KOGANEI

ACTUATORS GENERAL CATALOG

JIG CYLINDERS C SERIES
STROKE-ADJUSTING CYLINDERS

INDEX

RoHS directive compliant products

⚠ **CAUTION** Be sure to read the safety precautions at the front of the general personal catalog before using this product.

JIG CYLINDERS C SERIES
Stroke Adjusting Cylinders (push stroke adjusting)

World's first! Note

Single rod cylinder that allows push side stroke adjusting. Patent pending

(Stroke adjusting range 0 to -5 mm [0 to -0.197 in])

Note: As of April 2008. Based on research by Koganei.

●Push stroke can be adjusted by rotating the adjusting gear.

Adjusting gear

Rotating the adjusting gear towards the minus (-) side (leftwards when viewed from the piston rod side) shortens the push stroke.

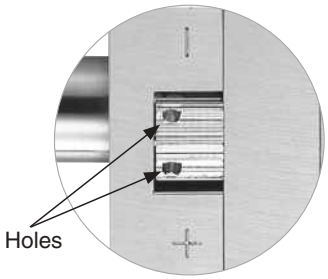
CPDA □

Rotating the adjusting gear towards the plus (+) side (rightwards when viewed from the piston rod side) lengthens the push stroke.

Image of previous stroke adjusting cylinder

Stroke adjusting method

With the adjusting gear ϕ2 [0.079] (ϕ12 to ϕ25 [0.472 to 0.984] cylinder bores) or ϕ2.5 [0.098] (ϕ32 [1.260], ϕ40 [1.575] cylinder bores) holes are at 90° intervals.



Holes

- Use a pin or other suitable object to rotate as required.

Note: The adjusting gear cannot be rotated while air is being applied. Do not try to force rotation past where adjusting gear adjustment ends. Doing so can lead to malfunction. Do not try to rotate with your fingernail. Doing so creates the risk of personal injury.

After stroke adjusting

- When determining the stroke, tighten the fixing screw. One fixing screen is temporarily installed at the factory.

Fixing screw (For fixing the adjusting gear)
There is also a female screw on the opposite side as a fixing screw.

Cylinder bore and stroke (mm [in])

Cylinder bore	Standard stroke											
12 [0.472]	5 [0.197]	10 [0.394]	15 [0.591]	20 [0.787]	25 [0.984]	30 [1.181]	–	–	–	–	–	–
16 [0.630]	5 [0.197]	10 [0.394]	15 [0.591]	20 [0.787]	25 [0.984]	30 [1.181]	–	–	–	–	–	–
20 [0.787]	5 [0.197]	10 [0.394]	15 [0.591]	20 [0.787]	25 [0.984]	30 [1.181]	35 [1.378]	40 [1.575]	45 [1.772]	50 [1.969]	–	–
25 [0.984]	5 [0.197]	10 [0.394]	15 [0.591]	20 [0.787]	25 [0.984]	30 [1.181]	35 [1.378]	40 [1.575]	45 [1.772]	50 [1.969]	–	–
32 [1.260]	5 [0.197]	10 [0.394]	15 [0.591]	20 [0.787]	25 [0.984]	30 [1.181]	35 [1.378]	40 [1.575]	45 [1.772]	50 [1.969]	75 [2.953]	100 [3.9]
40 [1.575]	5 [0.197]	10 [0.394]	15 [0.591]	20 [0.787]	25 [0.984]	30 [1.181]	35 [1.378]	40 [1.575]	45 [1.772]	50 [1.969]	75 [2.953]	100 [3.9]

Lubrication

Cylinders can be used without lubrication. To lubricate, use turbine oil 1 (ISO VG32) or an equivalent. Avoid using spindle oil or machine oil.

Mid-stroke

- The mid-stroke manufacturing method basically uses tube cutting.
  However, strokes up to 5 mm [0.197 in] are not tube cut. Contact your nearest Koganei sales office for information about availability.
- Dimensions
  In the case of tube cutting, the add stroke is the mid-stroke.

Other

Avoid use that subjects the piston rod to lateral load.

Allowable kinetic energy

Use the following equation to calculate the kinetic energy of loads.

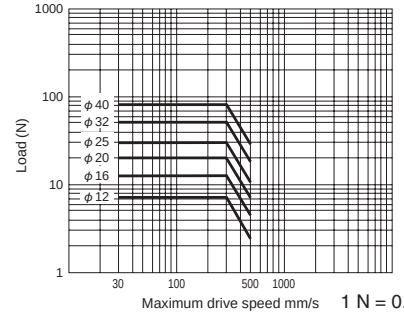
$$Ex=\frac{m}{2}v^2$$

Ex: Kinetic energy (J)
m: Mass of load (kg)
v: Piston speed (m/s)

J [ft•lbf]

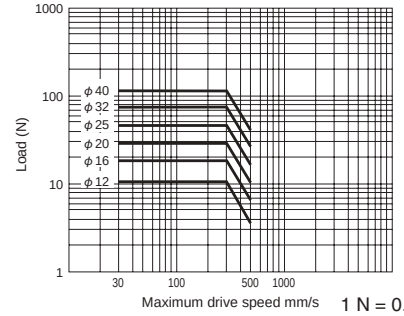
Cylinder bore mm [in]	Allowable kinetic energy	
	Without bumper	With bumper
12 [0.472]	0.032 [0.024]	0.048 [0.035]
16 [0.630]	0.057 [0.042]	0.086 [0.063]
20 [0.787]	0.090 [0.066]	0.135 [0.100]
25 [0.984]	0.140 [0.103]	0.210 [0.155]
32 [1.260]	0.230 [0.170]	0.344 [0.254]
40 [1.575]	0.359 [0.265]	0.538 [0.397]

Without bumper (Graph 1)



1 N = 0.2248 lbf
1 mm/s = 0.03937 in/sec

With bumper (Graph 2)



1 N = 0.2248 lbf
1 mm/s = 0.03937 in/sec

- Interpreting the graphs
  According to Graph 1, a maximum speed of 300 mm/s [11.8 in/sec] or less is required for operating a load of 30 N [6.744 lbf] when with a CPDA (S) 25.
  According to Graph 2, ϕ32 [1.260] [CPDA (S) 32×Stroke-R] for operation of a load of 20 N [4.496 lbf] operated at a maximum speed of 500 mm/s [19.7 in/sec].

