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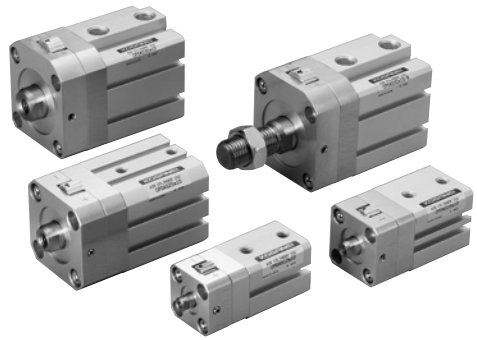
ACTUATORS GENERAL CATALOG

JIG CYLINDERS
C SERIES



JIG CYLINDERS C SERIES
STROKE-ADJUSTING CYLINDERS

JIG CYLINDERS C SERIES
LOW-FRICTION CYLINDERS

⚠ Caution Before use, be sure to read the “Safety Precautions” on p. 57.

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ACTUATORS GENERAL CATALOG

JIG CYLINDERS C SERIES

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⚠ Caution Before use, be sure to read the “Safety Precautions” on p. 57.

Square body demonstrates powerful downsizing capacity.

JIG CYLINDERS C SERIES

Richly abundant series of 9 different types and 69 models

A rich series configuration spanning from φ6 [0.236in.] to φ100 [3.940in.] responds to diverse needs far better than previous thin type cylinders.
Moreover, Non-ion specification is also available as standard.
(Excludes φ6 [0.236in.], φ8 [0.315in.], and φ10 [0.394in.])

Provides powerful back-up for device miniaturization

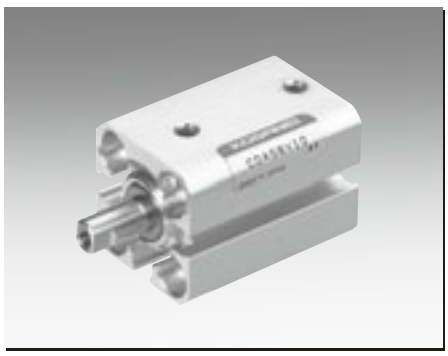
Exhibits no protrusions in its external shape even after a sensor switch has been mounted, for easy mounting in tight spaces.
This cylinder is one step up on cylinders of the same class in terms of size, mass, and performance.

φ 6 [0.236in.]

φ 100 [3.940in.]

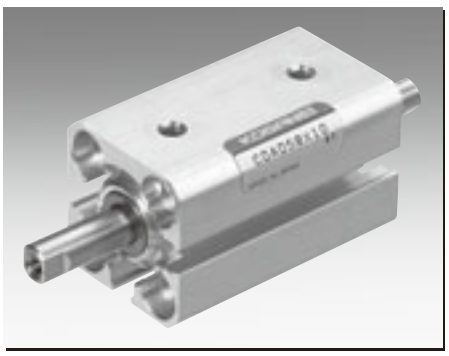
New Line-Up Includes φ 6 [0.236in.], φ 8 [0.315in.], and φ 10 [0.394in.]

For a greater selection in response to needs for miniaturization, 3 new bore sizes at φ 6, φ 8, and φ 10 have been added, increasing the range of sizes to choose from.



Standard Cylinders
φ6 [0.236in.]～φ100 [3.940in.]

Non-rotating Cylinders
φ6 [0.236in.]～φ10 [0.394in.]



Double Rod Cylinders
φ6 [0.236in.]～φ100 [3.940in.]

The Jig Cylinders C Series Includes the 9 Types Shown Below.

■Standard Cylinders p.137

■Non-rotating Cylinders p.145

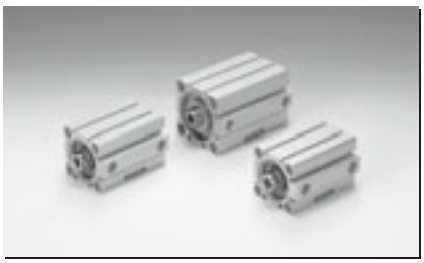
■Square Rod Cylinders p.149

■Double Rod Cylinders p.154

■Tandem Cylinders p.161

■Dual Stroke Cylinders p.170

■Lateral Load Resistant Cylinders p.180



■Long Stroke Cylinders p.185

■End Keep Cylinders p.190

■Mounting Brackets p.197

■Sensor Switches p.199

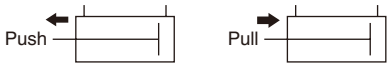
	Operation type			Cylinder specifications		Rod end specifications		Bumpers	Centering location	Non-ion specification	Mounting brackets		
	Double acting type	Single acting push type	Single acting pull type	Cylinder with magnet	Heat resistant type	Female thread	Male thread	Not available for heat resistant type		Not available for heat resistant type	Foot mounting bracket	Flange mounting bracket	Clevis mounting bracket
Standard Cylinders	■	■	■	■	□	■	■	□	□	□	□	□	
Non-rotating Cylinders	■ Note			■ Note		■ Note	■ Note						
Square Rod Cylinders	□			□		□	□	□	□		□	□	
Double Rod Cylinders	■	■		■	□	■	■	□	□	□	□	□	
Tandem Cylinders	□	□		□	□	□	□	□	□	□		□	
Dual Stroke Cylinders	□	□	□	□		□	□	□	□	□		□	
Lateral Load Resistant Cylinders	□			□		□	□	□	□	□	□	□	□
Long Stroke Cylinders	□			□		□	□	□	□	□	□	□	□
End Keep Cylinders	□			□		□	□	□	□	□	□	□	□

■ The colored areas include bore sizes of ϕ6, ϕ8, and ϕ10.
Note: Non-rotating cylinders are set at bore sizes ϕ6, ϕ8, and ϕ10 only.

Cylinder Thrust

Select a suitable bore size considering the load and air pressure to obtain the required thrust.
Since the figures in the table are calculated values, select a bore size that results in a load ratio (load ratio = $\frac{\text{Load}}{\text{Calculated value}}$) of 70% or less (50% or less for high speed).

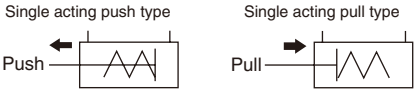
●Double acting type



N [lbf.]

Bore size mm [in.]	Piston rod diameter mm [in.]	Operation	Pressure area mm² [in.²]	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]	1.0 [145]
6 [0.236]	4 [0.157]	Push side	28.3 [0.0439]	2.8 [0.63]	5.7 [1.28]	8.5 [1.91]	11.3 [2.54]	14.1 [3.17]	17.0 [3.82]	19.8 [4.45]	22.6 [5.08]	25.4 [5.71]	–
		Pull side	15.7 [0.0243]	1.6 [0.36]	3.1 [0.7]	4.7 [1.06]	6.3 [1.42]	7.9 [1.78]	9.4 [2.11]	11.0 [2.47]	12.6 [2.83]	14.1 [3.17]	–
8 [0.315]	5 [0.197]	Push side	50.3 [0.0780]	5.0 [1.12]	10.1 [2.27]	15.1 [3.39]	20.1 [4.52]	25.1 [5.64]	30.2 [6.79]	35.2 [7.91]	40.2 [9.04]	45.2 [10.2]	–
		Pull side	30.6 [0.0474]	3.1 [0.70]	6.1 [1.37]	9.2 [2.07]	12.3 [2.77]	15.3 [3.44]	18.4 [4.14]	21.4 [4.81]	24.5 [5.51]	27.6 [6.20]	–
10 [0.394]	5 [0.197]	Push side	78.5 [0.1217]	7.9 [1.78]	15.7 [3.53]	23.6 [5.31]	31.4 [7.06]	39.3 [8.83]	47.1 [10.6]	55.0 [12.4]	62.8 [14.1]	70.7 [15.9]	–
		Pull side	58.9 [0.0913]	5.9 [1.33]	11.8 [2.65]	17.7 [3.98]	23.6 [5.31]	29.5 [6.63]	35.3 [7.94]	41.2 [9.26]	47.1 [10.6]	53.0 [11.9]	–
12 [0.472]	6 [0.236]	Push side	113.0 [0.175]	11.3 [2.54]	22.6 [5.08]	33.9 [7.62]	45.2 [10.2]	56.5 [12.7]	67.8 [15.2]	79.1 [17.8]	90.4 [20.3]	101.7 [22.86]	113.0 [25.40]
		Pull side	84.8 [0.131]	8.5 [1.91]	17.0 [3.82]	25.4 [5.71]	33.9 [7.62]	42.4 [9.53]	50.9 [11.4]	59.3 [13.3]	67.8 [15.2]	76.3 [17.2]	84.8 [19.1]
16 [0.630]	8 [0.315]	Push side	201.0 [0.312]	20.1 [4.52]	40.2 [9.04]	60.3 [13.6]	80.4 [18.1]	100.5 [22.59]	120.6 [27.11]	140.7 [31.63]	160.8 [36.15]	180.9 [40.67]	201.0 [45.18]
		Pull side	150.0 [0.233]	15.1 [3.39]	30.1 [6.77]	45.2 [10.2]	60.3 [13.6]	75.4 [16.9]	90.4 [20.3]	105.5 [23.72]	120.6 [27.11]	135.6 [30.48]	150.7 [33.88]
20 [0.787]	10 [0.394]	Push side	314.0 [0.487]	31.4 [7.06]	62.8 [14.1]	94.2 [21.2]	125.6 [28.23]	157.0 [35.29]	188.4 [42.35]	219.8 [49.41]	251.2 [56.47]	282.6 [63.53]	314.0 [70.59]
		Pull side	235.5 [0.365]	23.6 [5.31]	47.1 [10.6]	70.7 [15.9]	94.2 [21.2]	117.8 [26.48]	141.3 [31.76]	164.9 [37.07]	188.4 [42.35]	212.0 [47.66]	235.5 [52.94]
25 [0.984]	12 [0.472]	Push side	490.6 [0.760]	49.1 [11.0]	98.1 [22.1]	147.2 [33.09]	196.3 [44.13]	245.3 [55.14]	294.4 [66.18]	343.4 [77.20]	392.5 [88.23]	441.6 [99.27]	490.6 [110.3]
		Pull side	377.6 [0.585]	37.8 [8.50]	75.5 [17.0]	113.3 [25.47]	151.0 [33.94]	188.8 [42.44]	226.6 [50.94]	264.3 [59.41]	302.1 [67.91]	339.8 [76.39]	377.6 [84.88]
32 [1.260]	16 [0.630]	Push side	803.8 [1.246]	80.4 [18.1]	160.8 [36.15]	241.2 [54.22]	321.5 [72.27]	401.9 [90.35]	482.3 [108.4]	562.7 [126.5]	643.1 [144.6]	723.5 [162.6]	803.8 [180.7]
		Pull side	602.9 [0.934]	60.3 [13.6]	120.6 [27.11]	180.9 [40.67]	241.2 [54.22]	301.4 [67.75]	361.7 [81.31]	422.0 [94.87]	482.3 [108.4]	542.6 [122.0]	602.9 [135.5]
40 [1.575]	16 [0.630]	Push side	1256.0 [1.947]	125.6 [28.23]	251.2 [56.47]	376.8 [84.70]	502.4 [112.9]	628.0 [141.2]	753.6 [169.4]	879.2 [197.6]	1004.8 [225.9]	1130.4 [254.1]	1256.0 [282.3]
		Pull side	1055.0 [1.635]	105.5 [23.72]	211.0 [47.43]	316.5 [71.15]	422.0 [94.87]	527.5 [118.6]	633.0 [142.3]	738.5 [166.0]	844.0 [189.7]	949.5 [213.4]	1055.0 [237.2]
50 [1.969]	20 [0.787]	Push side	1962.5 [3.042]	196.3 [44.13]	392.5 [88.23]	588.8 [132.4]	785.0 [176.5]	981.3 [220.6]	1177.5 [264.7]	1373.8 [308.8]	1570.0 [352.9]	1766.3 [397.1]	1962.5 [441.2]
		Pull side	1648.5 [2.555]	164.9 [37.07]	329.7 [74.12]	494.6 [111.2]	659.4 [148.2]	824.3 [185.3]	989.1 [222.3]	1154.0 [259.4]	1318.8 [296.5]	1483.7 [333.5]	1648.5 [370.6]
63 [2.480]	20 [0.787]	Push side	3115.7 [4.829]	311.6 [70.05]	623.1 [140.1]	934.7 [210.1]	1246.3 [280.2]	1557.8 [350.2]	1869.4 [420.2]	2181.0 [490.3]	2492.5 [560.3]	2804.1 [630.4]	3115.7 [700.4]
		Pull side	2801.7 [4.343]	280.2 [62.99]	560.3 [126.0]	840.5 [188.9]	1120.7 [251.9]	1400.8 [314.9]	1681.0 [377.9]	1961.2 [440.9]	2241.3 [503.8]	2521.5 [566.8]	2801.7 [629.8]
80 [3.150]	25 [0.984]	Push side	5024.0 [7.787]	502.4 [112.9]	1004.8 [225.9]	1507.2 [338.8]	2009.6 [451.8]	2512.0 [564.7]	3014.4 [677.6]	3516.8 [790.6]	4019.2 [903.5]	4521.6 [1016.5]	5024.0 [1129.4]
		Pull side	4533.4 [7.027]	453.3 [101.9]	906.7 [203.8]	1360.0 [305.7]	1813.4 [407.7]	2266.7 [509.6]	2720.0 [611.5]	3173.4 [713.4]	3626.7 [815.3]	4080.0 [917.2]	4533.4 [1019.1]
100 [3.940]	32 [1.181]	Push side	7850.0 [12.168]	785.0 [176.5]	1570.0 [352.9]	2355.0 [529.4]	3140.0 [705.9]	3925.0 [882.3]	4710.0 [1058.8]	5495.0 [1235.3]	6280.0 [1411.7]	7065.0 [1588.2]	7850.0 [1764.7]
		Pull side	7046.2 [10.922]	704.6 [158.4]	1409.2 [316.8]	2113.8 [475.2]	2818.5 [633.6]	3523.1 [792.0]	4227.7 [950.4]	4932.3 [1108.8]	5636.9 [1267.2]	6341.5 [1425.6]	7046.2 [1584.0]

●Single acting type



N [lbf.]

Operation type	Bore size mm [in.]	Piston rod diameter mm [in.]	Pressure area mm² [in.²]	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]	1.0 [145]
Single acting push type	**6 [0.236]**	4 [0.157]	28.3 [0.0439]	–	–	5.6 [1.26]	8.4 [1.89]	11.2 [2.52]	14.1 [3.17]	16.9 [3.80]	19.7 [4.43]	22.5 [5.06]	–
	8 [0.315]	5 [0.197]	50.3 [0.0780]	–	–	10.4 [2.34]	15.4 [3.46]	20.4 [4.59]	25.5 [5.73]	30.5 [6.86]	35.5 [7.98]	40.5 [9.10]	–
	10 [0.394]	5 [0.197]	78.5 [0.1217]	–	–	18.9 [4.25]	26.7 [6.00]	34.6 [7.78]	42.4 [9.53]	50.3 [11.3]	58.1 [13.1]	66.0 [14.8]	–
	12 [0.472]	6 [0.236]	113.0 [0.175]	–	12.8 [2.88]	24.1 [5.42]	35.4 [7.96]	46.7 [10.5]	58.0 [13.0]	69.3 [15.6]	80.6 [18.1]	91.9 [20.7]	103.2 [23.20]
	16 [0.630]	6 [0.236]	201.0 [0.312]	–	26.1 [5.87]	46.2 [10.4]	66.3 [14.9]	86.4 [19.4]	106.5 [23.94]	126.6 [28.46]	146.7 [32.98]	166.8 [37.50]	186.9 [42.02]
	20 [0.787]	8 [0.315]	314.0 [0.487]	–	49.0 [11.0]	80.4 [18.1]	111.8 [25.13]	143.2 [32.19]	174.6 [39.25]	206.0 [46.31]	237.4 [53.37]	268.8 [60.43]	300.2 [67.48]
	25 [0.984]	10 [0.394]	490.6 [0.760]	–	76.3 [17.2]	125.4 [28.19]	174.5 [39.23]	223.5 [50.24]	272.6 [61.28]	321.6 [72.30]	370.7 [83.33]	419.8 [94.37]	468.8 [105.4]
	32 [1.260]	12 [0.472]	803.8 [1.246]	–	123.4 [27.74]	203.8 [45.81]	284.1 [63.87]	364.5 [81.94]	444.9 [100.0]	525.3 [118.1]	605.7 [136.2]	686.1 [154.2]	766.4 [172.3]
	40 [1.575]	16 [0.630]	1256.0 [1.947]	–	205.9 [46.29]	331.5 [74.52]	457.1 [102.8]	582.7 [131.0]	708.3 [159.2]	833.9 [187.5]	959.5 [215.7]	1085.1 [243.9]	1210.5 [272.1]
	50 [1.969]	20 [0.787]	1962.5 [3.042]	141.0 [31.70]	337.2 [75.80]	533.5 [119.9]	729.7 [164.0]	926.0 [208.2]	1122.2 [252.3]	1318.5 [296.4]	1514.7 [340.5]	1711.0 [384.6]	1907.2 [428.7]
Single acting pull type	**6 [0.236]**	4 [0.157]	15.7 [0.0243]	–	–	1.8 [0.40]	3.4 [0.76]	5.0 [1.12]	6.5 [1.46]	8.1 [1.82]	9.7 [2.18]	11.2 [2.52]	–
	8 [0.315]	5 [0.197]	30.6 [0.0474]	–	–	4.5 [1.01]	7.6 [1.71]	10.6 [2.38]	13.7 [3.08]	16.7 [3.75]	19.8 [4.45]	22.9 [5.15]	–
	10 [0.394]	5 [0.197]	58.9 [0.0913]	–	–	13.0 [2.92]	18.9 [4.25]	24.8 [5.58]	30.6 [6.88]	36.5 [8.21]	42.4 [9.53]	48.3 [10.9]	–
	12 [0.472]	6 [0.236]	84.8 [0.131]	–	7.2 [1.62]	15.6 [3.51]	24.1 [5.42]	32.6 [7.33]	41.1 [9.24]	49.5 [11.1]	58.0 [13.0]	66.5 [14.9]	75.0 [16.9]
	16 [0.630]	6 [0.236]	150.7 [0.234]	–	16.0 [3.60]	31.1 [6.99]	46.2 [10.4]	61.3 [13.8]	76.3 [17.2]	91.4 [20.5]	106.5 [23.94]	121.5 [27.31]	136.6 [30.71]
	20 [0.787]	8 [0.315]	235.5 [0.365]	–	33.3 [7.49]	56.9 [12.8]	80.4 [18.1]	104.0 [23.38]	127.5 [28.66]	151.1 [33.97]	174.6 [39.25]	198.2 [44.56]	221.7 [49.84]
	25 [0.984]	10 [0.394]	377.6 [0.585]	–	75.5 [17.0]	113.3 [25.47]	151.0 [33.94]	188.8 [42.44]	226.6 [50.94]	264.3 [59.41]	302.1 [67.91]	339.8 [76.39]	377.6 [84.88]
	32 [1.260]	12 [0.472]	602.9 [0.934]	–	61.4 [13.8]	121.7 [27.36]	182.0 [40.91]	242.2 [54.45]	302.5 [68.00]	362.8 [81.56]	423.1 [95.11]	483.4 [108.7]	543.7 [122.2]
	40 [1.575]	16 [0.630]	1055.0 [1.635]	–	165.7 [37.25]	271.2 [60.97]	376.7 [84.68]	482.2 [108.4]	587.7 [132.1]	693.2 [155.8]	798.7 [179.5]	904.2 [203.3]	1009.7 [227.0]
	50 [1.969]	20 [0.787]	1648.5 [2.555]	109.6 [24.64]	274.4 [61.69]	439.3 [98.75]	604.1 [135.8]	769.0 [172.9]	933.8 [209.9]	1098.7 [247.0]	1263.5 [284.0]	1428.4 [321.1]	1593.2 [358.2]

●Spring return force

N [lbf.]

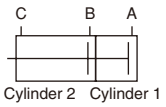
Bore size mm	Stroke mm	Zero stroke	End of stroke
6	× 5	2.1 [0.47]	2.9 [0.65]
	×10	1.2 [0.27]	
8	× 5	3.3 [0.74]	4.7 [1.06]
	×10	1.9 [0.43]	
10	× 5	3.3 [0.74]	4.7 [1.06]
	×10	1.9 [0.43]	
12	× 5	7.7 [1.73]	9.8 [2.20]
	×10	5.7 [1.28]	
	×15	3.7 [0.83]	
	×20	5.7 [1.28]	
	×25	4.7 [1.06]	
	×30	3.7 [0.83]	
16	× 5	11.1 [2.50]	14.1 [3.17]
	×10	8.2 [1.84]	
	×15	5.3 [1.19]	
	×20	8.2 [1.84]	
	×25	6.7 [1.51]	
	×30	5.3 [1.19]	
20	× 5	11.6 [2.61]	13.8 [3.10]
	×10	9.5 [2.14]	
	×15	7.3 [1.64]	
	×20	9.5 [2.14]	
	×25	8.4 [1.89]	
	×30	7.3 [1.64]	

N [lbf.]

Bore size mm	Stroke mm	Zero stroke	End of stroke
25	× 5	18.1 [4.07]	21.8 [4.90]
	×10	14.5 [3.26]	
	×15	10.7 [2.41]	
	×20	14.5 [3.26]	
	×25	12.7 [2.85]	
	×30	10.9 [2.45]	
32	× 5	32.0 [7.19]	37.4 [8.41]
	×10	26.7 [6.00]	
	×15	21.3 [4.79]	
	×20	26.7 [6.00]	
	×25	24.0 [5.40]	
	×30	21.3 [4.79]	
40	× 5	37.7 [8.47]	45.3 [10.18]
	×10	30.2 [6.79]	
	×15	22.6 [5.08]	
	×20	30.2 [6.79]	
	×25	26.4 [5.93]	
	×30	22.6 [5.08]	
50	×10	45.4 [10.21]	55.3 [12.43]
	×15	40.5 [9.10]	
	×20	35.5 [7.98]	
	×25	43.0 [9.67]	
	×30	40.5 [9.10]	
	×35	38.0 [8.54]	
	×40	35.5 [7.98]	

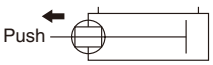
●How to read the thrust table

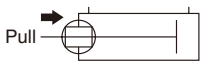
1. For the thrust of the double rod cylinder double acting type, see the pull side of the double acting type thrust table. For the thrust of the single acting type, see the single acting pull type thrust table.
2. The thrust of the tandem cylinder is double that of the standard type when air is supplied simultaneously to Port A and Port B, for any operation type before the stroke in Cylinder 1 is complete. When air is supplied to any of Ports A, B, or C alone, then the thrust is the same as for the standard type.



3. The thrust for dual stroke cylinders is the same as for the standard type, for any operation type.
4. When directly carrying a load, care must be exercised of a lateral load.
   For details, see p.206 “Lateral Load.”

●Square rod cylinders



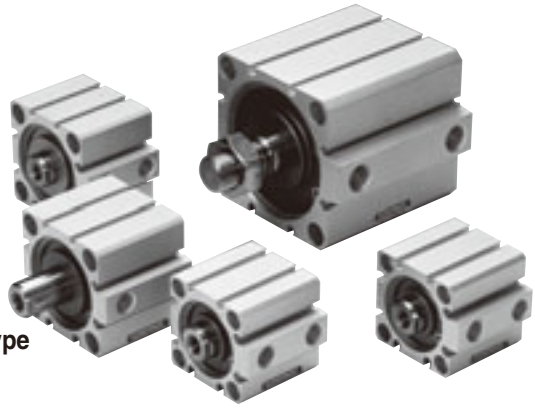


N [lbf.]

Bore size mm [in.]	Piston rod size mm [in.]	Operation	Pressure area mm² [in.²]	Air pressure MPa									
				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]	1.0 [145]
20 [0.787]	□7.4 [□0.291]	Push side	314.0 [0.487]	31.4 [7.06]	62.8 [14.1]	94.2 [21.2]	125.6 [28.23]	157.0 [35.29]	188.4 [42.35]	219.8 [49.41]	251.2 [56.47]	282.6 [63.53]	314.0 [70.59]
		Pull side	259.2 [0.402]	25.9 [5.82]	51.8 [11.6]	77.8 [17.5]	103.7 [23.3]	129.6 [29.13]	155.5 [34.96]	181.5 [40.80]	207.4 [46.62]	233.3 [52.45]	259.2 [58.27]
25 [0.984]		Push side	490.6 [0.760]	49.1 [11.0]	98.1 [22.1]	147.2 [33.09]	196.3 [44.13]	245.3 [55.14]	294.4 [66.18]	343.4 [77.20]	392.5 [88.23]	441.6 [99.27]	490.6 [110.3]
		Pull side	435.9 [0.676]	43.6 [9.80]	87.2 [19.6]	130.8 [29.40]	174.3 [39.18]	217.9 [48.98]	261.5 [58.79]	305.1 [68.59]	348.7 [78.39]	392.3 [88.19]	435.9 [97.99]
32 [1.260]	□13 [□0.512]	Push side	803.8 [1.246]	80.4 [18.1]	160.8 [36.15]	241.2 [54.22]	321.5 [72.27]	401.9 [90.35]	482.3 [108.4]	562.7 [126.5]	643.1 [144.6]	723.5 [162.6]	803.8 [180.7]
		Pull side	634.8 [0.984]	63.5 [14.3]	127.0 [28.55]	190.5 [42.82]	253.9 [57.08]	317.4 [71.35]	380.9 [85.63]	444.4 [99.90]	507.9 [114.2]	571.4 [128.5]	634.8 [142.7]
40 [1.575]		Push side	1256.0 [1.947]	125.6 [28.23]	251.2 [56.47]	376.8 [84.70]	502.4 [112.9]	628.0 [141.2]	753.6 [169.4]	879.2 [197.6]	1004.8 [225.9]	1130.4 [254.1]	1256.0 [282.3]
		Pull side	1087.0 [1.685]	108.7 [24.44]	217.4 [48.87]	326.1 [73.31]	434.8 [97.74]	543.5 [122.2]	652.2 [146.6]	760.9 [171.1]	869.6 [195.5]	978.3 [219.9]	1087.0 [244.4]
50 [1.969]	□18 [□0.709]	Push side	1962.5 [3.042]	196.3 [44.13]	392.5 [88.23]	588.8 [132.4]	785.0 [176.5]	981.3 [220.6]	1177.5 [264.7]	1373.8 [308.8]	1570.0 [352.9]	1766.3 [397.1]	1962.5 [441.2]
		Pull side	1638.5 [2.540]	163.9 [36.84]	327.7 [73.67]	491.6 [110.5]	655.4 [147.3]	819.3 [184.2]	983.1 [221.0]	1147.0 [257.8]	1310.8 [294.7]	1474.7 [331.5]	1638.5 [368.3]
63 [2.480]		Push side	3115.7 [4.829]	311.6 [70.05]	623.1 [140.1]	934.7 [210.1]	1246.3 [280.2]	1557.8 [350.2]	1869.4 [420.2]	2181.0 [490.3]	2492.5 [560.3]	2804.1 [630.4]	3115.7 [700.4]
		Pull side	2791.7 [4.327]	279.2 [62.76]	558.3 [125.5]	837.5 [188.3]	1116.7 [251.0]	1395.8 [313.8]	1675.0 [376.5]	1954.2 [439.3]	2233.3 [502.0]	2512.5 [564.8]	2791.7 [627.6]

JIG CYLINDERS C SERIES
STANDARD CYLINDERS

**Double Acting Type,
Single Acting Push Type, Single Acting Pull Type**



Symbols

●Double acting type ●Single acting push type ●Single acting pull type

Specifications

Item \ Bore size mm [in.]		6 [0.236]	8 [0.315]	10 [0.394]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]	80 [3.150]	100 [3.940]
Operation type		Double acting type, Single acting push type, Single acting pull type										Double acting type		
Media		Air												
Operating pressure range MPa [psi.]	Double acting type	0.15～0.9 [22～131]			0.1～1.0 [15～145]						0.05～1.0 [7～145]			
	Single acting type	0.25～0.9 [36～131]			0.15～1.0 Note1 [22～145]						0.1～1.0 [15～145]	—		
Proof pressure	MPa [psi.]	1.35 [196]			1.5 [218]									
Operating temperature range	°C [°F]	0～60 [32～140] (The heat resistant specification is 120 [248]. Note2)												
Operating speed range mm/s [in./sec.]	Double acting type	30～500 [1.2～19.7]			30～500 [1.2～19.7]						30～300 [1.2～11.8]			
	Single acting type	50～500 [2.0～19.7]			100～500 [3.9～19.7]						100～300 [3.9～11.8]	—		
Cushion	Double acting type	None			Rubber bumper (Option Note3)									
	Single acting type	None										—		
Lubrication		Not required (If lubrication is required, use Turbine Oil Class 1 [**ISO VG32**] or equivalent.)												
Port size		M3×0.5			M5×0.8				Rc1/8		Rc1/4		Rc3/8	

Remark: For Handling Instructions and Precautions, see p.205.

Notes: 1. The single acting pull type of ϕ12 is 0.18～1.0MPa [26～145psi.].
2. For heat resistant specification, it is not available with the sensor switch. Not available for bore sizes ϕ6, ϕ8, and ϕ10.
3. Not available for bore sizes ϕ6, ϕ8, and ϕ10, and heat resistant specification.

Note: For strokes that exceed the maximum standard strokes for each double acting type cylinder's bore size, use the long stroke cylinders on p.185～189.

Bore Size and Stroke

For non-standard strokes, see p.206. mm

Operation type	Bore size	Standard strokes	
		Standard cylinder	Cylinder with magnet
Double acting type	6	5, 10, 15, 20	5, 10, 15, 20
	8		
	10		
	12	5, 10, 15, 20, 25, 30	5, 10, 15, 20, 25, 30
	16		
	20	5, 10, 15, 20, 25, 30, 35, 40, 45, 50	5, 10, 15, 20, 25, 30, 35, 40, 45, 50
	25		
	32	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
	40		
	50	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
	63		
	80		
	100		
Single acting type	6	5, 10	5, 10
	8		
	10		
	12	5, 10, 15, 20, 25, 30	5, 10, 15, 20, 25, 30
	16		
	20		
	25		
	32		
	40		
	50	10, 15, 20, 25, 30, 35, 40	10, 15, 20, 25, 30, 35, 40

Remarks: 1. Stroke tolerance $^{+1}_{0}$ [$^{+0.039in.}_{0}$]
2. In most cases, body cutting is used for the non-standard strokes. However, body cutting is not used for strokes of less than 5mm for ϕ12～ϕ40, and strokes of less than 10mm for ϕ50～ϕ100. The collar packed is used for these cases.

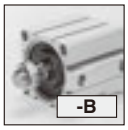
Order Codes for Standard Cylinders

Operation type

DA : Double acting type
SA : Single acting push type
TA : Single acting pull type

Rod end specification

Female thread


Male thread


Mounting type

Basic type


Foot mounting type Note7


Flange mounting type Note6


Sensor switch type Note4
(For cylinder with magnet)

Blank:
No sensor switch

-ZE135 : With ZE135
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Horizontal lead wire

-ZE155 : With ZE155
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Horizontal lead wire

-ZE235 : With ZE235
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Vertical lead wire

-ZE255 : With ZE255
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Vertical lead wire

-ZE101 : With ZE101 Note7
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V
  AC85～115V
- Horizontal lead wire

-ZE102 : With ZE102 Note7
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V
  AC85～115V
- Horizontal lead wire

-ZE201 : With ZE201 Note7
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V
  AC85～115V
- Vertical lead wire

-ZE202 : With ZE202 Note7
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V
  AC85～115V
- Vertical lead wire

Lead wire length

A : 1000mm [39in.]
B : 3000mm [118in.]

Number of sensor switches
(For cylinder with magnet)

Blank:
No sensor switch

1 : With 1 sensor switch
2 : With 2 sensor switches

Cylinder specification

Blank : Standard cylinder Note1 (Non-ion specification Note8)
S : Cylinder with magnet (Non-ion specification Note8)
F : Heat resistant cylinder Note2

Bumper Note3

Blank : No bumper
-R : With bumper

Centering location Note5

Blank : No centering location
-G : With centering location

Basic type			Bore size × Stroke							
C	DA SA TA	S F	×	-B	-R	-G	-1 -3	-ZE135 -ZE155 -ZE235 -ZE255 -ZE101 -ZE102 -ZE201 -ZE202	A B	1 2 ⋮ n

- See table for bore size and stroke.
- For information regarding the cylinder joint and cylinder rod end for male thread, see p.1568.
- For the order codes of sensor switches only, see p.199.
- For heat resistant specification, sensor switch is not available.
- Mounting brackets are included at shipping. For the clevis type, see p.181, Lateral Load Resistant Cylinders.
- In sizes ϕ12 and ϕ16 with foot mounting brackets and strokes of less than 10mm, the foot mounting bracket and sensor switch may interfere with each other, which could prevent 2 sensor switches from being mounted. For details, consult us.

Notes: 1. In the standard cylinder, a magnet for the sensor switch is not built-in.
2. Not available for the cylinder with magnet or the cylinder with bumper. Not available for bore sizes ϕ6, ϕ8, and ϕ10.
3. For the double acting type only. Not available for heat resistant specification, however. Not available for bore sizes ϕ6, ϕ8, and ϕ10.
4. For details of sensor switches, see p.1544.
5. Not available for bore sizes ϕ6～ϕ12.
6. Cannot be mounted on bore size ϕ40 with centering location (**-G**). Not available for bore sizes ϕ6, ϕ8, and ϕ10.
7. Not available for bore sizes ϕ6, ϕ8, and ϕ10. And cannot be mounted on the 5mm strokes of ϕ16 and ϕ25, and 10mm strokes of ϕ50, ϕ63, and ϕ80.
8. Bore sizes ϕ6, ϕ8, and ϕ10 are not non-ion specification.

Additional Parts (To be ordered separately)


Foot mounting bracket (p.197)

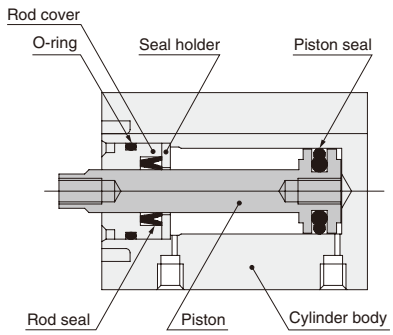

Flange mounting bracket (p.198)


Mounting screws (p.209)

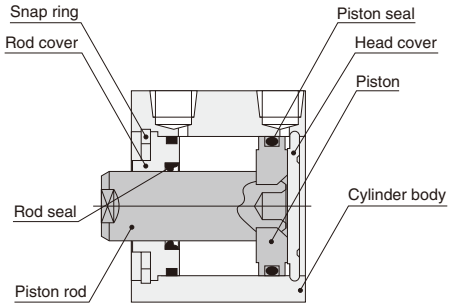
Inner Construction and Major Parts

●Double acting type (CDA)

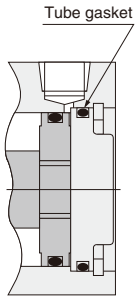
● ϕ6～ϕ10



● ϕ12～ϕ40

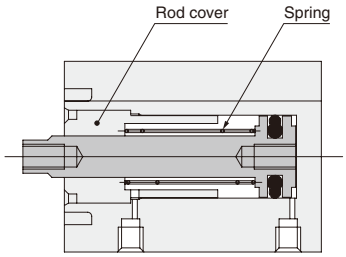


● ϕ50～ϕ100

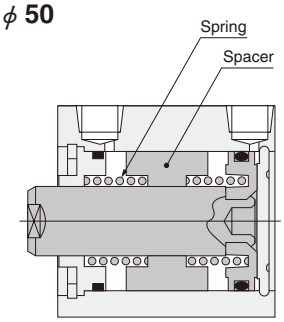


●Single acting push type (CSA)

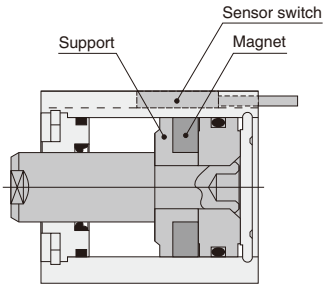
● ϕ6～ϕ10



● ϕ12～ϕ50



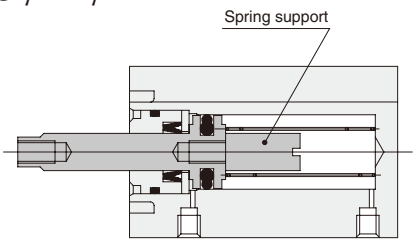
●Cylinder with magnet



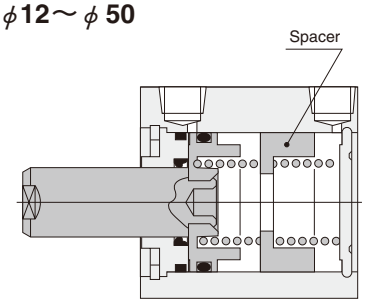
● The diagram is for ϕ 12～ϕ100.

●Single acting pull type (CTA)

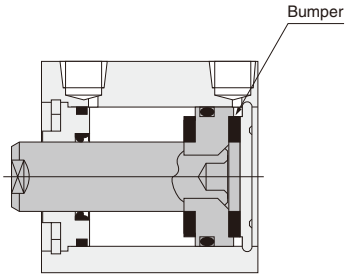
● ϕ6～ϕ10



● ϕ12～ϕ50



●With bumper



● The diagram is for ϕ 12～ϕ100.

Major Parts and Materials

Parts \ Bore mm	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20	ϕ25	ϕ32	ϕ40	ϕ50	ϕ63	ϕ80	ϕ100
Cylinder body	Aluminum alloy (anodized)												
Piston	Stainless steel			Aluminum alloy (special rust prevention treatment)									
Piston rod	—			Stainless steel (chrome plated)				Steel (chrome plated)					
Seal	Synthetic rubber (NBR)												
Rod cover	Aluminum alloy (special wear-resistant treatment)												
Head cover	—			Aluminum alloy (anodized)									
Snap ring	—			Steel (phosphate coating)									
Spring	Piano wire										—		
Spacer	—			Aluminum alloy (special rust prevention treatment)							—		
Bumper	—			Synthetic rubber (NBR; urethane for ϕ 12 only)									
Magnet	Neodymium magnet			Plastic magnet									
Support	Copper alloy			Aluminum alloy (special rust prevention treatment)									

Seals

Parts / Bore mm	Rod seal	Piston seal	Tube gasket	
			Rod side	Head side
ϕ **12**	MYR-6	COP-12	Y090260	None
ϕ **16**	MYR-8	COP-16	Y090207	None
ϕ **20**	MYR-10	COP-20(MYA-16)	Y090216	None
ϕ **25**	MYR-12	COP-25(MYA-21)	Y090210	None
ϕ **32**	MYR-16	COP-32	L090084	None
ϕ **40**	MYR-16	COP-40	L090151	None
ϕ **50**	MYR-20	COP-50	L090174	L090106
ϕ **63**	MYR-20	COP-63	L090180	L090107
ϕ **80**	PNY-25	COP-80	L090171	L090108
ϕ **100**	PNY-32	COP-100	L090172	L090109

Note: Items in parentheses ( ) are for the single acting type.

