CS4H, CS5H**



SENSOR SWITCHES

Solid State Type, Reed Switch Type

Order Codes



With mounting screw for Slide Unit

- SUTS — Fixed table type
- SUPS — Fixed end plate type
- SULS — Fixed rail-on plate type

Lead wire length

- A — 1000mm [39in.]
- B — 3000mm [118in.]

Sensor switch (For sensor type)

- CS9H — 3-lead wire solid state type with indicator lamp DC4~28V
- ZB430 — 2-lead wire solid state type with indicator lamp DC10~28V
- CS3H — Reed switch type with indicator lamp DC10~28V AC85~115V
- CS4H — Reed switch type with indicator lamp DC10~28V AC85~115V
- CS5H — Reed switch type without indicator lamp DC3~30V AC85~115V

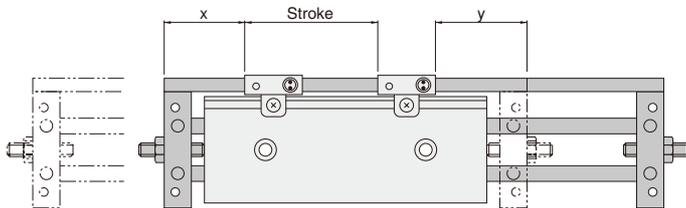
Note: The standard Slide Unit is not equipped with a magnet for sensor switch.

● For details of sensor switches, see p.1544.

Mounting Location of End of Stroke Detection Sensor Switch

When the sensor switch is mounted in the locations shown below (the figures in the tables are reference values), the magnet comes to the maximum sensing location of the sensor switch at the end of the stroke.

Fixed table type (SUTS, SUTKS)

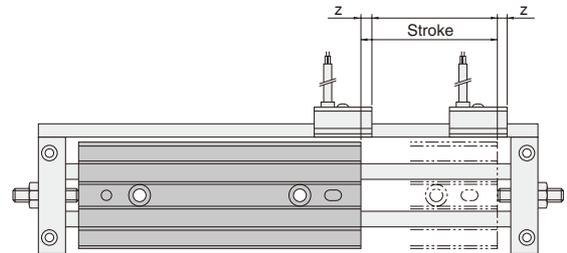


Bore size	x	y	mm [in.]
10 [0.394] ^{Note}	30 [1.181]	36 [1.417]	4 [0.157]
16 [0.630]	34.5 [1.358] (44 [1.732])	40.5 [1.594] (50 [1.969])	4 [0.157]
25 [0.984]	40.5 [1.594] (50 [1.969])	46.5 [1.831] (56 [2.205])	4 [0.157]

Note: Not available for types with end keep mechanism.

Remark: Values in parentheses () are values for types with end keep mechanism.

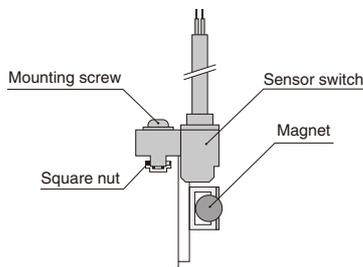
Fixed end plate type (SUPS, SULS, SUPKS, SULKS)



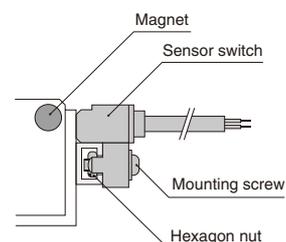
Moving Sensor Switch

- Loosening the mounting screw allows the sensor switch to be moved along the mounting groove.
- Tighten the mounting screw with a tightening torque of 19.6N·cm [1.7in·lbf] or less.

Fixed table type (SUTS, SUTKS)



Fixed end plate type (SUPS, SULS, SUPKS, SULKS)



Sensor Switch Operating Range, Response Differential, and Maximum Sensing Location

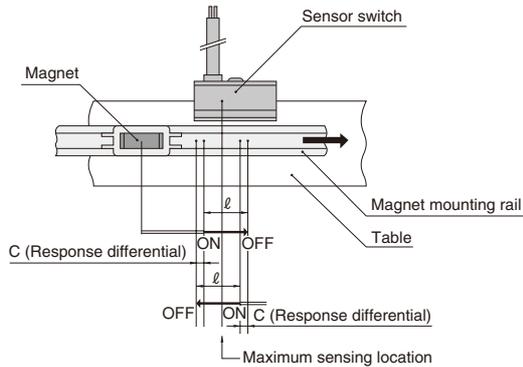
● **Operating range: ℓ**

The distance the piston travels in one direction, while the switch is in the ON position.