Sensor switch

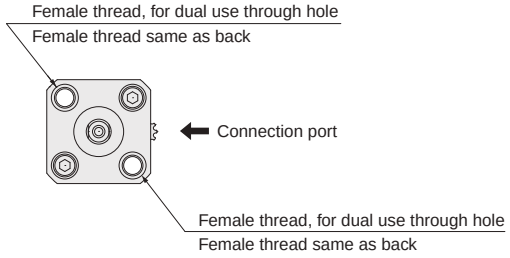
Standard cylinders do not have a sensor switch magnet built in. To mount a sensor switch, a sensor cylinder with a built-in sensor switch magnet is required.

Note 1. For information about the sensor switch mounting position and movement range, refer to page **29**.
2. Contact protection measures are required for connections that result in an inductive load on a contact sensor switch, or when capacitance surge is generated. For details about contact protection measures, refer to the sensor switch page of the general personal catalog.

Installing the main unit

To allow for a variety of possible mounting methods, the jig cylinder mounting holes are available as a combination of female threaded holes and as through holes, or as female threaded holes only.
For details, refer to the diagrams below. The mounting method is the same regardless of the cylinder bore.

* When fixing the main unit with direct through bolts, be sure to use the attached special washers.



* The head side (back surface) has dual use female thread/through holes at two locations. The other two locations are female thread only.

General precautions

Air supply

1. Use air as the media. For the use of any other medium, consult your nearest Koganei sales office.
2. Air to operate the cylinder should be clean air that contains no degraded compressor oil, etc. Install an air filter (filtration of 40 μm or less) near the cylinder or valve to remove dust and accumulated liquid. Also drain the air filter periodically. If liquid or dust gets into the cylinder, it may cause defective operation. Install an air filter (filtration of 40 μm or less) near the cylinder or valve to remove dust and accumulated liquid. Also drain the air filter periodically. If liquid or dust gets into the cylinder, it may cause defective operation.

Piping

Before installing piping to the cylinder, thoroughly flush the inside of the pipes (with compressed air). Machining chips, sealing tape, rust and other debris remaining from the piping work may result in air leaks and malfunctions.

Atmosphere

1. Cover the unit when using it in locations where it might be subject to excessive dust, dripping water, dripping oil, etc.
2. This product cannot be used if the medium or ambient atmosphere includes any of the substances below. Organic solvents, phosphate type hydraulic oil, sulfur dioxide gas, chlorine gas, acids, or ozone.

Stroke adjusting

Stroke adjusting cylinder

Adjusting gear

Fixing screw (For fixing the adjusting gear)

1. Fixing screws are temporarily installed at the factory. Loosen the fixing screws when adjusting the stroke.
2. The stroke is set at the factory as noted on the product label. Relative to the indicated product stroke, the push stroke can be adjusted up to a maximum of -5 mm [-0.197 in] by rotating the adjusting gear.
   When viewed from the piston rod side, rightward rotation (towards the "+" mark) lengthens the push stroke, while leftward rotations (towards the "-" mark) shortens the push stroke.
3. The adjusting gear cannot be rotated while air is being applied.
4. With the adjusting gear ϕ 2 [0.079] (ϕ 12 to ϕ 25 [0.472 to 0.984] cylinder bores) or ϕ2.5 [0.098] (ϕ 32 [1.260], ϕ 40 [1.575] cylinder bores) holes are at 90° intervals. Use a pin or other suitable object to rotate as required.
   Do not try to rotate with your fingernail. Doing so creates the risk of personal injury. NOTE
5. Do not try to force rotation past where adjusting gear adjustment ends. Doing so can lead to malfunction. NOTE
6. When determining the stroke, tighten the fixing screw. The tightening torques of the fixing screws are: 0.3 N•m [2.655 in•lbf] (ϕ 12 to ϕ 25 [0.472 to 0.984] cylinder bores) and 0.7 N•m [6.196 in•lbf] (ϕ 32 [1.260] and ϕ 40 [1.575] cylinder bores). There is also a screw on the opposite side. One fixing screw is temporarily installed at the factory.

Note: When you are unable to rotate the adjusting gear.
Is the fixing screw tightened?
- NO: Loosen the fixing screw.
- YES: Check the stroke on the product label and the actual product stroke.
  - ● [Stroke on Product Label] ≒ [Product Stroke] → The adjusting gear can be rotated towards the minus (-) mark.
  - ● [Stroke on Product Label] > [Product Stroke] → The adjusting gear can be rotated towards the plus (+) mark.

If you still have problems rotating the adjusting gear, contact Koganei.

Stroke adjusting guidelines (reference)

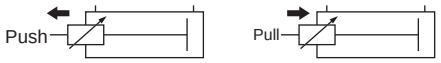
Model \ Item	Cylinder bore mm [in]	Stroke adjusting range mm [in]	Total adjusting gear rotations (Rotation)	Amount of adjustment per adjusting gear rotation mm	Required number of adjusting gear rotations to adjust by 1 mm
CPDA(S)	**12 [0.472]**	0 to –5 [0 to -0.197]	6.7	(0.8 [0.031])	(1.3)
	16 [0.630]	0 to –5 [0 to -0.197]	8.3	(0.6 [0.024])	(1.7)
	20 [0.787]	0 to –5 [0 to -0.197]	8.6	(0.6 [0.024])	(1.7)
	25 [0.984]	0 to –5 [0 to -0.197]	9.8	(0.5 [0.020])	(2.0)
	32 [1.260]	0 to –5 [0 to -0.197]	9.5	(0.5 [0.020])	(1.9)
	40 [1.575]	0 to –5 [0 to -0.197]	10.3	(0.5 [0.020])	(2.1)

Note: Actual values may be different due to component tolerances. Use the above information for general reference only.