Mass

●Double acting type

g [oz.]

Bore size mm [in.]	Zero stroke mass	Additional mass for each 1mm [0.0394in.] stroke	Additional mass of cylinder with bumper	Additional mass of cylinder with magnet	Mass of mounting bracket		Additional mass of sensor switch Note	
					Foot bracket	Flange bracket	ZE□□□A	ZE□□□B
6 [0.236]	9.2 [0.325]	0.74 [0.0261]	—	3.9 [0.138]	—	—	15 [0.53]	35 [1.23]
8 [0.315]	13.1 [0.462]	0.95 [0.0335]	—	5.4 [0.190]	—	—		
10 [0.394]	18.1 [0.638]	1.12 [0.0395]	—	6.8 [0.240]	—	—		
12 [0.472]	20.59 [0.726]	1.28 [0.0451]	6.42 [0.226]	6.59 [0.232]	50 [1.76]	55 [1.94]		
16 [0.630]	28.93 [1.020]	1.62 [0.0571]	8.08 [0.285]	9.93 [0.350]	62 [2.19]	71 [2.50]		
20 [0.787]	46.71 [1.648]	2.26 [0.0797]	11.29 [0.398]	25.71 [0.907]	84 [2.96]	101 [3.56]		
25 [0.984]	70.47 [2.486]	3.11 [0.110]	15.53 [0.548]	37.47 [1.322]	104 [3.67]	160 [5.64]		
32 [1.260]	106.43 [3.754]	4.11 [0.145]	20.57 [0.726]	52.43 [1.849]	126 [4.44]	186 [6.56]		
40 [1.575]	166.15 [5.861]	4.77 [0.168]	0	69.15 [2.439]	160 [5.64]	335 [11.82]		
50 [1.969]	271.69 [9.583]	7.03 [0.248]	0	108 [3.81]	220 [7.76]	447 [15.77]		
63 [2.480]	435.06 [15.35]	8.69 [0.307]	0	159 [5.61]	300 [10.58]	591 [20.85]		
80 [3.150]	861.44 [30.39]	13.06 [0.461]	0	245 [8.64]	644 [22.72]	1414 [49.88]		
100 [3.940]	1583.88 [55.87]	18.61 [0.656]	0	360 [12.70]	1172 [41.34]	2606 [91.92]		

Note: Sensor switch codes A and B show the lead wire lengths.
A: 1000mm [39in.] B: 3000mm [118in.]

●Single acting push type

g [oz.]

Item / Bore mm \ Stroke mm	Basic mass Note1								Additional mass of cylinder with magnet	Mass of mounting bracket		Additional mass of sensor switch Note2	
	5	10	15	20	25	30	35	40		Foot bracket	Flange bracket	ZE□□□A	ZE□□□B
6	20.8 [0.734]	24.5 [0.864]	—	—	—	—	—	—	3.9 [0.138]	—	—	15 [0.53]	35 [1.23]
8	28.3 [0.998]	33.1 [1.167]	—	—	—	—	—	—	5.4 [0.190]	—	—		
10	36.2 [1.277]	41.8 [1.474]	—	—	—	—	—	—	6.8 [0.240]	—	—		
12	32.81 [1.157]	39.22 [1.383]	45.64 [1.610]	67 [2.36]	73.42 [2.590]	79.83 [2.816]	—	—	7.78 [0.274]	50 [1.76]	55 [1.94]		
16	46.6 [1.644]	54.68 [1.929]	62.75 [2.213]	91 [3.21]	99.08 [3.495]	107.15 [3.780]	—	—	10.32 [0.364]	62 [2.19]	71 [2.50]		
20	58.33 [2.057]	69.62 [2.456]	80.91 [2.854]	121 [4.27]	132.29 [4.666]	143.58 [5.065]	—	—	25.38 [0.895]	84 [2.96]	101 [3.56]		
25	86.37 [3.047]	101.9 [3.594]	117.43 [4.142]	173 [6.10]	188.53 [6.650]	204.06 [7.198]	—	—	39.1 [1.379]	104 [3.67]	160 [5.64]		
32	128.85 [4.545]	149.42 [5.271]	169.99 [5.996]	276 [9.74]	296.57 [10.461]	317.14 [11.187]	—	—	50.58 [1.784]	126 [4.44]	186 [6.56]		
40	190.73 [6.728]	214.58 [7.569]	238.43 [8.410]	373 [13.16]	396.85 [13.998]	420.7 [14.84]	—	—	69.42 [2.449]	160 [5.64]	335 [11.82]		
50	—	343.95 [12.132]	379.11 [13.372]	414.26 [14.61]	582 [20.53]	617.16 [21.769]	652.31 [23.009]	687.47 [24.249]	106.05 [3.741]	220 [7.76]	447 [15.77]		

Notes: 1. The above table is for the standard strokes.
2. Sensor switch codes A and B show the lead wire lengths.
A: 1000mm [39in.] B: 3000mm [118in.]

●Single acting pull type

g [oz.]

Item / Bore mm \ Stroke mm	Basic mass Note1								Additional mass of cylinder with magnet	Mass of mounting bracket		Additional mass of sensor switch Note2	
	5	10	15	20	25	30	35	40		Foot bracket	Flange bracket	ZE□□□A	ZE□□□B
6	20.5 [0.723]	24.2 [0.854]	—	—	—	—	—	—	3.9 [0.138]	—	—	15 [0.53]	35 [1.23]
8	27.6 [0.974]	32.4 [1.143]	—	—	—	—	—	—	5.5 [0.194]	—	—		
10	35.1 [1.238]	40.7 [1.436]	—	—	—	—	—	—	6.7 [0.236]	—	—		
12	32.03 [1.130]	38.44 [1.356]	44.86 [1.582]	64 [2.26]	70.42 [2.484]	76.83 [2.710]	—	—	8.56 [0.302]	50 [1.76]	55 [1.94]		
16	45.55 [1.607]	53.63 [1.892]	61.7 [2.176]	86 [3.03]	94.08 [3.319]	102.15 [3.603]	—	—	11.37 [0.401]	62 [2.19]	71 [2.50]		
20	68.4 [2.413]	79.69 [2.811]	90.98 [3.209]	125 [4.41]	136.29 [4.807]	147.58 [5.206]	—	—	26.31 [0.928]	84 [2.96]	101 [3.56]		
25	100.02 [3.528]	115.55 [4.076]	131.08 [4.623]	178 [6.28]	193.53 [6.826]	209.06 [7.374]	—	—	38.45 [1.356]	104 [3.67]	160 [5.64]		
32	144.73 [5.105]	165.3 [5.831]	185.87 [6.556]	269 [9.49]	289.57 [10.214]	310.14 [10.940]	—	—	51.71 [1.824]	126 [4.44]	186 [6.56]		
40	215.24 [7.592]	239.09 [8.434]	262.94 [9.275]	374 [13.19]	397.85 [14.034]	421.7 [14.875]	—	—	67.91 [2.395]	160 [5.64]	335 [11.82]		
50	—	378.94 [13.366]	414.1 [14.61]	449.25 [15.847]	580 [20.46]	615.16 [21.699]	650.31 [22.939]	685.47 [24.179]	70.06 [2.471]	220 [7.76]	447 [15.77]		

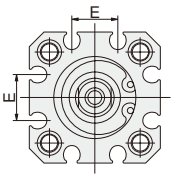
Notes: 1. The above table is for the standard strokes.
2. Sensor switch codes A and B show the lead wire lengths.
A: 1000mm [39in.] B: 3000mm [118in.]

Calculation example: For the mass of a double acting type cylinder with magnet, bore size of 25mm, stroke of 30mm, and with 2 sensor switches (**ZE135A**)
70.47+(3.11×30)+37.47+(15×2)=231.24g [8.157oz.]

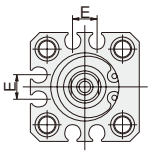
Dimensions of Standard Cylinder Double Acting Type (mm)

●ϕ6～ϕ25

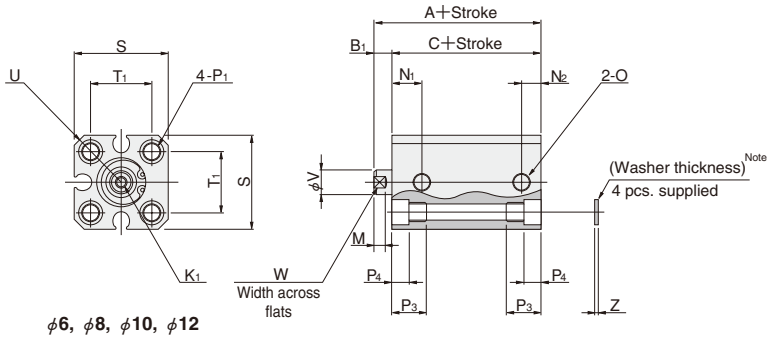
CAD CDA Bore size



ϕ20, ϕ25



ϕ16

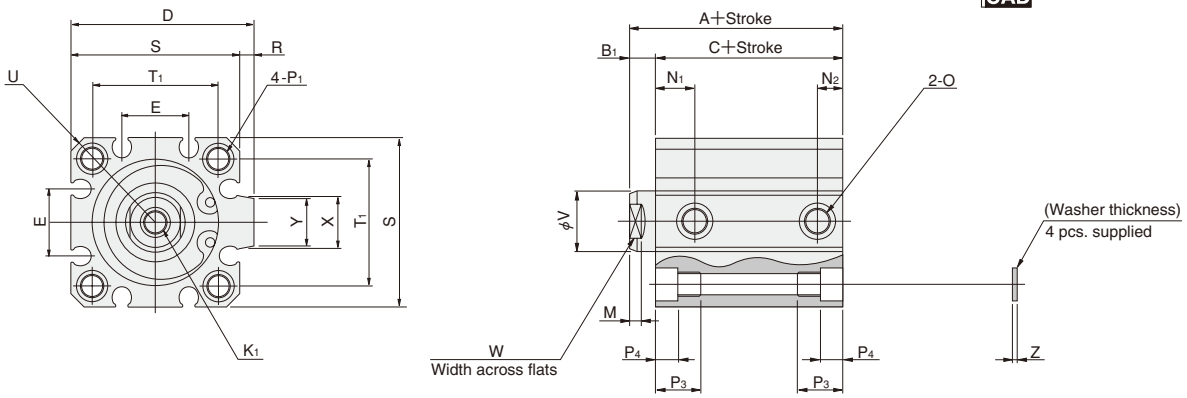


ϕ6, ϕ8, ϕ10, ϕ12

Note: Bore sizes ϕ6, ϕ8, and ϕ10 are not available with washers.
● The drawing is for ϕ12.

●ϕ32～ϕ100

CAD CDA Bore size



Type / Bore mm [in.] / Code	Standard cylinder (CDA)			Cylinder with magnet (CDAS)			Standard cylinder with bumper (CDA-R)			Cylinder with magnet and bumper (CDAS-R)			D	E	K1	M	N1	N2
	A	B1	C	A	B1	C	A	B1	C	A	B1	C						
6 [0.236]	19	5	14	24	5	19	—	—	—	—	—	—	—	—	M2.5X0.45 Depth5	3	6.5	3.5
8 [0.315]	20	5	15	25	5	20	—	—	—	—	—	—	—	—	M3X0.5 Depth5	3	7.5	3.5
10 [0.394]	21	5	16	26	5	21	—	—	—	—	—	—	—	—	M3X0.5 Depth5	3	8	4
12 [0.472]	22	5	17	27	5	22	27	5	22	32	5	27	—	—	M3X0.5 Depth6	3.5	8	5
16 [0.630]	22.5	5.5	17	27.5	5.5	22	27.5	5.5	22	32.5	5.5	27	—	6.2	M4X0.7 Depth8	3.5	8	5
20 [0.787]	25	5.5	19.5	35	5.5	29.5	30	5.5	24.5	40	5.5	34.5	—	12.2	M5X0.8 Depth10	4.5	9.5	5
25 [0.984]	27	6	21	37	6	31	32	6	26	42	6	36	—	12.2	M6X1 Depth10	5	10.5	5
32 [1.260]	30	7	23	40	7	33	35	7	28	40	7	33	48.5	18.2	M8X1.25 Depth12	6	9.5	7.5〔6〕
40 [1.575]	33	7	26	43	7	36	33	7	26	43	7	36	56.5	18.2	M8X1.25 Depth12	6	10.5	7.5
50 [1.969]	37	9	28	47	9	38	37	9	28	47	9	38	70	24.8	M10X1.5 Depth15	7	11	9.5
63 [2.480]	41	9	32	51	9	42	41	9	32	51	9	42	83	26.8	M10X1.5 Depth15	7	12.5	11
80 [3.150]	52	11	41	62	11	51	52	11	41	62	11	51	102	32.8	M14X2 Depth20	9	18	12
100 [3.940]	63	12	51	73	12	61	63	12	51	73	12	61	122	32.8	M18X2.5 Depth20	9	22.5	16.5

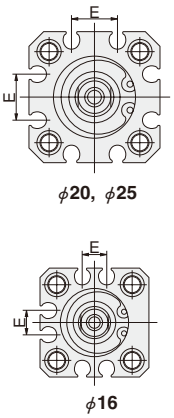
Type / Bore mm [in.]	O	P1	P3	P4	R	S	T1	U	V	W	X	Y	Z	Appropriate through bolt
6 [0.236]	M3X0.5	ϕ3.3 (Thru hole) C'bore ϕ6 (Both sides) and M4X0.7 (Both sides)	9.5	3.5	—	19	11	R12	4	3.5	—	—	—	M3
8 [0.315]	M3X0.5	ϕ3.3 (Thru hole) C'bore ϕ6.2 (Both sides) and M4X0.7 (Both sides)	9.5	3.5	—	21	13	R13.5	5	4	—	—	—	M3
10 [0.394]	M3X0.5	ϕ3.3 (Thru hole) C'bore ϕ6.2 (Both sides) and M4X0.7 (Both sides)	9.5	3.5	—	23	15	R15	5	4	—	—	—	M3
12 [0.472]	M5X0.8	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5X0.8 (Both sides)	9.5	4.5	—	25	16.3	R16	6	5	—	—	1	M3
16 [0.630]	M5X0.8	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5X0.8 (Both sides)	9.5	4.5	—	29	19.8	R19	8	6	—	—	1	M3
20 [0.787]	M5X0.8	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5X0.8 (Both sides)	9.5	4.5	—	34	24	R22	10	8	—	—	1	M3
25 [0.984]	M5X0.8	ϕ5.1 (Thru hole) C'bore ϕ8 (Both sides) and M6X1 (Both sides)	11.5	5.5	—	40	28	R25	12	10	—	—	1	M4
32 [1.260]	Rc1/8	ϕ5.1 (Thru hole) C'bore ϕ8 (Both sides) and M6X1 (Both sides)	11.5	5.5	4.5	44	34	R29.5	16	14	15	13.6	1	M4
40 [1.575]	Rc1/8	ϕ6.9 (Thru hole) C'bore ϕ9.5 (Both sides) and M8X1.25 (Both sides)	15.5	7.5	4.5	52	40	R35	16	14	15	13.6	1.6	M5
50 [1.969]	Rc1/4	ϕ6.9 (Thru hole) C'bore ϕ11 (Both sides) and M8X1.25 (Both sides)	16.5	8.5	8	62	48	R41	20	17	21.6	19	1.6	M6
63 [2.480]	Rc1/4	ϕ6.9 (Thru hole) C'bore ϕ11 (Both sides) and M8X1.25 (Both sides)	16.5	8.5	8	75	60	R50	20	17	21.6	19	1.6	M6
80 [3.150]	Rc3/8	ϕ10.5 (Thru hole) C'bore ϕ14 (Both sides) and M12X1.75 (Both sides)	22.5	10.5	8	94	74	R62	25	22	27.6	25	1.6	M8
100 [3.940]	Rc3/8	ϕ12.3 (Thru hole) C'bore ϕ17.5 (Both sides) and M14X2 (Both sides)	27	13	8	114	90	R75	32	27	27.6	25	2	M10

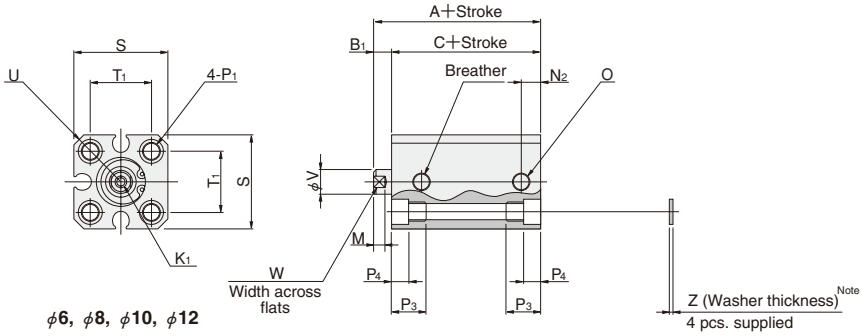
Note: Figure in parentheses 〔 〕 is for the standard cylinder (**CDA**) with 5mm stroke.
Remark: If using a through bolt to directly mount the body in place, see p.205.

Dimensions of Standard Cylinder Single Acting Push Type (mm)

●ϕ6～ϕ25

CSA Bore size



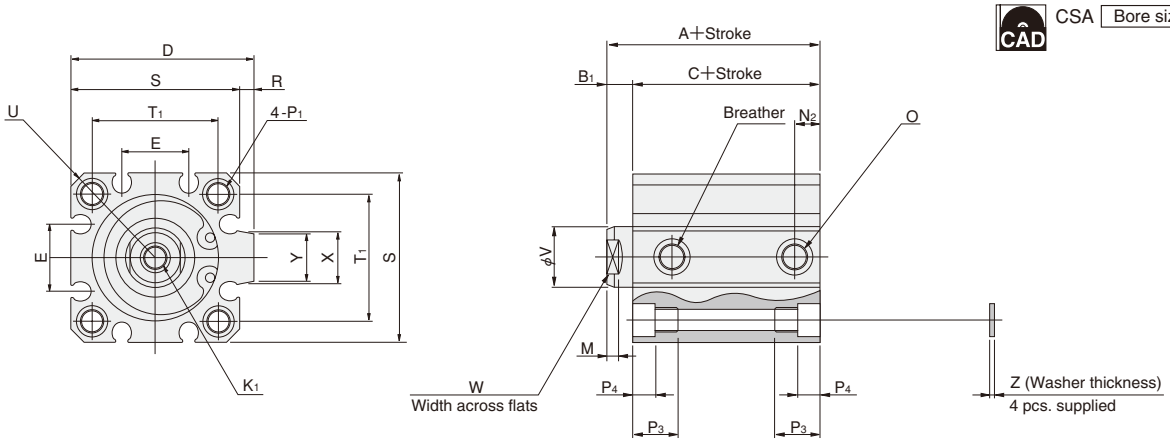


ϕ6, ϕ8, ϕ10, ϕ12

Note: Bore sizes ϕ6, ϕ8, and ϕ10 are not available with washers.
● The drawing is for ϕ12.

●ϕ32～ϕ50

CSA Bore size



Type / Stroke / Bore mm [in.] / Code	Standard cylinder (CSA) 5～15 (ϕ50: 10～20) A	B1	C	16～30 (ϕ50: 21～40) A	B1	C	Cylinder with magnet (CSAS) 5～15 (ϕ50: 10～20) A	B1	C	16～30 (ϕ50: 21～40) A	B1	C	D	E	K1	M	N2	O
6 [0.236]	29	5	24	—	—	—	34	5	29	—	—	—	—	—	M2.5×0.45 Depth5	3	3.5	M3×0.5
8 [0.315]	30	5	25	—	—	—	35	5	30	—	—	—	—	—	M3×0.5 Depth5	3	3.5	M3×0.5
10 [0.394]	31	5	26	—	—	—	36	5	31	—	—	—	—	—	M3×0.5 Depth5	3	4	M3×0.5
12 [0.472]	27	5	22	37	5	32	32	5	27	42	5	37	—	—	M3×0.5 Depth6	3.5	5	M5×0.8
16 [0.630]	27.5	5.5	22	37.5	5.5	32	32.5	5.5	27	42.5	5.5	37	—	6.2	M4×0.7 Depth8	3.5	5	M5×0.8
20 [0.787]	25	5.5	19.5	35	5.5	29.5	35	5.5	29.5	45	5.5	39.5	—	12.2	M5×0.8 Depth10	4.5	5	M5×0.8
25 [0.984]	27	6	21	37	6	31	37	6	31	47	6	41	—	12.2	M6×1 Depth10	5	5	M5×0.8
32 [1.260]	30	7	23	45	7	38	40	7	33	55	7	48	48.5	18.2	M8×1.25 Depth12	6	7.5〔6〕	Rc1/8
40 [1.575]	33	7	26	48	7	41	43	7	36	58	7	51	56.5	18.2	M8×1.25 Depth12	6	7.5	Rc1/8
50 [1.969]	37	9	28	52	9	43	47	9	38	62	9	53	70	24.8	M10×1.5 Depth15	7	9.5	Rc1/4

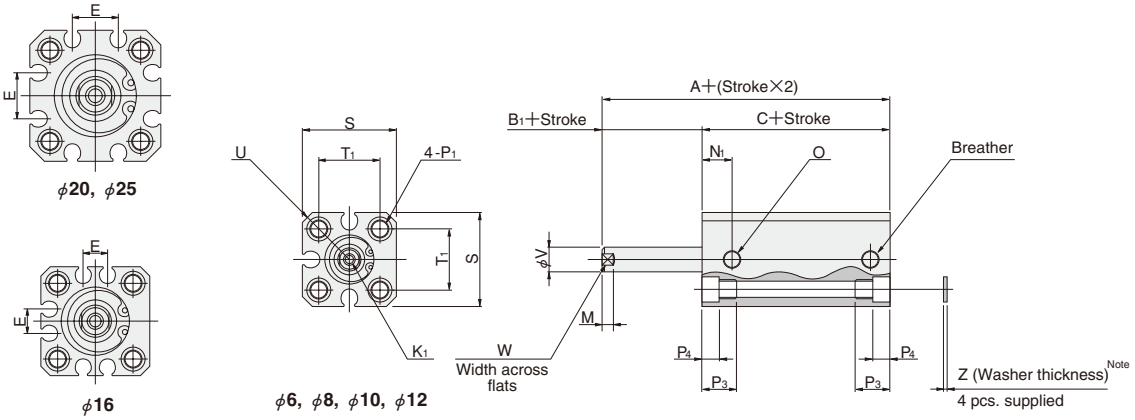
Bore mm [in.] / Code	P1	P3	P4	R	S	T1	U	V	W	X	Y	Z	Appropriate through bolt※
6 [0.236]	ϕ3.3 (Thru hole) C'bore ϕ6 (Both sides) and M4×0.7 (Both sides)	9.5	3.5	—	19	11	R12	4	3.5	—	—	—	M3
8 [0.315]	ϕ3.3 (Thru hole) C'bore ϕ6.2 (Both sides) and M4×0.7 (Both sides)	9.5	3.5	—	21	13	R13.5	5	4	—	—	—	M3
10 [0.394]	ϕ3.3 (Thru hole) C'bore ϕ6.2 (Both sides) and M4×0.7 (Both sides)	9.5	3.5	—	23	15	R15	5	4	—	—	—	M3
12 [0.472]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	25	16.3	R16	6	5	—	—	1	M3
16 [0.630]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	29	19.8	R19	8	6	—	—	1	M3
20 [0.787]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	34	24	R22	10	8	—	—	1	M3
25 [0.984]	ϕ5.1 (Thru hole) C'bore ϕ8 (Both sides) and M6×1 (Both sides)	11.5	5.5	—	40	28	R25	12	10	—	—	1	M4
32 [1.260]	ϕ5.1 (Thru hole) C'bore ϕ8 (Both sides) and M6×1 (Both sides)	11.5	5.5	4.5	44	34	R29.5	16	14	15	13.6	1	M4
40 [1.575]	ϕ6.9 (Thru hole) C'bore ϕ9.5 (Both sides) and M8×1.25 (Both sides)	15.5	7.5	4.5	52	40	R35	16	14	15	13.6	1.6	M5
50 [1.969]	ϕ6.9 (Thru hole) C'bore ϕ11 (Both sides) and M8×1.25 (Both sides)	16.5	8.5	8	62	48	R41	20	17	21.6	19	1.6	M6

Note: Figure in parentheses 〔 〕 is for the standard cylinder (**CSA**) with 5mm stroke.
Remark: If using a through bolt to directly mount the body in place, see p.205.
※Some types of mounting screws are available (to be ordered separately). See p.209.

Dimensions of Standard Cylinder Single Acting Pull Type (mm)

●ϕ6～ϕ25

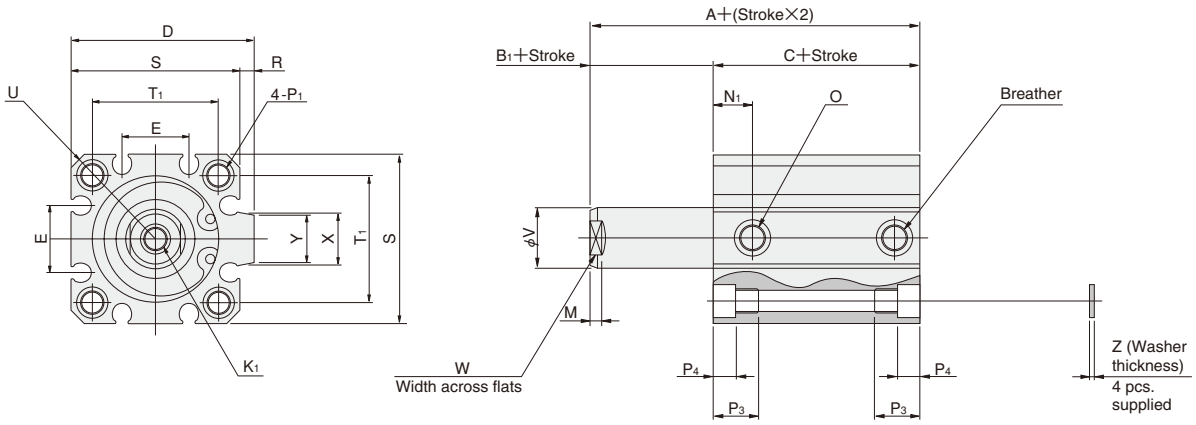
CAD CTA Bore size



Note: Bore sizes ϕ6, ϕ8, and ϕ10 are not available with washers.
● The drawing is for ϕ12.

●ϕ32～ϕ50

CAD CTA Bore size



Type / Stroke / Bore mm [in.] / Code	Standard cylinder (CTA)						Cylinder with magnet (CTAS)						D	E	K1	M	N1	O
	5～15 (ϕ50: 10～20)※1			16～30 (ϕ50: 21～40)			5～15 (ϕ50: 10～20)※1			16～30 (ϕ50: 21～40)								
	A	B1	C	A	B1	C	A	B1	C	A	B1	C						
6 [0.236]	29	5	24	—	—	—	34	5	29	—	—	—	—	—	M2.5×0.45 Depth5	3	6.5	M3×0.5
8 [0.315]	30	5	25	—	—	—	35	5	30	—	—	—	—	—	M3×0.5 Depth5	3	7.5	M3×0.5
10 [0.394]	31	5	26	—	—	—	36	5	31	—	—	—	—	—	M3×0.5 Depth5	3	8	M3×0.5
12 [0.472]	27	5	22	37	5	32	32	5	27	42	5	37	—	—	M3×0.5 Depth6	3.5	8	M5×0.8
16 [0.630]	27.5	5.5	22	37.5	5.5	32	32.5	5.5	27	42.5	5.5	37	—	6.2	M4×0.7 Depth8	3.5	8	M5×0.8
20 [0.787]	30	5.5	24.5	40	5.5	34.5	40	5.5	34.5	50	5.5	44.5	—	12.2	M5×0.8 Depth10	4.5	9.5	M5×0.8
25 [0.984]	32	6	26	42	6	36	42	6	36	52	6	46	—	12.2	M6×1 Depth10	5	10.5	M5×0.8
32 [1.260]	35	7	28	50	7	43	45	7	38	60	7	53	48.5	18.2	M8×1.25 Depth12	6	9.5	Rc1/8
40 [1.575]	38	7	31	53	7	46	48	7	41	63	7	56	56.5	18.2	M8×1.25 Depth12	6	10.5	Rc1/8
50 [1.969]	37	9	28	52	9	43	47	9	38	62	9	53	70	24.8	M10×1.5 Depth15	7	11	Rc1/4

Code / Bore mm [in.]	P1	P3	P4	R	S	T1	U	V	W	X	Y	Z	Appropriate through bolt※2
6 [0.236]	ϕ3.3 (Thru hole) C'bore ϕ6 (Both sides) and M4×0.7 (Both sides)	9.5	3.5	—	19	11	R12	4	3.5	—	—	—	M3
8 [0.315]	ϕ3.3 (Thru hole) C'bore ϕ6.2 (Both sides) and M4×0.7 (Both sides)	9.5	3.5	—	21	13	R13.5	5	4	—	—	—	M3
10 [0.394]	ϕ3.3 (Thru hole) C'bore ϕ6.2 (Both sides) and M4×0.7 (Both sides)	9.5	3.5	—	23	15	R15	5	4	—	—	—	M3
12 [0.472]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	25	16.3	R16	6	5	—	—	1	M3
16 [0.630]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	29	19.8	R19	8	6	—	—	1	M3
20 [0.787]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	34	24	R22	10	8	—	—	1	M3
25 [0.984]	ϕ5.1 (Thru hole) C'bore ϕ8 (Both sides) and M6×1 (Both sides)	11.5	5.5	—	40	28	R25	12	10	—	—	1	M4
32 [1.260]	ϕ5.1 (Thru hole) C'bore ϕ8 (Both sides) and M6×1 (Both sides)	11.5	5.5	4.5	44	34	R29.5	16	14	15	13.6	1	M4
40 [1.575]	ϕ6.9 (Thru hole) C'bore ϕ9.5 (Both sides) and M8×1.25 (Both sides)	15.5	7.5	4.5	52	40	R35	16	14	15	13.6	1.6	M5
50 [1.969]	ϕ6.9 (Thru hole) C'bore ϕ11 (Both sides) and M8×1.25 (Both sides)	16.5	8.5	8	62	48	R41	20	17	21.6	19	1.6	M6

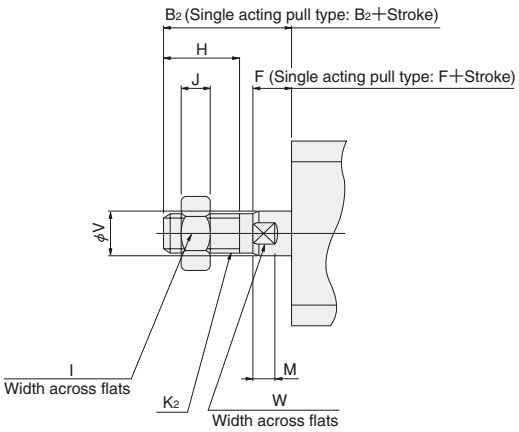
Remark: If using a through bolt to directly mount the body in place, see p.205.
※ 1. Bore sizes ϕ6, ϕ8, and ϕ10 are 5～10 strokes.
2. Some types of mounting screws are available (to be ordered separately). See p.209.

Dimensions of Male Rod End Thread Specification (mm)

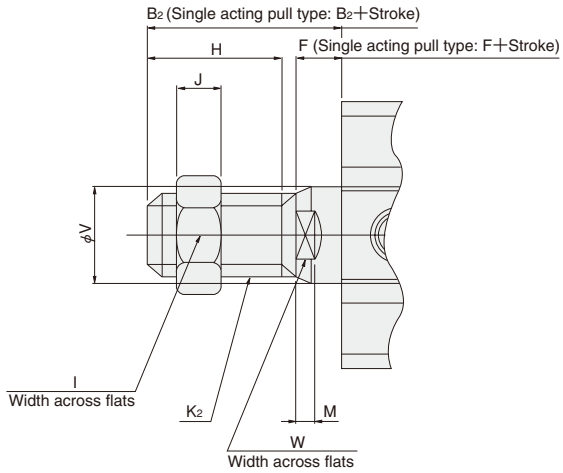
CAD Available in the file of each cylinder body.

●Double acting type, Single acting push type, Single acting pull type

● ϕ6～ϕ25



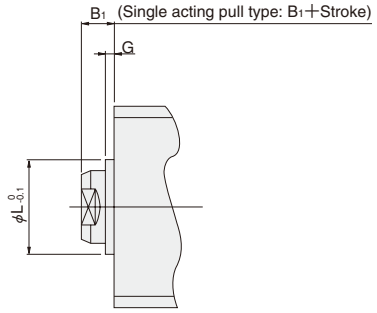
● ϕ32～ϕ100
(Single acting type available up to ϕ50)



Bore mm [in.] \ Code	B_2	F	H	I	J	K_2	M	V	W
6 [0.236]	15	5	8	5.5	1.8	M3×0.5	3	4	3.5
8 [0.315]	15	5	8	7	2.4	M4×0.7	3	5	4
10 [0.394]	15	5	8	7	2.4	M4×0.7	3	5	4
12 [0.472]	17	5	10	8	4	M5×0.8	3.5	6	5
16 [0.630]	20.5	5.5	13	10	5	M6×1	3.5	8	6
20 [0.787]	22.5	5.5	15	12	5	M8×1	4.5	10	8
25 [0.984]	24	6	15	14	6	M10×1.25	5	12	10
32 [1.260]	35	7	25	19	8	M14×1.5	6	16	14
40 [1.575]	35	7	25	19	8	M14×1.5	6	16	14
50 [1.969]	37	9	25	27	11	M18×1.5	7	20	17
63 [2.480]	37	9	25	27	11	M18×1.5	7	20	17
80 [3.150]	44	11	30	32	13	M22×1.5	9	25	22
100 [3.940]	50	12	35	36	14	M26×1.5	9	32	27

Remark: Cylinder joints and cylinder rod ends are available for mounting with the rod end male thread specification. For details, see p.1568.

Dimensions of Centering Location (mm)



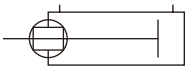
●Not available for bore sizes ϕ6, ϕ8, ϕ10 and ϕ12.

Bore mm [in.] \ Code	B_1	G	L
16 [0.630]	5.5	1.5	9.4
20 [0.787]	5.5	1.5	12
25 [0.984]	6	2	15
32 [1.260]	7	2	21
40 [1.575]	7	2	29
50 [1.969]	9	2	38
63 [2.480]	9	2	40
80 [3.150]	11	2	45
100 [3.940]	12	2	55

JIG CYLINDERS C SERIES
NON-ROTATING CYLINDERS

Double Acting Type

Symbol



Specifications

Item / Bore size mm [in.]	6 [0.236]	8 [0.315]	10 [0.394]
Operation type	Double acting type		
Media	Air		
Operating pressure range MPa [psi.]	0.15～0.9 [22～131]		
Proof pressure MPa[psi.]	1.35 [196]		
Operating temperature range °C [°F]	0～60 [32～140]		
Operating speed range mm/s [in./sec.]	50～500 [2.0～19.7]		
Cushion	—		
Lubrication	Not required (If lubrication is required, use Turbine Oil Class 1 [**ISO VG32**] or equivalent.)		
Non-rotating accuracy	±2°	±1.6°	±1.4°
Port size	M3×0.5		

Remark: For Handling Instructions and Precautions, see p.205.

Bore Size and Stroke

For non-standard strokes, see p.206.

mm

Bore size	Standard strokes	
	Standard cylinder	Cylinder with magnet
6	5, 10	5, 10
8		
10		

Remark: Stroke tolerance $^{+1}_{0}$ [$^{+0.039in.}_{0}$]

Order Codes for Non-rotating Cylinders

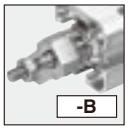
Operation type

DA : Double acting type

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
- DC10～28V
- Horizontal lead wire

-ZE235 : With ZE235
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Vertical lead wire

-ZE155 : With ZE155
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Horizontal lead wire

-ZE255 : With ZE255
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Vertical lead wire

Lead wire length

A : 1000mm [39in.]
B : 3000mm [118in.]

Number of sensor switches
(For cylinder with magnet)
Blank:
No sensor switch

1 : With 1 sensor switch
2 : With 2 sensor switches

Non-rotating cylinder

Cylinder specification

Blank : Standard cylinder Note1
S : Cylinder with magnet

Basic type				Bore size×Stroke				
C	DA	L	S	×	-B	-ZE135 -ZE155 -ZE235 -ZE255	A B	1 2 ⋮ n

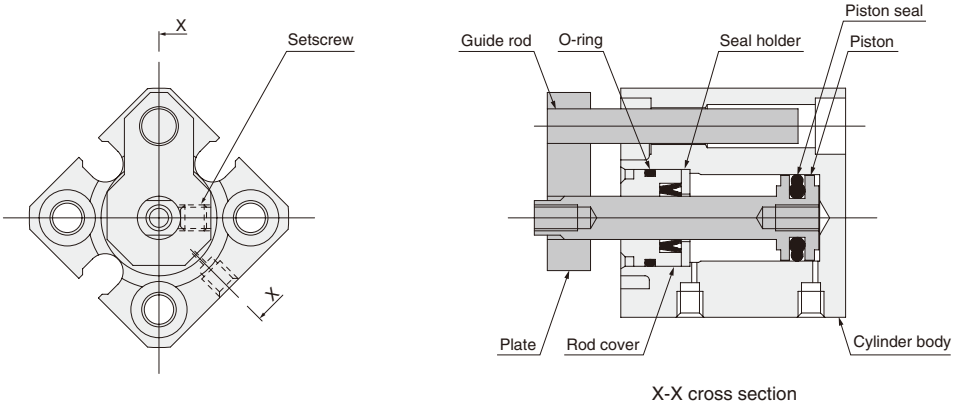
- See table for bore size and stroke.
- For information regarding the cylinder joint and cylinder rod end for male thread, see p.1568.
- For the order codes of sensor switches only, see p.199.

Notes: 1. In the standard cylinder, a magnet for the sensor switch is not built-in.
2. For details of sensor switches, see p.1544.