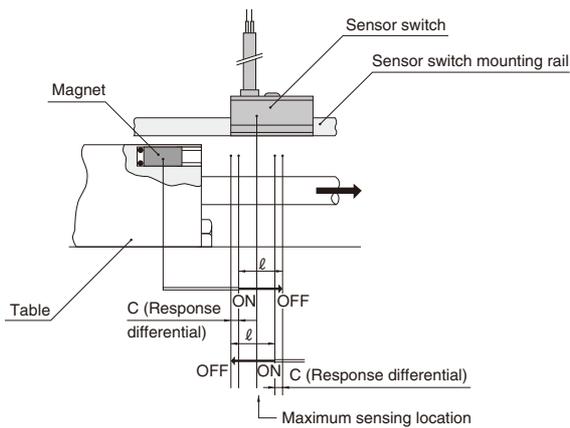
● **Response differential: C**

The distance between the point where the piston turns the switch ON and the point where the switch is turned OFF as the piston travels in the opposite direction.

Fixed table type (SUTS, SUTKS)



Fixed end plate type (SUPS, SULS, SUPKS, SULKS)



Item \ Type	Solid state type		Reed switch type	
	CS9H	ZB430	CS3H, CS4H, CS5H	
Bore size	10, 16, 25 [0.394, 0.630, 0.984]		10 [0.394]	16, 25 [0.630, 0.984]
Operating range: ℓ	3.2~3.5 [0.126~0.138] TYP (25°C [77°F])	3.2~3.5 [0.126~0.138] TYP (25°C [77°F])	5.5~8.0 [0.217~0.315]	6.0~8.5 [0.236~0.335]
Response differential: C	0.7 [0.028] MAX (25°C [77°F])		2 [0.079]	
Maximum sensing location ^{Note}	8 [0.315]			

Remark: The above table shows reference values.

Note: This is the length measured from the switch's opposite end side to the lead wire.

Handling Instructions and Precautions



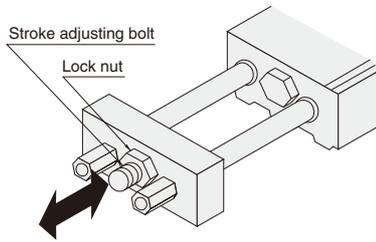
Mounting and adjustment

Mounting

- While any mounting direction is allowed, the mounting surface should always be flat. Twisting or bending in the table or plate during mounting may disturb the accuracy and may also result in air leaks or improper operation.
- Care should be taken that scratches or dents on the mounting surface of the table and/or plate may damage its flatness.
- Use JIS B 1354 straight pins to locate the table and the plate.
- In applications with high load ratios or speeds of 200mm/s [7.9in./sec.] or higher, either select a unit with a shock absorber or use an externally mounted shock absorber.

Stroke adjustment

In the Slide Unit, the stroke is easily adjustable. Loosening the lock nut and turning the stroke adjusting bolt to the right (clockwise) shortens the stroke. Turning it to the left (counterclockwise) lengthens the stroke. After adjustment, tighten the lock nut and secure it in place.



Model	Stroke adjusting range	Stroke changes (per 1 rotation)
SUT10×□, SUP10×□ SUL10×□	±10 [±0.394]	0.8 [0.031]
SUT(K)16×□, SUT(K)25×□ SUP(K)16×□, SUP(K)25×□ SUL(K)16×□, SUL(K)25×□	±10 [±0.394] (±5 [0.197])	1 [0.039]

Remark: Figures in parentheses () are for types with end keep mechanism (one side only).

Allowable lateral load

When applying a lateral load on the plate in the fixed table type, keep the load at or below the values in the table below.