Thrust

Determine the thrust required by the load and working air pressure, the then select the appropriate cylinder bore.
The table shows calculated values,so select a cylinder bore whose load factor (Load Factor = $\frac{\text{Load}}{\text{Calculated value}}$) that is 70% or lower (50% or lower in the case of high speed).

● Double acting type with adjusting mechanism

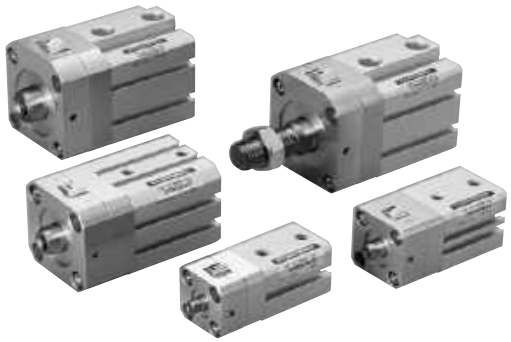


N [lbf]

Cylinder bore mm [in]	Piston Rod diameter mm [in]	Operation	Pressure area mm² [in²]	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]
12 [0.472]	6 [0.236]	Push side	113.0 [0.2]	11.3 [2.540]	22.6 [5.081]	33.9 [7.621]	45.2 [10.161]	56.5 [12.702]	67.8 [15.242]	79.1 [17.782]
		Pull side	84.8 [0.131]	8.5 [1.911]	17.0 [3.822]	25.4 [5.710]	33.9 [7.621]	42.4 [9.532]	50.9 [11.443]	59.3 [13.331]
16 [0.630]	8 [0.315]	Push side	201.0 [0.3]	20.1 [4.519]	40.2 [9.037]	60.3 [13.556]	80.4 [18.075]	100.5 [22.6]	120.6 [27.1]	140.7 [31.6]
		Pull side	150.0 [0.2]	15.1 [3.395]	30.1 [6.767]	45.2 [10.161]	60.3 [13.556]	75.4 [16.951]	90.4 [20.323]	105.5 [23.7]
20 [0.787]	10 [0.394]	Push side	314.0 [0.5]	31.4 [7.059]	62.8 [14.118]	94.2 [21.177]	125.6 [28.2]	157.0 [35.3]	188.4 [42.4]	219.8 [49.4]
		Pull side	235.5 [0.4]	23.6 [5.305]	47.1 [10.589]	70.7 [15.894]	94.2 [21.177]	117.8 [26.5]	141.3 [31.8]	164.9 [37.1]
25 [0.984]	12 [0.472]	Push side	490.6 [0.8]	49.1 [11.038]	98.1 [22.054]	147.2 [33.1]	196.3 [44.1]	245.3 [55.1]	294.4 [66.2]	343.4 [77.2]
		Pull side	377.6 [0.6]	37.8 [8.498]	75.5 [16.973]	113.3 [25.5]	151.0 [33.9]	188.8 [42.4]	226.6 [50.9]	264.3 [59.4]
32 [1.260]	16 [0.630]	Push side	803.8 [1.2]	80.4 [18.075]	160.8 [36.1]	241.2 [54.2]	321.5 [72.3]	401.9 [90.4]	482.3 [108.4]	562.7 [126.5]
		Pull side	602.9 [0.9]	60.3 [13.556]	120.6 [27.1]	180.9 [40.7]	241.2 [54.2]	301.4 [67.8]	361.7 [81.3]	422.0 [94.9]
40 [1.575]	16 [0.630]	Push side	1256.0 [2]	125.6 [28.2]	251.2 [56.5]	376.8 [84.7]	502.4 [112.9]	628.0 [141.2]	753.6 [169.4]	879.2 [197.7]
		Pull side	1055.0 [2]	105.5 [23.7]	211.0 [47.4]	316.5 [71.2]	422.0 [94.9]	527.5 [118.6]	633.0 [142.3]	738.5 [166.0]

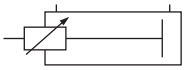
JIG CYLINDERS C SERIES
STROKE ADJUSTING CYLINDERS

Double Acting Type



Symbols

● Push side stroke adjusting



Specifications

Item \ Cylinder bore mm [in]		12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Operating type		Double acting type with stroke adjusting mechanism					
Media		Air					
Operating temperature range	℃ [℉]	0 ～ 60 [32 ～ 140]					
Proof pressure	MPa	1.05					
Operating pressure range	[psi]	0.1 ～ 0.7 [15 ～ 102]					
Operating speed range	MPa	30 ～ 500 [1.181 ～ 19.7]					
Cushion	[psi]	Rubber bumper type (option)					
Repeatability	mm/s	±0.05 [±0.002] (Without rubber bumper specification)					
Stroke adjusting range	[in/sec]	0 ～ −5 [0 ～ -0.197]					
Lubrication		Not required (if lubricated, use turbine oil class 1 (ISO VG32) or equivalent)					
Port size	mm [in]	M5×0.8				Rc1/8	

Bore Size and Stroke

For information about mid-stroke, refer to page 20.

mm [in]

Operating type	Bore	Standard strokes	
		Standard cylinder	Cylinder with magnet
Double acting type with stroke adjusting mechanism	**12 [0.472]**	5 [0.197], 10 [0.394], 15 [0.591], 20 [0.787], 25 [0.984], 30 [1.181]	5 [0.197], 10 [0.394], 15 [0.591], 20 [0.787], 25 [0.984], 30 [1.181]
	16 [0.630]		
	20 [0.787]	5 [0.197], 10 [0.394], 15 [0.591], 20 [0.787], 25 [0.984], 30 [1.181], 35 [1.378], 40 [1.575], 45 [1.772], 50 [1.969]	5 [0.197], 10 [0.394], 15 [0.591], 20 [0.787], 25 [0.984], 30 [1.181], 35 [1.378], 40 [1.575], 45 [1.772], 50 [1.969]
	25 [0.984]		
	32 [1.260]	5 [0.197], 10 [0.394], 15 [0.591], 20 [0.787], 25 [0.984], 30 [1.181], 35 [1.378], 40 [1.575], 45 [1.772], 50 [1.969], 75 [2.953], 100 [3.9]	5 [0.197], 10 [0.394], 15 [0.591], 20 [0.787], 25 [0.984], 30 [1.181], 35 [1.378], 40 [1.575], 45 [1.772], 50 [1.969], 75 [2.953], 100 [3.9]
	40 [1.575]		

Reference 1: Stroke tolerance $^{+1}_{0}$ (for basic stroke)
2: Mid-strokes basically are tube cut.
However, strokes up to 5 mm [0.197 in] are not tube cut.
3: The stroke adjusting range is 0 to -5 mm [0 to -0.197 in] for the basic stroke.