Inner Construction and Major Parts

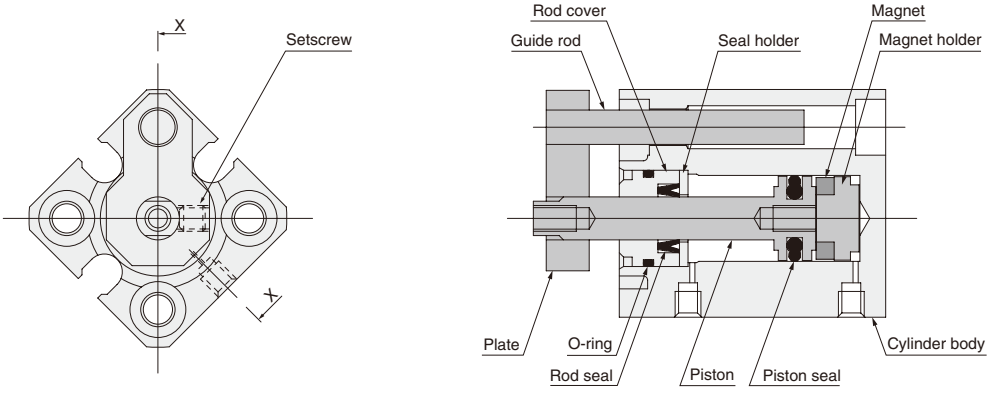
●Double acting type

●ϕ6～ϕ10



X-X cross section

●Cylinder with magnet



X-X cross section

Major Parts and Materials

Parts \ Bore mm	ϕ6～ϕ10
Cylinder body	Aluminum alloy (anodized)
Piston	Stainless steel
Seal	Synthetic rubber (NBR)
Seal holder	Copper alloy
Rod cover	Aluminum alloy (special wear resistant treatment)
Plate	Copper alloy (nickel plated)
Setscrew	Steel
Magnet	Neodymium magnet
Magnet holder	Copper alloy
Guide rod	Stainless steel

Mass

g [oz.]

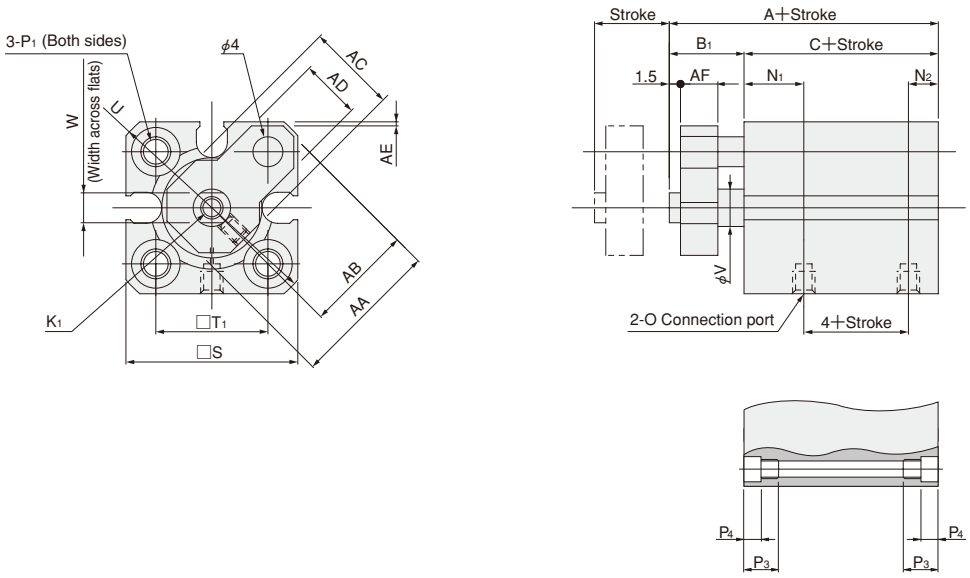
Bore size mm [in.]	Basic mass Note1		Mass with sensor		Additional mass of sensor switch Note2	
	5mm stroke	10mm stroke	5mm stroke	10mm stroke	**ZE□□□A**	**ZE□□□B**
6 [0.236]	19.8 [0.698]	23.4 [0.825]	23.1 [0.815]	27.1 [0.956]	15 [0.53]	35 [1.23]
8 [0.315]	26.4 [0.931]	31.1 [1.097]	31.2 [1.101]	36.3 [1.280]		
10 [0.394]	33.7 [1.189]	39.2 [1.383]	39.9 [1.407]	45.9 [1.619]		

Notes: 1. The above table is for the standard strokes.
2. Sensor switch codes A and B show the lead wire lengths.
A: 1000mm [39in.] B: 3000mm [118in.]

Calculation example: For the mass of a double acting type cylinder with magnet, bore size of 8mm, stroke of 10mm, and with 2 sensor switches (**ZE135A**)
36.3＋(15×2)＝66.3g [2.339oz.]

Dimensions of Non-rotating Cylinder Double Acting Type (mm)

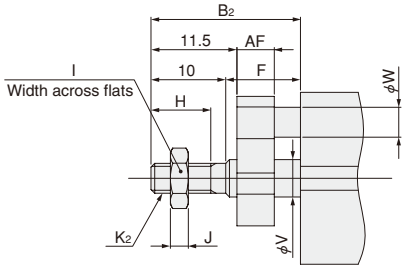
● ϕ6～ϕ10



Bore mm [in.] \ Type	Standard cylinder (CDAL)			Cylinder with magnet (CDALS)			K1		N1	N2	O	P1
Code	A	B1	C	A	B1	C						
6 [0.236]	24	10	14	29	10	19	M2.5×0.45	Depth5	6.5	3.5	M3×0.5	φ3.3 (Thru hole) C'bore φ6 (Both sides) and M4×0.7 (Both sides)
8 [0.315]	25	10	15	30	10	20	M3×0.5	Depth5	7.5	3.5	M3×0.5	φ3.3 (Thru hole) C'bore φ6.2 (Both sides) and M4×0.7 (Both sides)
10 [0.394]	26	10	16	31	10	21	M3×0.5	Depth5	8	4	M3×0.5	φ3.3 (Thru hole) C'bore φ6.2 (Both sides) and M4×0.7 (Both sides)

Bore mm [in.] \ Code	P3	P4	S	T1	U	V	W	Appropriate through bolt	AA	AB	AC	AD	AE	AF
6 [0.236]	9.5	3.5	19	11	R12	4	3.5	M3	15	11.5	9.5	7	0.3	5
8 [0.315]	9.5	3.5	21	13	R13.5	5	4	M3	17	12.5	11	7	0.6	5
10 [0.394]	9.5	3.5	23	15	R15	5	4	M3	20	14.5	12	8	0.5	5

Dimensions of Male Rod End Thread Specification (mm)

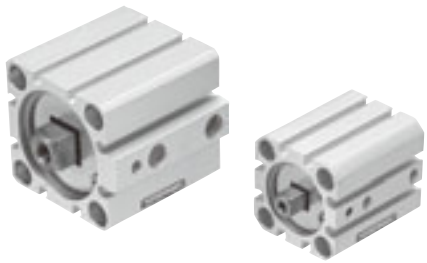


Bore mm [in.] \ Code	B2	F	H	I	J	K2	V	W	AF
6 [0.236]	20	10	8	5.5	1.8	M3×0.5	4	4	5
8 [0.315]	20	10	8	7	2.4	M4×0.7	5	4	5
10 [0.394]	20	10	8	7	2.4	M4×0.7	5	4	5

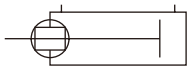
Remark: Cylinder joints and cylinder rod ends are available for mounting with the rod end male thread specification. For details, see p.1568.

JIG CYLINDERS C SERIES
SQUARE ROD CYLINDERS

Double Acting Type



Symbol



Specifications

Item \ Bore size mm [in.]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]
Operation type	Double acting type					
Media	Air					
Operating pressure range MPa [psi.]	0.1～1.0 [15～145]					
Proof pressure MPa [psi.]	1.5 [218]					
Operating temperature range °C [°F]	0～60 [32～140]					
Operating speed range mm/s [in./sec.]	30～500 [1.2～19.7]				30～300 [1.2～11.8]	
Cushion	Rubber bumper (Optional)					
Lubrication	Not required (If lubrication is required, use Turbine Oil Class 1 [**ISO VG32**] or equivalent.)					
Non-rotating accuracy	±1.5°		±0.8°		±0.6°	
Allowable torque Note N·cm [in·lbf]	2 [0.18]	2.4 [0.21]		4.4 [0.39]		
Port size	M5×0.8		Rc1/8		Rc1/4	

Remark: For Handling Instructions and Precautions, see p.205.
Note: Maximum torque allowed on piston rod.

Bore Size and Stroke

For non-standard strokes, see p.206.

mm

Bore size	Standard strokes	
	Standard cylinder	Cylinder with magnet
20	5, 10, 15, 20, 25, 30, 35, 40, 45, 50	5, 10, 15, 20, 25, 30, 35, 40, 45, 50
25		
32	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
40		
50	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
63		

Remarks: 1. Stroke tolerance $^{+1}_{0}$ [$^{+0.039in.}_{0}$]
2. In most cases, body cutting is used for the non-standard strokes.
However, body cutting is not used for strokes of less than 5mm for ϕ 12 ～ ϕ 40, and strokes of less than 10mm for ϕ 50 and ϕ 63. The collar packed is used for these cases.

Order Codes for Square Rod Cylinders

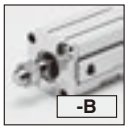
Operation type

DA : Double acting type

Rod end specification

Female thread

Male thread



Mounting type

Basic type

Foot mounting type

Flange mounting type Note2

Sensor switch type Note3
(For cylinder with magnet)

Blank:
No sensor switch

-ZE135 : With ZE135
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Horizontal lead wire

-ZE155 : With ZE155
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Horizontal lead wire

-ZE235 : With ZE235
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Vertical lead wire

-ZE255 : With ZE255
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Vertical lead wire

-ZE101 : With ZE101
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V AC85～115V
- Horizontal lead wire

-ZE102 : With ZE102
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V AC85～115V
- Horizontal lead wire

-ZE201 : With ZE201
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V AC85～115V
- Vertical lead wire

-ZE202 : With ZE202
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V AC85～115V
- Vertical lead wire

Lead wire length

A : 1000mm [39in.]
B : 3000mm [118in.]

Number of sensor switches
(For cylinder with magnet)
Blank:
No sensor switch

1 : With 1 sensor switch
2 : With 2 sensor switches

Square rod cylinder

Cylinder specification

Blank : Standard cylinder Note1
S : Cylinder with magnet

Bumper

Blank : No bumper
-R : With bumper

Centering location

Blank : No centering location
-G : With centering location

Basic type				Bore size × Stroke							
C	DA	L	S	×	-B	-R	-G	-1 -3	-ZE135 -ZE155 -ZE235 -ZE255 -ZE101 -ZE102 -ZE201 -ZE202	A B	1 2 ⋮ n

- See table for bore size and stroke.
- For information regarding the cylinder joint and cylinder rod end for male thread, see p.1568.
- Mounting brackets are included at shipping.
- For the order codes of sensor switches only, see p.199.

Notes: 1. In the standard cylinder, a magnet for the sensor switch is not built-in.
2. When using with a centering location (**-G**), the flange mounting bracket can be mounted on the head side only.
3. For details of sensor switches, see p.1544.

Additional Parts (To be ordered separately)

Foot mounting bracket (p.197)

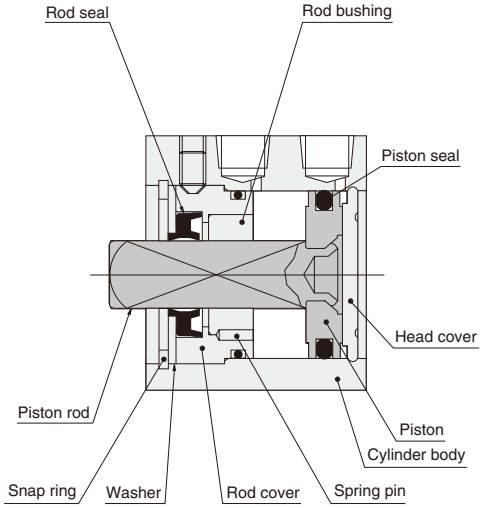
Flange mounting bracket (p.198)

Mounting screws (p.209)

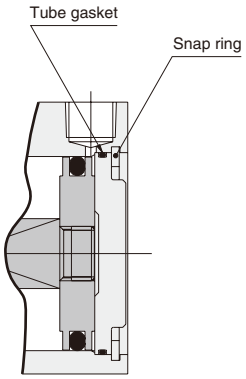
Inner Construction and Major Parts

●Double acting type

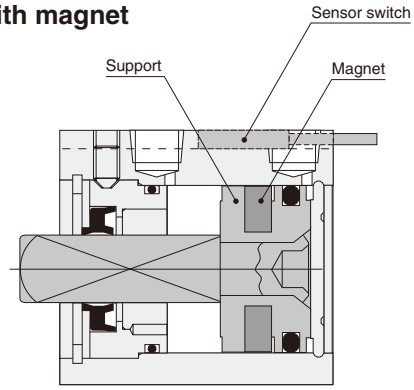
● φ20～φ40



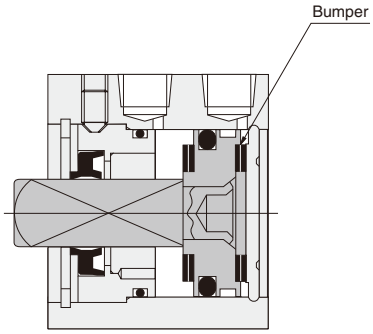
● φ50, φ63



●Cylinder with magnet



●With bumper



Major Parts and Materials

Parts \ Bore mm	φ20～φ63
Cylinder body	Aluminum alloy (anodized)
Piston	Aluminum alloy (special rust prevention treatment)
Piston rod	Steel (chrome plated)
Seal	Synthetic rubber (NBR; urethane for the rod seal)
Rod bushing	Oil impregnated bronze
Rod cover	Aluminum alloy (anodized)
Head cover	Aluminum alloy (anodized)
Spring pin	Steel
Washer	Steel (nickel plated)
Snap ring	Steel (phosphate coating)
Bumper	Synthetic rubber (NBR)
Magnet	Plastic magnet
Support	Aluminum alloy (special rust prevention treatment)

Seals

Parts / Bore mm	Rod seal	Piston seal	Tube gasket	
			Rod side	Head side
φ20	KC-7.4	COP-20	Y090216	None
φ25	KC-7.4	COP-25	Y090210	None
φ32	KC-13	COP-32	L090084	None
φ40	KC-13	COP-40	L090151	None
φ50	KC-18	COP-50	L090174	L090106
φ63	KC-18	COP-63	L090180	L090107

Mass

g [oz.]

Bore size mm [in.]	Zero stroke mass Note1	Additional mass for each 1mm [0.0394in.] stroke	Additional mass of cylinder with bumper	Additional mass of cylinder with magnet	Mass of mounting bracket		Additional mass of sensor switch Note2	
					Foot bracket	Flange bracket	ZE□□□A	ZE□□□B
20 [0.787]	63.89 [2.254]	2.07 [0.0730]	10.36 [0.365]	25.71 [0.907]	87 [3.07]	105 [3.70]	15 [0.53]	35 [1.23]
25 [0.984]	96.54 [3.405]	2.65 [0.0935]	13.24 [0.467]	37.47 [1.322]	108 [3.81]	165 [5.82]		
32 [1.260]	160.05 [5.646]	3.86 [0.136]	19.31 [0.681]	52.43 [1.849]	131 [4.62]	196 [6.91]		
40 [1.575]	241.47 [8.517]	4.52 [0.159]	0	69.15 [2.439]	168 [5.93]	351 [12.38]		
50 [1.969]	477.70 [16.850]	7.11 [0.251]	0	108 [3.81]	232 [8.18]	471 [16.61]		
63 [2.480]	706.58 [24.923]	8.77 [0.309]	0	159 [5.61]	312 [11.01]	615 [21.69]		

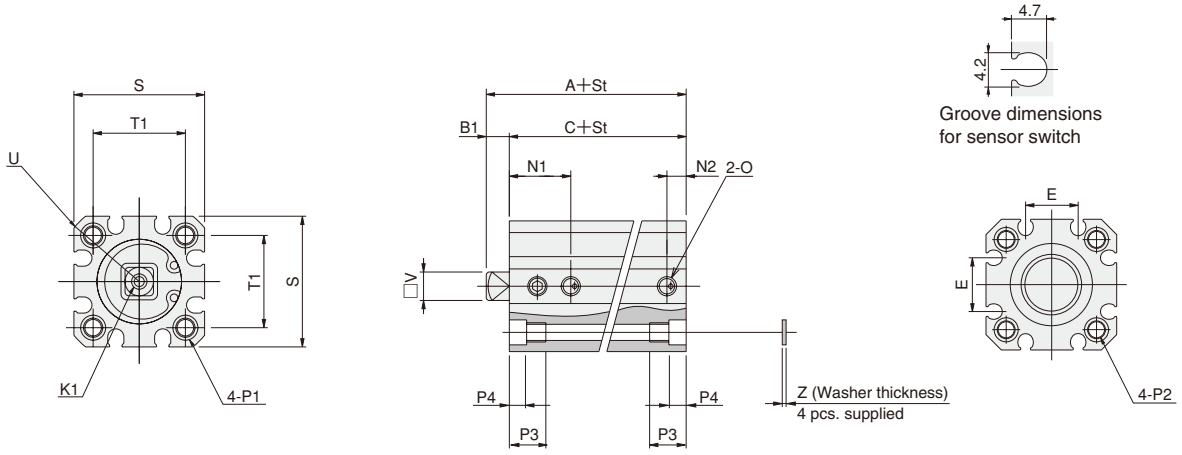
Notes: 1. The above table is for the standard strokes.
2. Sensor switch codes A and B show the lead wire lengths.
A : 1000mm [39in.] B : 3000mm [118in.]

Calculation example: For the mass of a double acting type cylinder with magnet, bore size of 32mm, stroke of 30mm, and with 2 sensor switches (**ZE135A**)
167.38＋(3.86×30)＋52.43＋(15×2)＝365.61g [12.896oz.]

Dimensions of Square Rod Cylinder Double Acting Type (mm)

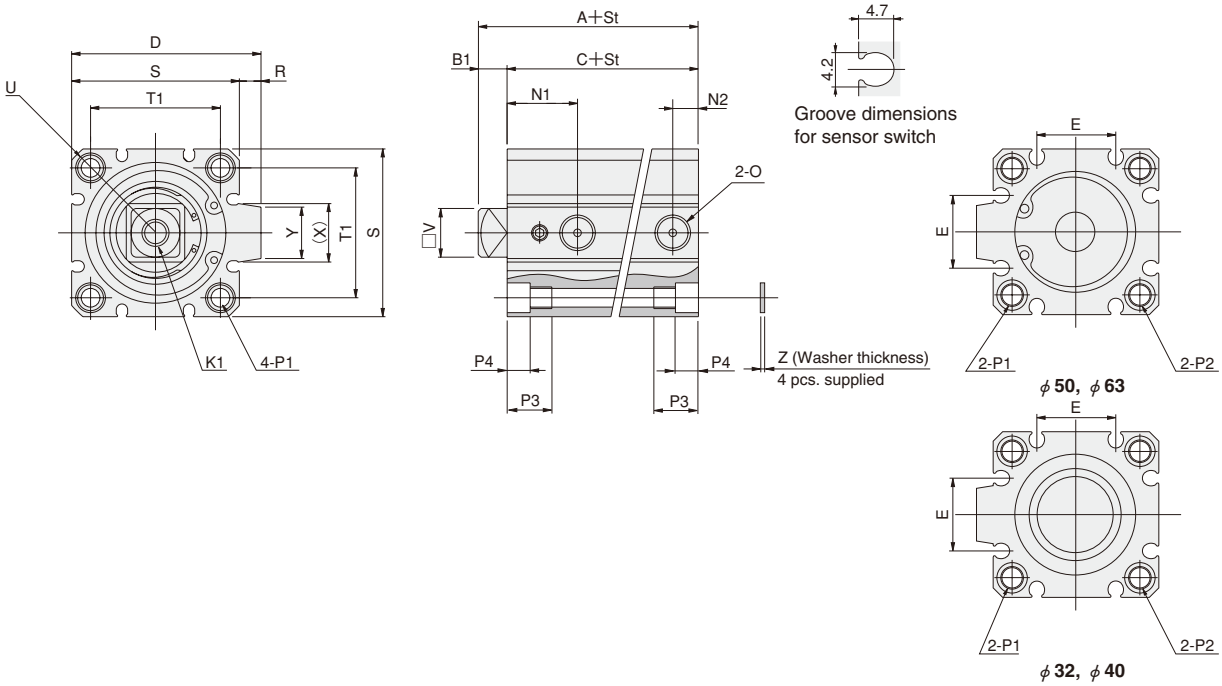
● ϕ20～ϕ25

CAD CDAL Bore size



● ϕ32～ϕ63

CAD CDAL Bore size



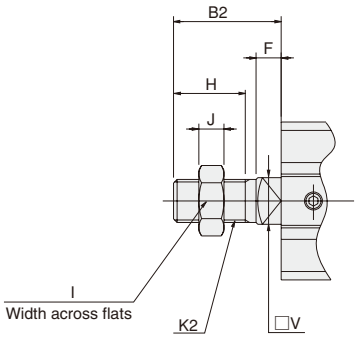
Type / Bore mm [in.] / Code	Standard cylinder (CDAL)			Cylinder with magnet (CDALS)			Standard cylinder with bumper (CDAL-R)			Cylinder with magnet and bumper (CDALS-R)			D	E	K1	N1	N2	O
	A	B1	C	A	B1	C	A	B1	C	A	B1	C						
20 [0.787]	32	6	26	42	6	36	37	6	31	47	6	41	—	12.2	M4×0.7 Depth8	16	5	M5×0.8
25 [0.984]	33.5	6	27.5	43.5	6	37.5	38.5	6	32.5	48.5	6	42.5	—	12.2	M4×0.7 Depth8	17	5	M5×0.8
32 [1.260]	39	7	32	49	7	42	44	7	37	49	7	42	48.5	18.2	M8×1.25 Depth12	18.5	7.5〔6〕	Rc1/8
40 [1.575]	43	7	36	53	7	46	43	7	36	53	7	46	56.5	18.2	M8×1.25 Depth12	20.5	7.5	Rc1/8
50 [1.969]	53.7	10.7	43	63.7	10.7	53	53.7	10.7	43	63.7	10.7	53	70	24.8	M10×1.5 Depth15	26	9.5	Rc1/4
63 [2.480]	56.2	9.2	47	66.2	9.2	57	56.2	9.2	47	66.2	9.2	57	83	26.8	M10×1.5 Depth15	27.5	11	Rc1/4

Bore mm [in.] / Code	P1	P2	P3	P4	R	S	T1	U	V	X	Y	Z	Appropriate through bolt※
20 [0.787]	φ4.3 (Thru hole) C'bore φ6.5 (Both sides) and M5×0.8 (Both sides)	Counterbore φ6.5 and M5×0.8	9.5	4.5	—	34	24	R22	7.4	—	—	1	M3
25 [0.984]	φ5.1 (Thru hole) C'bore φ8 (Both sides) and M6×1 (Both sides)	Counterbore φ8 and M6×1	11.5	5.5	—	40	28	R25	7.4	—	—	1	M4
32 [1.260]	φ5.1 (Thru hole) C'bore φ8 (Both sides) and M6×1 (Both sides)	Counterbore φ8 and M6×1	11.5	5.5	4.5	44	34	R29.5	13	15	13.6	1	M4
40 [1.575]	φ6.9 (Thru hole) C'bore φ9.5 (Both sides) and M8×1.25 (Both sides)	Counterbore φ9.5 and M8×1.25	15.5	7.5	4.5	52	40	R35	13	15	13.6	1.6	M5
50 [1.969]	φ6.9 (Thru hole) C'bore φ11 (Both sides) and M8×1.25 (Both sides)	Counterbore φ11 and M8×1.25	16.5	8.5	8	62	48	R41	18	21.6	19	1.6	M6
63 [2.480]	φ6.9 (Thru hole) C'bore φ11 (Both sides) and M8×1.25 (Both sides)	Counterbore φ11 and M8×1.25	16.5	8.5	8	75	60	R50	18	21.6	19	1.6	M6

Note: Figure in parentheses 〔 〕 is for the standard cylinder (**CDAL**) with 5mm stroke.
※Some types of mounting screws are available (to be ordered separately). See p.209.

Dimensions of Male Rod End Thread Specification (mm)

CAD Available in the file of each cylinder body.

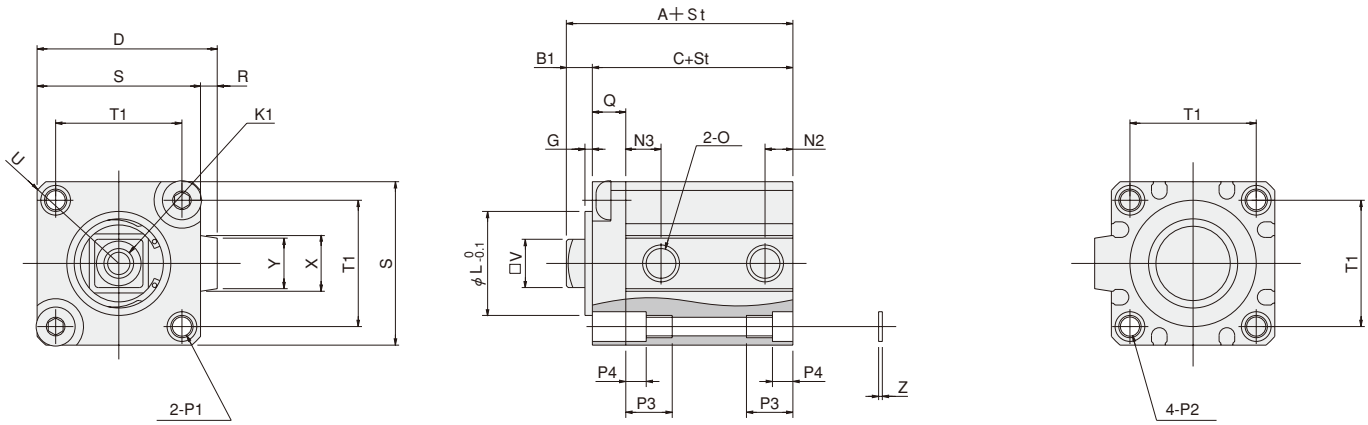


Bore mm [in.] \ Code	B_2	F	H	I	J	K_2	V
20 [0.787]	21	6	13	10	5	M6×1	7.4
25 [0.984]	23	6	15	12	5	M8×1	7.4
32 [1.260]	30	7	20	17	7	M12×1.25	13
40 [1.575]	35	7	25	19	8	M14×1.5	13
50 [1.969]	38.7	10.7	25	27	11	M18×1.5	18
63 [2.480]	37.2	9.2	25	27	11	M18×1.5	18

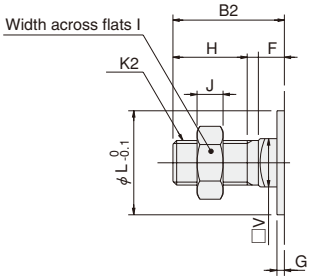
Remark: Cylinder joints and cylinder rod ends are available for mounting with the rod end male thread specification. For details, see p.1568.

Dimensions of Centering Location (mm)

●Female thread specification, with centering location



●Male thread specification, with centering location



Bore mm [in.] \ Code	B_1	G	L	N_3	Q
20 [0.787]	6	1.5	18	9.5	6.5
25 [0.984]	6	2	18	10.5	6.5
32 [1.260]	7	2	28	9.5	9
40 [1.575]	7	2	28	10.5	10
50 [1.969]	10.7	2	38	11	15
63 [2.480]	9.2	2	40	12.5	15

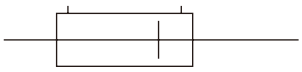
● The outward view of the square rod cylinder with centering location differs from the view in the case of no centering location, in that a rod cover is mounted on the piston rod side, as shown in the dimension above.
For the dimension tables for female thread specification with centering location, also use the table on p.152, while for male thread specification with centering location, see the above this page.

JIG CYLINDERS C SERIES DOUBLE ROD CYLINDERS

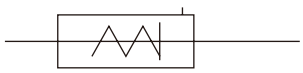
Double Acting Type, Single Acting Type

Symbols

● **Double acting type**



● **Single acting type**



Specifications

Item \ Bore size mm [in.]		6 [0.236]	8 [0.315]	10 [0.394]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]	80 [3.150]	100 [3.940]
Operation type		Double acting type			Double acting type, Single acting type							Double acting type		
Media		Air												
Operating pressure range MPa [psi.]	Double acting type	0.15～0.9 [22～131]			0.1～1.0 [15～145]						0.05～1.0 [7～145]			
	Single acting type	—			0.18～1.0 [26～145]	0.15～1.0 [22～145]					0.1～1.0 [15～145]	—		
Proof pressure	MPa [psi.]	1.35 [196]			1.5 [218]									
Operating temperature range	°C [°F]	0～60 [32～140] (The heat resistant specification is 120 [248]. Note1)												
Operating speed range mm/s [in./sec.]	Double acting type	50～500 [2.0～19.7]			30～500 [1.2～19.7]						30～300 [1.2～11.8]			
	Single acting type	—			100～500 [3.9～19.7]						100～300 [3.9～11.8]	—		
Cushion	Double acting type	None			Rubber bumper (Option Note2)									
	Single acting type	—			None							—		
Lubrication		Not required (If lubrication is required, use Turbine Oil Class 1 [**ISO VG32**] or equivalent.)												
Port size		M3×0.5			M5×0.8				Rc1/8		Rc1/4		Rc3/8	

Remark: For Handling Instructions and Precautions, see p.205.

Notes: 1. For heat resistant specification, consult us. Not available for bore sizes ϕ6, ϕ8, and ϕ10.
2. Not available for heat resistant specification.

Bore Size and Stroke

For non-standard strokes, see p.206.

mm

Operation type	Bore size	Standard strokes	
		Standard cylinder	Cylinder with magnet
Double acting type	**6**	5, 10, 15, 20	5, 10, 15, 20
	8		
	10		
	12	5, 10, 15, 20, 25, 30	5, 10, 15, 20, 25, 30
	16		
	20	5, 10, 15, 20, 25, 30, 35, 40, 45, 50	5, 10, 15, 20, 25, 30, 35, 40, 45, 50
	25		
	32	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
	40		
	50	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
	63		
	80		
	100		
Single acting type	**12**	5, 10, 15, 20, 25, 30	5, 10, 15, 20, 25, 30
	16		
	20		
	25		
	32		
	40		
	50	10, 15, 20, 25, 30, 35, 40	10, 15, 20, 25, 30, 35, 40

Remarks: 1. Stroke tolerance $^{+1}_{0}$ [$^{+0.039in.}_{0}$]
2. In most cases, body cutting is used for the non-standard strokes.
However, body cutting is not used for strokes of less than 5mm for ϕ12～ϕ40, and strokes of less than 10mm for ϕ50～ϕ100. The collar packed is used for these cases.
Bore sizes ϕ6 to ϕ10 are collar packed only.

Order Codes for Double Rod Cylinders

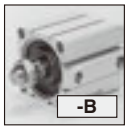
Operation type

DA : Double acting type
SA : Single acting type Note1

Rod end specification Note4

Female thread

Male thread



Mounting type

Basic type

Foot mounting type Note7

Flange mounting type Note8

Sensor switch type Note6
(For cylinder with magnet)

Blank:
No sensor switch

-ZE135 : With ZE135
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Horizontal lead wire

-ZE155 : With ZE155
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Horizontal lead wire

-ZE235 : With ZE235
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Vertical lead wire

-ZE255 : With ZE255
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Vertical lead wire

-ZE101 : With ZE101 note7
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V
  AC85～115V
- Horizontal lead wire

-ZE102 : With ZE102 note7
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V
  AC85～115V
- Horizontal lead wire

-ZE201 : With ZE201 note7
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V
  AC85～115V
- Vertical lead wire

-ZE202 : With ZE202 note7
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V
  AC85～115V
- Vertical lead wire

Lead wire length

A : 1000mm [39in.]
B : 3000mm [118in.]

Number of sensor switches
(For cylinder with magnet)
Blank:
No sensor switch

1 : With 1 sensor switch
2 : With 2 sensor switches

Double rod cylinder

Cylinder specification

Blank : Standard cylinder Note2
(Non-ion specification Note9)
S : Cylinder with magnet
(Non-ion specification Note9)
F : Heat resistant cylinder Note3

Bumper Note5

Blank : No bumper
-R : With bumper

Centering location Note7

Blank : No centering location
-G : With centering location

Basic type			Bore size×Stroke							
C	DA SA	D	S F	×	-B Note10	-R	-G	-1 -3	-ZE135 -ZE155 -ZE235 -ZE255 -ZE101 -ZE102 -ZE201 -ZE202	A B	1 2 ⋮ n

- See table for bore size and stroke.
- Mounting brackets are included at shipping.
- For the order codes of sensor switches only, see p.199.
- For heat resistant specification, sensor switch is not available.
- In sizes ϕ12 and ϕ16 with foot mounting brackets and strokes of less than 10mm, the foot mounting bracket and sensor switch may interfere with each other, which could prevent 2 sensor switches from being mounted. For details, consult us.

Notes: 1. Used for both single acting push type and single acting pull type. Not available for bore sizes ϕ6, ϕ8, and ϕ10.
2. In the standard cylinders, a magnet for the sensor switch is not built-in.
3. Not available for the cylinder with magnet or the cylinder with bumper.
4. Specifications are the same for both sides.
5. For the double acting type only. Not available in heat resistant specification, however. Not available for bore sizes ϕ6, ϕ8, and ϕ10.
6. For details of sensor switches, see p.1544.
7. Not available for bore sizes ϕ6, ϕ8, ϕ10 and ϕ12.
8. Cannot be mounted on bore size ϕ40 with centering location (**-G**). Not available for bore sizes ϕ6, ϕ8, and ϕ10.
9. Bore sizes ϕ6, ϕ8, ϕ10, and ϕ12 are not non-ion specification.
10. For information regarding the cylinder joint and cylinder rod end for male thread, see p.1568.

Additional Parts (To be ordered separately)

Foot mounting bracket (p.197)

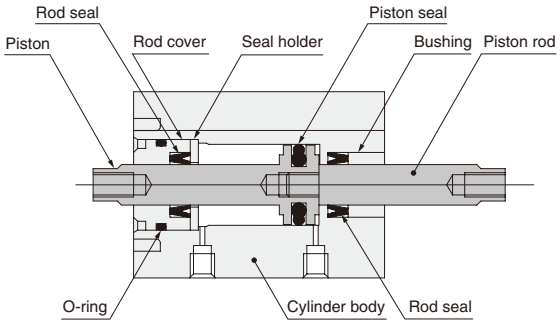
Flange mounting bracket (p.198)

Mounting screws (p.209)

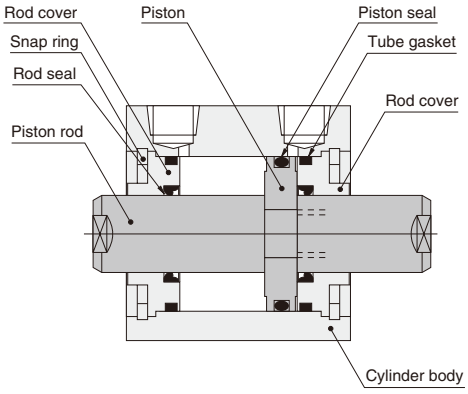
Inner Construction and Major Parts

●Double acting type (CDAD)

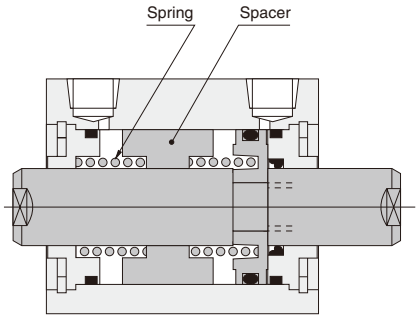
● ϕ6～ϕ10



● ϕ12～ϕ100

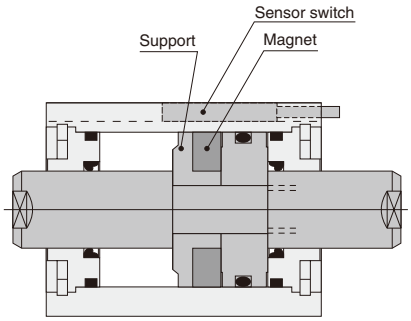


●Single acting type (CSAD)

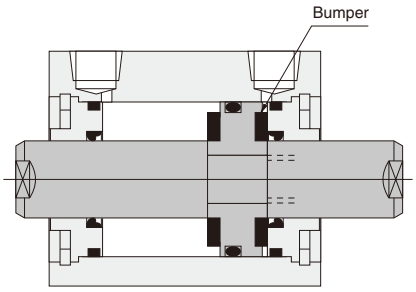


Note: Bore sizes ϕ6 to ϕ10 are not available as single acting cylinders.

●Cylinder with magnet



●With bumper



Note: Bore sizes ϕ6 to ϕ10 are not available with bumpers.

Major Parts and Materials

Parts \ Bore mm	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20	ϕ25	ϕ32	ϕ40	ϕ50	ϕ63	ϕ80	ϕ100
Cylinder body	Aluminum alloy (anodized)												
Piston	Stainless steel			Aluminum alloy (special rust prevention treatment)									
Piston rod	Stainless steel			Stainless steel (chrome plated)			Steel (chrome plated)						
Seal	Synthetic rubber (NBR)												
Rod cover	Aluminum alloy (special wear-resistant treatment)												
Snap ring	—			Steel (phosphate coating)									
Spring	—			Piano wire							—		
Spacer	—			Aluminum alloy (special rust prevention treatment)							—		
Bumper	—			Synthetic rubber (NBR; urethane for ϕ12 only)									
Magnet	Neodymium magnet			Plastic magnet									
Support	—			Aluminum alloy (special rust prevention treatment)									
Bushing	Copper alloy			—									

Seals

Parts / Bore mm	Rod seal	Piston seal	Tube gasket
ϕ 12	MYR-6	COP-12	Y090260
ϕ 16	MYR-8	COP-16	Y090207
ϕ 20	MYR-10	COP-20(MYA-16)	Y090216
ϕ 25	MYR-12	COP-25(MYA-21)	Y090210
ϕ 32	MYR-16	COP-32	L090084
ϕ 40	MYR-16	COP-40	L090151
ϕ 50	MYR-20	COP-50	L090174
ϕ 63	MYR-20	COP-63	L090180
ϕ 80	PNY-25	COP-80	L090171
ϕ 100	PNY-32	COP-100	L090172

Note: Items in parentheses ( ) are for the single acting type.