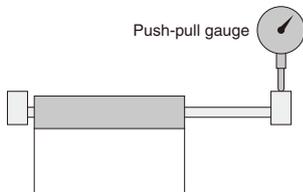
Model	Stroke mm	25	50	75	100	125	150	175	200
SUT10×□		1.34 [0.301]	0.93 [0.209]	0.71 [0.160]	0.58 [0.130]	—	—	—	—
SUT(K)16×□		3.06 [0.688]	2.12 [0.477]	1.62 [0.364]	1.31 [0.294]	1.11 [0.250]	0.95 [0.214]	0.83 [0.187]	0.75 [0.169]
SUT(K)25×□		8.40 [1.888]	5.92 [1.331]	4.57 [1.027]	3.72 [0.836]	3.14 [0.706]	2.71 [0.609]	2.38 [0.535]	2.13 [0.479]

Remark: These are reference values, not guaranteed values.

Piston rod deflection

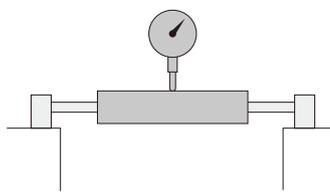
Applying load on the table or plate can cause deflection in the piston rod. For the amount of the deflection, use the table below as a guide.

● Fixed table type (SUT, SUTK)

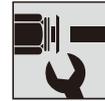


Model	Load N [lbf.]	Stroke	
		100	200
SUT10×□	2.0 [0.45]	0.11 [0.0043]	—
	2.9 [0.65]	0.16 [0.0063]	—
	4.9 [1.10]	0.27 [0.0106]	—
SUT(K)16×□	4.9 [1.10]	0.07 [0.0028]	0.44 [0.0173]
	9.8 [2.20]	0.15 [0.0059]	0.88 [0.0346]
	14.7 [3.30]	0.22 [0.0087]	1.32 [0.0520]
SUT(K)25×□	9.8 [2.20]	0.03 [0.0012]	0.18 [0.0071]
	14.7 [3.30]	0.05 [0.0020]	0.27 [0.0106]
	24.5 [5.51]	0.08 [0.0031]	0.45 [0.0177]

● Fixed end plate type (SUP, SUPK)



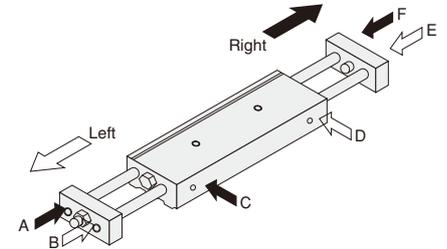
Model	Load N [lbf.]	Stroke	
		100	200
SUP10×□	2.0 [0.45]	0.02 [0.0008]	—
	4.9 [1.10]	0.04 [0.0016]	—
	9.8 [2.20]	0.07 [0.0028]	—
SUP(K)16×□	9.8 [2.20]	0.02 [0.0008]	0.12 [0.0047]
	19.6 [4.41]	0.05 [0.0020]	0.25 [0.0098]
	29.4 [6.61]	0.07 [0.0028]	0.37 [0.0146]
SUP(K)25×□	19.6 [4.41]	0.01 [0.0004]	0.05 [0.0020]
	29.4 [6.61]	0.01 [0.0004]	0.08 [0.0031]
	49 [11.0]	0.02 [0.0008]	0.13 [0.0051]



Piping

Piping location and operating direction

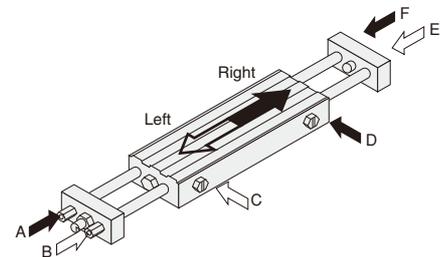
● Fixed table type (SUT, SUTK)



When supplying air to the C port, the piston rod and end plate move to the right. When supplying air to the D port, they move to the left. While the unit can also be used by plugging C, D ports, and plumbing A, B, E, F ports, consult us since such configuration needs special adapters and plugs, etc. (In this case, when supplying air to A, F ports, the piston rod and end plate move to the right. When supplying air to B, E ports, they move to the left.)