Order Codes for Stroke Adjusting Cylinders

■Operating type

DA:Double acting type

■ Cylinder specification

Blank: Standard cylinder[Note 1]
(Non-ion specification)
S: Cylinder with magnet
(Non-ion specification)

■ Rod end specification

Female thread

Male thread

■ Sensor switch type[Note2]
(For cylinder with magnet)

Blank : No sensor switch

-ZE135: With ZE135
- 2-lead wire, solid state type
- With indicator lamp
- 10 to 28 VDC
- Horizontal lead wire

-ZE155: With ZE155
- 3-lead wire, solid state NPN output type
- With indicator lamp
- 4.5 to 28 VDC
- Horizontal lead wire

-ZE175: With ZE175
- 3-lead wire, solid state PNP output type
- With indicator lamp
- 4.5 to 28 VDC
- Horizontal lead wire

-ZE235: With ZE235
- 2-lead wire, solid state type
- With indicator lamp
- 10 to 28 VDC
- Vertical lead wire

-ZE255: With ZE255
- 3-lead wire, solid state NPN output type
- With indicator lamp
- 4.5 to 28 VDC
- Vertical lead wire

-ZE275: With ZE275
- 3-lead wire, solid state PNP output type
- With indicator lamp
- 4.5 to 28 VDC
- Vertical lead wire

-ZE101: With ZE101
- 2-lead wire, contact type
- Without indicator lamp
- 5 to 28 VDC
  85 to 115 VAC
- Horizontal lead wire

-ZE102: With ZE102
- 2-lead wire, contact type
- With indicator lamp
- 10 to 28 VDC
  85 to 115 VAC
- Horizontal lead wire

-ZE201: With ZE201
- 2-lead wire, contact type
- Without indicator lamp
- 5 to 28 VDC
  85 to 115 VAC
- Vertical lead wire

-ZE202: With ZE202
- 2-lead wire, contact type
- With indicator lamp
- 10 to 28 VDC
  85 to 115 VAC
- Vertical lead wire

■Lead wire length

A: 1000 mm [39 in]
B: 3000 mm [118 in]
G: 300 mm [11.8 in]
with M8 connector;
ZE175, **ZE275** only

■ Number of sensor switches
(For cylinder with magnet)

Blank:
No sensor switch

1: With 1 sensor switch

2: With 2 sensor switches

■Bumper

Blank: No bumper
-R: With bumper

Stroke adjusting cylinder Basic type			Bore size × stroke					
CP	DA	S	×	-B	-R	-ZE135 -ZE155 -ZE175 -ZE235 -ZE255 -ZE275 -ZE101 -ZE102 -ZE201 -ZE202	A B G	1 2 ⋮ n

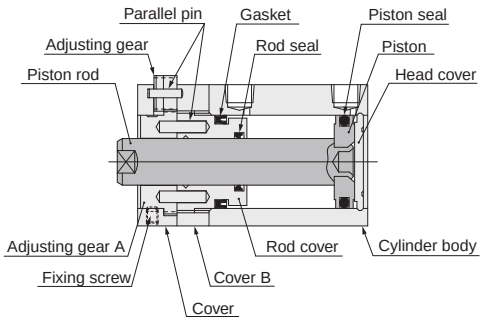
- See table for bore and stroke.
- For details about cylinder joints for male thread and cylinder rod ends, refer to the sensor switch page of the actuator general catalog.
- For the order number of a sensor switch only, see page 28.

Note 1: Stroke adjusting standard cylinders do not have a sensor switch magnet built in.
2: For details about sensor switches, see the general personal catalog.

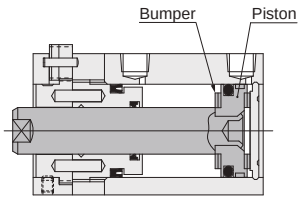
Inner Construction and Major Parts

● Double acting type (**CPDA**)

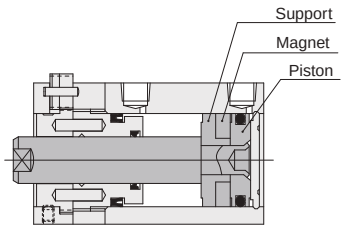
● φ12 [0.472] ～ φ 40 [1.575]



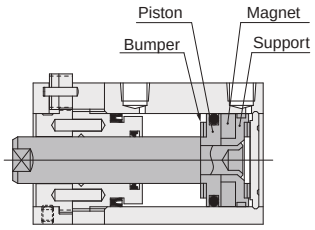
● With bumper



● Cylinder with magnet



● With magnet and bumper



Major Parts and Materials

Article \ Cylinder bore mm [in]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Cylinder body	Aluminum alloy (anodized)					
Cover, Cover B	Aluminum alloy (anodized)					
Piston	Aluminum alloy (special anti-rust treatment)					
Piston rod	Stainless steel (with chrome plating)				Hard steel (with chrome plating)	
Seal	Synthetic rubber (NBR)					
Rod cover	Aluminum alloy (special anti-abrasion treatment)					
Adjusting gear, Adjusting gear A	Aluminum alloy (anodized)					
Parallel pin	Stainless steel					
Bumper	Synthetic rubber (NBR)					
Magnet	Plastic magnet					
Support	Aluminum alloy (special anti-rust treatment)					
Fixing screw	Stainless steel				Steel (nickel plated)	