Mass

●Double acting type

g [oz.]

Bore size mm [in.]	Zero stroke mass	Additional mass for each 1mm [0.0394in.] stroke	Additional mass of cylinder with bumper	Additional mass of cylinder with magnet	Mass of mounting bracket		Additional mass of sensor switch Note	
					Foot bracket	Flange bracket	**ZE□□□A**	**ZE□□□B**
6 [0.236]	12.7 [0.448]	0.84 [0.0296]	—	3.9 [0.138]	—	—	15 [0.53]	35 [1.23]
8 [0.315]	19.2 [0.677]	1.11 [0.0392]	—	5.3 [0.187]	—	—		
10 [0.394]	21.0 [0.741]	1.27 [0.0448]	—	6.7 [0.236]	—	—		
12 [0.472]	30.41 [1.073]	1.51 [0.0533]	7.53 [0.266]	6.59 [0.232]	50 [1.76]	55 [1.94]		
16 [0.630]	44.4 [1.566]	2.01 [0.0709]	10.05 [0.354]	9.93 [0.350]	62 [2.19]	71 [2.50]		
20 [0.787]	73.31 [2.586]	2.88 [0.102]	14.38 [0.507]	25.71 [0.907]	84 [2.96]	101 [3.56]		
25 [0.984]	104.2 [3.675]	3.99 [0.141]	19.97 [0.704]	37.47 [1.322]	104 [3.67]	160 [5.64]		
32 [1.260]	165.44 [5.836]	5.69 [0.201]	28.47 [1.004]	52.43 [1.849]	126 [4.44]	186 [6.56]		
40 [1.575]	241.43 [8.516]	6.35 [0.224]	0	69.15 [2.439]	160 [5.64]	335 [11.82]		
50 [1.969]	328.92 [11.602]	9.5 [0.335]	0	108 [3.81]	220 [7.76]	447 [15.77]		
63 [2.480]	499.3 [17.61]	11.16 [0.394]	0	159 [5.61]	300 [10.58]	591 [20.85]		
80 [3.150]	1029.17 [36.302]	16.91 [0.596]	0	245 [8.64]	644 [22.72]	1414 [49.88]		
100 [3.940]	1872.15 [66.037]	24.93 [0.879]	0	360 [12.70]	1172 [41.34]	2606 [91.92]		

Note: Sensor switch codes A and B show the lead wire lengths.
A: 1000mm [39in.] B: 3000mm [118in.]

●Single acting type

g [oz.]

Item	Basic mass Note1								Additional mass of cylinder with magnet 5～30 (ϕ 50: 10～40.)	Mass of mounting bracket		Additional mass of sensor switch Note2	
Bore mm [in.] \ Stroke mm	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**		Foot bracket	Flange bracket	**ZE□□□A**	**ZE□□□B**
12 [0.472]	42.64 [1.504]	50.16 [1.769]	57.69 [2.035]	76.83 [2.710]	84.35 [2.975]	91.88 [3.241]	—	—	7.78 [0.274]	50 [1.76]	55 [1.94]	15 [0.53]	35 [1.23]
16 [0.630]	62.08 [2.190]	72.13 [2.544]	82.18 [2.899]	106.48 [3.756]	116.53 [4.110]	126.58 [4.465]	—	—	10.32 [0.364]	62 [2.19]	71 [2.50]		
20 [0.787]	84.93 [2.996]	99.31 [3.503]	113.68 [4.010]	147.6 [5.206]	161.98 [5.714]	176.35 [6.220]	—	—	23.38 [0.825]	84 [2.96]	101 [3.56]		
25 [0.984]	120.1 [4.236]	140.07 [4.941]	160.04 [5.645]	206.73 [7.292]	226.7 [7.996]	246.67 [8.701]	—	—	39.1 [1.379]	104 [3.67]	160 [5.64]		
32 [1.260]	187.86 [6.626]	216.33 [7.631]	244.79 [8.635]	335.01 [11.817]	363.48 [12.821]	391.94 [13.825]	—	—	50.58 [1.784]	126 [4.44]	186 [6.56]		
40 [1.575]	266 [9.38]	297.75 [10.503]	329.49 [11.622]	448.28 [15.812]	480.02 [16.932]	511.77 [18.052]	—	—	69.42 [2.449]	160 [5.64]	335 [11.82]		
50 [1.969]	—	401.18 [14.151]	448.67 [15.826]	496.15 [17.501]	639.23 [22.548]	686.72 [24.223]	734.2 [25.898]	781.69 [27.573]	106.05 [3.741]	220 [7.76]	447 [15.77]		

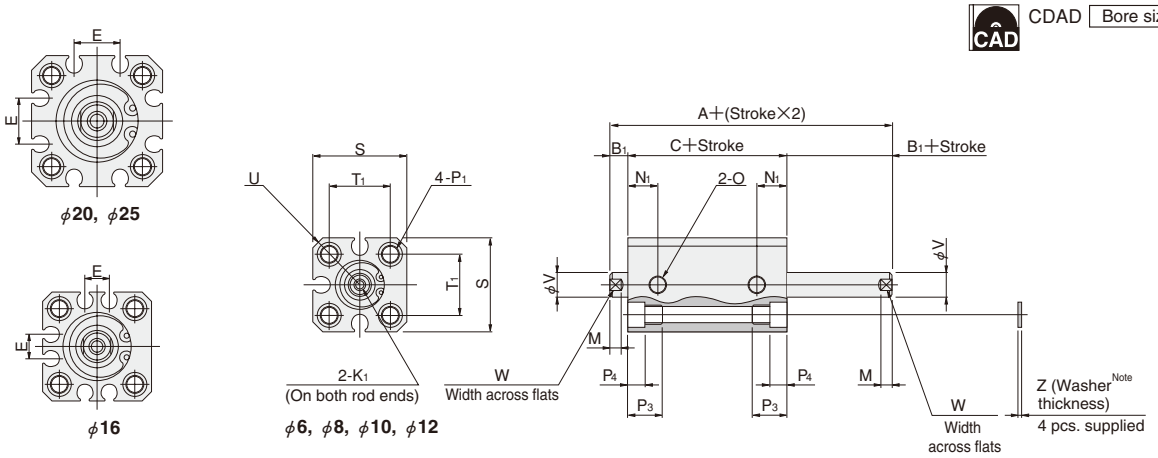
Notes: 1. The above table is for the standard strokes.
2. Sensor switch codes A and B show the lead wire lengths.
A: 1000mm [39in.] B: 3000mm [118in.]

Calculation example: For the mass of a double acting type cylinder with magnet, bore size of 25mm, stroke of 30mm, and with 2 sensor switches (**ZE135A**)
104.2＋(3.99×30)＋37.47＋(15×2)＝291.37g [10.278oz.]

Dimensions of Double Rod Double Acting Type (mm)

CDAD Bore size

● ϕ6～ϕ25

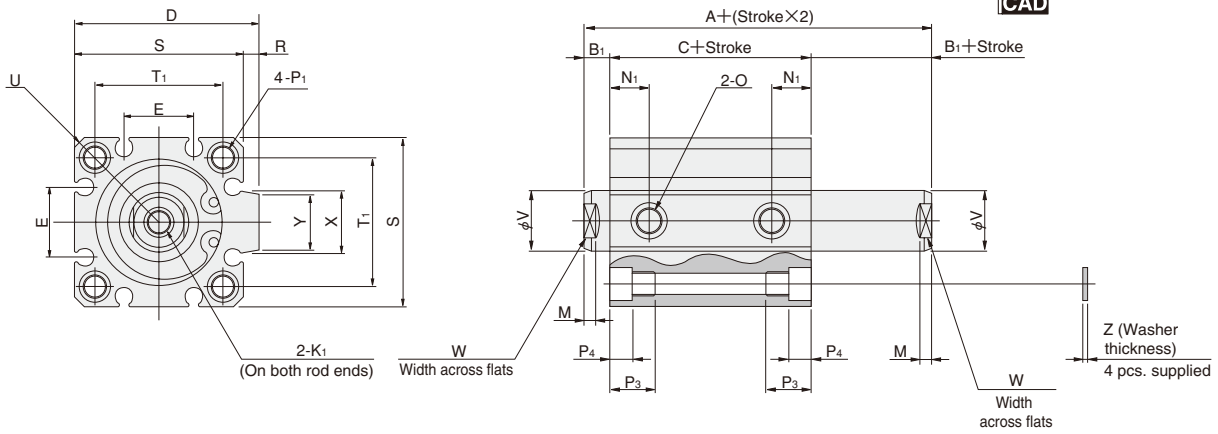


Note: Washers for bore sizes ϕ6, ϕ8, and ϕ10 are not available.

● The drawing is for ϕ12.

● ϕ32～ϕ100

CDAD Bore size



Bore mm [in.] \ Type	Standard cylinder (CDAD)			Cylinder with magnet (CDADS)			Standard cylinder with bumper (CDAD-R)			Cylinder with magnet and bumper (CDADS-R)			D	E	K1	M	N1	O
Code	A	B1	C	A	B1	C	A	B1	C	A	B1	C						
6 [0.236]	28.5	5	18.5	33.5	5	23.5	—	—	—	—	—	—	—	—	M2.5×0.45 Depth5	3	7	M3×0.5
8 [0.315]	30.5	5	20.5	35.5	5	25.5	—	—	—	—	—	—	—	—	M3×0.5 Depth5	3	7.5	M3×0.5
10 [0.394]	31	5	21	36	5	26	—	—	—	—	—	—	—	—	M3×0.5 Depth5	3	8.5	M3×0.5
12 [0.472]	33	5	23	38	5	28	38	5	28	43	5	33	—	—	M3×0.5 Depth6	3.5	8	M5×0.8
16 [0.630]	34	5.5	23	39	5.5	28	39	5.5	28	44	5.5	33	—	6.2	M4×0.7 Depth8	3.5	8	M5×0.8
20 [0.787]	37	5.5	26	47	5.5	36	42	5.5	31	52	5.5	41	—	12.2	M5×0.8 Depth10	4.5	9.5	M5×0.8
25 [0.984]	38.5	6	26.5	48.5	6	36.5	43.5	6	31.5	53.5	6	41.5	—	12.2	M6×1 Depth10	5	10.5	M5×0.8
32 [1.260]	44	7	30	54	7	40	49	7	35	54	7	40	48.5	18.2	M8×1.25 Depth12	6	9.5	Rc1/8
40 [1.575]	47	7	33	57	7	43	47	7	33	57	7	43	56.5	18.2	M8×1.25 Depth12	6	10.5	Rc1/8
50 [1.969]	48	9	30	58	9	40	48	9	30	58	9	40	70	24.8	M10×1.5 Depth15	7	11	Rc1/4
63 [2.480]	52.5	9	34.5	62.5	9	44.5	52.5	9	34.5	62.5	9	44.5	83	26.8	M10×1.5 Depth15	7	12.5	Rc1/4
80 [3.150]	69.5	11	47.5	79.5	11	57.5	69.5	11	47.5	79.5	11	57.5	102	32.8	M14×2 Depth20	9	18	Rc3/8
100 [3.940]	81.5	12	57.5	91.5	12	67.5	81.5	12	57.5	91.5	12	67.5	122	32.8	M18×2.5 Depth20	9	22.5	Rc3/8

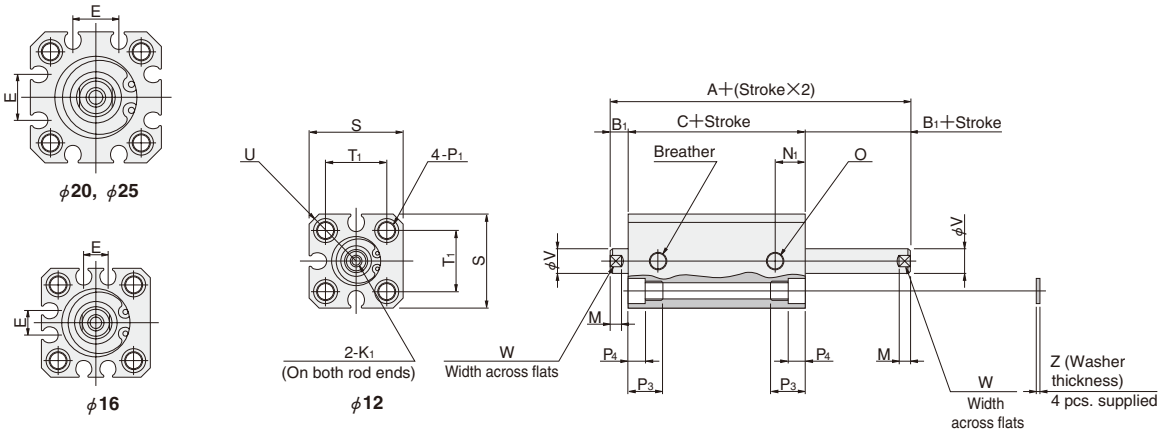
Bore mm [in.] \ Code	P1	P3	P4	R	S	T1	U	V	W	X	Y	Z	Appropriate through bolt※
6 [0.236]	ϕ3.3 (Thru hole) C'bore ϕ6 (Both sides) and M4×0.7 (Both sides)	9.5	3.5	—	19	11	R12	4	3.5	—	—	—	M3
8 [0.315]	ϕ3.3 (Thru hole) C'bore ϕ6.2 (Both sides) and M4×0.7 (Both sides)	9.5	3.5	—	21	13	R13.5	5	4	—	—	—	M3
10 [0.394]	ϕ3.3 (Thru hole) C'bore ϕ6.2 (Both sides) and M4×0.7 (Both sides)	9.5	3.5	—	23	15	R15	5	4	—	—	—	M3
12 [0.472]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	25	16.3	R16	6	5	—	—	1	M3
16 [0.630]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	29	19.8	R19	8	6	—	—	1	M3
20 [0.787]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	34	24	R22	10	8	—	—	1	M3
25 [0.984]	ϕ5.1 (Thru hole) C'bore ϕ8 (Both sides) and M6×1 (Both sides)	11.5	5.5	—	40	28	R25	12	10	—	—	1	M4
32 [1.260]	ϕ5.1 (Thru hole) C'bore ϕ8 (Both sides) and M6×1 (Both sides)	11.5	5.5	4.5	44	34	R29.5	16	14	15	13.6	1	M4
40 [1.575]	ϕ6.9 (Thru hole) C'bore ϕ9.5 (Both sides) and M8×1.25 (Both sides)	15.5	7.5	4.5	52	40	R35	16	14	15	13.6	1.6	M5
50 [1.969]	ϕ6.9 (Thru hole) C'bore ϕ11 (Both sides) and M8×1.25 (Both sides)	16.5	8.5	8	62	48	R41	20	17	21.6	19	1.6	M6
63 [2.480]	ϕ6.9 (Thru hole) C'bore ϕ11 (Both sides) and M8×1.25 (Both sides)	16.5	8.5	8	75	60	R50	20	17	21.6	19	1.6	M6
80 [3.150]	ϕ10.5 (Thru hole) C'bore ϕ14 (Both sides) and M12×1.75 (Both sides)	22.5	10.5	8	94	74	R62	25	22	27.6	25	1.6	M8
100 [3.940]	ϕ12.3 (Thru hole) C'bore ϕ17.5 (Both sides) and M14×2 (Both sides)	27	13	8	114	90	R75	32	27	27.6	25	2	M10

※ Some types of mounting screws are available (to be ordered separately). See p.209.

Dimensions of Double Rod Single Acting Type (mm)

● ϕ12～ϕ25

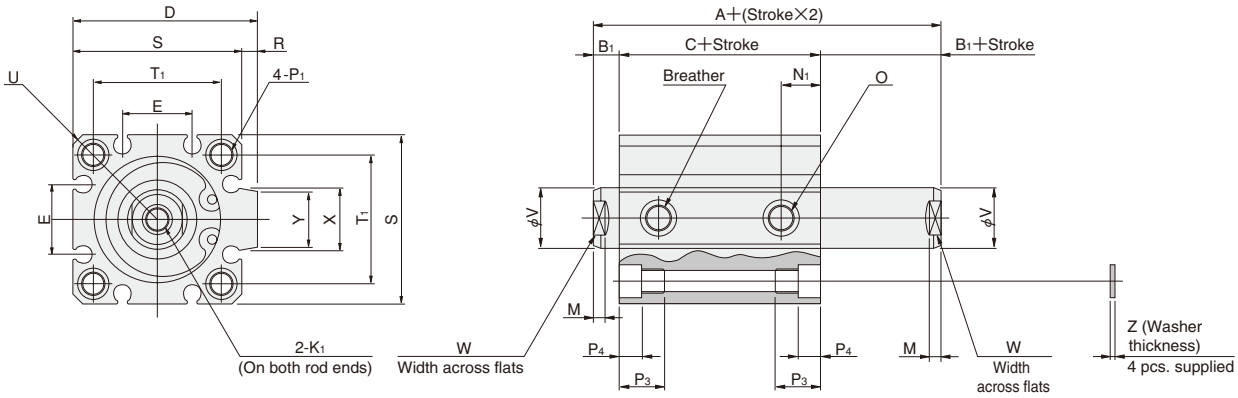
CAD CSAD Bore size



● The drawing is for ϕ 12.

● ϕ32～ϕ50

CAD CSAD Bore size



Type / Stroke / Bore mm [in.] / Code	Standard cylinder (CSAD) 5～15 (ϕ50: 10～20) A	B1	C	16～30 (ϕ50: 21～40) A	B1	C	Cylinder with magnet (CSADS) 5～15 (ϕ50: 10～20) A	B1	C	16～30 (ϕ50: 21～40) A	B1	C	D	E	K1	M	N1	O
12 [0.472]	38	5	28	48	5	38	43	5	33	53	5	43	—	—	M3×0.5 Depth6	3.5	8	M5×0.8
16 [0.630]	39	5.5	28	49	5.5	38	44	5.5	33	54	5.5	43	—	6.2	M4×0.7 Depth8	3.5	8	M5×0.8
20 [0.787]	37	5.5	26	47	5.5	36	47	5.5	36	57	5.5	46	—	12.2	M5×0.8 Depth10	4.5	9.5	M5×0.8
25 [0.984]	38.5	6	26.5	48.5	6	36.5	48.5	6	36.5	58.5	6	46.5	—	12.2	M6×1 Depth10	5	10.5	M5×0.8
32 [1.260]	44	7	30	59	7	45	54	7	40	69	7	55	48.5	18.2	M8×1.25 Depth12	6	9.5	Rc1/8
40 [1.575]	47	7	33	62	7	48	57	7	43	72	7	58	56.5	18.2	M8×1.25 Depth12	6	10.5	Rc1/8
50 [1.969]	48	9	30	63	9	45	58	9	40	73	9	55	70	24.8	M10×1.5 Depth15	7	11	Rc1/4

Code / Bore mm [in.]	P1	P3	P4	R	S	T1	U	V	W	X	Y	Z	Appropriate through bolt※
12 [0.472]	ϕ4.3 (Thru hole) Counterbore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	25	16.3	R16	6	5	—	—	1	M3
16 [0.630]	ϕ4.3 (Thru hole) Counterbore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	29	19.8	R19	8	6	—	—	1	M3
20 [0.787]	ϕ4.3 (Thru hole) Counterbore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	34	24	R22	10	8	—	—	1	M3
25 [0.984]	ϕ5.1 (Thru hole) Counterbore ϕ8 (Both sides) and M6×1 (Both sides)	11.5	5.5	—	40	28	R25	12	10	—	—	1	M4
32 [1.260]	ϕ5.1 (Thru hole) Counterbore ϕ8 (Both sides) and M6×1 (Both sides)	11.5	5.5	4.5	44	34	R29.5	16	14	15	13.6	1	M4
40 [1.575]	ϕ6.9 (Thru hole) Counterbore ϕ9.5 (Both sides) and M8×1.25 (Both sides)	15.5	7.5	4.5	52	40	R35	16	14	15	13.6	1.6	M5
50 [1.969]	ϕ6.9 (Thru hole) Counterbore ϕ11 (Both sides) and M8×1.25 (Both sides)	16.5	8.5	8	62	48	R41	20	17	21.6	19	1.6	M6

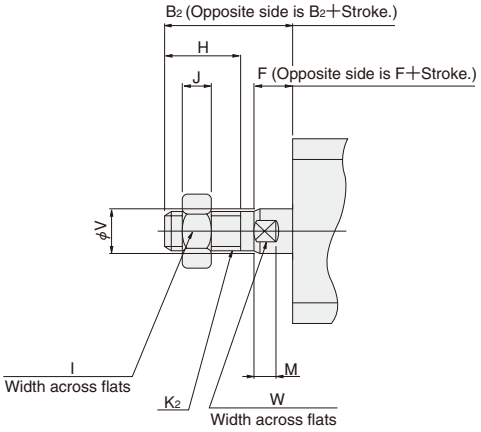
※ Some types of mounting screws are available (to be ordered separately). See p.209.

Dimensions of Male Rod End Thread Specification (mm)

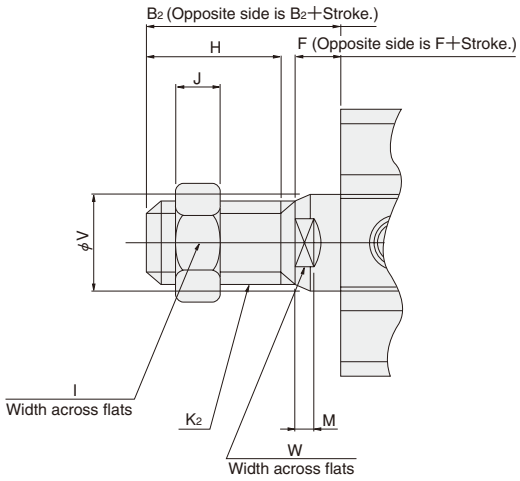
CAD Available in the file of each cylinder body.

●Double acting type, Single acting type

● ϕ6～ϕ25



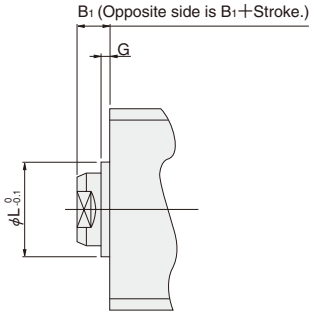
● ϕ32～ϕ100
(Single acting type available up to ϕ50)



Bore mm [in.] \ Code	B2	F	H	I	J	K2	M	V	W
6 [0.236]	15	5	8	5.5	1.8	M3×0.5	3	4	3.5
8 [0.315]	15	5	8	7	2.4	M4×0.7	3	5	4
10 [0.394]	15	5	8	7	2.4	M4×0.7	3	5	4
12 [0.472]	17	5	10	8	4	M5×0.8	3.5	6	5
16 [0.630]	20.5	5.5	13	10	5	M6×1	3.5	8	6
20 [0.787]	22.5	5.5	15	12	5	M8×1	4.5	10	8
25 [0.984]	24	6	15	14	6	M10×1.25	5	12	10
32 [1.260]	35	7	25	19	8	M14×1.5	6	16	14
40 [1.575]	35	7	25	19	8	M14×1.5	6	16	14
50 [1.969]	37	9	25	27	11	M18×1.5	7	20	17
63 [2.480]	37	9	25	27	11	M18×1.5	7	20	17
80 [3.150]	44	11	30	32	13	M22×1.5	9	25	22
100 [3.940]	50	12	35	36	14	M26×1.5	9	32	27

Remark: Cylinder joints and cylinder rod ends are available for mounting with the rod end male thread specification. For details, see p.1568.

Dimensions of Centering Location (mm)



●Not available for bore sizes ϕ6, ϕ8, ϕ10 and ϕ12.

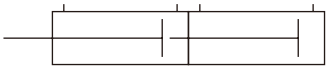
Bore mm [in.] \ Code	B1	G	L
16 [0.630]	5.5	1.5	9.4
20 [0.787]	5.5	1.5	12
25 [0.984]	6	2	15
32 [1.260]	7	2	21
40 [1.575]	7	2	29
50 [1.969]	9	2	38
63 [2.480]	9	2	40
80 [3.150]	11	2	45
100 [3.940]	12	2	55

JIG CYLINDERS C SERIES TANDEM CYLINDERS

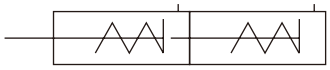
Double Acting Type, Single Acting Push Type

Symbols

●Double acting type



●Single acting push type



Specifications

Item \ Bore size mm [in.]		12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]	80 [3.150]	100 [3.940]
Operation type		Double acting type, Single acting push type							Double acting type		
Media		Air									
Operating pressure range MPa [psi.]	Double acting type	0.2～1.0 [29～145]						0.1～1.0 [15～145]			
	Single acting type	0.3～1.0 [44～145]						0.2～1.0 [29～145]	—		
Proof pressure MPa [psi.]		1.5 [218]									
Operating temperature range ℃ [°F]		0～60 [32～140] (The heat resistant specification is 120 [248]. Note1)									
Operating speed range mm/s [in./sec.]	Double acting type	30～500 [1.2～19.7]						30～300 [1.2～11.8]			
	Single acting type	100～500 [3.9～19.7]						100～300 [3.9～11.8]	—		
Cushion	Double acting type	Rubber bumper (Option Note2)									
	Single acting type	None							—		
Lubrication		Not required (If lubrication is required, use Turbine Oil Class 1 [**ISO VG32**] or equivalent.)									
Port size		M5×0.8				Rc1/8		Rc1/4		Rc3/8	

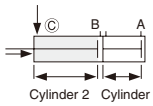
Remark: For Handling Instructions and Precautions, see p.205.

Notes: 1. For heat resistant specification, consult us.
2. Not available for heat resistant specification.

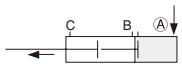
Operation of Tandem Cylinders

Tandem Cylinders are a set of 2 cylinders joined end to end.

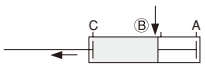
It can be used as a two-stage stroke cylinder by supplying air to either Port A or Port B. It can also obtain twice the thrust within the "stroke Ⅰ" range.



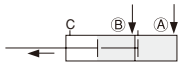
The rods retract strokes Ⅱ and Ⅰ when air is supplied from Port Ⓒ.



The rod moves stroke Ⅰ when air is supplied from Port Ⓐ.



The rod moves stroke Ⅱ when air is supplied from Port Ⓑ.



Twice the thrust is obtained within the stroke Ⅰ range when air is supplied from Ports Ⓐ and Ⓑ.

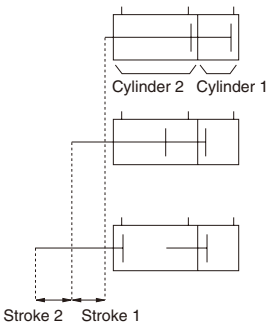
Bore Size and Stroke

For non-standard strokes, see p.206.

mm

Operation type	Bore size \ Stroke1	5	10	15	20	25	30	35	40	45	50	75	100
Double acting type **CDAT CDATS**	**12、16**	0,5,10 15,20,25	0,5,10 15,20	0,5,10,15	0,5,10	0,5	0	—	—	—	—	—	—
	20、25	0,5,10,15 20,25,30 35,40,45	0,5,10,15 20,25,30 35,40	0,5,10 15,20,25 30,35	0,5,10,15 20,25,30	0,5,10 15,20,25	0,5,10 15,20	0,5,10,15	0,5,10	0,5	0	—	—
	32、40	0,5,10,15 20,25,30,35 40,45,70,95	0,5,10,15 20,25,30,35 40,65,90	0,5,10,15 20,25,30 35,60,85	0,5,10,15 20,25,30 55,80	0,5,10 15,20,25 50,75	0,5,10 15,20 45,70	0,5,10,15 40,65	0,5,10 35,60	0,5,30,55	0,25,50	0,25	0
	50、63 80、100	—	0,5,10,15 20,25,30,35 40,65,90	0,5,10,15 20,25,30 35,60,85	0,5,10,15 20,25,30 55,80	0,5,10 15,20,25 50,75	0,5,10,15 20,45,70	0,5,10,15 40,65	0,5,10 35,60	0,5,30,55	0,25,50	0,25	0
Single acting type **CSAT CSATS**	**12、16、20 25、32、40**	0,5,10 15,20,25	0,5,10 15,20	0,5,10,15	0,5,10	0,5	0	—	—	—	—	—	—
	50	—	0,5,10,15 20,25,30	0,5,10 15,20,25	0,5,10 15,20	0,5,10,15	0,5,10	0,5	0	—	—	—	—

Remarks: 1. Stroke tolerance: Stroke 1 side $^{+1}_{-0.2}$[$^{+0.039in.}_{-0.008in.}$], stroke 2 side $^{+1}_{0}$[$^{+0.039in.}_{0}$]
2. The figures in the table are combinations of stroke 2 (standard) responding to stroke 1 (standard).
3. In most cases, body cutting is used for the non-standard strokes.
However, body cutting is not used for "Stroke 1" or "Stroke 1 ＋ Stroke 2" under the condition mentioned below. The collar packed is used for these cases.
ϕ 12～ϕ 40: less than 5mm
ϕ 50～ϕ 100: less than 10mm



●About stroke 1 and stroke 2

Stroke 1 is the stroke of cylinder 1.

Stroke 2 is obtained by subtracting stroke 1 from the stroke of cylinder 2.

Order Codes for Tandem Cylinders

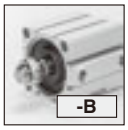
Operation type

DA : Double acting type
SA : Single acting push type

Rod end specification

Female thread

Male thread



Mounting type

Basic type

Flange mounting type Note6

Sensor switch type Note5
(For cylinder with magnet)

Blank:
No sensor switch

-ZE135 : With ZE135
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Horizontal lead wire

-ZE155 : With ZE155
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Horizontal lead wire

-ZE235 : With ZE235
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Vertical lead wire

-ZE255 : With ZE255
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Vertical lead wire

-ZE101 : With ZE101
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V AC85～115V
- Horizontal lead wire

-ZE102 : With ZE102
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V AC85～115V
- Horizontal lead wire

-ZE201 : With ZE201
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V AC85～115V
- Vertical lead wire

-ZE202 : With ZE202
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V AC85～115V
- Vertical lead wire

Lead wire length

A : 1000mm [39in.]
B : 3000mm [118in.]

Number of sensor switches
(For cylinder with magnet)
Blank:
No sensor switch

1 : With 1 sensor switch
2 : With 2 sensor switches

Heat resistant specification

Blank : Standard cylinder Note1
F : Heat resistant cylinder Note2

Cylinder specification

Blank : Standard cylinder Note1 (Non-ion specification)
S : Cylinder with magnet Note3 (Non-ion specification)

Tandem cylinder

Bumper Note4

Blank : No bumper
-R : With bumper

Centering location Note7

Blank : No centering location
-G : With centering location

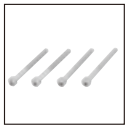
Basic type					Bore size × Stroke							
C	DA SA	F	T	S	Bore size × Stroke1 × Stroke2	-B Note8	-R	-G	-3	-ZE135 -ZE155 -ZE235 -ZE255 -ZE101 -ZE102 -ZE201 -ZE202	A B	1 2 ⋮ n

- See table for bore size and stroke.
- Mounting brackets are included at shipping.
- For the order codes of sensor switches only, see p.199.
- For heat resistant specification, sensor switch is not available.

Notes: 1. In the standard cylinder, a magnet for the sensor switch is not built-in.
2. Not available for the cylinder with magnet or the cylinder with bumper.
3. Not available in heat resistant specification.
4. For the double acting type only. Not available for heat resistant specification.
5. For details of sensor switches, see p.1544.
6. The flange mounting bracket can be mounted on the rod side only. Moreover, it cannot be mounted on the bore size ϕ 40 with centering location (**-G**).
7. Not available for the bore size ϕ 12.
8. For information regarding the cylinder joint and cylinder rod end for male thread, see p.1568.

Additional Parts (To be ordered separately)

Flange mounting bracket (p.198)

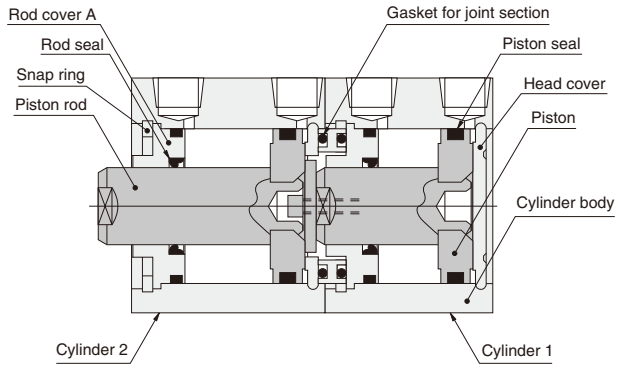


Mounting screws (p.209)

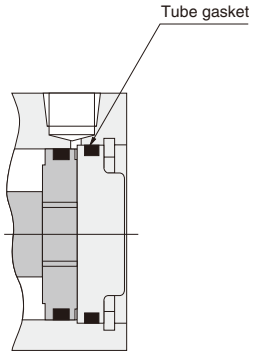
Inner Construction and Major Parts

●Double acting type (CDAT)

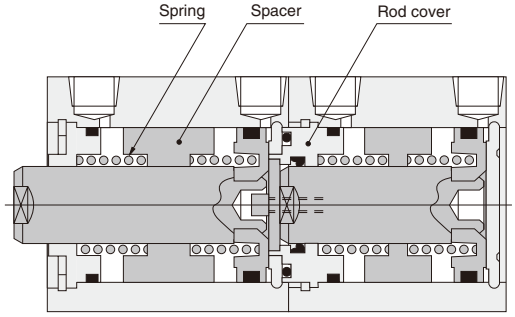
● ϕ12～ϕ40



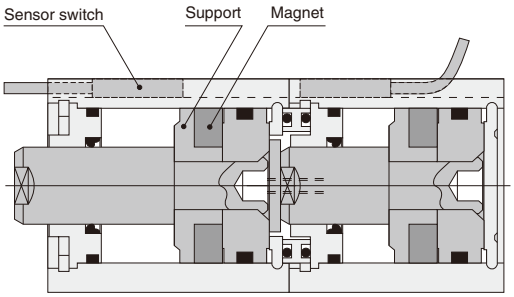
● ϕ50～ϕ100



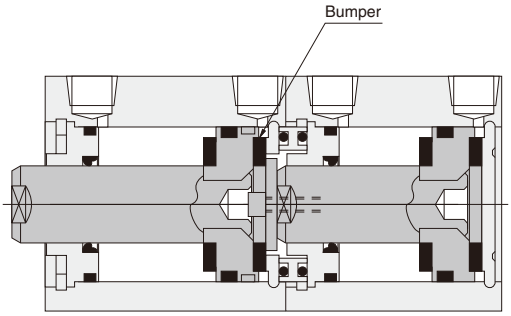
●Single acting push type (CSAT)



●Cylinder with magnet



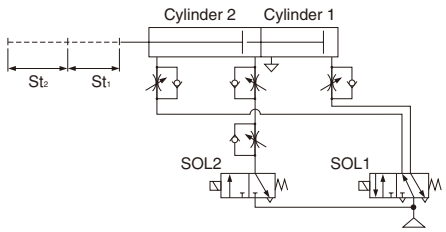
●With bumper

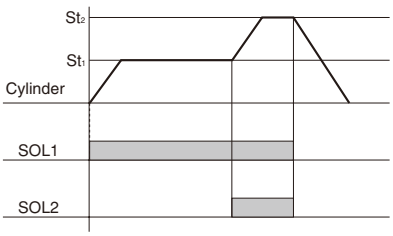


Tandem Cylinder Air Circuit Examples

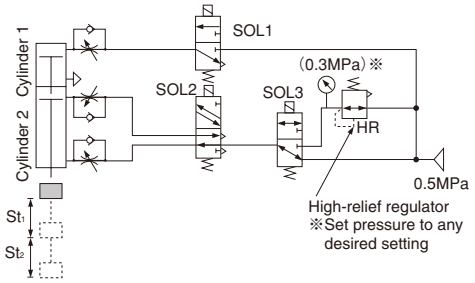
When using a tandem cylinder as a 2-stage stroke cylinder, refer to the air circuits shown below. For application of other air circuits not shown below, consult us.

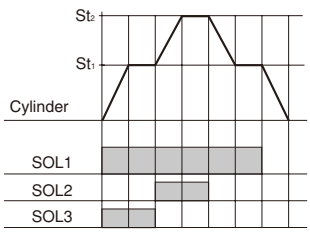
●For mounting upward-facing cylinders





●For mounting downward-facing or horizontal cylinders





Major Parts and Materials

Parts \ Bore mm	φ12	φ16	φ20	φ25	φ32	φ40	φ50	φ63	φ80	φ100
Cylinder body	Aluminum alloy (anodized)									
Piston	Aluminum alloy (special rust prevention treatment)									
Piston rod	Stainless steel (chrome plated)				Steel (chrome plated)					
Seal	Synthetic rubber (NBR)									
Rod cover	Aluminum alloy (special wear-resistant treatment)									
Head cover	Aluminum alloy (anodized)									
Snap ring	Steel (phosphate coating)									
Spring	Piano wire							—		
Spacer	Aluminum alloy (special rust prevention treatment)							—		
Bumper	Synthetic rubber (NBR; urethane for φ12 only)									
Magnet	Plastic magnet									
Support	Aluminum alloy (special rust prevention treatment)									

Seals

Parts \ Bore mm	Rod seal	Piston seal	Tube gasket		Gasket for joint section
			Rod side	Head side	
φ12	MYR-6	COP-12	Y090260	None	Y090119
φ16	MYR-8	COP-16	Y090207	None	M202208
φ20	MYR-10	COP-20(MYA-16)	Y090216	None	L090134
φ25	MYR-12	COP-25(MYA-21)	Y090210	None	Y090196
φ32	MYR-16	COP-32	L090084	None	L090015
φ40	MYR-16	COP-40	L090151	None	L090028
φ50	MYR-20	COP-50	L090174	L090106	None
φ63	MYR-20	COP-63	L090180	L090107	None
φ80	PNY-25	COP-80	L090171	L090108	None
φ100	PNY-32	COP-100	L090172	L090109	None

Note: Items in parentheses ( ) are for the single acting type.

Mass

●Double acting type

g [oz.]