● Fixed end plate type (SUP, SUPK)

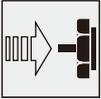
● Fixed rail-on plate type (SUL, SULK)



When supplying air to the A port, the table moves to the right. When supplying air to the B port, it moves to the left. While the unit can also be used by plugging A, B ports, and plumbing C, D, E, F ports, consult us since such configuration requires special plugs, etc. (In this case, when supplying air to D, F ports, the table moves to the right, when supplying to C, E ports, it moves to the left.)

Cautions: 1. Always thoroughly blow off (use compressed air) the tubing before connecting it to the Slide Unit. Entering chips, sealing tape, rust, etc., generated during piping work could result in air leaks or other defective operation.

2. When piping to moving portions, be careful about bending or folding tubes. Excessive bending or repeated folding may damage the tubes or fittings.



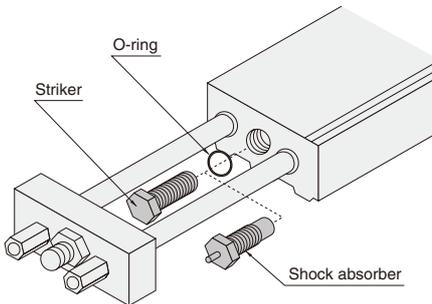
Shock absorber

Selection

The absorbing capacity of the shock absorber built into the Slide Unit is a fixed type. From the graph below, select the shock absorber with the optimum absorbing capacity (see the table below).

Replacements

If the load and operating speed have been changed, replace the shock absorber with one that has the appropriate absorbing capacity.



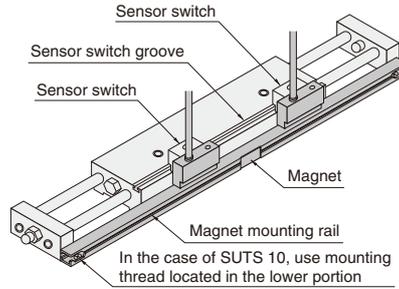
- Cautions :**
1. Be careful to avoid scratching the piston rod when detaching the shock absorber or striker.
 2. Always attach O-rings when mounting the shock absorber or striker to the slide table.
 3. Never use the unit when the shock absorber or striker is removed.
 4. Do not loosen or remove the mounting screw on the rear surface of the shock absorber. Oil sealed inside could leak, damaging the shock absorber function.



Sensor switches

● Fixed table type (SUTS, SUTKS)

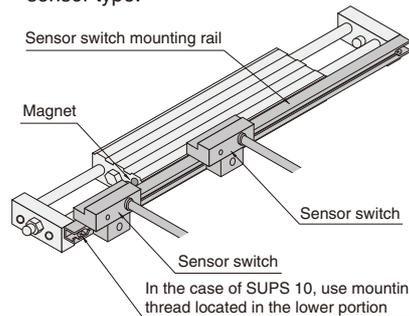
Can be used as a sensor type by installing a magnet mounting rail. If a magnet mounting rail is required, consult us.



● Fixed end plate type (SUPS, SUPKS)

Fixed rail-on plate type (SULS, SULKS)

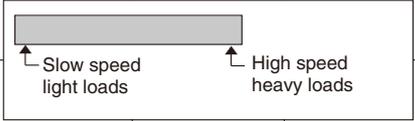
The magnet for sensor switch is not built into the standard type. When mounting a sensor switch is required, always order the sensor type.



- Cautions:**
1. For the sensor switch mounting location and moving instructions, see p.887.
 2. Contact protection is needed when the sensor switch is connected to inductive loads or when capacitive surges occur. For contact protection, see p.1566.