Mass

g [oz]

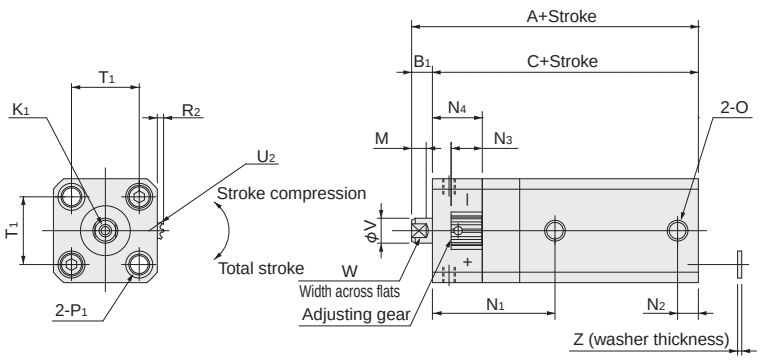
Cylinder bore mm [in]	Zero stroke Mass	Additional mass for each 1mm stroke	Mass added by bumper	Additional mass of cylinder with magnet	Additional mass of sensor switch[Note2]	
					ZE□□□A **ZE□□□G**	**ZE□□□B**
12 [0.472]	64.9 [2.289]	1.28 [0.045]	6.42 [0.226]	6.59 [0.232]	15 [0.529]	35 [1.235]
16 [0.630]	92.5 [3.263]	1.62 [0.057]	8.08 [0.285]	9.93 [0.350]		
20 [0.787]	139.5 [4.9]	2.26 [0.080]	11.29 [0.398]	25.71 [0.907]		
25 [0.984]	203.6 [7.2]	3.11 [0.110]	15.53 [0.548]	37.47 [1.322]		
32 [1.260]	300.9 [10.6]	4.11 [0.145]	20.57 [0.726]	52.43 [1.849]		
40 [1.575]	443.0 [15.6]	4.77 [0.168]	0	69.15 [2.439]		

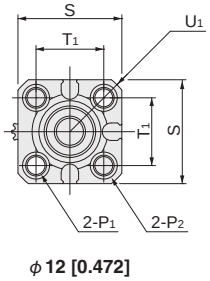
Note 1: Above table values are for standard stroke.

2: Sensor switch codes A, B, and G are lead wire lengths. A: 1000 mm [39 in], B: 3000 mm [118 in], G: 300 mm [11.8 in], with M8 connector

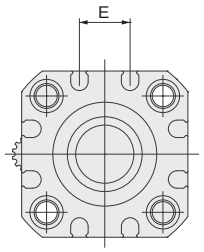
Dimension of Double Acting Cylinder Stroke Adjusting Type (mm [in])

● **ϕ12 [0.472] ～ ϕ 25 [0.984]**

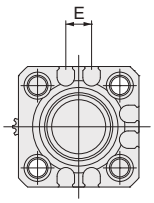




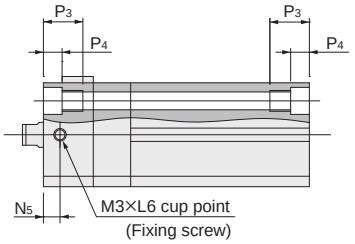
ϕ12 [0.472]

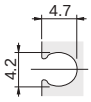


ϕ20 [0.787] ϕ 25 [0.984]



ϕ16 [0.630]