Bore size mm [in.]	Zero stroke mass Note1	Additional mass for each 1mm [0.0394in.] of stroke1	Additional mass for each 1mm [0.0394in.] of stroke2	Additional mass of cylinder with bumper	Additional mass of cylinder with magnet	Mass of mounting bracket	Additional mass of sensor switch Note2	
						Flange bracket	ZE□□□A	ZE□□□B
12 [0.472]	44.26 [1.561]	2.68 [0.095]	1.28 [0.045]	13.39 [0.472]	13.73 [0.484]	55 [1.94]	15 [0.53]	35 [1.23]
16 [0.630]	61.11 [2.156]	3.34 [0.118]	1.62 [0.057]	16.71 [0.589]	20.41 [0.720]	71 [2.50]		
20 [0.787]	96.79 [3.414]	4.63 [0.163]	2.26 [0.080]	23.14 [0.816]	52.54 [1.853]	101 [3.56]		
25 [0.984]	147.69 [5.210]	6.41 [0.226]	3.11 [0.110]	32.05 [1.131]	76.92 [2.713]	160 [5.64]		
32 [1.260]	220.3 [7.771]	8.43 [0.297]	4.11 [0.145]	42.13 [1.486]	106.84 [3.769]	186 [6.56]		
40 [1.575]	345.12 [12.174]	9.85 [0.347]	4.77 [0.168]	0	141.38 [4.987]	335 [11.82]		
50 [1.969]	562.47 [19.840]	14.51 [0.512]	7.03 [0.248]	0	220.44 [7.776]	447 [15.77]		
63 [2.480]	890.99 [31.428]	17.83 [0.629]	8.69 [0.307]	0	322.44 [11.374]	591 [20.85]		
80 [3.150]	1770.07 [62.436]	26.91 [0.949]	13.06 [0.461]	0	497.9 [17.563]	1414 [49.88]		
100 [3.940]	3252 [114.7]	38.46 [1.357]	18.61 [0.656]	0	732.34 [25.832]	2606 [91.92]		

Notes: 1. The above table is for the standard strokes.
2. Sensor switch codes A and B show the lead wire lengths.
A: 1000mm [39in.] B: 3000mm [118in.]

Calculation example: For the mass of a double acting type cylinder with magnet, bore size of 25mm, 30mm for stroke1, 10mm for stroke2, and 2 sensor switches (**ZE135A**)
147.69+(6.41×30)+(3.11×10)+76.92+(15×2)=478.01g [16.861oz.]

●Single acting push type

g [oz.]

Bore size mm [in.]	Zero stroke mass Note1			Additional mass for each 1mm [0.0394in.] of stroke1	Additional mass for each 1mm [0.0394in.] of stroke2	Additional mass of cylinder with magnet	Mass of mounting bracket	Additional mass of sensor switch Note2	
	Stroke1								
	5～15 (φ50: 10～20)		16～30 (φ50: 21～40)				Flange bracket	ZE□□□A	ZE□□□B
	Stroke1+Stroke2								
	5～15 (φ50: 10～20)	16～30 (φ50: 21～40)							
12 [0.472]	55.88 [1.971]	69.98 [2.468]	85.21 [3.006]	2.68 [0.0945]	1.28 [0.0451]	16.11 [0.568]	55 [1.94]	15 [0.53]	35 [1.23]
16 [0.630]	80.31 [2.833]	99.64 [3.515]	120.1 [4.236]	3.34 [0.118]	1.62 [0.0571]	21.21 [0.748]	71 [2.50]		
20 [0.787]	96.88 [3.417]	124.84 [4.404]	153.93 [5.430]	4.63 [0.163]	2.26 [0.0797]	51.89 [1.830]	101 [3.56]		
25 [0.984]	147.45 [5.201]	186 [6.561]	226.53 [7.990]	6.41 [0.226]	3.11 [0.110]	80.18 [2.828]	160 [5.64]		
32 [1.260]	223.01 [7.866]	306.96 [10.828]	393.89 [13.894]	8.43 [0.297]	4.11 [0.145]	103.14 [3.638]	186 [6.56]		
40 [1.575]	345.03 [12.170]	453.44 [15.994]	566.48 [19.982]	9.85 [0.347]	4.77 [0.168]	141.93 [5.006]	335 [11.82]		
50 [1.969]	561.93 [19.821]	691.19 [24.381]	827.1 [29.175]	14.51 [0.512]	7.03 [0.248]	216.54 [7.638]	447 [15.77]		

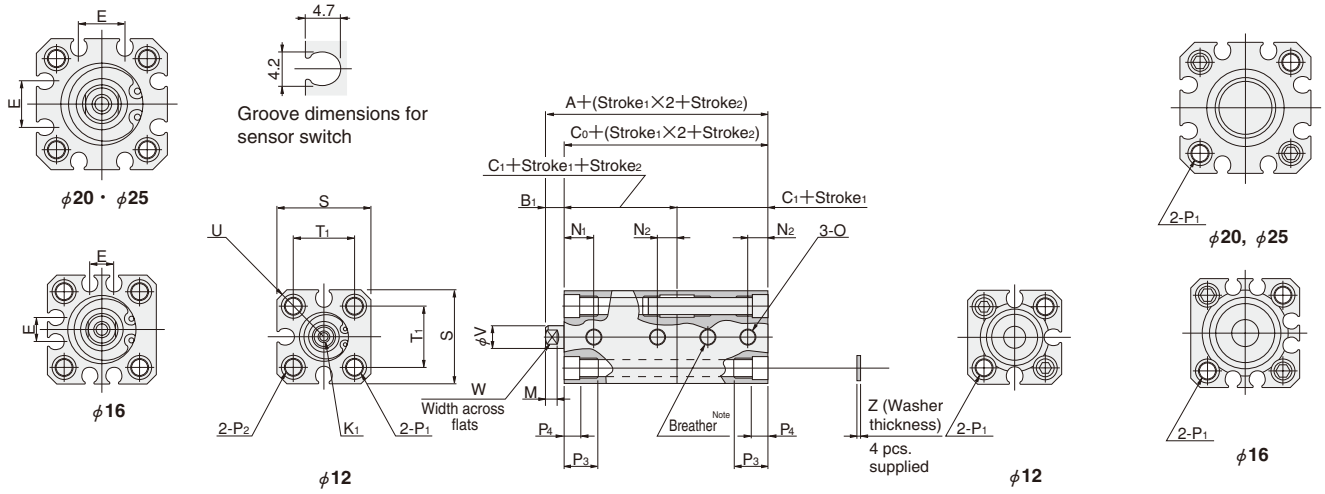
Notes 1: The above table is for the standard strokes.
2: Sensor switch codes A and B show the lead wire lengths.
A: 1000mm [39in.] B: 3000mm [118in.]

Calculation example: For the mass of a single acting push type cylinder with magnet, bore size of 25mm, 10mm for stroke1, 20mm for stroke2, and 2 sensor switches (**ZE135A**)
186+(6.41×10)+(3.11×20)+80.18+(15×2)=422.48g [14.902oz.]

Dimensions of Tandem Cylinder Double Acting Type (mm)

● ϕ12～ϕ25

CDAT Bore size

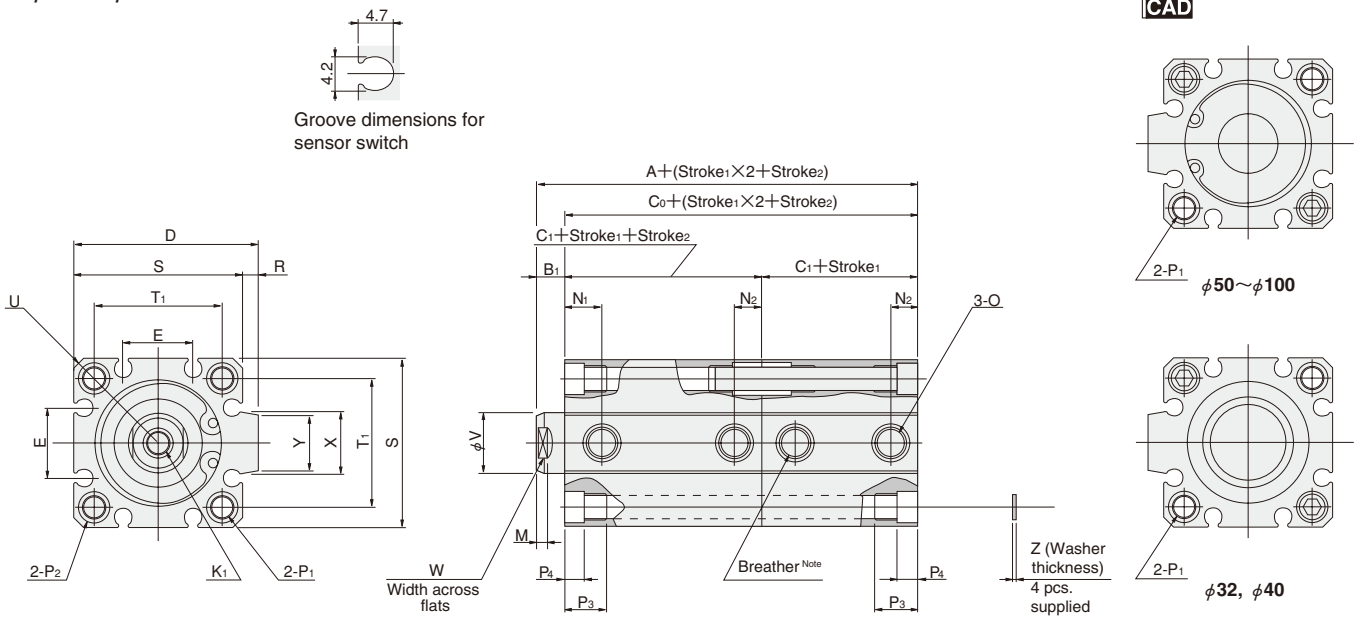


Note: Mufflers, etc. are not included.
Install a muffler when using in places exposed to dust, etc.

● The drawing is for ϕ 12.

● ϕ32～ϕ100

CDAT Bore size



Note: Mufflers, etc. are not included.
Install a muffler when using in places exposed to dust, etc.

Type / Code / Bore mm [in.]	Standard cylinder (CDAT)				Cylinder with magnet (CDATS)				Standard cylinder with bumper (CDAT-R)				Cylinder with magnet with bumper (CDATS-R)				D	E	K1	M	N1	N2	O
	A	B1	C0	C1	A	B1	C0	C1	A	B1	C0	C1	A	B1	C0	C1							
12 [0.472]	39	5	34	17	49	5	44	22	49	5	44	22	59	5	54	27	—	—	M3X0.5 Depth6	3.5	8	5	M5X0.8
16 [0.630]	39.5	5.5	34	17	49.5	5.5	44	22	49.5	5.5	44	22	59.5	5.5	54	27	—	6.2	M4X0.7 Depth8	3.5	8	5	M5X0.8
20 [0.787]	44.5	5.5	39	19.5	64.5	5.5	59	29.5	54.5	5.5	49	24.5	74.5	5.5	69	34.5	—	12.2	M5X0.8 Depth10	4.5	9.5	5	M5X0.8
25 [0.984]	48	6	42	21	68	6	62	31	58	6	52	26	78	6	72	36	—	12.2	M6X1 Depth10	5	10.5	5	M5X0.8
32 [1.260]	53	7	46	23	73	7	66	33	63	7	56	28	73	7	66	33	48.5	18.2	M8X1.25 Depth12	6	9.5	7.5(6)	Rc1/8
40 [1.575]	59	7	52	26	79	7	72	36	59	7	52	26	79	7	72	36	56.5	18.2	M8X1.25 Depth12	6	10.5	7.5	Rc1/8
50 [1.969]	65	9	56	28	85	9	76	38	65	9	56	28	85	9	76	38	70	24.8	M10X1.5 Depth15	7	11	9.5	Rc1/4
63 [2.480]	73	9	64	32	93	9	84	42	73	9	64	32	93	9	84	42	83	26.8	M10X1.5 Depth15	7	12.5	11	Rc1/4
80 [3.150]	93	11	82	41	113	11	102	51	93	11	82	41	113	11	102	51	102	32.8	M14X2 Depth20	9	18	12	Rc3/8
100 [3.940]	114	12	102	51	134	12	122	61	114	12	102	51	134	12	122	61	122	32.8	M18X2.5 Depth20	9	22.5	16.5	Rc3/8

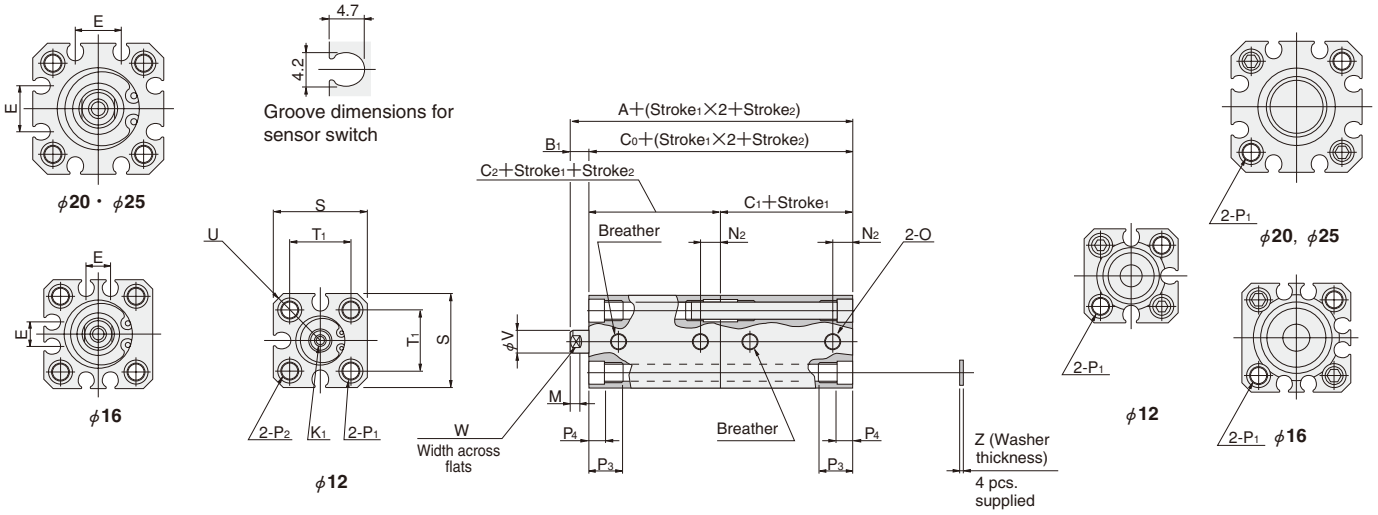
Code / Bore mm [in.]	P1	P2	P3	P4	R	S	T1	U	V	W	X	Y	Z	Appropriate through bolt※
12 [0.472]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5X0.8 (Both sides)	Counterbore ϕ6.5 and M5X0.8	9.5	4.5	—	25	16.3	R16	6	5	—	—	1	M3
16 [0.630]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5X0.8 (Both sides)	Counterbore ϕ6.5 and M5X0.8	9.5	4.5	—	29	19.8	R19	8	6	—	—	1	M3
20 [0.787]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5X0.8 (Both sides)	Counterbore ϕ6.5 and M5X0.8	9.5	4.5	—	34	24	R22	10	8	—	—	1	M3
25 [0.984]	ϕ5.1 (Thru hole) C'bore ϕ8 (Both sides) and M6X1 (Both sides)	Counterbore ϕ8 and M6X1	11.5	5.5	—	40	28	R25	12	10	—	—	1	M4
32 [1.260]	ϕ5.1 (Thru hole) C'bore ϕ8 (Both sides) and M6X1 (Both sides)	Counterbore ϕ8 and M6X1	11.5	5.5	4.5	44	34	R29.5	16	14	15	13.6	1	M4
40 [1.575]	ϕ6.9 (Thru hole) C'bore ϕ9.5 (Both sides) and M8X1.25 (Both sides)	Counterbore ϕ9.5 and M8X1.25	15.5	7.5	4.5	52	40	R35	16	14	15	13.6	1.6	M5
50 [1.969]	ϕ6.9 (Thru hole) C'bore ϕ11 (Both sides) and M8X1.25 (Both sides)	Counterbore ϕ11 and M8X1.25	16.5	8.5	8	62	48	R41	20	17	21.6	19	1.6	M6
63 [2.480]	ϕ6.9 (Thru hole) C'bore ϕ11 (Both sides) and M8X1.25 (Both sides)	Counterbore ϕ11 and M8X1.25	16.5	8.5	8	75	60	R50	20	17	21.6	19	1.6	M6
80 [3.150]	ϕ10.5 (Thru hole) C'bore ϕ14 (Both sides) and M12X1.75 (Both sides)	Counterbore ϕ14 and M12X1.75	22.5	10.5	8	94	74	R62	25	22	27.6	25	1.6	M8
100 [3.940]	ϕ12.3 (Thru hole) C'bore ϕ17.5 (Both sides) and M14X2 (Both sides)	Counterbore ϕ17.5 and M14X2	27	13	8	114	90	R75	32	27	27.6	25	2	M10

Note: Figure in parentheses 〔 〕 is for the standard cylinder (**CDAT**) when stroke1, or stroke1 + stroke2 is 5mm.
※Some types of mounting screws are available (to be ordered separately). See p.209.

Dimensions of Tandem Cylinder Single Acting Push Type (mm)

● ϕ12～ϕ25

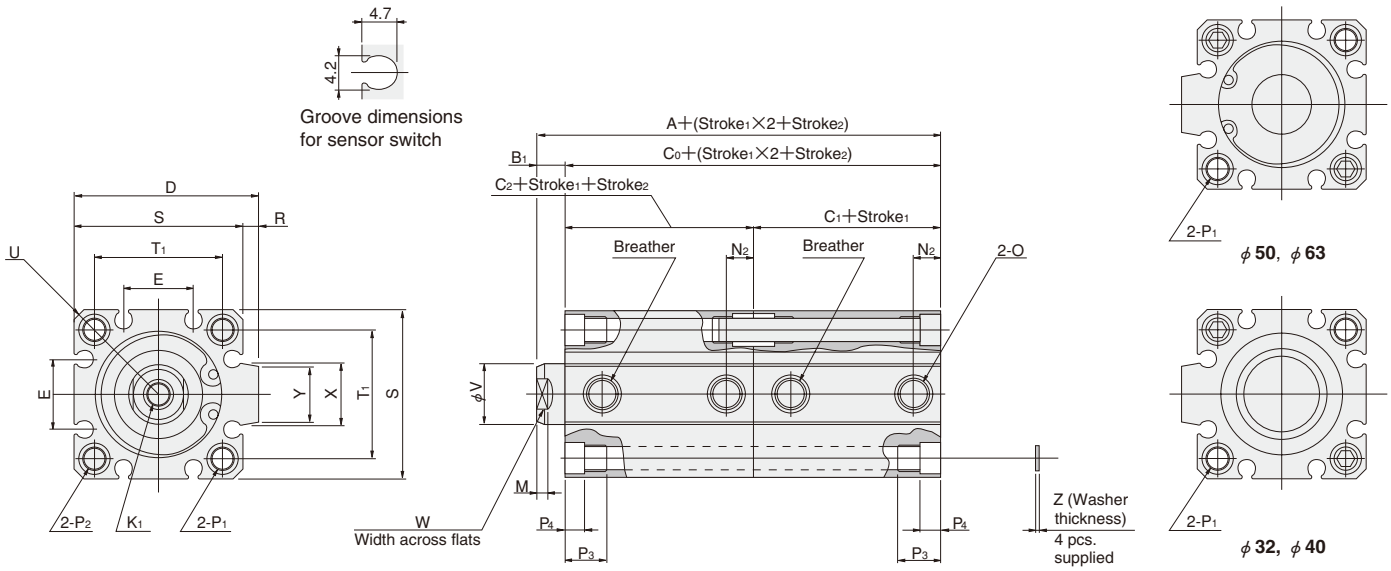
CSAT Bore size



● The drawing is for ϕ 12.

● ϕ32～ϕ50

CSAT Bore size



Bore mm [in.] Note / Type / Stroke1 / Code		Standard cylinder (CSAT)										Cylinder with magnet (CSATS)									
		5～15 (ϕ50: 10～20)					16～30 (ϕ50: 21～40)					5～15 (ϕ50: 10～20)					16～30 (ϕ50: 21～40)				
		A	B_1	C_0	C_1	C_2	A	B_1	C_0	C_1	C_2	A	B_1	C_0	C_1	C_2	A	B_1	C_0	C_1	C_2
12 [0.472]	D1	49	5	44	22	22	—	—	—	—	—	59	5	54	27	27	—	—	—	—	—
	D2	59		54		32	69	5	64	32	32	69		64		37	79	5	74	37	37
16 [0.630]	D1	49.5	5.5	44	22	22	—	—	—	—	—	59.5	5.5	54	27	27	—	—	—	—	—
	D2	59.5		54		32	69.5	5.5	64	32	32	69.5		64		37	79.5	5.5	74	37	37
20 [0.787]	D1	44.5	5.5	39	19.5	19.5	—	—	—	—	—	64.5	5.5	59	29.5	29.5	—	—	—	—	—
	D2	54.5		49		29.5	64.5	5.5	59	29.5	29.5	74.5		69		39.5	84.5	5.5	79	39.5	39.5
25 [0.984]	D1	48	6	42	21	21	—	—	—	—	—	68	6	62	31	31	—	—	—	—	—
	D2	58		52		31	68	6	62	31	31	78		72		41	88	6	82	41	41
32 [1.260]	D1	53	7	46	23	23	—	—	—	—	—	73	7	66	33	33	—	—	—	—	—
	D2	68		61		38	83	7	76	38	38	88		81		48	103	7	96	48	48
40 [1.575]	D1	59	7	52	26	26	—	—	—	—	—	79	7	72	36	36	—	—	—	—	—
	D2	74		67		41	89	7	82	41	41	94		87		51	109	7	102	51	51
50 [1.969]	D1	65	9	56	28	28	—	—	—	—	—	85	9	76	38	38	—	—	—	—	—
	D2	80		71		43	95	9	86	43	43	100		91		53	115	9	106	53	53

Bore mm [in.] / Code		D	E	K_1	M	N_2	O	P_1
12 [0.472]	D1	—	—	M3×0.5 Depth6	3.5	5	M5×0.8	ϕ4.3 (Thru hole) Counterbore ϕ6.5 (Both sides) and M5×0.8 (Both sides)
	D2							
16 [0.630]	D1	—	6.2	M4×0.7 Depth8	3.5	5	M5×0.8	ϕ4.3 (Thru hole) Counterbore ϕ6.5 (Both sides) and M5×0.8 (Both sides)
	D2							
20 [0.787]	D1	—	12.2	M5×0.8 Depth10	4.5	5	M5×0.8	ϕ4.3 (Thru hole) Counterbore ϕ6.5 (Both sides) and M5×0.8 (Both sides)
	D2							
25 [0.984]	D1	—	12.2	M6×1 Depth10	5	5	M5×0.8	ϕ5.1 (Thru hole) Counterbore ϕ8 (Both sides) and M6×1 (Both sides)
	D2							
32 [1.260]	D1	48.5	18.2	M8×1.25 Depth12	6	7.5	Rc1/8	ϕ5.1 (Thru hole) Counterbore ϕ8 (Both sides) and M6×1 (Both sides)
	D2							
40 [1.575]	D1	56.5	18.2	M8×1.25 Depth12	6	7.5	Rc1/8	ϕ6.9 (Thru hole) Counterbore ϕ9.5 (Both sides) and M8×1.25 (Both sides)
	D2							
50 [1.969]	D1	70	24.8	M10×1.5 Depth15	7	9.5	Rc1/4	ϕ6.9 (Thru hole) Counterbore ϕ11 (Both sides) and M8×1.25 (Both sides)
	D2							

Bore mm [in.] / Code		P_2	P_3	P_4	R	S	T_1	U	V	W	X	Y	Z	Appropriate through bolt※
12 [0.472]	D1	Counterbore ϕ6.5 and M5×0.8	9.5	4.5	—	25	16.3	R16	6	5	—	—	1	M3
	D2													
16 [0.630]	D1	Counterbore ϕ6.5 and M5×0.8	9.5	4.5	—	29	19.8	R19	8	6	—	—	1	M3
	D2													
20 [0.787]	D1	Counterbore ϕ6.5 and M5×0.8	9.5	4.5	—	34	24	R22	10	8	—	—	1	M3
	D2													
25 [0.984]	D1	Counterbore ϕ8 and M6×1	11.5	5.5	—	40	28	R25	12	10	—	—	1	M4
	D2													
32 [1.260]	D1	Counterbore ϕ8 and M6×1	11.5	5.5	4.5	44	34	R29.5	16	14	15	13.6	1	M4
	D2													
40 [1.575]	D1	Counterbore ϕ9.5 and M8×1.25	15.5	7.5	4.5	52	40	R35	16	14	15	13.6	1.6	M5
	D2													
50 [1.969]	D1	Counterbore ϕ11 and M8×1.25	16.5	8.5	8	62	48	R41	20	17	21.6	19	1.6	M6
	D2													

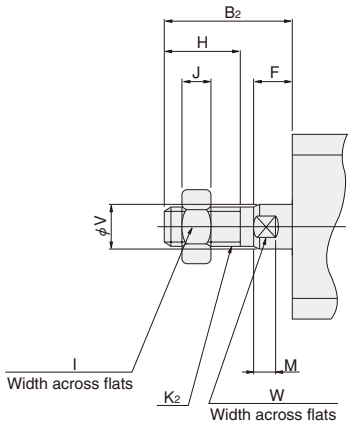
Notes: D1 is when stroke1 + stroke2 is 5～15 (ϕ50: 10～20) mm.
D2 is when stroke1 + stroke2 is 16～30 (ϕ50: 21～40) mm.
※ Some types of mounting screws are available (to be ordered separately). See p.209.

Dimensions of Male Rod End Thread Specification (mm)

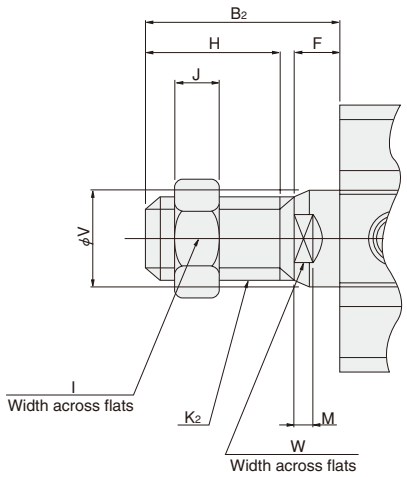
CAD Available in the file of each cylinder body.

●Double acting type, Single acting push type

● ϕ12～ϕ25



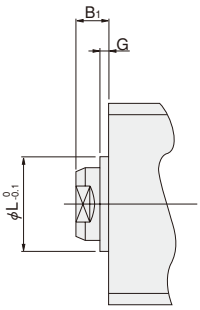
● ϕ32～ϕ100
(Single acting type available up to ϕ50)



Bore mm [in.] \ Code	B2	F	H	I	J	K2	M	V	W
12 [0.472]	17	5	10	8	4	M5×0.8	3.5	6	5
16 [0.630]	20.5	5.5	13	10	5	M6×1	3.5	8	6
20 [0.787]	22.5	5.5	15	12	5	M8×1	4.5	10	8
25 [0.984]	24	6	15	14	6	M10×1.25	5	12	10
32 [1.260]	35	7	25	19	8	M14×1.5	6	16	14
40 [1.575]	35	7	25	19	8	M14×1.5	6	16	14
50 [1.969]	37	9	25	27	11	M18×1.5	7	20	17
63 [2.480]	37	9	25	27	11	M18×1.5	7	20	17
80 [3.150]	44	11	30	32	13	M22×1.5	9	25	22
100 [3.940]	50	12	35	36	14	M26×1.5	9	32	27

Remark: Cylinder joints and cylinder rod ends are available for mounting with the rod end male thread specification. For details, see p.1568.

Dimensions of Centering Location (mm)



●Not available for bore size ϕ12.

Bore mm [in.] \ Code	B1	G	L
16 [0.630]	5.5	1.5	9.4
20 [0.787]	5.5	1.5	12
25 [0.984]	6	2	15
32 [1.260]	7	2	21
40 [1.575]	7	2	29
50 [1.969]	9	2	38
63 [2.480]	9	2	40
80 [3.150]	11	2	45
100 [3.940]	12	2	55

JIG CYLINDERS C SERIES DUAL STROKE CYLINDERS

**Double Acting Type,
Single Acting Push Type, Single Acting Pull Type**

Symbols

●Double acting type ●Single acting push type ●Single acting pull type

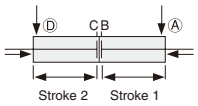
Specifications

Item \ Bore size mm [in.]		12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]	80 [3.150]	100 [3.940]
Operation type		Double acting type, Single acting push type, Single acting pull type							Double acting type		
Media		Air									
Operating pressure range MPa [psi.]	Double acting type	0.1～1.0 [15～145]						0.05～1.0 [7～145]			
	Single acting type	0.15～1.0 Note1 [22～145]						0.1～1.0 [15～145]	—		
Proof pressure MPa [psi.]		1.5 [218]									
Operating temperature range °C [°F]		0～60 [32～140] (The heat resistant specification is 120 [248]. Note2)									
Operating speed range mm/s [in./sec.]	Double acting type	30～500 [1.2～19.7]						30～300 [1.2～11.8]			
	Single acting type	100～500 [3.9～19.7]						100～300 [3.9～11.8]	—		
Cushion	Double acting type	Rubber bumper (Option Note2)									
	Single acting type	None							—		
Lubrication		Not required (If lubrication is required, use Turbine Oil Class 1 [**ISO VG32**] or equivalent.)									
Port size		M5×0.8				Rc1/8		Rc1/4		Rc3/8	

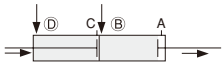
Remark: For Handling Instructions and Precautions, see p.205.
Notes: 1. The single acting pull type of ϕ 12 is 0.18～1.0MPa [26～145psi.].
2. For heat resistant specification, consult us.
3. Not available for heat resistant specification.

Operation of Dual Stroke Cylinders

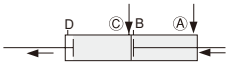
Dual Stroke Cylinders are a set of 2 cylinders connected back to back.
The cylinder body can be secured in place and each stroke can be controlled separately. It can also be used to obtain 2-stage or 3-stage strokes by securing the piston rod on one side in place.



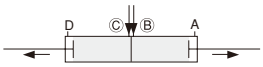
The rods retract stroke 1 and stroke 2 when air is supplied from Ports Ⓐ and Ⓓ.



The rod moves stroke 1 when air is supplied from Ports Ⓑ and Ⓓ.



The rod moves stroke 2 when air is supplied from Ports Ⓐ and Ⓒ.



The rod moves stroke 1 and stroke 2 when air is supplied from Ports Ⓑ and Ⓒ.

Bore Size and Stroke

For non-standard strokes, see p.206.

mm

Operation type	Bore size	Standard strokes	
		Standard cylinder	Cylinder with magnet
Double acting type	12	5, 10, 15, 20, 25, 30	5, 10, 15, 20, 25, 30
	16		
	20	5, 10, 15, 20, 25, 30, 35, 40, 45, 50	5, 10, 15, 20, 25, 30, 35, 40, 45, 50
	25		
	32	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
	40		
	50	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
	63		
	80		
	100		
Single acting type	12	5, 10, 15, 20, 25, 30	5, 10, 15, 20, 25, 30
	16		
	20		
	25		
	32		
	40		
	50	10, 15, 20, 25, 30, 35, 40	10, 15, 20, 25, 30, 35, 40

Remarks: 1. Stroke tolerance $^{+1}_{0}$ [$^{+0.039in.}_{0}$]
2. In most cases, body cutting is used for the non-standard strokes.
However, body cutting is not used for strokes of less than 5mm for ϕ 12～ϕ 40, and strokes of less than 10mm for ϕ 50～ϕ 100. The collar packed is used for these cases.

Order Codes for Dual Stroke Cylinders

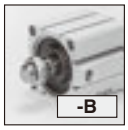
Operation type

DA : Double acting type
SA : Single acting push type
TA : Single acting pull type

Rod end specification

Female thread

Male thread



Mounting type

Basic type

Flange mounting type Note6

Sensor switch type Note5
(For cylinder with magnet)

Blank:
No sensor switch

-ZE135 : With ZE135
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Horizontal lead wire

-ZE155 : With ZE155
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Horizontal lead wire

-ZE235 : With ZE235
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Vertical lead wire

-ZE255 : With ZE255
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Vertical lead wire

-ZE101 : With ZE101
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V
  AC85～115V
- Horizontal lead wire

-ZE102 : With ZE102
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V
  AC85～115V
- Horizontal lead wire

-ZE201 : With ZE201
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V
  AC85～115V
- Vertical lead wire

-ZE202 : With ZE202
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V
  AC85～115V
- Vertical lead wire

Lead wire length

A : 1000mm [39in.]
B : 3000mm [118in.]

Number of sensor switches
(For cylinder with magnet)
Blank:
No sensor switch

1 : With 1 sensor switch
2 : With 2 sensor switches

Heat resistant specification

Blank : Standard cylinder Note1
F : Heat resistant cylinder Note2

Dual stroke cylinder

Cylinder specification

Blank : Standard cylinder Note1 (Non-ion specification)
S : Cylinder with magnet Note3 (Non-ion specification)

Bumper Note4

Blank : No bumper
-R : With bumper

Centering location Note7

Blank : No centering location
-G : With centering location

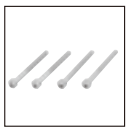
Basic type					Bore size × Stroke							
C	DA SA TA	F	W	S	Bore size × Stroke1 × Stroke2	-B Note8	-R	-G	-3	-ZE135 -ZE155 -ZE235 -ZE255 -ZE101 -ZE102 -ZE201 -ZE202	A B	1 2 ⋮ n

- See table for bore size and stroke.
- Mounting brackets are included at shipping.
- For the order codes of sensor switches only, see p.199.

Notes: 1. In the standard cylinder, a magnet for the sensor switch is not built-in.
2. Not available for the cylinder with magnet or the cylinder with bumper.
3. Not available in heat resistant specification.
4. For the double acting type only. Not available for heat resistant specification.
5. For details of sensor switches, see p.1544.
6. The flange mounting bracket can be mounted on the end of cylinder 2 only. Moreover, it cannot be mounted on the bore size ϕ 40 with centering location (**-G**).
7. Not available for the bore size ϕ 12.
8. For information regarding the cylinder joint and cylinder rod end for male thread, see p.1568.

Additional Parts (To be ordered separately)

Flange mounting bracket (p.198)

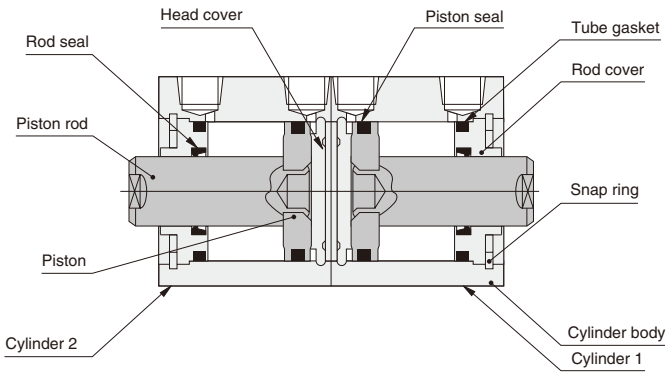


Mounting screws (p.209)

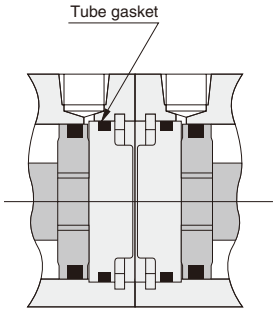
Inner Construction and Major Parts

●Double acting type (CDAW)

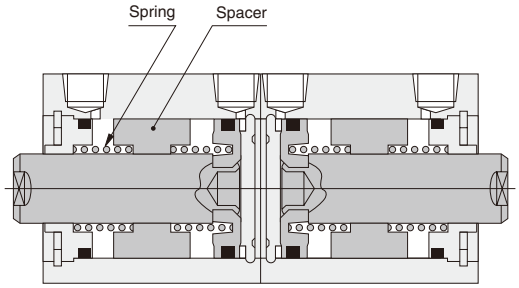
● ϕ12～ϕ40



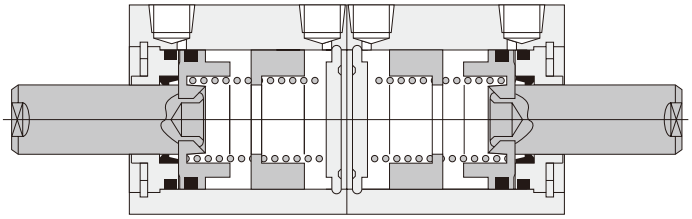
● ϕ50～ϕ100



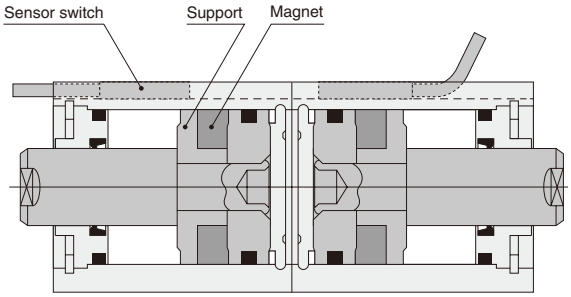
●Single acting push type (CSAW)



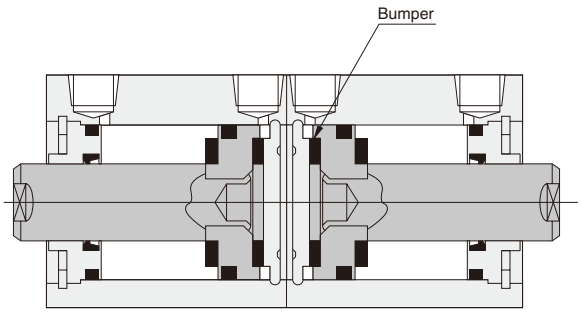
●Single acting pull type (CTAW)



●Cylinder with magnet



●With bumper



Major Parts and Materials

Parts \ Bore mm	ϕ12	ϕ16	ϕ20	ϕ25	ϕ32	ϕ40	ϕ50	ϕ63	ϕ80	ϕ100
Cylinder body	Aluminum alloy (anodized)									
Piston	Aluminum alloy (special rust prevention treatment)									
Piston rod	Stainless steel (chrome plated)				Steel (chrome plated)					
Seal	Synthetic rubber (NBR)									
Rod cover	Aluminum alloy (special wear-resistant treatment)									
Head cover	Aluminum alloy (anodized)									
Snap ring	Steel (phosphate coating)									
Spring	Piano wire							—		
Spacer	Aluminum alloy (special rust prevention treatment)							—		
Bumper	Synthetic rubber (NBR; urethane for ϕ12 only)									
Magnet	Plastic magnet									
Support	Aluminum alloy (special rust prevention treatment)									

Seals

Parts / Bore mm	Rod seal	Piston seal	Tube gasket	
			Rod side	Head side
ϕ12	MYR-6	COP-12	Y090260	None
ϕ16	MYR-8	COP-16	Y090207	None
ϕ20	MYR-10	COP-20(MYA-16)	Y090216	None
ϕ25	MYR-12	COP-25(MYA-21)	Y090210	None
ϕ32	MYR-16	COP-32	L090084	None
ϕ40	MYR-16	COP-40	L090151	None
ϕ50	MYR-20	COP-50	L090174	L090106
ϕ63	MYR-20	COP-63	L090180	L090107
ϕ80	PNY-25	COP-80	L090171	L090108
ϕ100	PNY-32	COP-100	L090172	L090109

Note: Items in parentheses ( ) are for the single acting type.