Shock absorber selection guide

Model	Code Model Air pressure MPa [psi.] Absorbing capacity J	-D	-E	-F	-G	-K
		KSHA6×8-D-X	KSHA6×8-E-X	KSHA6×8-F-X	KSHA7×8-G-X	KSHA7×8-K-X
		1.0	2.0	2.9	3.9	4.9 5.9
SUT16×□	0.4 [58]		■			
SUTK16×□	0.5 [73]		■			
SUP16×□	0.6 [87]		■			
SUPK16×□	0.7 [102]		■			
SUL16×□	0.4 [58]		■			
SULK16×□	0.5 [73]		■			
	0.6 [87]		■			
	0.7 [102]		■			
SUT25×□	0.4 [58]			■		
SUTK25×□	0.5 [73]			■		
SUP25×□	0.6 [87]			■		
SUPK25×□	0.7 [102]			■		
SUL25×□	0.4 [58]			■		
SULK25×□	0.5 [73]			■		
	0.6 [87]			■		
	0.7 [102]			■		



1J = 0.7376ft·lbf



Control circuit for types with end keep mechanism

1. For control of the Slide Units with end keep mechanisms, we recommend the use of 2-position, 4-, 5-port valves. Avoid the use of control circuit with ABR connection (exhaust center) 3-position valves that exhaust air from 2 delivery ports.
2. Always use meter-out control for speed control. Meter-in control may result in failure of the locking mechanism to release.
3. Always set the air pressure to 0.2MPa [29psi.] or more.

- Cautions :**
1. It is dangerous to supply air to a connection port on a side with a locking mechanism while the cylinder has already been exhausted, because the piston rod may suddenly extend (or retract). In addition, since the lock piston could also cause galling of the lock piston and piston rod, resulting in defective operation. Always supply air to the connection port opposite the adjacent to the locking mechanism to ensure applying back pressure.
 2. When restarting operations after air has been exhausted from the cylinder due to completion of operations or to an emergency stop, always start by supplying air to the connection port opposite the adjacent to the locking mechanism.
 3. Connect the valve port A (NC) to the connection port on the side with the locking mechanism.



Installation and adjustment of types with end keep mechanism

Avoid using an external stopper, etc., to adjust the stroke on the side of the locking mechanism, since it becomes unable to make the end keep lock.

Stroke adjustment on the side without the locking mechanism is allowed within a range of $\pm 5\text{mm}$ [$\pm 0.197\text{in.}$].



Manual operation for types with end keep mechanism

While the locking mechanism is normally released automatically through cylinder operations, it can also be released manually. For manual release, insert an M3×0.5 screw that has 30mm [1.18in.] screw length into the opening for manual override, thread it in about 3 turns into the internal lock piston, and then pull up the screw. To maintain the manual override for adjustment, etc., thread the locknut onto the screw and, with the locking mechanism in a released state, tighten the locknut against the cylinder.

- Cautions :**
1. It is dangerous to release the lock when load (weight) is present on the piston rod, because it may cause the unintended piston rod's extension (or retraction). In this case, always supply air to the connection port opposite the one adjacent to the locking mechanism before releasing the locking mechanism.
 2. If the locking mechanism cannot easily be released even with manual override, it could be the result of galling of the lock piston and piston rod. In this case, supply air to the connection port opposite the one adjacent to the locking mechanism before releasing the locking mechanism.
 3. Water, oil, dust, etc., intruding through the opening for manual override may be a cause of defective locks or other erratic operation. If using in locations subject to dripping water, dripping oil, etc., or large amounts of dust, use a cover to protect the unit.



General precautions

Media

1. Use air for the media. For the use of any other media, consult us.
2. Air used for the cylinder should be clean air that contains no deteriorated compressor oil, etc. Install an air filter (filtration of a minimum 40 μm) near the cylinder or valve to remove collected liquid or dust. In addition, drain the air filter periodically. Collected liquid or dust entering the cylinder may cause improper operation.

Lubrication

The product can be used without lubrication, if lubrication is required, use Turbine Oil Class 1 (ISO VG32) or equivalent. Avoid using spindle oil or machine oil.

Atmosphere

1. If using in locations subject to dripping water, dripping oil, etc., or to large amounts of dust, use a cover to protect the unit.
2. The product cannot be used when the media or ambient atmosphere contains any of the substances listed below. Organic solvents, phosphate ester type hydraulic oil, sulphur dioxide, chlorine gas, or acids, etc.