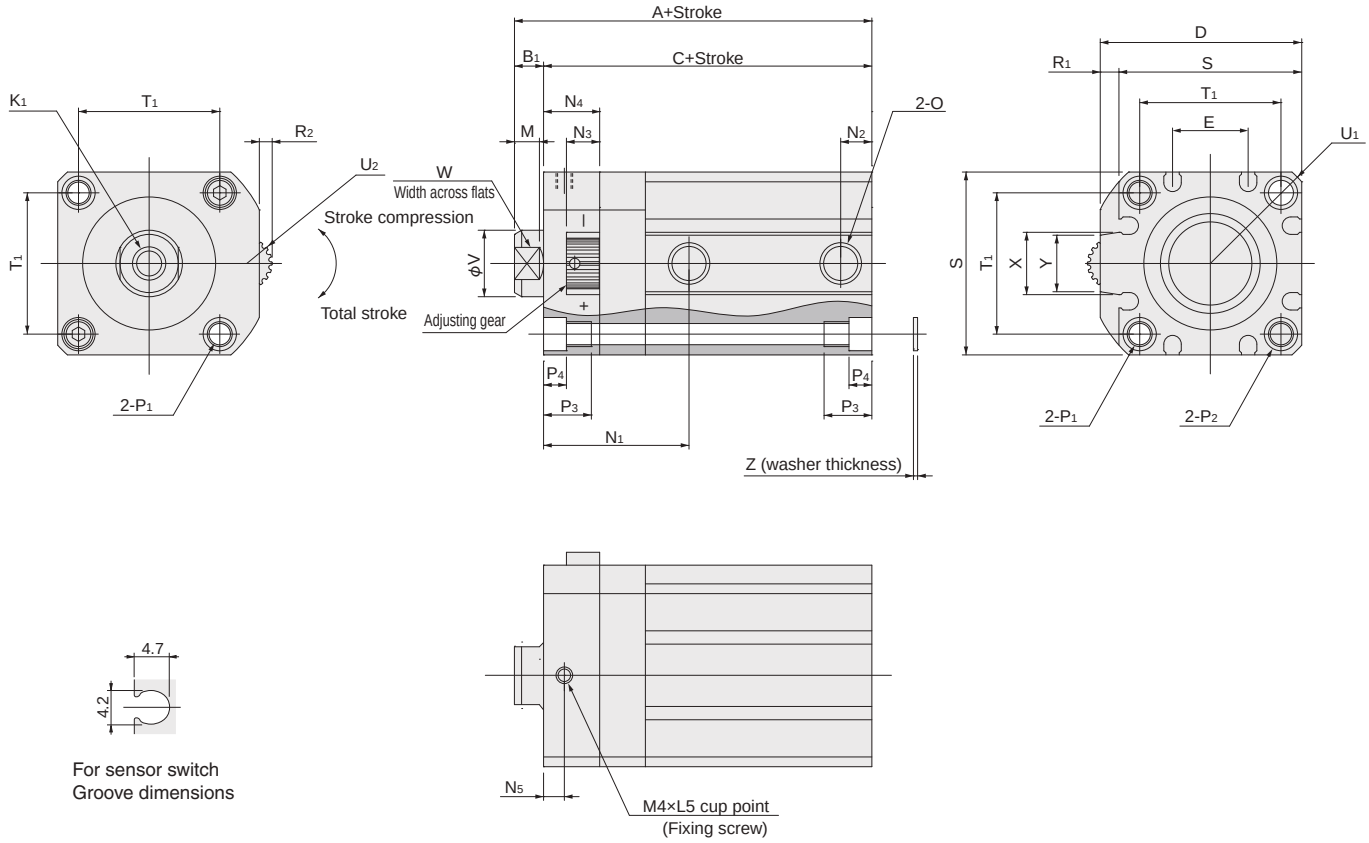
For sensor switch
Groove dimensions

Bore \ Model / Code	Standard cylinder (CPDA)			Cylinder with magnet (CPDAS)			Standard cylinder with bumper (CPDA-R)			Cylinder with magnet and bumper (CPDAS-R)			E	K1	M	N1	N2	N3	N4	N5	O
	A	B1	C	A	B1	C	A	B1	C	A	B1	C									
12 [0.472]	44 [1.732]	5 [0.197]	39 [1.535]	49 [1.929]	5 [0.197]	44 [1.732]	49 [1.929]	5 [0.197]	44 [1.732]	54 [2.126]	5 [0.197]	49 [1.929]	—	M3×0.5, depth 6 [0.236]	3.5 [0.138]	29.5 [1.161]	5 [0.197]	7.5 [0.295]	12 [0.472]	4 [0.157]	M5×0.8
16 [0.630]	45.5 [1.791]	5.5 [0.217]	40 [1.575]	50.5 [1.988]	5.5 [0.217]	45 [1.772]	50.5 [1.988]	5.5 [0.217]	45 [1.772]	55.5 [2.185]	5.5 [0.217]	50 [1.969]	6.2 [0.244]	M4×0.7, depth 8 [0.315]	3.5 [0.138]	30.5 [1.201]	5 [0.197]	7.5 [0.295]	12 [0.472]	4 [0.157]	M5×0.8
20 [0.787]	48 [1.890]	5.5 [0.217]	42.5 [1.673]	58 [2.283]	5.5 [0.217]	52.5 [2.067]	53 [2.087]	5.5 [0.217]	47.5 [1.87]	63 [2.480]	5.5 [0.217]	57.5 [2.264]	12.2 [0.480]	M5×0.8, depth 10 [0.394]	4.5 [0.177]	32 [1.260]	5 [0.197]	7.5 [0.295]	12 [0.472]	4 [0.157]	M5×0.8
25 [0.984]	51 [2.008]	6 [0.236]	45 [1.772]	61 [2.402]	6 [0.236]	55 [2.165]	56 [2.205]	6 [0.236]	50 [1.969]	66 [2.598]	6 [0.236]	60 [2.362]	12.2 [0.480]	M6×1, depth 10 [0.394]	5 [0.197]	34 [1.339]	5 [0.197]	7.5 [0.295]	12.5 [0.492]	4.5 [0.177]	M5×0.8

Bore \ Code	P1	P2	P3	P4	R2	S	T1	U1	U2	V	W	Z	Applicable through bolt
12 [0.472]	ϕ4.3 [0.169] (through hole) counter bore ϕ6.5 (both sides) and M5×0.8 (both sides)	Counter bore ϕ6.5 [0.256] and M5×0.8	9.5 [0.374]	4.5 [0.177]	1.5 [0.059]	25 [0.984]	16.3 [0.642]	R16	R3.57	6 [0.236]	5 [0.197]	1 [0.039]	M3
16 [0.630]	ϕ4.3 [0.169] (through hole) counter bore ϕ6.5 (both sides) and M5×0.8 (both sides)	Counter bore ϕ6.5 [0.256] and M5×0.8	9.5 [0.374]	4.5 [0.177]	1.4 [0.055]	29 [1.142]	19.8 [0.780]	R19	R3.57	8 [0.315]	6 [0.236]	1 [0.039]	M3
20 [0.787]	ϕ4.3 [0.169] (through hole) counter bore ϕ6.5 (both sides) and M5×0.8 (both sides)	Counter bore ϕ6.5 [0.256] and M5×0.8	9.5 [0.374]	4.5 [0.177]	2.1 [0.083]	34 [1.339]	24 [0.945]	R22	R4.2	10 [0.394]	8 [0.315]	1 [0.039]	M3
25 [0.984]	ϕ5.1 [0.201] (through hole) counter bore ϕ8 (both sides) and M6×1 (both sides)	Counter bore ϕ8 [0.315] and M6×1	11.5 [0.453]	5.5 [0.217]	2.3 [0.091]	40 [1.575]	28 [1.102]	R25	R4.52	12 [0.472]	10 [0.394]	1 [0.039]	M4

Dimension of Double Acting Cylinder Stroke Adjusting Type (mm [in])

● ϕ32 [1.260] • ϕ 40 [1.575]