Mass

Dual stroke

●Double acting type

g [oz.]

Bore size mm [in.]	Zero stroke mass Note1	Additional mass for each 1mm [0.0394in.] of stroke1	Additional mass for each 1mm [0.0394in.] of stroke2	Additional mass of cylinder with bumper	Additional mass of cylinder with magnet	Mass of mounting bracket	Additional mass of sensor switch Note2	
						Flange bracket	ZE□□□A	ZE□□□B
12 [0.472]	44.26 [1.561]	1.4 [0.0494]	1.28 [0.0451]	13.39 [0.472]	13.73 [0.484]	55 [1.94]	15 [0.53]	35 [1.23]
16 [0.630]	61.11 [2.156]	1.73 [0.0610]	1.62 [0.0571]	16.71 [0.589]	20.41 [0.720]	71 [2.50]		
20 [0.787]	96.79 [3.414]	2.37 [0.0836]	2.26 [0.0797]	23.14 [0.816]	52.54 [1.853]	101 [3.56]		
25 [0.984]	147.69 [5.210]	3.3 [0.116]	3.11 [0.110]	32.05 [1.131]	76.92 [2.713]	160 [5.64]		
32 [1.260]	220.3 [7.771]	4.31 [0.152]	4.11 [0.145]	42.13 [1.486]	106.84 [3.769]	186 [6.56]		
40 [1.575]	345.12 [12.174]	5.08 [0.179]	4.77 [0.168]	0	141.38 [4.987]	335 [11.82]		
50 [1.969]	562.47 [19.840]	7.48 [0.264]	7.03 [0.248]	0	220.44 [7.776]	447 [15.77]		
63 [2.480]	896.12 [31.609]	9.14 [0.322]	8.69 [0.307]	0	322.4 [11.37]	591 [20.85]		
80 [3.150]	1755.88 [61.936]	13.51 [0.477]	13.06 [0.461]	0	494.4 [17.44]	1414 [49.88]		
100 [3.940]	3207.76 [113.15]	19.06 [0.672]	18.61 [0.656]	0	724.4 [25.55]	2606 [91.92]		

Notes 1: The above table is for the standard strokes.
2: Sensor switch codes A and B show the lead wire lengths.
A: 1000mm [39in.] B: 3000mm [118in.]

Calculation example: For the mass of a double acting type cylinder with magnet, bore size of 25mm, 30mm for stroke 1, 10mm for stroke 2, and with 2 sensor switches (**ZE135A**)
147.69＋(3.3×30)＋(3.11×10)＋76.92＋(15×2)＝384.71g [13.570oz.]

Dual stroke

●Single acting push type

g [oz.]

Bore size mm [in.]	Zero stroke mass Note1				Additional mass for each 1mm [0.0394in.] of stroke1	Additional mass for each 1mm [0.0394in.] of stroke2	Additional mass of cylinder with magnet	Mass of mounting bracket	Additional mass of sensor switch Note2	
	Stroke1									
	5～15 (ϕ 50: 10～20)		**16～30 (ϕ 50: 21～40)**							
	Stroke2									
	5～15 (ϕ 50: 10～20)	16～30 (ϕ 50: 21～40)	5～15 (ϕ 50: 10～20)	16～30 (ϕ 50: 21～40)				Flange bracket	ZE□□□A	ZE□□□B
12 [0.472]	55.88 [1.971]	69.98 [2.468]	71.1 [2.508]	85.21 [3.006]	1.4 [0.0494]	1.28 [0.0451]	16.11 [0.568]	55 [1.94]	15 [0.53]	35 [1.23]
16 [0.630]	80.31 [2.833]	99.64 [3.515]	100.76 [3.554]	120.1 [4.236]	1.73 [0.0610]	1.62 [0.0571]	21.21 [0.748]	71 [2.50]		
20 [0.787]	96.88 [3.417]	124.84 [4.404]	125.96 [4.443]	153.93 [5.430]	2.37 [0.0836]	2.26 [0.0797]	51.89 [1.830]	101 [3.56]		
25 [0.984]	147.45 [5.201]	186 [6.561]	187.98 [6.631]	226.53 [7.990]	3.3 [0.116]	3.11 [0.110]	80.18 [2.828]	160 [5.64]		
32 [1.260]	223.01 [7.866]	306.96 [10.828]	309.93 [10.932]	393.89 [13.894]	4.31 [0.152]	4.11 [0.145]	103.14 [3.638]	186 [6.56]		
40 [1.575]	345.03 [12.170]	453.44 [15.994]	458.06 [16.157]	566.48 [19.982]	5.08 [0.179]	4.77 [0.168]	141.93 [5.006]	335 [11.82]		
50 [1.969]	561.93 [19.821]	691.19 [24.381]	697.85 [24.616]	827.1 [29.175]	7.48 [0.264]	7.03 [0.248]	216.54 [7.638]	447 [15.77]		

Notes 1: The above table is for the standard strokes.
2: Sensor switch codes A and B show the lead wire lengths.
A: 1000mm [39in.] B: 3000mm [118in.]

Calculation example: For the mass of a single acting push type cylinder with magnet, bore size of 25mm, 20mm for stroke 1, 20mm for stroke 2, and with 2 sensor switches (**ZE135A**)
226.53＋(3.3×20)＋(3.11×20)＋80.18＋(15×2)＝464.91g [16.399oz.]

Dual stroke

●Single acting pull type

g [oz.]

Bore size mm [in.]	Zero stroke mass Note1				Additional mass for each 1mm [0.0394in.] of stroke1	Additional mass for each 1mm [0.0394in.] of stroke2	Additional mass of cylinder with magnet	Mass of mounting bracket	Additional mass of sensor switch Note2	
	Stroke1									
	5～15 (ϕ 50: 10～20)		**16～30 (ϕ 50: 21～40)**							
	Stroke2									
	5～15 (ϕ 50: 10～20)	16～30 (ϕ 50: 21～40)	5～15 (ϕ 50: 10～20)	16～30 (ϕ 50: 21～40)				Flange bracket	ZE□□□A	ZE□□□B
12 [0.472]	54.88 [1.936]	66.76 [2.355]	67.88 [2.394]	79.77 [2.814]	1.4 [0.0494]	1.28 [0.0451]	17.67 [0.623]	55 [1.94]	15 [0.53]	35 [1.23]
16 [0.630]	78.77 [2.778]	94.15 [3.321]	95.27 [3.360]	110.66 [3.903]	1.73 [0.0610]	1.62 [0.0571]	23.31 [0.822]	71 [2.50]		
20 [0.787]	117.58 [4.147]	139.48 [4.920]	140.6 [4.959]	162.49 [5.732]	2.37 [0.0836]	2.26 [0.0797]	53.74 [1.896]	101 [3.56]		
25 [0.984]	175.72 [6.198]	205.63 [7.253]	207.61 [7.323]	237.52 [8.378]	3.3 [0.116]	3.11 [0.110]	78.89 [2.783]	160 [5.64]		
32 [1.260]	255.75 [9.021]	316.83 [11.176]	319.8 [11.280]	380.88 [13.435]	4.31 [0.152]	4.11 [0.145]	105.39 [3.717]	186 [6.56]		
40 [1.575]	395.6 [13.954]	480.5 [16.949]	485.12 [17.112]	570.02 [20.107]	5.08 [0.179]	4.77 [0.168]	138.9 [4.899]	335 [11.82]		
50 [1.969]	634.13 [22.368]	726.4 [25.623]	733.06 [25.857]	825.32 [29.112]	7.48 [0.264]	7.03 [0.248]	144.56 [5.099]	447 [15.77]		

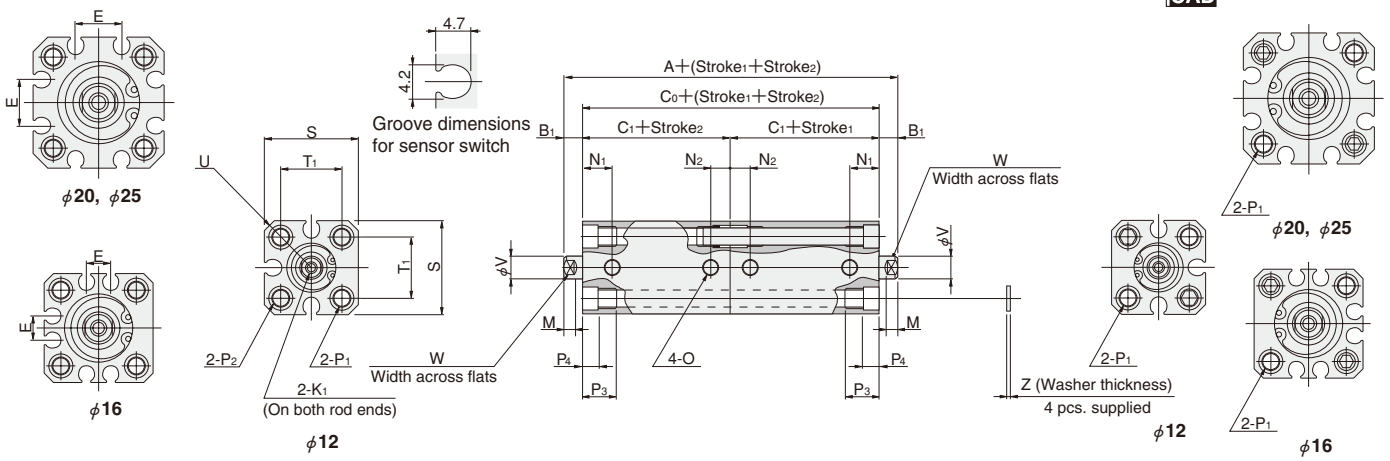
Notes 1: The above table is for the standard strokes.
2: Sensor switch codes A and B show the lead wire lengths.
A: 1000mm [39in.] B: 3000mm [118in.]

Calculation example: For the mass of a single acting pull type cylinder with magnet, bore size of 25mm, 20mm for stroke 1, 20mm for stroke 2, and with 2 sensor switches (**ZE135A**)
237.52＋(3.3×20)＋(3.11×20)＋78.89＋(15×2)＝474.61g [16.741oz.]

Dimensions of Dual Stroke Double Acting Type (mm)

● ϕ12～ϕ25

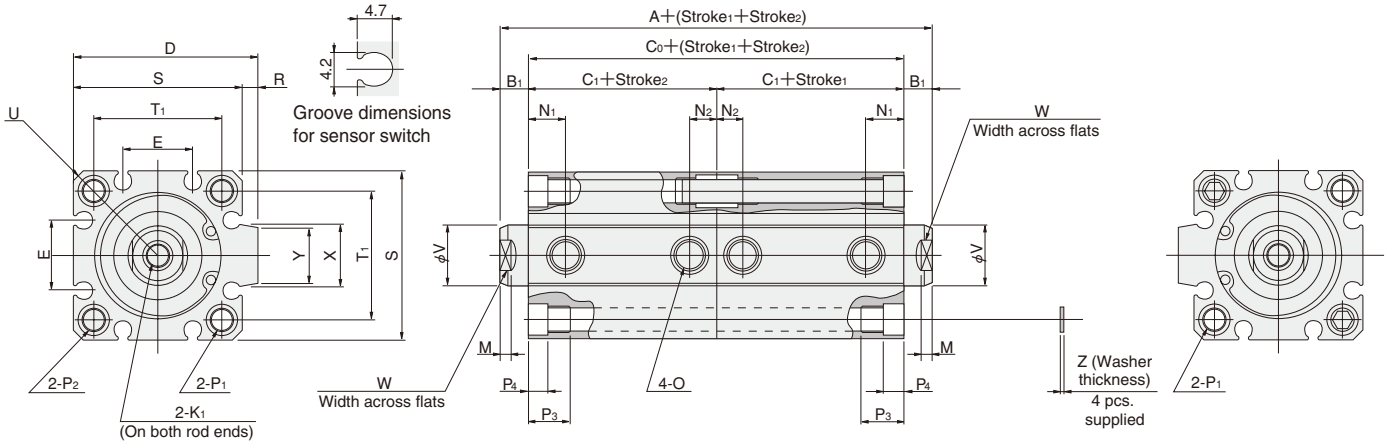
CDAW Bore size



●The drawing is for ϕ12.

● ϕ32～ϕ100

CDAW Bore size



Type / Code / Bore mm [in.]	Standard cylinder (CDAW)				Cylinder with magnet (CDAWS)				Standard cylinder with bumper (CDAW-R)				Cylinder with magnet and bumper (CDAWS-R)				D	E	K1	M	N1	N2	O
	A	B1	C0	C1	A	B1	C0	C1	A	B1	C0	C1	A	B1	C0	C1							
12 [0.472]	44	5	34	17	54	5	44	22	54	5	44	22	64	5	54	27	—	—	M3X0.5 Depth6	3.5	8	5	M5X0.8
16 [0.630]	45	5.5	34	17	55	5.5	44	22	55	5.5	44	22	65	5.5	54	27	—	6.2	M4X0.7 Depth8	3.5	8	5	M5X0.8
20 [0.787]	50	5.5	39	19.5	70	5.5	59	29.5	60	5.5	49	24.5	80	5.5	69	34.5	—	12.2	M5X0.8 Depth10	4.5	9.5	5	M5X0.8
25 [0.984]	54	6	42	21	74	6	62	31	64	6	52	26	84	6	72	36	—	12.2	M6X1 Depth10	5	10.5	5	M5X0.8
32 [1.260]	60	7	46	23	80	7	66	33	70	7	56	28	80	7	66	33	48.5	18.2	M8X1.25 Depth12	6	9.5	7.5(6)	Rc1/8
40 [1.575]	66	7	52	26	86	7	72	36	66	7	52	26	86	7	72	36	56.5	18.2	M8X1.25 Depth12	6	10.5	7.5	Rc1/8
50 [1.969]	74	9	56	28	94	9	76	38	74	9	56	28	94	9	76	38	70	24.8	M10X1.5 Depth15	7	11	9.5	Rc1/4
63 [2.480]	82	9	64	32	102	9	84	42	82	9	64	32	102	9	84	42	83	26.8	M10X1.5 Depth15	7	12.5	11	Rc1/4
80 [3.150]	104	11	82	41	124	11	102	51	104	11	82	41	124	11	102	51	102	32.8	M14X2 Depth20	9	18	12	Rc3/8
100 [3.940]	126	12	102	51	146	12	122	61	126	12	102	51	146	12	122	61	122	32.8	M18X2.5 Depth20	9	22.5	16.5	Rc3/8

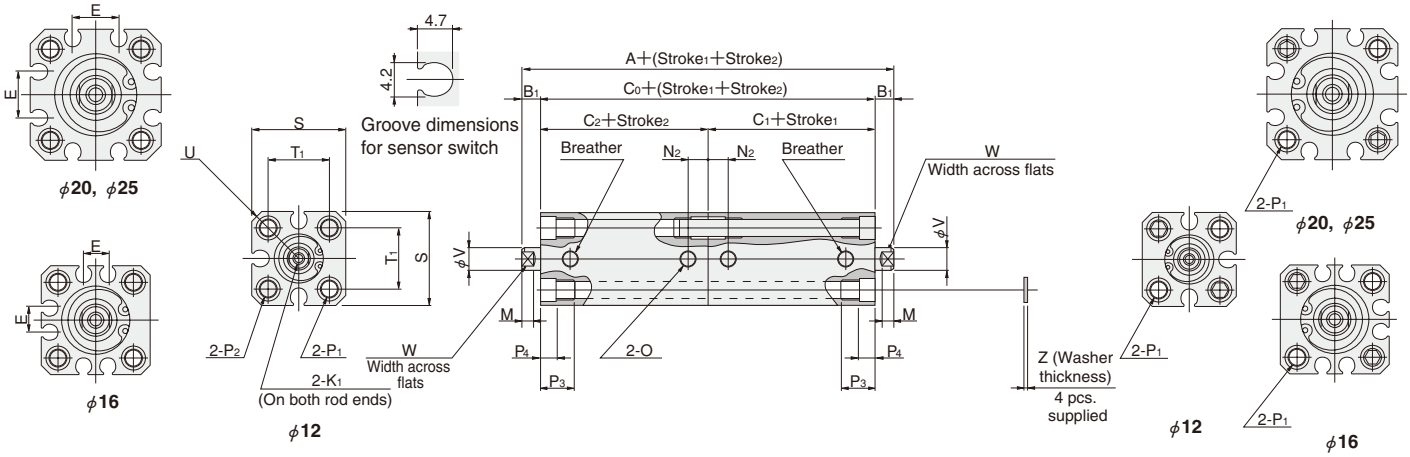
Bore mm [in.] / Code	P1	P2	P3	P4	R	S	T1	U	V	W	X	Y	Z	Appropriate through bolt※
12 [0.472]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5X0.8 (Both sides)	Counterbore ϕ6.5 and M5X0.8	9.5	4.5	—	25	16.3	R16	6	5	—	—	1	M3
16 [0.630]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5X0.8 (Both sides)	Counterbore ϕ6.5 and M5X0.8	9.5	4.5	—	29	19.8	R19	8	6	—	—	1	M3
20 [0.787]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5X0.8 (Both sides)	Counterbore ϕ6.5 and M5X0.8	9.5	4.5	—	34	24	R22	10	8	—	—	1	M3
25 [0.984]	ϕ5.1 (Thru hole) C'bore ϕ8 (Both sides) and M6X1 (Both sides)	Counterbore ϕ8 and M6X1	11.5	5.5	—	40	28	R25	12	10	—	—	1	M4
32 [1.260]	ϕ5.1 (Thru hole) C'bore ϕ8 (Both sides) and M6X1 (Both sides)	Counterbore ϕ8 and M6X1	11.5	5.5	4.5	44	34	R29.5	16	14	15	13.6	1	M4
40 [1.575]	ϕ6.9 (Thru hole) C'bore ϕ9.5 (Both sides) and M8X1.25 (Both sides)	Counterbore ϕ9.5 and M8X1.25	15.5	7.5	4.5	52	40	R35	16	14	15	13.6	1.6	M5
50 [1.969]	ϕ6.9 (Thru hole) C'bore ϕ11 (Both sides) and M8X1.25 (Both sides)	Counterbore ϕ11 and M8X1.25	16.5	8.5	8	62	48	R41	20	17	21.6	19	1.6	M6
63 [2.480]	ϕ6.9 (Thru hole) C'bore ϕ11 (Both sides) and M8X1.25 (Both sides)	Counterbore ϕ11 and M8X1.25	16.5	8.5	8	75	60	R50	20	17	21.6	19	1.6	M6
80 [3.150]	ϕ10.5 (Thru hole) C'bore ϕ14 (Both sides) and M12X1.75 (Both sides)	Counterbore ϕ14 and M12X1.75	22.5	10.5	8	94	74	R62	25	22	27.6	25	1.6	M8
100 [3.940]	ϕ12.3 (Thru hole) C'bore ϕ17.5 (Both sides) and M14X2 (Both sides)	Counterbore ϕ17.5and M14X2	27	13	8	114	90	R75	32	27	27.6	25	2	M10

Note: Figure in parentheses 〔 〕is for the standard cylinder (**CDAW**) with 5mm stroke.
※Some types of mounting screws are available (to be ordered separately). See p.209.

Dimensions of Dual Stroke Single Acting Push Type (mm)

● ϕ12～ϕ25

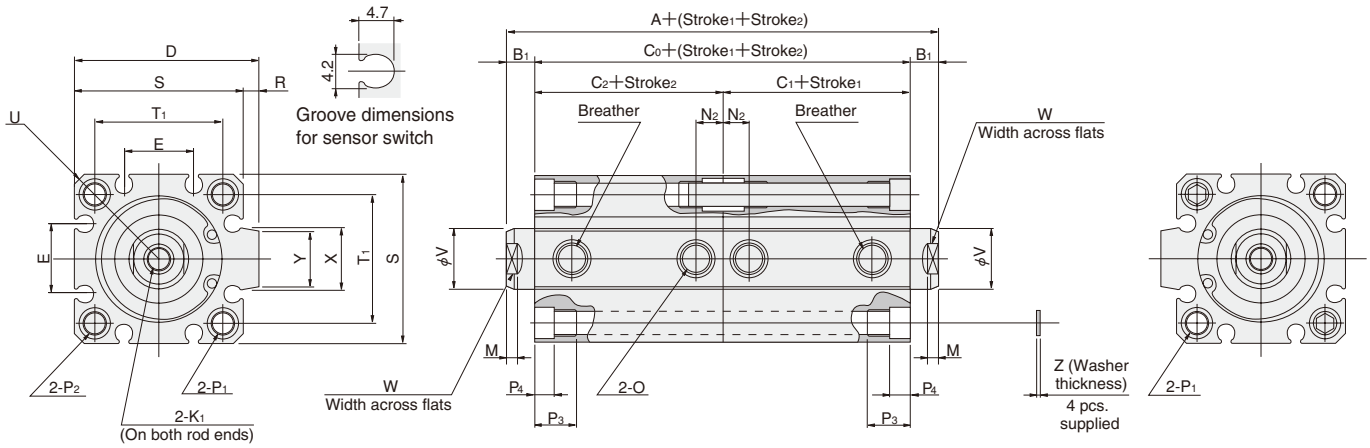
CAD CSAW Bore size



● The drawing is for ϕ 12.

● ϕ32～ϕ50

CAD CSAW Bore size



Bore mm [in.] Note / Type / Stroke1 / Code		Standard cylinder (CSAW)										Cylinder with magnet (CSAWS)									
		5～15 (ϕ50: 10～20)					16～30 (ϕ50: 21～40)					5～15 (ϕ50: 10～20)					16～30 (ϕ50: 21～40)				
		A	B_1	C_0	C_1	C_2	A	B_1	C_0	C_1	C_2	A	B_1	C_0	C_1	C_2	A	B_1	C_0	C_1	C_2
12 [0.472]	D1	54	5	44	22	22	64	5	54	32	22	64	5	54	27	27	74	5	64	37	27
	D2	64		54		32	74		64		32	74		64		37	84		74		37
16 [0.630]	D1	55	5.5	44	22	22	65	5.5	54	32	22	65	5.5	54	27	27	75	5.5	64	37	27
	D2	65		54		32	75		64		32	75		64		37	85		74		37
20 [0.787]	D1	50	5.5	39	19.5	19.5	60	5.5	49	29.5	19.5	70	5.5	59	29.5	29.5	80	5.5	69	39.5	29.5
	D2	60		49		29.5	70		59		29.5	80		69		39.5	90		79		39.5
25 [0.984]	D1	54	6	42	21	21	64	6	52	31	21	74	6	62	31	31	84	6	72	41	31
	D2	64		52		31	74		62		31	84		72		41	94		82		41
32 [1.260]	D1	60	7	46	23	23	75	7	61	38	23	80	7	66	33	33	95	7	81	48	33
	D2	75		61		38	90		76		38	95		81		48	110		96		48
40 [1.575]	D1	66	7	52	26	26	81	7	67	41	26	86	7	72	36	36	101	7	87	51	36
	D2	81		67		41	96		82		41	101		87		51	116		102		51
50 [1.969]	D1	74	9	56	28	28	89	9	71	43	28	94	9	76	38	38	109	9	91	53	38
	D2	89		71		43	104		86		43	109		91		53	124		106		53

Bore mm [in.] / Code		D	E	K_1	M	N_2	O	P_1
12 [0.472]	D1	—	—	M3×0.5 Depth6	3.5	5	M5×0.8	ϕ4.3 (Thru hole) Counterbore ϕ6.5 (Both sides) and M5×0.8 (Both sides)
	D2							
16 [0.630]	D1	—	6.2	M4×0.7 Depth8	3.5	5	M5×0.8	ϕ4.3 (Thru hole) Counterbore ϕ6.5 (Both sides) and M5×0.8 (Both sides)
	D2							
20 [0.787]	D1	—	12.2	M5×0.8 Depth10	4.5	5	M5×0.8	ϕ4.3 (Thru hole) Counterbore ϕ6.5 (Both sides) and M5×0.8 (Both sides)
	D2							
25 [0.984]	D1	—	12.2	M6×1 Depth10	5	5	M5×0.8	ϕ5.1 (Thru hole) Counterbore ϕ8 (Both sides) and M6×1 (Both sides)
	D2							
32 [1.260]	D1	48.5	18.2	M8×1.25 Depth12	6	7.5	Rc1/8	ϕ5.1 (Thru hole) Counterbore ϕ8 (Both sides) and M6×1 (Both sides)
	D2							
40 [1.575]	D1	56.5	18.2	M8×1.25 Depth12	6	7.5	Rc1/8	ϕ6.9 (Thru hole) Counterbore ϕ9.5 (Both sides) and M8×1.25 (Both sides)
	D2							
50 [1.969]	D1	70	24.8	M10×1.5 Depth15	7	9.5	Rc1/4	ϕ6.9 (Thru hole) Counterbore ϕ11 (Both sides) and M8×1.25 (Both sides)
	D2							

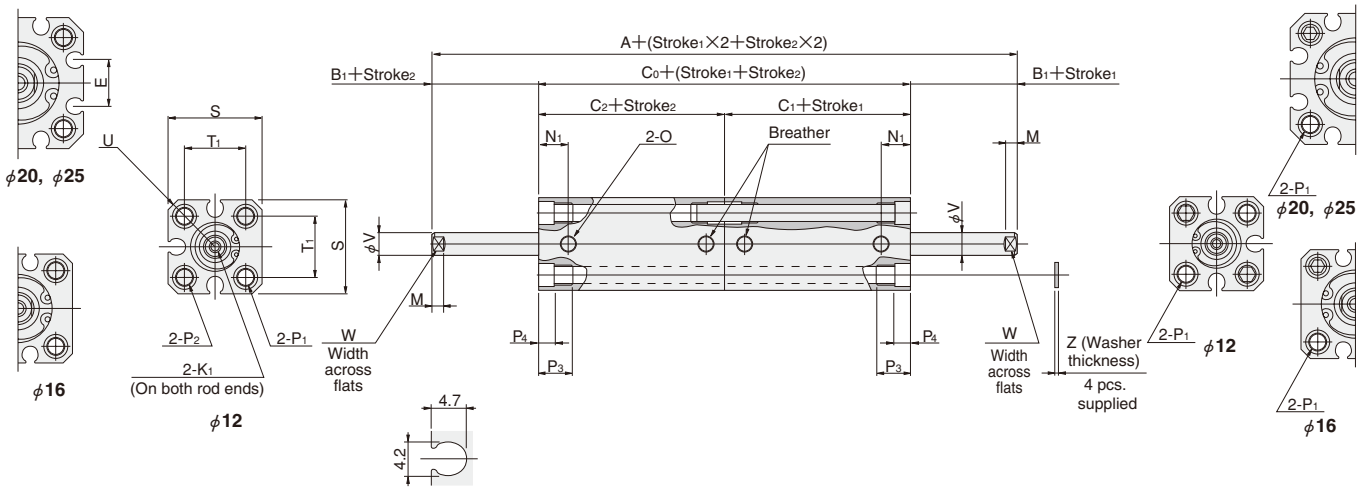
Bore mm [in.] / Code		P_2	P_3	P_4	R	S	T_1	U	V	W	X	Y	Z	Appropriate through bolt※
12 [0.472]	D1	Counterbore ϕ6.5 and M5×0.8	9.5	4.5	—	25	16.3	R16	6	5	—	—	1	M3
	D2													
16 [0.630]	D1	Counterbore ϕ6.5 and M5×0.8	9.5	4.5	—	29	19.8	R19	8	6	—	—	1	M3
	D2													
20 [0.787]	D1	Counterbore ϕ6.5 and M5×0.8	9.5	4.5	—	34	24	R22	10	8	—	—	1	M3
	D2													
25 [0.984]	D1	Counterbore ϕ8 and M6×1	11.5	5.5	—	40	28	R25	12	10	—	—	1	M4
	D2													
32 [1.260]	D1	Counterbore ϕ8 and M6×1	11.5	5.5	4.5	44	34	R29.5	16	14	15	13.6	1	M4
	D2													
40 [1.575]	D1	Counterbore ϕ9.5 and M8×1.25	15.5	7.5	4.5	52	40	R35	16	14	15	13.6	1.6	M5
	D2													
50 [1.969]	D1	Counterbore ϕ11 and M8×1.25	16.5	8.5	8	62	48	R41	20	17	21.6	19	1.6	M6
	D2													

Note: D1 is when stroke 2 is 5～15 (ϕ50: 10～20)mm.
D2 is when stroke 2 is 16～30 (ϕ50: 21～40)mm.
※ Some types of mounting screws are available (to be ordered separately). See p.209.

Dimensions of Dual Stroke Single Acting Pull Type (mm)

● ϕ12～ϕ25

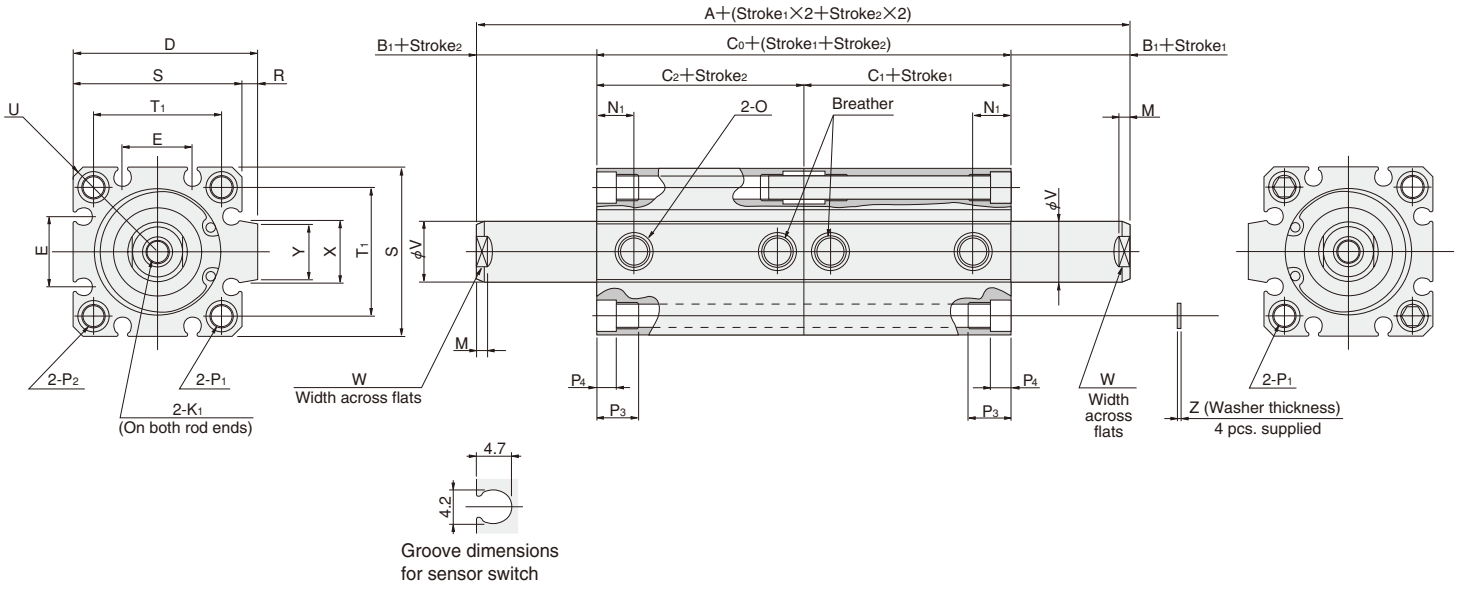
CAD CTAW Bore size



● The drawing is for ϕ 12.

● ϕ32～ϕ50

CAD CTAW Bore size



Bore mm [in.] Note / Type / Stroke1 / Code		Standard cylinder (CTAW)										Cylinder with magnet (CTAWS)									
		5～15 (φ50: 10～20)					16～30 (φ50: 21～40)					5～15 (φ50: 10～20)					16～30 (φ50: 21～40)				
		A	B1	C0	C1	C2	A	B1	C0	C1	C2	A	B1	C0	C1	C2	A	B1	C0	C1	C2
12 [0.472]	D1	54	5	44	22	22	64	5	54	32	22	64	5	54	27	27	74	5	64	37	27
	D2	64		54		32	74		64		32	74		64		37	84		74		37
16 [0.630]	D1	55	5.5	44	22	22	65	5.5	54	32	22	65	5.5	54	27	27	75	5.5	64	37	27
	D2	65		54		32	75		64		32	75		64		37	85		74		37
20 [0.787]	D1	60	5.5	49	24.5	24.5	70	5.5	59	34.5	24.5	80	5.5	69	34.5	34.5	90	5.5	79	44.5	34.5
	D2	70		59		34.5	80		69		34.5	90		79		44.5	100		89		44.5
25 [0.984]	D1	64	6	52	26	26	74	6	62	36	26	84	6	72	36	36	94	6	82	46	36
	D2	74		62		36	84		72		36	94		82		46	104		92		46
32 [1.260]	D1	70	7	56	28	28	85	7	71	43	28	90	7	76	38	38	105	7	91	53	38
	D2	85		71		43	100		86		43	105		91		53	120		106		53
40 [1.575]	D1	76	7	62	31	31	91	7	77	46	31	96	7	82	41	41	111	7	97	56	41
	D2	91		77		46	106		92		46	111		97		56	126		112		56
50 [1.969]	D1	74	9	56	28	28	89	9	71	43	28	94	9	76	38	38	109	9	91	53	38
	D2	89		71		43	104		86		43	109		91		53	124		106		53

Bore mm [in.] / Code		D	E	K1	M	N1	O	P1
12 [0.472]	D1	—	—	M3×0.5 Depth6	3.5	8	M5×0.8	φ4.3 (Thru hole) Counterbore φ6.5 (Both sides) and M5×0.8 (Both sides)
	D2							
16 [0.630]	D1	—	6.2	M4×0.7 Depth8	3.5	8	M5×0.8	φ4.3 (Thru hole) Counterbore φ6.5 (Both sides) and M5×0.8 (Both sides)
	D2							
20 [0.787]	D1	—	12.2	M5×0.8 Depth10	4.5	9.5	M5×0.8	φ4.3 (Thru hole) Counterbore φ6.5 (Both sides) and M5×0.8 (Both sides)
	D2							
25 [0.984]	D1	—	12.2	M6×1 Depth10	5	10.5	M5×0.8	φ5.1 (Thru hole) Counterbore φ8 (Both sides) and M6×1 (Both sides)
	D2							
32 [1.260]	D1	48.5	18.2	M8×1.25 Depth12	6	9.5	Rc1/8	φ5.1 (Thru hole) Counterbore φ8 (Both sides) and M6×1 (Both sides)
	D2							
40 [1.575]	D1	56.5	18.2	M8×1.25 Depth12	6	10.5	Rc1/8	φ6.9 (Thru hole) Counterbore φ9.5 (Both sides) and M8×1.25 (Both sides)
	D2							
50 [1.969]	D1	70	24.8	M10×1.5 Depth15	7	11	Rc1/4	φ6.9 (Thru hole) Counterbore φ11 (Both sides) and M8×1.25 (Both sides)
	D2							

Bore mm [in.] / Code		P2	P3	P4	R	S	T1	U	V	W	X	Y	Z	Appropriate through bolt※
12 [0.472]	D1	Counterbore φ6.5 and M5×0.8	9.5	4.5	—	25	16.3	R16	6	5	—	—	1	M3
	D2													
16 [0.630]	D1	Counterbore φ6.5 and M5×0.8	9.5	4.5	—	29	19.8	R19	8	6	—	—	1	M3
	D2													
20 [0.787]	D1	Counterbore φ6.5 and M5×0.8	9.5	4.5	—	34	24	R22	10	8	—	—	1	M3
	D2													
25 [0.984]	D1	Counterbore φ8 and M6×1	11.5	5.5	—	40	28	R25	12	10	—	—	1	M4
	D2													
32 [1.260]	D1	Counterbore φ8 and M6×1	11.5	5.5	4.5	44	34	R29.5	16	14	15	13.6	1	M4
	D2													
40 [1.575]	D1	Counterbore φ9.5 and M8×1.25	15.5	7.5	4.5	52	40	R35	16	14	15	13.6	1.6	M5
	D2													
50 [1.969]	D1	Counterbore φ11 and M8×1.25	16.5	8.5	8	62	48	R41	20	17	21.6	19	1.6	M6
	D2													

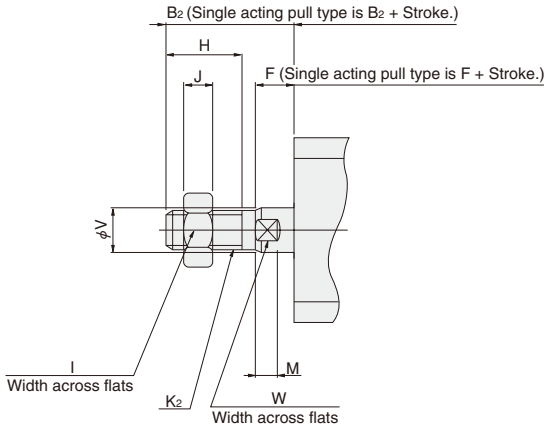
Note: D1 is when stroke 2 is 5～15 (φ50: 10～20)mm.
D2 is when stroke 2 is 16～30 (φ50: 21～40)mm.
※ Some types of mounting screws are available (to be ordered separately). See p.209.

Dimensions of Male Rod End Thread Specification (mm)

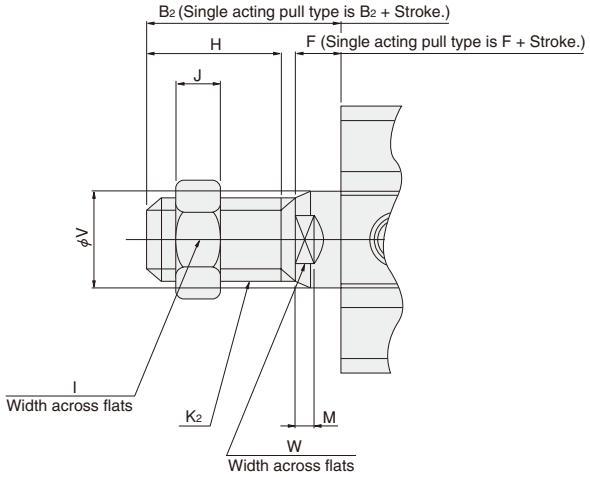
CAD Available in the file of each cylinder body.