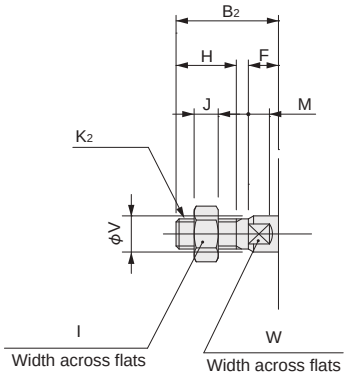
For sensor switch
Groove dimensions

Bore \ Model / Code	Standard cylinder (**CPDA**)			Cylinder with magnet (**CPDAS**)			Standard cylinder with bumper (**CPDA-R**)			Cylinder with magnet and bumper (**CPDAS-R**)			D	E	K1	M	N1	N2	N3	N4	N5	O
	A	B1	C	A	B1	C	A	B1	C	A	B1	C										
32 [1.260]	56 [2.205]	7 [0.276]	49 [1.929]	66 [2.598]	7 [0.276]	59 [2.323]	61 [2.402]	7 [0.276]	54 [2.126]	66 [2.598]	7 [0.276]	59 [2.323]	48.5 [1.909]	18.2 [0.717]	M8×1.25, depth 12 [0.472]	6 [0.236]	35 [1.378]	7.5 [0.295]	8 [0.315]	13.5 [0.531]	5 [0.197]	Rc1/8
40 [1.575]	61 [2.402]	7 [0.276]	54 [2.126]	71 [2.795]	7 [0.276]	64 [2.520]	61 [2.402]	7 [0.276]	54 [2.126]	71 [2.795]	7 [0.276]	64 [2.520]	56.5 [2.224]	18.2 [0.717]	M8×1.25, depth 12 [0.472]	6 [0.236]	38 [1.496]	7.5 [0.295]	8 [0.315]	15.5 [0.610]	6 [0.236]	Rc1/8

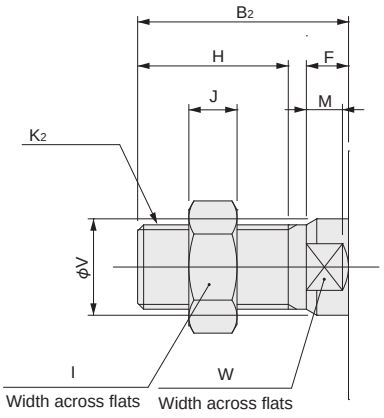
Bore \ Code	P1	P2	P3	P4	R1	R2	S	T1	U1	U2	V	W	X	Y	Z	Applicable through bolt
32 [1.260]	ϕ5.1 [0.201] (through hole) counter bore ϕ8 [0.315] (both sides) and M6×1 (both sides)	Counter bore ϕ8 [0.315] and M6×1	11.5 [0.453]	5.5 [0.217]	4.5 [0.177]	3.1 [0.122]	44 [1.732]	34 [1.339]	R29.5	R6.11	16 [0.630]	14 [0.551]	15 [0.591]	13.6 [0.535]	1 [0.039]	M4
40 [1.575]	ϕ6.9 [0.272] (through hole) counter bore ϕ9.5 [0.374] (both sides) and M8×1.25 (both sides)	Counter bore ϕ9.5 [0.374] and M8×1.25	15.5 [0.610]	7.5 [0.295]	4.5 [0.177]	3.9 [0.154]	52 [2.047]	40 [1.575]	R35	R6.75	16 [0.630]	14 [0.551]	15 [0.591]	13.6 [0.535]	1.6 [0.063]	M5

Dimensions of Male Rod End Thread Specification (mm [in])

● ϕ12 [0.472] ～ ϕ 25 [0.984]



● ϕ32 [1.260] • ϕ 40 [1.575]



Bore \ Code	B2	F	H	I	J	K2	M	V	W
12 [0.472]	17 [0.669]	5 [0.197]	10 [0.394]	8 [0.315]	4 [0.157]	M5×0.8	3.5 [0.138]	6 [0.236]	5 [0.197]
16 [0.630]	20.5 [0.807]	5.5 [0.217]	13 [0.512]	10 [0.394]	5 [0.197]	M6×1	3.5 [0.138]	8 [0.315]	6 [0.236]
20 [0.787]	22.5 [0.886]	5.5 [0.217]	15 [0.591]	12 [0.472]	5 [0.197]	M8×1	4.5 [0.177]	10 [0.394]	8 [0.315]
25 [0.984]	24 [0.945]	6 [0.236]	15 [0.591]	14 [0.551]	6 [0.236]	M10×1.25	5 [0.197]	12 [0.472]	10 [0.394]
32 [1.260]	35 [1.378]	7 [0.276]	25 [0.984]	19 [0.748]	8 [0.315]	M14×1.5	6 [0.236]	16 [0.630]	14 [0.551]
40 [1.575]	35 [1.378]	7 [0.276]	25 [0.984]	19 [0.748]	8 [0.315]	M14×1.5	6 [0.236]	16 [0.630]	14 [0.551]

Remark: Cylinder joints and cylinder rod ends for mounting on a male thread rod end specification are also available. For details, see the general personal catalog.

JIG CYLINDERS C SERIES SENSOR SWITCHES

Solid State Type, Reed Switch Type

Order codes

□ - CDAS □

Lead wire length
A: 1000 mm [39 in]
B: 3000 mm [118 in]
G: 300 mm [11.8 in] with M8 connector (ZE175, ZE275 only)

Sensor switch model

ZE135: Solid state type	2 lead wires	With indicator	10 to 28 VDC	Horizontal lead wire
ZE155: Solid state type	3 lead wires NPN output type	With indicator	4.5 to 28 VDC	Horizontal lead wire
ZE175: Solid state type	3-lead wires PNP output type	With indicator	4.5 to 28 VDC	Horizontal lead wire
ZE235: Solid state type	2 lead wires	With indicator	10 to 28 VDC	Vertical lead wire
ZE255: Solid state type	3-lead wires NPN output type	With indicator	4.5 to 28 VDC	Vertical lead wire
ZE275: Solid state type	3 lead wires PNP output type	With indicator	4.5 to 28 VDC	Vertical lead wire

ZE101: Contact type	Without indicator	5 to 28 VDC 85 to 115 VAC	Horizontal lead wire
ZE102: Contact type	With indicator	10 to 28 VDC 85 to 115 VAC	Horizontal lead wire
ZE201: Contact type	Without indicator	5 to 28 VDC 85 to 115 VAC	Vertical lead wire
ZE202: Contact type	With indicator	10 to 28 VDC 85 to 115 VAC	Vertical lead wire

Minimum allowable cylinder stroke for sensor switch use

● Solid State Type

mm [in]

Cylinder bore	Two mounted[Note]		One mounted
	One surface mounting	Two surface mounting	
12 [0.472]	30 [1.181]	10 [0.394]	5 [0.197]
16~40 [0.630~1.575]	10 [0.394]		

Note: Two can be mounted with a 5 mm [0.197 in] stroke.
However, care should be taken because overlap may occur.