●Double acting type, Single acting push type, Single acting pull type

● ϕ12～ϕ25



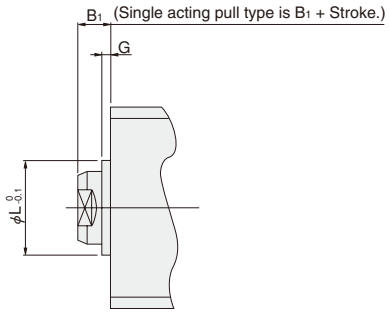
● ϕ32～ϕ100
(Single acting type available up to ϕ50)



Bore mm [in.] \ Code	B2	F	H	I	J	K2	M	V	W
12 [0.472]	17	5	10	8	4	M5×0.8	3.5	6	5
16 [0.630]	20.5	5.5	13	10	5	M6×1	3.5	8	6
20 [0.787]	22.5	5.5	15	12	5	M8×1	4.5	10	8
25 [0.984]	24	6	15	14	6	M10×1.25	5	12	10
32 [1.260]	35	7	25	19	8	M14×1.5	6	16	14
40 [1.575]	35	7	25	19	8	M14×1.5	6	16	14
50 [1.969]	37	9	25	27	11	M18×1.5	7	20	17
63 [2.480]	37	9	25	27	11	M18×1.5	7	20	17
80 [3.150]	44	11	30	32	13	M22×1.5	9	25	22
100 [3.940]	50	12	35	36	14	M26×1.5	9	32	27

Remark: Cylinder joints and cylinder rod ends are available for mounting with the rod end male thread specification. For details, see p.1568.

Dimensions of Centering Location (mm)

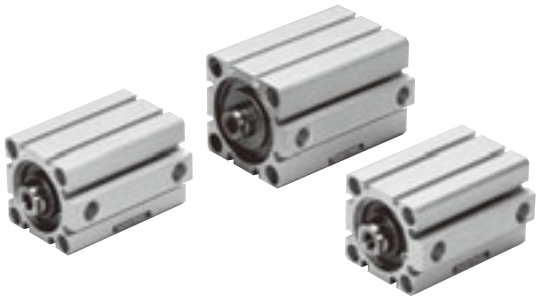


●Not available for bore size ϕ12.

Bore mm [in.] \ Code	B1	G	L
16 [0.630]	5.5	1.5	9.4
20 [0.787]	5.5	1.5	12
25 [0.984]	6	2	15
32 [1.260]	7	2	21
40 [1.575]	7	2	29
50 [1.969]	9	2	38
63 [2.480]	9	2	40
80 [3.150]	11	2	45
100 [3.940]	12	2	55

JIG CYLINDERS C SERIES
LATERAL LOAD RESISTANT CYLINDERS

Double Acting Type



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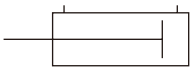


Specifications

Item \ Bore size mm [in.]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]	80 [3.150]	100 [3.940]
Operation type	Double acting type									
Media	Air									
Operating pressure range MPa [psi.]	0.15～1.0 [22～145]						0.1～1.0 [15～145]			
Proof pressure MPa [psi.]	1.5 [218]									
Operating temperature range °C [°F]	0～60 [32～140]									
Operating speed range mm/s [in./sec.]	30～500 [1.2～19.7]						30～300 [1.2～11.8]			
Cushion	Rubber bumper (Standard equipment)									
Lubrication	Not required (If lubrication is required, use Turbine Oil Class 1 [**ISO VG32**] or equivalent.)									
Port size	M5×0.8				Rc1/8		Rc1/4		Rc3/8	

Remark: For Handling Instructions and Precautions, see p.205.

Refer to p.206 of the graph of “Lateral Load” when the Lateral Load Resistant Cylinder is used.

Bore Size and Stroke

For non-standard strokes, see p.206.

mm

Operation type	Bore size	Standard strokes	
		Standard cylinder	Cylinder with magnet
Double acting type	**12**	5, 10, 15, 20, 25, 30	5, 10, 15, 20, 25, 30
	16		
	20	5, 10, 15, 20, 25, 30, 35, 40, 45, 50	5, 10, 15, 20, 25, 30, 35, 40, 45, 50
	25		
	32	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
	40		
	50	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
	63		
	80		
	100		

Remarks: 1. Stroke tolerance $^{+1}_{0}$ [$^{+0.039in.}_{0}$]
2. In most cases, body cutting is used for the non-standard strokes.
However, body cutting is not used for strokes of less than 5mm for ϕ 12 ～ ϕ 40, and strokes of less than 10mm for ϕ 50 ～ ϕ 100. The collar packed is used for these cases.

Order Codes for Lateral Load Resistant Cylinders

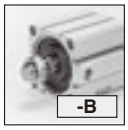
Operation type

DA : Double acting type

Rod end specification

Female thread

Male thread



Mounting type

Basic type

Foot mounting type

Flange mounting type Note 4

Clevis mounting type (with pin)

Sensor switch type Note2
(For cylinder with magnet)

Blank:
No sensor switch

-ZE135 : With ZE135
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Horizontal lead wire

-ZE155 : With ZE155
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Horizontal lead wire

-ZE235 : With ZE235
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Vertical lead wire

-ZE255 : With ZE255
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Vertical lead wire

-ZE101 : With ZE101
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V
  AC85～115V
- Horizontal lead wire

-ZE102 : With ZE102
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V
  AC85～115V
- Horizontal lead wire

-ZE201 : With ZE201
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V
  AC85～115V
- Vertical lead wire

-ZE202 : With ZE202
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V
  AC85～115V
- Vertical lead wire

Lead wire length

A : 1000mm [39in.]
B : 3000mm [118in.]

Number of sensor switches
(For cylinder with magnet)
Blank:
No sensor switch

1 : With 1 sensor switch
2 : With 2 sensor switches

Cylinder specification

Blank : Standard cylinder Note1 (Non-ion specification)
S : Cylinder with magnet (Non-ion specification)

Centering location Note3

Blank : No centering location
-G : With centering location

Lateral load resistant cylinder Basic type			Bore size × Stroke						
CB	DA	S	×	-B Note5	-G	-1 -3 -7	-ZE135 -ZE155 -ZE235 -ZE255 -ZE101 -ZE102 -ZE201 -ZE202	A B	1 2 ⋮ n

- See table for bore size and stroke.
- Mounting brackets are included at shipping.
- In sizes ϕ 12 and ϕ 16 with foot mounting brackets and strokes of less than 10mm, the foot mounting bracket and sensor switch may interfere with each other, which could prevent 2 sensor switches from being mounted. For details, consult us.
- For the order codes of sensor switches only, see p.199.

Notes: 1. In the standard cylinder, a magnet for the sensor switch is not built-in.
2. For details of sensor switches, see p.1544.
3. Not available for the bore size ϕ 12.
4. Cannot be mounted on the bore size ϕ 40 with centering location (**-G**).
5. For information regarding the cylinder joint and cylinder rod end for male thread, see p.1568.

Additional Parts (To be ordered separately)

Foot mounting bracket (p.197)

Flange mounting bracket (p.198)

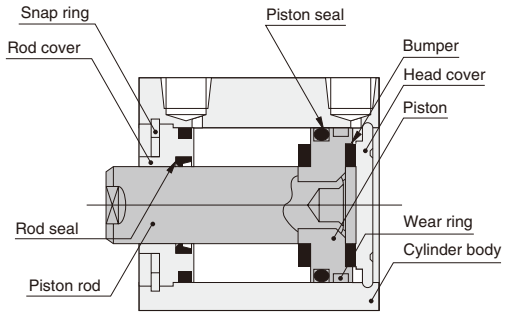
Clevis mounting bracket (with pin) (p.198)

Mounting screws (p.209)

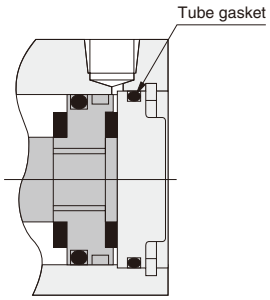
Inner Construction and Major Parts

●Double acting type (CBDA)

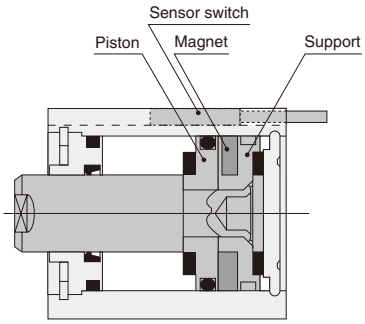
● ϕ12～ϕ40



● ϕ50～ϕ100



●Cylinder with magnet



Major Parts and Materials

Parts \ Bore mm	ϕ12	ϕ16	ϕ20	ϕ25	ϕ32	ϕ40	ϕ50	ϕ63	ϕ80	ϕ100
Cylinder body	Aluminum alloy (anodized)									
Piston	Aluminum alloy (special rust prevention treatment)									
Piston rod	Stainless steel (chrome plated)					Steel (chrome plated)				
Seal	Synthetic rubber (NBR)									
Rod cover	Aluminum alloy (special wear-resistant treatment)									
Head cover	Aluminum alloy (anodized)									
Snap ring	Steel (phosphate coating)									
Bumper	Synthetic rubber (NBR; urethane for ϕ 12 only)									
Magnet	Plastic magnet									
Support	Aluminum alloy (special rust prevention treatment)									
Wear ring	Plastic									

Seals

Parts / Bore mm	Rod seal	Piston seal	Tube gasket	
			Rod side	Head side
ϕ12	MYR-6	COP-12	Y090260	None
ϕ16	MYR-8	COP-16	Y090207	None
ϕ20	MYR-10	COP-20	Y090216	None
ϕ25	MYR-12	COP-25	Y090210	None
ϕ32	MYR-16	COP-32	L090084	None
ϕ40	MYR-16	COP-40	L090151	None
ϕ50	MYR-20	COP-50	L090174	L090106
ϕ63	MYR-20	COP-63	L090180	L090107
ϕ80	PNY-25	COP-80	L090171	L090108
ϕ100	PNY-32	COP-100	L090172	L090109

Mass

g [oz.]

Bore size mm [in.]	Zero stroke mass Note 1	Additional mass for each 1mm [0.0394in.] stroke	Additional mass of cylinder with magnet	Mass of mounting bracket			Additional mass of sensor switch Note2	
				Foot bracket	Flange bracket	Clevis bracket	ZE□□□A	ZE□□□B
12 [0.472]	26.17 [0.923]	1.28 [0.0451]	8 [0.28]	50 [1.76]	55 [1.94]	30 [1.06]	15 [0.53]	35 [1.23]
16 [0.630]	36.85 [1.300]	1.62 [0.0571]	11 [0.39]	62 [2.19]	71 [2.50]	40 [1.41]		
20 [0.787]	57.42 [2.025]	2.26 [0.0797]	27 [0.95]	84 [2.96]	101 [3.56]	75 [2.65]		
25 [0.984]	85.94 [3.031]	3.11 [0.110]	39 [1.38]	104 [3.67]	160 [5.64]	100 [3.53]		
32 [1.260]	126.86 [4.475]	4.11 [0.145]	28 [0.99]	126 [4.44]	186 [6.56]	165 [5.82]		
40 [1.575]	195.3 [6.889]	4.77 [0.168]	37 [1.31]	160 [5.64]	335 [11.82]	200 [7.05]		
50 [1.969]	314.69 [11.100]	7.03 [0.248]	57 [2.01]	220 [7.76]	447 [15.77]	315 [11.11]		
63 [2.480]	501.06 [17.674]	8.69 [0.307]	79 [2.79]	300 [10.58]	591 [20.85]	495 [17.46]		
80 [3.150]	951.44 [33.560]	13.06 [0.461]	244 [8.61]	644 [22.72]	1414 [49.88]	1110 [39.15]		
100 [3.940]	1729.88 [61.019]	18.61 [0.656]	344 [12.13]	1172 [41.34]	2606 [91.92]	1490 [52.56]		

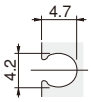
Notes: 1. The above table is for the standard strokes.
2. Sensor switch codes A and B show the lead wire lengths.
A: 1000mm [39in.] B: 3000mm [118in.]

Calculation example: For the mass of a cylinder with magnet, bore size of 25mm, stroke of 30mm, and with 2 sensor switches (**ZE135A**)
85.94＋(3.11×30)＋39＋(15×2)＝248.24g [8.756oz.]

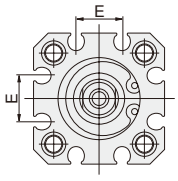
Dimensions of Lateral Load Resistant Double Acting Type (mm)

● ϕ12～ϕ25

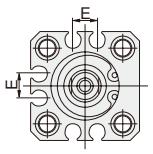
CBDA Bore size



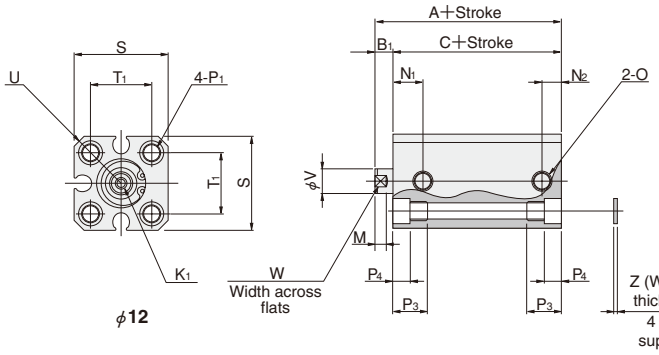
Groove dimensions for sensor switch



ϕ20, ϕ25



ϕ16

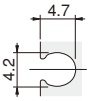


ϕ12

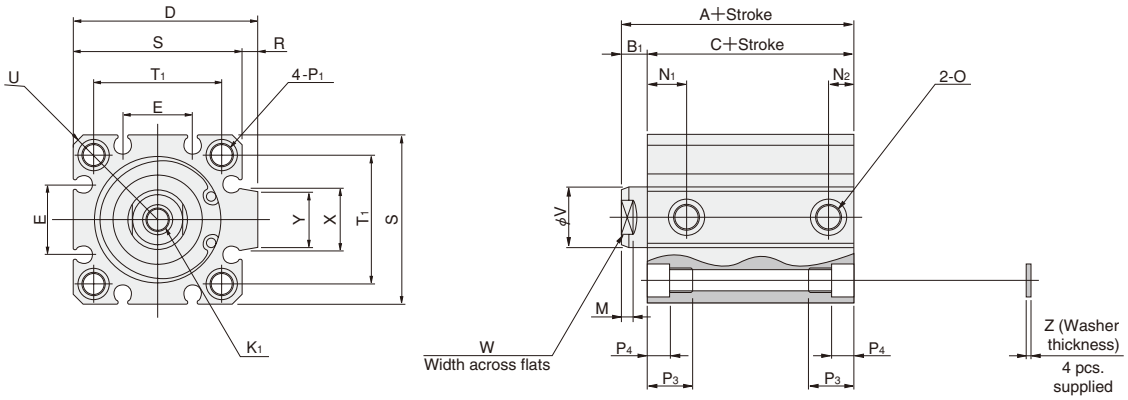
● The drawing is for ϕ 12.

● ϕ32～ϕ100

CBDA Bore size



Groove dimensions for sensor switch



Type / Code / Bore mm [in.]	Standard cylinder (CBDA)			Cylinder with magnet (CBDAS)			D	E	K1	M	N1	N2	O
	A	B1	C	A	B1	C							
12 [0.472]	27	5	22	32	5	27	—	—	M3×0.5 Depth6	3.5	8	5	M5×0.8
16 [0.630]	27.5	5.5	22	32.5	5.5	27	—	6.2	M4×0.7 Depth8	3.5	8	5	M5×0.8
20 [0.787]	30	5.5	24.5	40	5.5	34.5	—	12.2	M5×0.8 Depth10	4.5	9.5	5	M5×0.8
25 [0.984]	32	6	26	42	6	36	—	12.2	M6×1 Depth10	5	10.5	5	M5×0.8
32 [1.260]	35	7	28	40	7	33	48.5	18.2	M8×1.25 Depth12	6	9.5	7.5	Rc1/8
40 [1.575]	38	7	31	43	7	36	56.5	18.2	M8×1.25 Depth12	6	10.5	7.5	Rc1/8
50 [1.969]	42	9	33	47	9	38	70	24.8	M10×1.5 Depth15	7	11	9.5	Rc1/4
63 [2.480]	46	9	37	51	9	42	83	26.8	M10×1.5 Depth15	7	12.5	11	Rc1/4
80 [3.150]	57	11	46	67	11	56	102	32.8	M14×2 Depth20	9	18	12	Rc3/8
100 [3.940]	68	12	56	78	12	66	122	32.8	M18×2.5 Depth20	9	22.5	16.5	Rc3/8

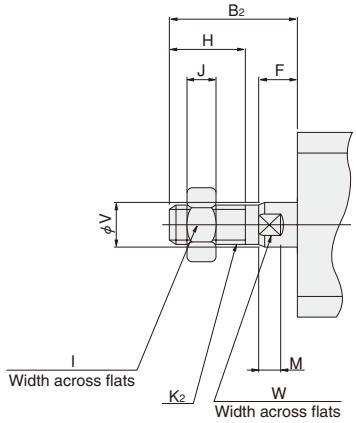
Code / Bore mm [in.]	P1	P3	P4	R	S	T1	U	V	W	X	Y	Z	Appropriate through bolt※
12 [0.472]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	25	16.3	R16	6	5	—	—	1	M3
16 [0.630]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	29	19.8	R19	8	6	—	—	1	M3
20 [0.787]	ϕ4.3 (Thru hole) C'bore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	34	24	R22	10	8	—	—	1	M3
25 [0.984]	ϕ5.1 (Thru hole) C'bore ϕ8 (Both sides) and M6×1 (Both sides)	11.5	5.5	—	40	28	R25	12	10	—	—	1	M4
32 [1.260]	ϕ5.1 (Thru hole) C'bore ϕ8 (Both sides) and M6×1 (Both sides)	11.5	5.5	4.5	44	34	R29.5	16	14	15	13.6	1	M4
40 [1.575]	ϕ6.9 (Thru hole) C'bore ϕ9.5 (Both sides) and M8×1.25 (Both sides)	15.5	7.5	4.5	52	40	R35	16	14	15	13.6	1.6	M5
50 [1.969]	ϕ6.9 (Thru hole) C'bore ϕ11 (Both sides) and M8×1.25 (Both sides)	16.5	8.5	8	62	48	R41	20	17	21.6	19	1.6	M6
63 [2.480]	ϕ6.9 (Thru hole) C'bore ϕ11 (Both sides) and M8×1.25 (Both sides)	16.5	8.5	8	75	60	R50	20	17	21.6	19	1.6	M6
80 [3.150]	ϕ10.5 (Thru hole) C'bore ϕ14 (Both sides) and M12×1.75 (Both sides)	22.5	10.5	8	94	74	R62	25	22	27.6	25	1.6	M8
100 [3.940]	ϕ12.3 (Thru hole) C'bore ϕ17.5 (Both sides) and M14×2 (Both sides)	27	13	8	114	90	R75	32	27	27.6	25	2	M10

※ Some types of mounting screws are available (to be ordered separately). See p.209.

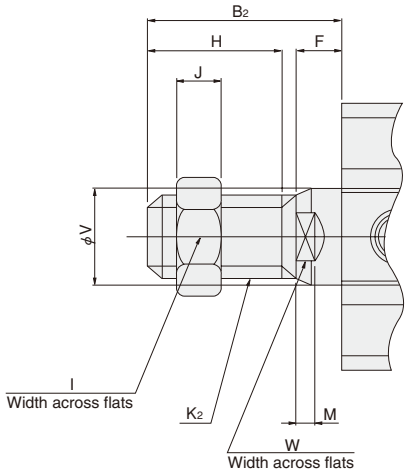
Dimensions of Male Rod End Thread Specification (mm)

CAD Available in the file of each cylinder body.

● ϕ12～ϕ25



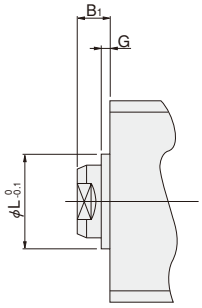
● ϕ32～ϕ100



Bore mm [in.] \ Code	B2	F	H	I	J	K2	M	V	W
12 [0.472]	17	5	10	8	4	M5×0.8	3.5	6	5
16 [0.630]	20.5	5.5	13	10	5	M6×1	3.5	8	6
20 [0.787]	22.5	5.5	15	12	5	M8×1	4.5	10	8
25 [0.984]	24	6	15	14	6	M10×1.25	5	12	10
32 [1.260]	35	7	25	19	8	M14×1.5	6	16	14
40 [1.575]	35	7	25	19	8	M14×1.5	6	16	14
50 [1.969]	37	9	25	27	11	M18×1.5	7	20	17
63 [2.480]	37	9	25	27	11	M18×1.5	7	20	17
80 [3.150]	44	11	30	32	13	M22×1.5	9	25	22
100 [3.940]	50	12	35	36	14	M26×1.5	9	32	27

Remark: Cylinder joints and cylinder rod ends are available for mounting with the rod end male thread specification. For details, see p.1568.

Dimensions of Centering Location (mm)



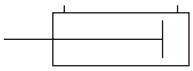
●Not available for bore size ϕ12.

Bore mm [in.] \ Code	B1	G	L
16 [0.630]	5.5	1.5	9.4
20 [0.787]	5.5	1.5	12
25 [0.984]	6	2	15
32 [1.260]	7	2	21
40 [1.575]	7	2	29
50 [1.969]	9	2	38
63 [2.480]	9	2	40
80 [3.150]	11	2	45
100 [3.940]	12	2	55

JIG CYLINDERS C SERIES
LONG STROKE CYLINDERS

Double Acting Type

Symbol



Specifications

Item \ Bore size mm [in.]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]	80 [3.150]	100 [3.940]
Operation type	Double acting type									
Media	Air									
Operating pressure range MPa [psi.]	0.15～1.0 [22～145]						0.1～1.0 [15～145]			
Proof pressure MPa [psi.]	1.5 [218]									
Operating temperature range °C [°F]	0～60 [32～140]									
Operating speed range mm/s [in./sec.]	30～500 [1.2～19.7]						30～300 [1.2～11.8]			
Cushion	Rubber bumper (Standard equipment)									
Lubrication	Not required (If lubrication is required, use Turbine Oil Class 1 [**ISO VG32**] or equivalent.)									
Port size	M5×0.8				Rc1/8		Rc1/4		Rc3/8	

Remark: For Handling Instructions and Precautions, see p.205.

Bore Size and Stroke

For non-standard strokes, see p.206.

mm

Operation type	Bore size	Standard strokes	
		Standard cylinder	Cylinder with magnet
Double acting type	12	35, 50, 75, 100, 125	35, 50, 75, 100, 125
	16		
	20	75, 100, 125, 150, 175, 200	75, 100, 125, 150, 175, 200
	25	75, 100, 125, 150, 175, 200, 225, 250	75, 100, 125, 150, 175, 200, 225, 250
	32	125, 150, 175, 200, 225, 250, 275, 300	125, 150, 175, 200, 225, 250, 275, 300
	40		
	50		
	63		
	80		
	100		

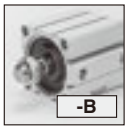
Remarks: 1. Stroke tolerance $^{+1}_{0}$ [$^{+0.039in.}_{0}$]
2. In most cases, body cutting is used for the non-standard strokes.
Body cutting is also used for strokes of 31～34mm for ϕ12 and ϕ16, strokes of 51～74mm for ϕ20 and ϕ25, strokes of 101～124mm for ϕ32 and ϕ100.

Order Codes for Long Stroke Cylinders

Rod end specification

Female thread

Male thread



Mounting type

Basic type

Foot mounting type

Flange mounting type Note 4

Clevis mounting type (with pin)

Sensor switch type Note2
(For cylinder with magnet)

Blank:
No sensor switch

-ZE135 : With ZE135
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Horizontal lead wire

-ZE155 : With ZE155
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Horizontal lead wire

-ZE235 : With ZE235
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Vertical lead wire

-ZE255 : With ZE255
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Vertical lead wire

-ZE101 : With ZE101
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V
  AC85～115V
- Horizontal lead wire

-ZE102 : With ZE102
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V
  AC85～115V
- Horizontal lead wire

-ZE201 : With ZE201
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V
  AC85～115V
- Vertical lead wire

-ZE202 : With ZE202
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V
  AC85～115V
- Vertical lead wire

Lead wire length

A : 1000mm [39in.]
B : 3000mm [118in.]

Number of sensor switches
(For cylinder with magnet)
Blank:
No sensor switch

1 : With 1 sensor switch
2 : With 2 sensor switches

Operation type

DA : Double acting type

Cylinder specification

Blank : Standard cylinder Note1 (Non-ion specification)
S : Cylinder with magnet (Non-ion specification)

Centering location Note3

Blank : No centering location
-G : With centering location

Long stroke cylinder Basic type			Bore size × Stroke						
CC	DA	S	×	-B Note5	-G	-1 -3 -7	-ZE135 -ZE155 -ZE235 -ZE255 -ZE101 -ZE102 -ZE201 -ZE202	A B	1 2 ⋮ n

- See table for bore size and stroke.
- Mounting brackets are included at shipping.
- For the order codes of sensor switches only, see p.199.

Notes: 1. In the standard cylinder, a magnet for the sensor switch is not built-in.
2. For details of sensor switches, see p.1544.
3. Not available for the bore size ϕ 12.
4. Cannot be mounted on the bore size ϕ 40 with centering locator (**-G**).
5. For information regarding the cylinder joint and cylinder rod end for male thread, see p.1568.

Additional Parts (To be ordered separately)


Foot mounting bracket (p.197)

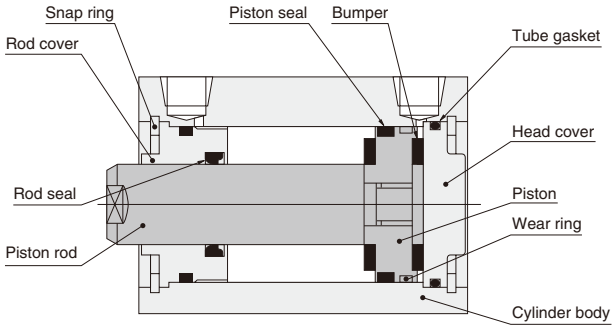

Flange mounting bracket (p.198)


Clevis mounting bracket (with pin) (p.198)

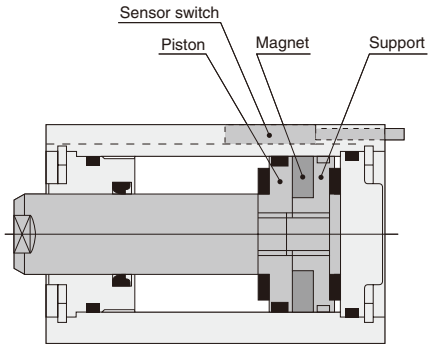

Mounting screws (p.209)

Inner Construction and Major Parts

●Double acting type (CCDA)



●Cylinder with magnet



Major Parts and Materials

Parts \ Bore mm	ϕ 12	ϕ 16	ϕ 20	ϕ 25	ϕ 32	ϕ 40	ϕ 50	ϕ 63	ϕ 80	ϕ 100
Cylinder body	Aluminum alloy (anodized)									
Piston	Aluminum alloy (special rust prevention treatment)									
Piston rod	Stainless steel (chrome plated)					Steel (chrome plated)				
Seal	Synthetic rubber (NBR)									
Rod cover	Aluminum alloy (special wear-resistant treatment)									
Head cover	Aluminum alloy (anodized)									
Snap ring	Steel (phosphate coating)									
Bumper	Synthetic rubber (NBR; urethane for ϕ 12 only)									
Magnet	Plastic magnet									
Support	Aluminum alloy (special rust prevention treatment)									
Wear ring	Plastic									

Seals

Parts / Bore mm	Rod seal	Piston seal	Tube gasket	
			Rod side	Head side
ϕ 12	MYR-6	COP-12	Y090260	Y090260
ϕ 16	MYR-8	COP-16	Y090207	Y090207
ϕ 20	MYR-10	COP-20	Y090216	Y090216
ϕ 25	MYR-12	COP-25	Y090210	Y090210
ϕ 32	MYR-16	COP-32	L090084	L090084
ϕ 40	MYR-16	COP-40	L090151	L090151
ϕ 50	MYR-20	COP-50	L090174	L090106
ϕ 63	MYR-20	COP-63	L090180	L090107
ϕ 80	PNY-25	COP-80	L090171	L090108
ϕ 100	PNY-32	COP-100	L090172	L090109

Mass

g [oz.]

Bore size mm [in.]	Zero stroke mass Note 1	Additional mass for each 1mm [0.0394in.] stroke	Additional mass of cylinder with magnet	Mass of mounting bracket			Additional mass of sensor switch Note2	
				Foot bracket	Flange bracket	Clevis bracket	ZE□□□A	ZE□□□B
12 [0.472]	39.15 [1.381]	1.28 [0.0451]	7 [0.25]	50 [1.76]	55 [1.94]	30 [1.06]	15 [0.53]	35 [1.23]
16 [0.630]	54.75 [1.931]	1.62 [0.0571]	11 [0.39]	62 [2.19]	71 [2.50]	40 [1.41]		
20 [0.787]	84 [2.963]	2.26 [0.0797]	26 [0.92]	84 [2.96]	101 [3.56]	75 [2.65]		
25 [0.984]	121 [4.268]	3.11 [0.110]	38 [1.34]	104 [3.67]	160 [5.64]	100 [3.53]		
32 [1.260]	184.15 [6.496]	4.11 [0.145]	28 [0.99]	126 [4.44]	186 [6.56]	165 [5.82]		
40 [1.575]	281.75 [9.938]	4.77 [0.168]	34 [1.20]	160 [5.64]	335 [11.82]	200 [7.05]		
50 [1.969]	370.23 [13.059]	7.03 [0.248]	56 [1.98]	220 [7.76]	447 [15.77]	315 [11.11]		
63 [2.480]	578.65 [20.411]	8.69 [0.307]	79 [2.79]	300 [10.58]	591 [20.85]	495 [17.46]		
80 [3.150]	1057.6 [37.305]	13.06 [0.461]	250 [8.82]	644 [22.72]	1414 [49.88]	1110 [39.15]		
100 [3.940]	1913.7 [67.503]	18.61 [0.656]	350 [12.35]	1172 [41.34]	2606 [91.92]	1490 [52.56]		

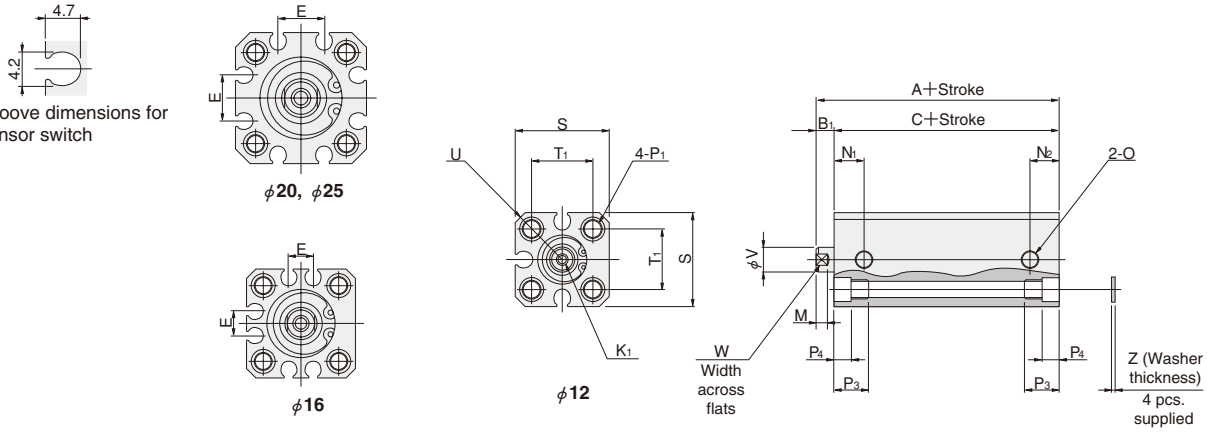
Notes: 1. The above table is for the standard strokes.
2. Sensor switch codes A and B show the lead wire lengths.
A: 1000mm [39in.] B: 3000mm [118in.]

Calculation example: For the mass of a cylinder with magnet, bore size of 25mm, stroke of 150mm, and with 2 sensor switches (**ZE135A**)
121+(3.11×150)+38+(15×2)=655.5g [23.122oz.]

Dimensions of Long Stroke Cylinder Double Acting Type (mm)

● ϕ12～ϕ25

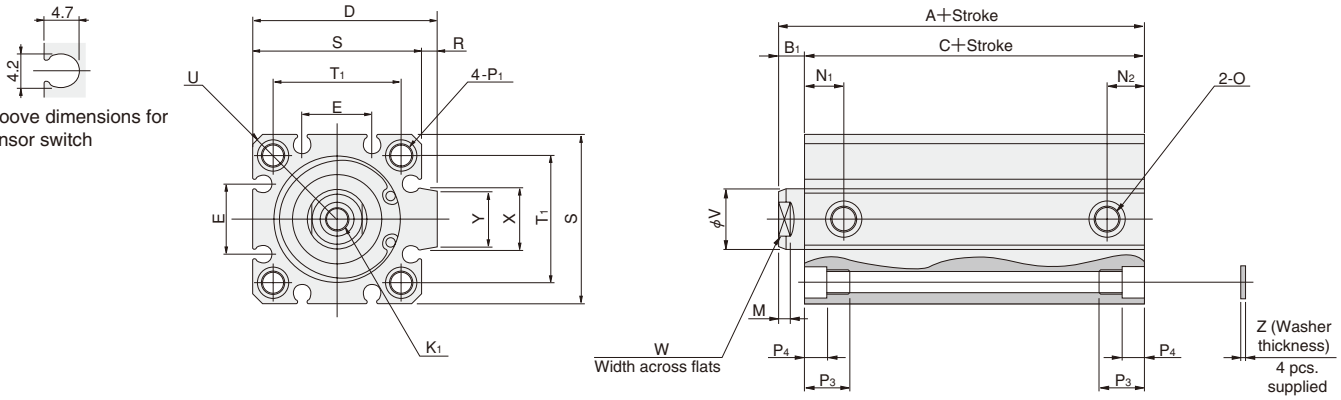
CCDA Bore size



●The drawing is for ϕ 12.

● ϕ32～ϕ100

CCDA Bore size



Type / Code / Bore mm [in.]	Standard cylinder (CCDA)			Cylinder with magnet (CCDAS)			D	E	K1	M	N1	N2	O
	A	B1	C	A	B1	C							
12 [0.472]	38	5	33	43	5	38	—	—	M3×0.5 Depth6	3.5	8	8	M5×0.8
16 [0.630]	38.5	5.5	33	43.5	5.5	38	—	6.2	M4×0.7 Depth8	3.5	8	8	M5×0.8
20 [0.787]	41.5	5.5	36	51.5	5.5	46	—	12.2	M5×0.8 Depth10	4.5	9.5	9.5	M5×0.8
25 [0.984]	42.5	6	36.5	52.5	6	46.5	—	12.2	M6×1 Depth10	5	10.5	10.5	M5×0.8
32 [1.260]	47	7	40	52	7	45	48.5	18.2	M8×1.25 Depth12	6	9.5	9.5	Rc1/8
40 [1.575]	50	7	43	55	7	48	56.5	18.2	M8×1.25 Depth12	6	10.5	10.5	Rc1/8
50 [1.969]	47	9	38	52	9	43	70	24.8	M10×1.5 Depth15	7	11	9.5	Rc1/4
63 [2.480]	51	9	42	56	9	47	83	26.8	M10×1.5 Depth15	7	12.5	11	Rc1/4
80 [3.150]	62	11	51	72	11	61	102	32.8	M14×2 Depth20	9	18	12	Rc3/8
100 [3.940]	73	12	61	83	12	71	122	32.8	M18×2.5 Depth20	9	22.5	16.5	Rc3/8

Code / Bore mm [in.]	P1	P3	P4	R	S	T1	U	V	W	X	Y	Z	Appropriate through bolt※
12 [0.472]	ϕ4.3 (Thru hole) Counterbore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	25	16.3	R16	6	5	—	—	1	M3
16 [0.630]	ϕ4.3 (Thru hole) Counterbore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	29	19.8	R19	8	6	—	—	1	M3
20 [0.787]	ϕ4.3 (Thru hole) Counterbore ϕ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	34	24	R22	10	8	—	—	1	M3
25 [0.984]	ϕ5.1 (Thru hole) Counterbore ϕ8 (Both sides) and M6×1 (Both sides)	11.5	5.5	—	40	28	R25	12	10	—	—	1	M4
32 [1.260]	ϕ5.1 (Thru hole) Counterbore ϕ8 (Both sides) and M6×1 (Both sides)	11.5	5.5	4.5	44	34	R29.5	16	14	15	13.6	1	M4
40 [1.575]	ϕ6.9 (Thru hole) Counterbore ϕ9.5 (Both sides) and M8×1.25 (Both sides)	15.5	7.5	4.5	52	40	R35	16	14	15	13.6	1.6	M5
50 [1.969]	ϕ6.9 (Thru hole) Counterbore ϕ11 (Both sides) and M8×1.25 (Both sides)	16.5	8.5	8	62	48	R41	20	17	21.6	19	1.6	M6
63 [2.480]	ϕ6.9 (Thru hole) Counterbore ϕ11 (Both sides) and M8×1.25 (Both sides)	16.5	8.5	8	75	60	R50	20	17	21.6	19	1.6	M6
80 [3.150]	ϕ10.5 (Thru hole) Counterbore ϕ14 (Both sides) and M12×1.75 (Both sides)	22.5	10.5	8	94	74	R62	25	22	27.6	25	1.6	M8
100 [3.940]	ϕ12.3 (Thru hole) Counterbore ϕ17.5 (Both sides) and M14×2 (Both sides)	27	13	8	114	90	R75	32	27	27.6	25	2	M10

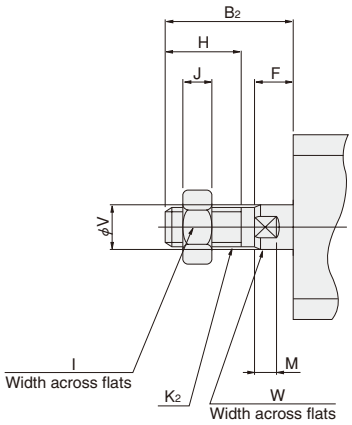
※ Some types of mounting screws are available (to be ordered separately). See p.209.