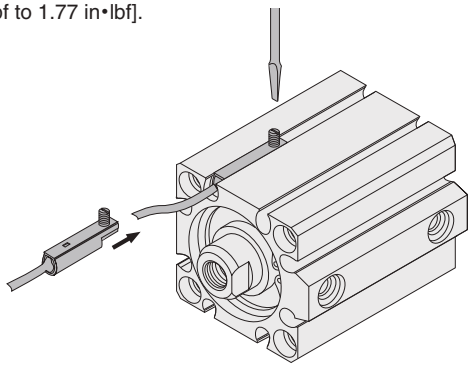
● Reed Switch Type

mm [in]

Cylinder bore	Two mounted		One mounted
	One surface mounting	Two surface mounting	
12 [0.472]	30 [1.181]	10 [0.394]	10 [0.394]
16~40 [0.630~1.575]	10 [0.394]		

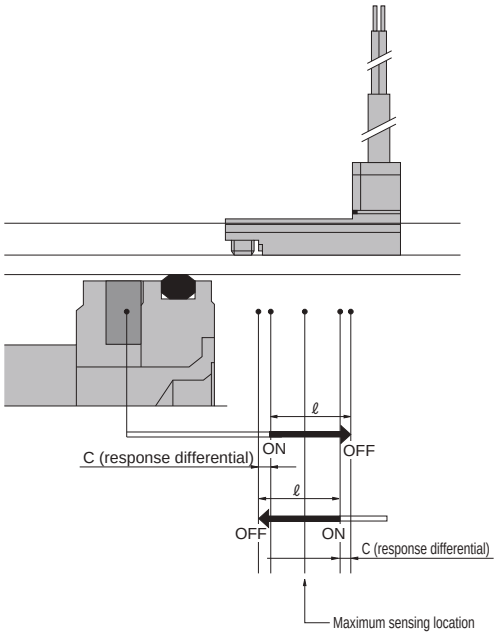
Moving Sensor Switch

- Loosening the screw allows the sensor switch to be moved along the switch mounting groove of the cylinder tube.
- The tightening torque for the screws is 0.1 N•m to 0.2 N•m [0.885 in•lbf to 1.77 in•lbf].



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

●Operating range: ℓ
The range from where the piston turns the switch on and the point where the switch is turned off as the piston travels in the same direction.
●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.



● Solid State Type

mm [in]

Item \ Bore	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Operating range: ℓ	2~4 [0.079~0.157]	2~5 [0.079~0.197]	3.5~7.5 [0.138~0.295]	4~8 [0.157~0.315]	3~7 [0.118~0.276]	3.5~7.5 [0.138~0.295]
Response differential: C	0.5 [0.020] or less					
Maximum sensing location	6 [0.236]					

Remark: The values in the table above are reference values.

● Reed Switch Type

mm [in]

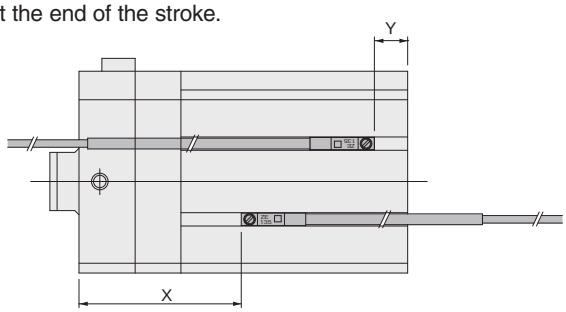
Item \ Bore	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Operating range: ℓ	4.5~8.5 [0.177~0.335]	5.5~9.5 [0.217~0.374]	9~13.5 [0.354~0.531]	10~15.5 [0.394~0.61]	8~12 [0.315~0.472]	8.5~14 [0.335~0.551]
Response differential: C	1.0 [0.039] or less	2.0 [0.079] or less				
Maximum sensing location	10 [0.394]					

Remark: The values in the table above are reference values.

Mounting Position of the End of Stroke Detection Sensor Switch

Mounting the sensor switch in the locations shown (values in diagram are reference values), the sensor magnet comes to the maximum sensing location of the sensor switch at the end of the stroke.

● Stroke adjusting cylinder



NOTE Following cylinder stroke adjusting, be sure to adjust the sensor switch mounting position also.

■ Solid State Type

● Double acting type

mm [in]

Code \ Bore		12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
X	Standard type	28 [1.102]	29 [1.142]	33 [1.299]	35 [1.378]	39 [1.535]	42 [1.654]
	With bumper (**-R**)	31 [1.220]	33 [1.299]	38 [1.496]	39 [1.535]	41 [1.614]	44 [1.732]
Y	Standard type	4 [0.157]	4 [0.157]	7.5 [0.295]	8 [0.315]	8 [0.315]	10 [0.394]
	With bumper (**-R**)	6 [0.236]	5 [0.197]	8 [0.315]	9 [0.354]	6 [0.236]	8 [0.315]

■ Reed Switch Type

● Double acting type

mm [in]

Code \ Bore		12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
X	Standard type	24.5 [0.965]	25 [0.984]	29 [1.142]	31 [1.220]	35 [1.378]	38 [1.496]
	With bumper (**-R**)	27.5 [1.083]	29 [1.142]	34 [1.339]	35 [1.378]	37 [1.457]	40 [1.575]
Y	Standard type	-0.5 [-0.02]	-0.5 [-0.02]	3 [0.118]	4 [0.157]	4 [0.157]	6 [0.236]
	With bumper (**-R**)	1.5 [0.059]	1 [0.039]	4 [0.157]	5 [0.197]	2 [0.079]	4 [0.157]