Dimensions of Male Rod End Thread Specification (mm)

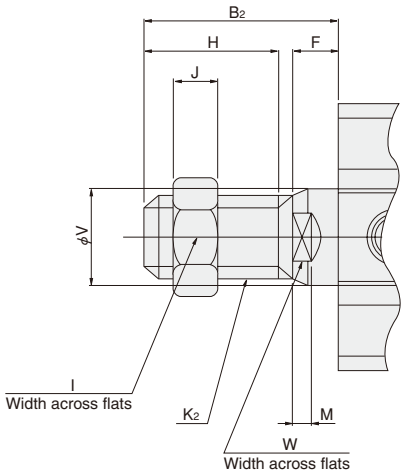
CAD Available in the file of each cylinder body.

●Double acting type

● ϕ12～ϕ25



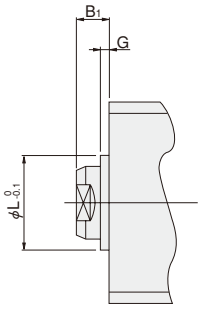
● ϕ32～ϕ100



Bore mm [in.] \ Code	B2	F	H	I	J	K2	M	V	W
12 [0.472]	17	5	10	8	4	M5×0.8	3.5	6	5
16 [0.630]	20.5	5.5	13	10	5	M6×1	3.5	8	6
20 [0.787]	22.5	5.5	15	12	5	M8×1	4.5	10	8
25 [0.984]	24	6	15	14	6	M10×1.25	5	12	10
32 [1.260]	35	7	25	19	8	M14×1.5	6	16	14
40 [1.575]	35	7	25	19	8	M14×1.5	6	16	14
50 [1.969]	37	9	25	27	11	M18×1.5	7	20	17
63 [2.480]	37	9	25	27	11	M18×1.5	7	20	17
80 [3.150]	44	11	30	32	13	M22×1.5	9	25	22
100 [3.940]	50	12	35	36	14	M26×1.5	9	32	27

Remark: Cylinder joints and cylinder rod ends are available for mounting with the rod end male thread specification. For details, see p.1568.

Dimensions of Centering Location (mm)



●Not available for bore size ϕ12.

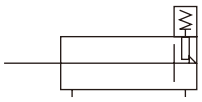
Bore mm [in.] \ Code	B1	G	L
16 [0.630]	5.5	1.5	9.4
20 [0.787]	5.5	1.5	12
25 [0.984]	6	2	15
32 [1.260]	7	2	21
40 [1.575]	7	2	29
50 [1.969]	9	2	38
63 [2.480]	9	2	40
80 [3.150]	11	2	45
100 [3.940]	12	2	55

JIG CYLINDERS C SERIES END KEEP CYLINDERS

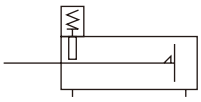
Double Acting Type

Symbols

●Head side end keep



●Rod side end keep



Specifications

Item / Bore size mm [in.]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]
Operation type	Double acting type						
Media	Air						
Operating pressure range MPa [psi.]	0.2～0.9 [29～131]	0.15～0.9 [22～131]				0.1～0.7 [15～102]	
Proof pressure MPa [psi.]	1.5 [218]						
Operating temperature range °C [°F]	0～60 [32～140]						
Operating speed range mm/s [in./sec.]	30～500 [1.2～19.7]					30～300 [1.2～11.8]	
Cushion	Rubber bumper (Standard equipment)						
Lubrication	Not required (If lubrication is required, use Turbine Oil Class 1 [**ISO VG32**] or equivalent.)						
Maximum holding force (at end keep) N [lbf.]	61.7 [13.9]	96.1 [21.6]	151 [33.9]	248.1 [55.8]	387.3 [87.1]	471.6 [106]	534.4 [120]
Backlash (at end keep) mm [in.]	1.4 [0.055] MAX.			1.6 [0.063] MAX.			
Port size	M5×0.8			Rc1/8		Rc1/4	

Remark : For Handling Instructions and Precautions, see p.205.

Bore Size and Stroke

For non-standard strokes, see p.206.

mm

Operation type	Bore size	Standard strokes
		Standard cylinder, cylinder with magnet
Double acting type	**16**	5, 10, 15, 20, 25, 30, 35, 50, 75, 100, 125
	20	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100, 125, 150, 175, 200
	25	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100, 125, 150, 175, 200, 225, 250
	32	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300
	40	
	50	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300
	63	

Remarks 1: Stroke tolerance $^{+1}_{0}$ [$^{+0.039in.}_{0}$]

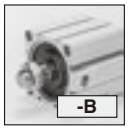
2: In most cases, body cutting is used for the non-standard strokes.
However, body cutting is not used for strokes of less than 5mm for ϕ16～ϕ40, and strokes of less than 10mm for ϕ50 and ϕ63. The collar packed is used for these cases.
Rod side end keep cylinders cannot be collar packed.

Order Codes for End Keep Cylinders

Rod end specification

Female thread

Male thread

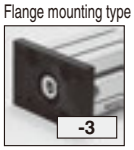


Mounting type

Basic type

Foot mounting type

Flange mounting type Note 3



Clevis mounting type (with pin)

Sensor switch type Note2
(For cylinder with magnet)

Blank:
No sensor switch

-ZE135 : With ZE135
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Horizontal lead wire

-ZE155 : With ZE155
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Horizontal lead wire

-ZE235 : With ZE235
- 2-lead wire Solid state type
- With indicator lamp
- DC10～28V
- Vertical lead wire

-ZE255 : With ZE255
- 3-lead wire Solid state type
- With indicator lamp
- DC4.5～28V
- Vertical lead wire

-ZE101 : With ZE101
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V
  AC85～115V
- Horizontal lead wire

-ZE102 : With ZE102
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V
  AC85～115V
- Horizontal lead wire

-ZE201 : With ZE201
- 2-lead wire Reed switch type
- Without indicator lamp
- DC5～28V
  AC85～115V
- Vertical lead wire

-ZE202 : With ZE202
- 2-lead wire Reed switch type
- With indicator lamp
- DC10～28V
  AC85～115V
- Vertical lead wire

End keep position

Head side end keep

Rod side end keep

Lead wire length

A : 1000mm [39in.]
B : 3000mm [118in.]

Number of sensor switches
(For cylinder with magnet)
Blank:
No sensor switch

1 : With 1 sensor switch
2 : With 2 sensor switches

Operation type

DA : Double acting type

End keep cylinder

Cylinder specification

Blank : Standard cylinder Note1 (Non-ion specification)
S : Cylinder with magnet (Non-ion specification)

Centering location

Blank : No centering location
-G : With centering location

Long stroke cylinder Basic type

Bore size × Stroke

CC	DA	K	S	×	-B Note4	-G	-HL -RL	-1 -3 -7	-ZE135 -ZE155 -ZE235 -ZE255 -ZE101 -ZE102 -ZE201 -ZE202	A B	1 2 ⋮ n

- See table for bore size and stroke.
- Mounting brackets are included at shipping.
- For the order codes of sensor switches only, see p.199.

Notes: 1. In the standard cylinder, a magnet for the sensor switch is not built-in.
2. For details of sensor switches, see p.1544.
3. Cannot be mounted on the bore size ϕ 40 with centering location (**-G**).
4. For information regarding the cylinder joint and cylinder rod end for male thread, see p.1568.

Additional Parts (To be ordered separately)

Foot mounting bracket (p.197)

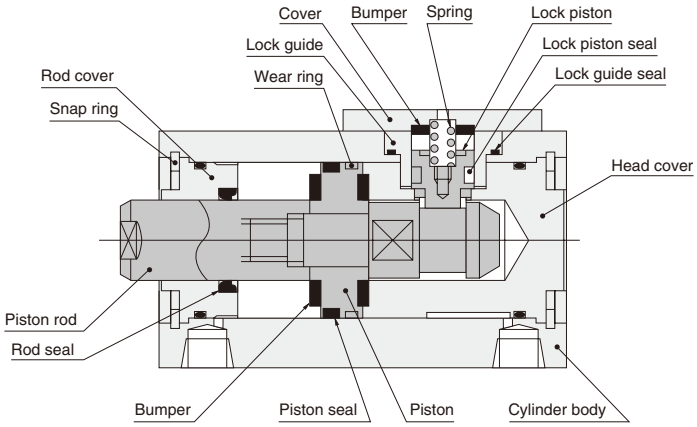
Flange mounting bracket (p.198)

Clevis mounting bracket (with pin) (p.198)

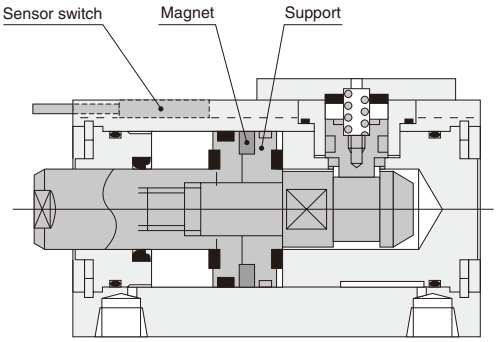
Mounting screws (p.209)

Inner Construction and Major Parts

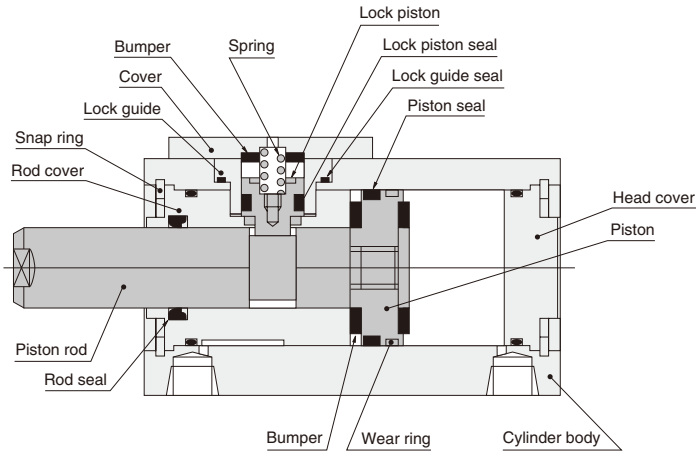
●Head side end keep (CCDAK-HL)



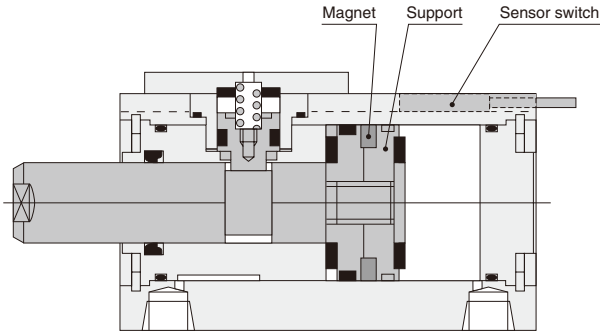
●Cylinder with magnet



●Rod side end keep (CCDAK-RL)



●Cylinder with magnet



The locking mechanism uses a sequential operation.

Major Parts and Materials

Parts \ Bore mm	ϕ 16	ϕ 20	ϕ 25	ϕ 32	ϕ 40	ϕ 50	ϕ 63
Cylinder body	Aluminum alloy (anodized)						
Piston	Aluminum alloy (special rust prevention treatment)						
Piston rod	Stainless steel (chrome plated)			Steel (chrome plated)			
Seal	Synthetic rubber (NBR)						
Rod cover	Aluminum alloy (special wear-resistant treatment)						
Head cover	Aluminum alloy (special rust prevention treatment)						
Snap ring	Steel (phosphate coating)						
Lock piston	Stainless steel						
Bumper	Synthetic rubber (NBR)						
Magnet	Plastic magnet						
Support	Aluminum alloy (special rust prevention treatment)						
Wear ring	Plastic						
Lock cover	Aluminum alloy (anodized)						
Spring	Piano wire						

Seals

Parts / Bore mm	Rod seal	Piston seal	Tube gasket		Lock piston seal	Lock guide seal
			Rod side	Head side		
ϕ 16	MYR-8	COP-16	Y090207	Y090207	MYN-4	Y090157
ϕ 20	MYR-10	COP-20	Y090216	Y090216	MYN-5	Y090260
ϕ 25	MYR-12	COP-25	Y090210	Y090210	MYN-5	Y090260
ϕ 32	MYR-16	COP-32	L090084	L090084	MYN-10A	L090009
ϕ 40	MYR-16	COP-40	L090151	L090151	MYN-10A	L090009
ϕ 50	MYR-20	COP-50	L090174	L090106	MYN-16	L090084
ϕ 63	MYR-20	COP-63	L090180	L090107	MYN-16	L090084

Mass

●Head side end keep cylinder

g [oz.]

Bore size mm [in.]	Zero stroke mass Note 1	Additional mass for each 1mm [0.0394in.] stroke	Additional mass of cylinder with magnet	Mass of mounting bracket			Additional mass of sensor switch Note2	
				Foot bracket	Flange bracket	Clevis bracket	**ZE□□□A**	**ZE□□□B**
16 [0.630]	109.33 [3.856]	1.62 [0.0571]	9.93 [0.350]	62 [2.19]	71 [2.50]	40 [1.41]	15 [0.53]	35 [1.23]
20 [0.787]	142.49 [5.026]	2.26 [0.0797]	25.71 [0.907]	84 [2.96]	101 [3.56]	75 [2.65]		
25 [0.984]	205.98 [7.266]	3.11 [0.110]	37.47 [1.322]	104 [3.67]	160 [5.64]	100 [3.53]		
32 [1.260]	330.47 [11.657]	4.11 [0.145]	52.43 [1.849]	126 [4.44]	186 [6.56]	165 [5.82]		
40 [1.575]	475.35 [16.767]	4.77 [0.168]	69.15 [2.439]	160 [5.64]	335 [11.82]	200 [7.05]		
50 [1.969]	775.35 [27.349]	7.03 [0.248]	108 [3.81]	220 [7.76]	447 [15.77]	315 [11.11]		
63 [2.480]	1137.3 [40.116]	8.69 [0.307]	159 [5.61]	300 [10.58]	591 [20.85]	495 [17.46]		

●Rod side end keep cylinder

g [oz.]

Bore size mm [in.]	Zero stroke mass Note 1	Additional mass for each 1mm [0.0394in.] stroke	Additional mass of cylinder with magnet	Mass of mounting bracket			Additional mass of sensor switch Note2	
				Foot bracket	Flange bracket	Clevis bracket	**ZE□□□A**	**ZE□□□B**
16 [0.630]	101.33 [3.574]	1.62 [0.0571]	9.93 [0.350]	62 [2.19]	71 [2.50]	40 [1.41]	15 [0.53]	35 [1.23]
20 [0.787]	130.49 [4.603]	2.26 [0.0797]	25.71 [0.907]	84 [2.96]	101 [3.56]	75 [2.65]		
25 [0.984]	185.93 [6.558]	3.11 [0.110]	37.47 [1.322]	104 [3.67]	160 [5.64]	100 [3.53]		
32 [1.260]	310.44 [10.950]	4.11 [0.145]	52.46 [1.850]	126 [4.44]	186 [6.56]	165 [5.82]		
40 [1.575]	445.35 [15.709]	4.77 [0.168]	69.15 [2.439]	160 [5.64]	335 [11.82]	200 [7.05]		
50 [1.969]	755.35 [26.644]	7.03 [0.248]	108 [3.81]	220 [7.76]	447 [15.77]	315 [11.11]		
63 [2.480]	1082.3 [38.176]	8.69 [0.307]	159 [5.61]	300 [10.58]	591 [20.85]	495 [17.46]		

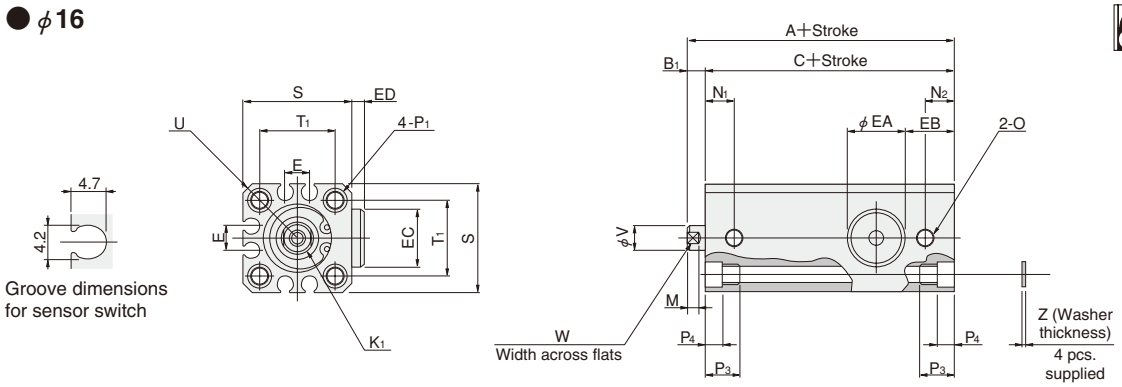
Notes: 1. The above table is for the standard strokes.
2. Sensor switch codes A and B show the lead wire lengths.
A: 1000mm [39in.] B: 3000mm [118in.]

Calculation example: For the mass of a head side end keep cylinder with magnet, bore size of 25mm, stroke of 30mm, and with 2 sensor switches (**ZE135A**)
205.98＋(3.11×30)＋37.47＋(15×2)＝366.75g [12.937oz.]

Dimensions of Head Side End Keep Double Acting Type (mm)

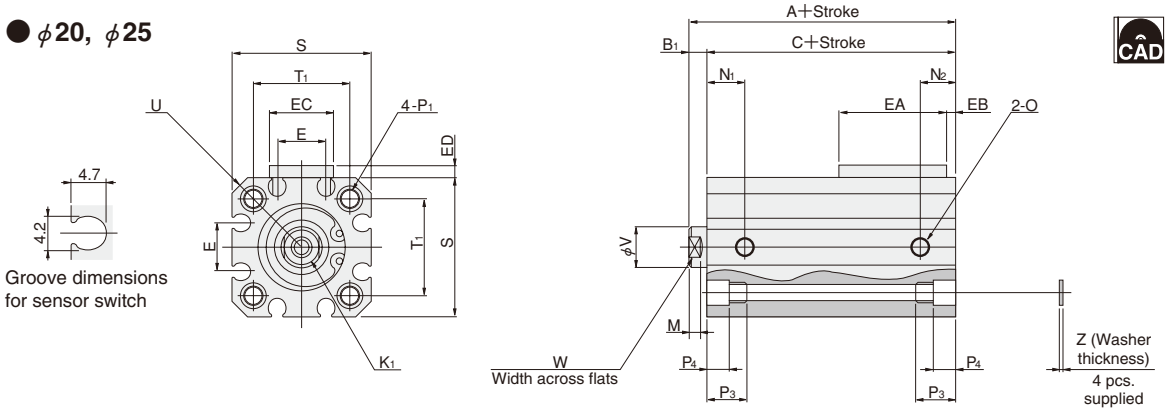
● ϕ16

CCDAK Bore size H



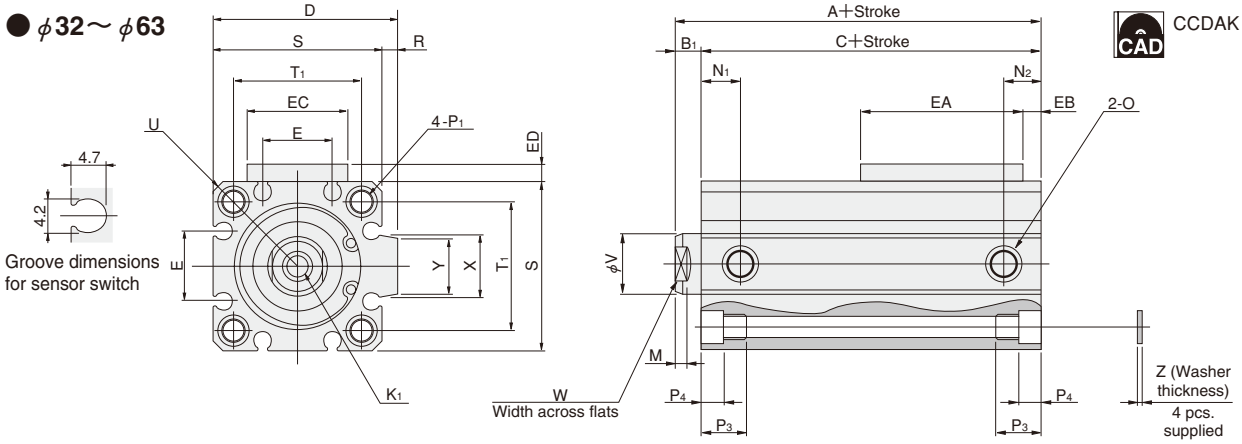
● ϕ20, ϕ25

CCDAK Bore size H



● ϕ32～ϕ63

CCDAK Bore size H



Type / Bore mm [in.] Code	Standard cylinder (CCDAK-HL)			Cylinder with magnet (CCDAKS-HL)			D	E	K1	M	N1	N2	O
	A	B1	C	A	B1	C							
16 [0.630]	63.5	5.5	58	68.5	5.5	63	—	6.2	M4×0.7 Depth8	3.5	8	8	M5×0.8
20 [0.787]	61.5	5.5	56	71.5	5.5	66	—	12.2	M5×0.8 Depth10	4.5	9.5	9.5	M5×0.8
25 [0.984]	62.5	6	56.5	72.5	6	66.5	—	12.2	M6×1 Depth10	5	10.5	10.5	M5×0.8
32 [1.260]	77	7	70	82	7	75	48.5	18.2	M8×1.25 Depth12	6	9.5	9.5	Rc1/8
40 [1.575]	80	7	73	85	7	78	56.5	18.2	M8×1.25 Depth12	6	10.5	10.5	Rc1/8
50 [1.969]	87	9	78	92	9	83	70	24.8	M10×1.5 Depth15	7	11	9.5	Rc1/4
63 [2.480]	91	9	82	96	9	87	83	26.8	M10×1.5 Depth15	7	12.5	11	Rc1/4

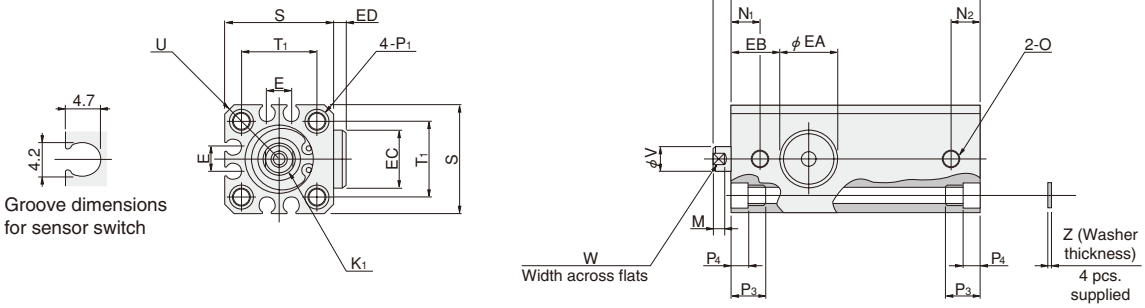
Bore mm [in.] Code	P1	P3	P4	R	S	T1	U	V	W	X	Y	Z	EA	EB	EC	ED	Appropriate through bolt※
16 [0.630]	φ4.3 (Thru hole) Counterbore φ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	29	19.8	R19	8	6	—	—	1	16.5	13.75	16.5	3	M3
20 [0.787]	φ4.3 (Thru hole) Counterbore φ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	34	24	R22	10	8	—	—	1	30	3	16	3.2	M3
25 [0.984]	φ5.1 (Thru hole) Counterbore φ8 (Both sides) and M6×1 (Both sides)	11.5	5.5	—	40	28	R25	12	10	—	—	1	30	3	16	3.2	M4
32 [1.260]	φ5.1 (Thru hole) Counterbore φ8 (Both sides) and M6×1 (Both sides)	11.5	5.5	4.5	44	34	R29.5	16	14	15	13.6	1	42	5	26	4	M4
40 [1.575]	φ6.9 (Thru hole) Counterbore φ9.5 (Both sides) and M8×1.25 (Both sides)	15.5	7.5	4.5	52	40	R35	16	14	15	13.6	1.6	42	6	26	4	M5
50 [1.969]	φ6.9 (Thru hole) Counterbore φ11 (Both sides) and M8×1.25 (Both sides)	16.5	8.5	8	62	48	R41	20	17	21.6	19	1.6	49	6	35	6	M6
63 [2.480]	φ6.9 (Thru hole) Counterbore φ11 (Both sides) and M8×1.25 (Both sides)	16.5	8.5	8	75	60	R50	20	17	21.6	19	1.6	49	7.5	35	6	M6

※ Some types of mounting screws are available (to be ordered separately). See p.209.

Dimensions of Rod Side End Keep Double Acting Type (mm)

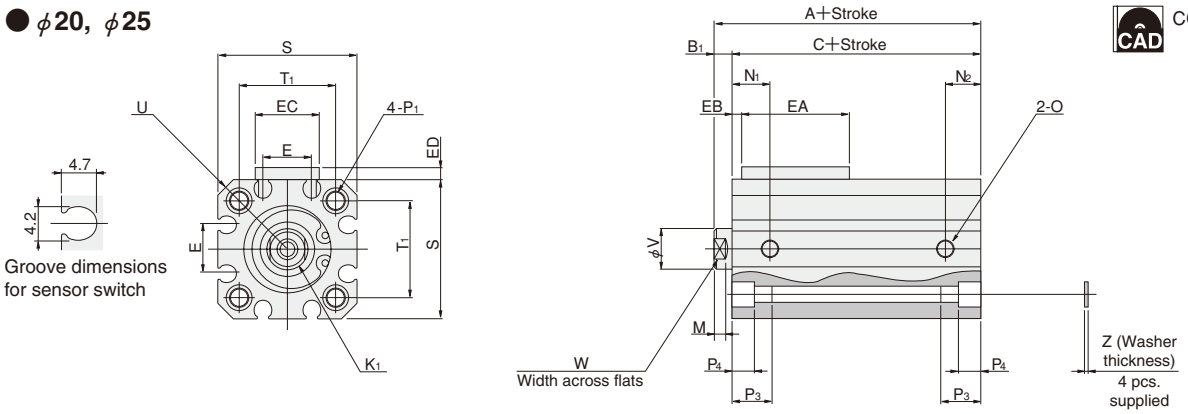
● ϕ16

CCDAK Bore size R



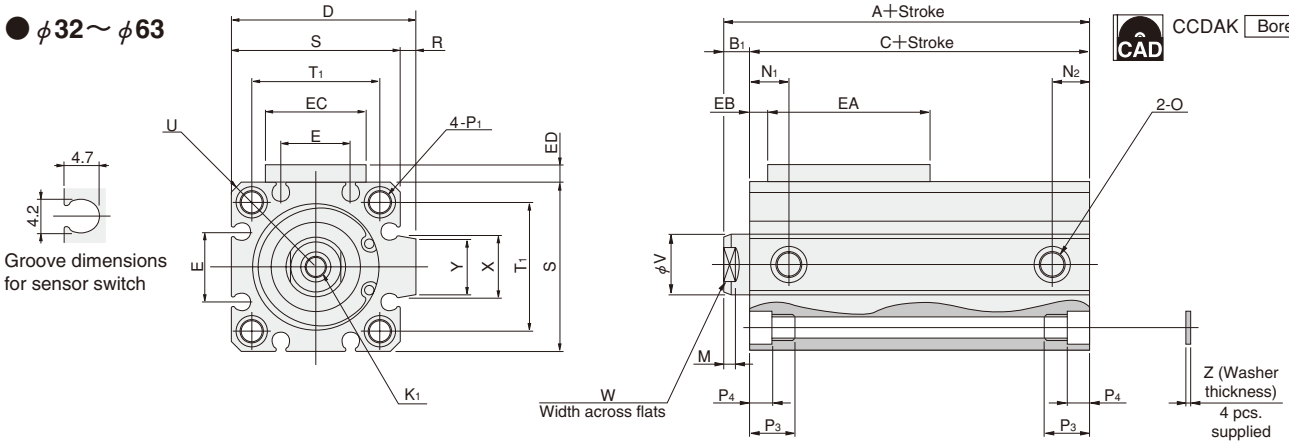
● ϕ20, ϕ25

CCDAK Bore size R



● ϕ32～ϕ63

CCDAK Bore size R



Type / Bore mm [in.] / Code	Standard cylinder (CCDAK-RL)			Cylinder with magnet (CCDAKS-RL)			D	E	K1	M	N1	N2	O
	A	B1	C	A	B1	C							
16 [0.630]	58.5	5.5	53	63.5	5.5	58	—	6.2	M4×0.7 Depth8	3.5	8	8	M5×0.8
20 [0.787]	56.5	5.5	51	66.5	5.5	61	—	12.2	M5×0.8 Depth10	4.5	9.5	9.5	M5×0.8
25 [0.984]	57.5	6	51.5	67.5	6	61.5	—	12.2	M6×1 Depth10	5	10.5	10.5	M5×0.8
32 [1.260]	72	7	65	77	7	70	48.5	18.2	M8×1.25 Depth12	6	9.5	9.5	Rc1/8
40 [1.575]	75	7	68	80	7	73	56.5	18.2	M8×1.25 Depth12	6	10.5	10.5	Rc1/8
50 [1.969]	82	9	73	87	9	78	70	24.8	M10×1.5 Depth15	7	11	9.5	Rc1/4
63 [2.480]	86	9	77	91	9	82	83	26.8	M10×1.5 Depth15	7	12.5	11	Rc1/4

Code / Bore mm [in.]	P1	P3	P4	R	S	T1	U	V	W	X	Y	Z	EA	EB	EC	ED	Appropriate through bolt※
16 [0.630]	φ4.3 (Thru hole) Counterbore φ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	29	19.8	R19	8	6	—	—	1	16.5	13.75	16.5	3	M3
20 [0.787]	φ4.3 (Thru hole) Counterbore φ6.5 (Both sides) and M5×0.8 (Both sides)	9.5	4.5	—	34	24	R22	10	8	—	—	1	30	3	16	3.2	M3
25 [0.984]	φ5.1 (Thru hole) Counterbore φ8 (Both sides) and M6×1 (Both sides)	11.5	5.5	—	40	28	R25	12	10	—	—	1	30	3	16	3.2	M4
32 [1.260]	φ5.1 (Thru hole) Counterbore φ8 (Both sides) and M6×1 (Both sides)	11.5	5.5	4.5	44	34	R29.5	16	14	15	13.6	1	42	5	26	4	M4
40 [1.575]	φ6.9 (Thru hole) Counterbore φ9.5 (Both sides) and M8×1.25 (Both sides)	15.5	7.5	4.5	52	40	R35	16	14	15	13.6	1.6	42	6	26	4	M5
50 [1.969]	φ6.9 (Thru hole) Counterbore φ11 (Both sides) and M8×1.25 (Both sides)	16.5	8.5	8	62	48	R41	20	17	21.6	19	1.6	49	6	35	6	M6
63 [2.480]	φ6.9 (Thru hole) Counterbore φ11 (Both sides) and M8×1.25 (Both sides)	16.5	8.5	8	75	60	R50	20	17	21.6	19	1.6	49	7.5	35	6	M6

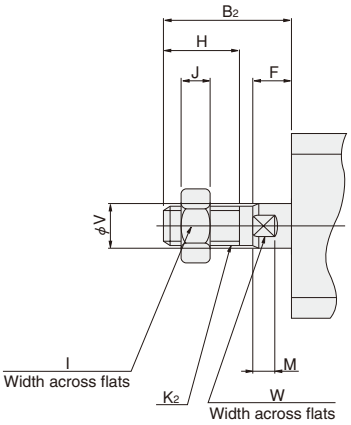
※ Some types of mounting screws are available (to be ordered separately). See p.209.

Dimensions of Male Rod End Thread Specification (mm)

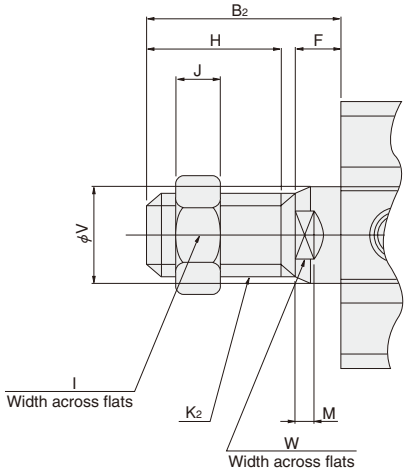
CAD Available in the file of each cylinder body.

●Double acting type

● ϕ16～ϕ25



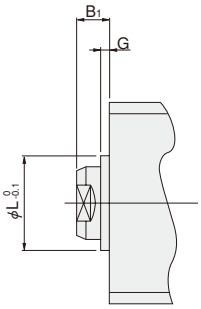
● ϕ32～ϕ63



Bore mm [in.] \ Code	B2	F	H	I	J	K2	M	V	W
16 [0.630]	20.5	5.5	13	10	5	M6×1	3.5	8	6
20 [0.787]	22.5	5.5	15	12	5	M8×1	4.5	10	8
25 [0.984]	24	6	15	14	6	M10×1.25	5	12	10
32 [1.260]	35	7	25	19	8	M14×1.5	6	16	14
40 [1.575]	35	7	25	19	8	M14×1.5	6	16	14
50 [1.969]	37	9	25	27	11	M18×1.5	7	20	17
63 [2.480]	37	9	25	27	11	M18×1.5	7	20	17

Remark: Cylinder joints and cylinder rod ends are available for mounting with the rod end male thread specification. For details, see p.1568.

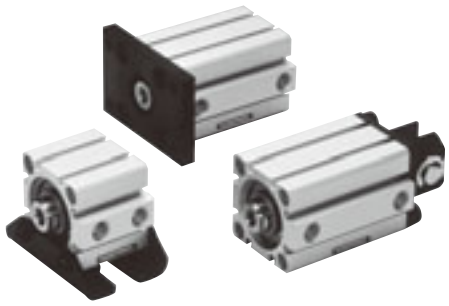
Dimensions of Centering Location (mm)



Bore mm [in.] \ Code	B1	G	L
16 [0.630]	5.5	1.5	9.4
20 [0.787]	5.5	1.5	12
25 [0.984]	6	2	15
32 [1.260]	7	2	21
40 [1.575]	7	2	29
50 [1.969]	9	2	38
63 [2.480]	9	2	40

JIG CYLINDERS C SERIES MOUNTING BRACKETS

Foot Mounting Bracket, Flange Mounting Bracket, Clevis Mounting Bracket



Order Codes of Mounting Bracket Only

□ – **CDA** □

Bore size ϕ **12**～ϕ **100** Note5

Cylinder type
CDA —— For standard, double rod end, tandem, dual stroke, long stroke, lateral load resistant, and end keep cylinder
CDAL —— For square rod cylinder Note4

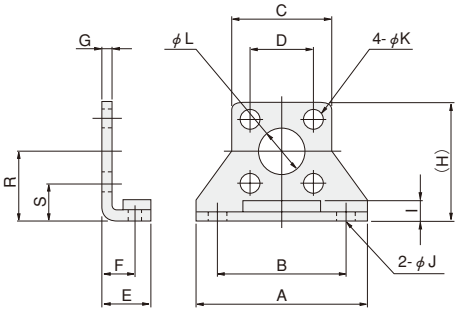
Mounting bracket
1 —— Foot bracket Note1
● One set consists of 2 brackets.
3 —— Flange bracket Note2
7 —— Clevis bracket Note3

Notes: 1. Cannot be mounted on tandem or dual stroke cylinders.
And cannot be mounted on the 5mm strokes of ϕ 16 and ϕ 25, and 10mm strokes of ϕ 50, ϕ 63, and ϕ 80 of the standard cylinders.
2. Cannot be mounted on the head side of the tandem cylinder, cylinder 1 side of the dual stroke cylinder, the rod side of the square rod cylinder with centering location, or the bore size ϕ 40 with centering location (**-G**).
3. Cannot be used with anything other than the long stroke cylinder, the lateral load resistant cylinder, or the end keep cylinder.
4. Applicable to the foot mounting bracket only.
5. Not available for ϕ 6 [0.236in.], ϕ 8 [0.315in.], and ϕ 10 [0.394in.].

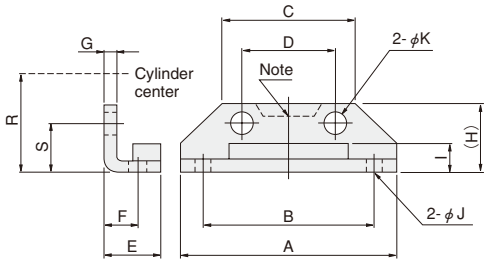
Dimensions of Foot Mounting Bracket (mm)

CAD ϕ 12～ϕ 40：CDA-OP1, ϕ 50～ϕ 100：CDA-OP2

● ϕ 12～ϕ 16



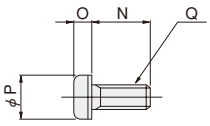
● ϕ 20～ϕ 100



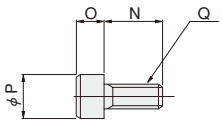
Note: Only for ϕ 50

● Mounting screw

For ϕ 12～ϕ 80



For ϕ 100



Material: Steel

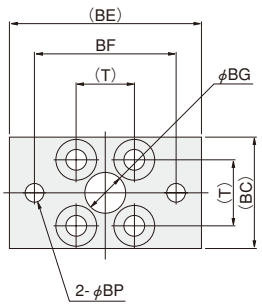
Bore mm [in.] \ Code	A	B	C	D	E	F	G	H	I	J	K	L	N	O	P	Q	R	S	Mass g [oz.]
12 [0.472]	44	34	25	16.3	12.5	8	2	29.5	4.5	4.5	5.5	11	12	2.7	9.5	M5	17	8.9	50 [1.76]
16 [0.630]	48	38	29	19.8	13	8	2	33.5	4.5	4.5	5.5	11	12	2.7	9.5	M5	19	9.1	62 [2.19]
20 [0.787]	54	44	34	24	15	9.2	3.2	16.5	7	4.5	5.5	—	12 (12, 20)	2.7	9.5	M5	24	12	84 [2.96] (87 [3.07])
25 [0.984]	64	52	40	28	16.5	10.7	3.2	17.5	6	5.5	6.6	—	14 (14, 22)	3.3	10.5	M6	26	12	104 [3.67] (108 [3.81])
32 [1.260]	68	56	44	34	17	11.2	3.2	19	8	5.5	6.6	—	14 (14, 25)	3.3	10.5	M6	30	13	126 [4.44] (131 [4.62])
40 [1.575]	78	64	52	40	18.2	11.2	3.2	19	7	6.6	9	—	20 (20, 30)	4.4	14	M8	33	13	160 [5.64] (168 [5.93])
50 [1.969]	96	78	62	48	22.7	14.7	3.2	22	8	9	9	—	20 (20, 35)	4.4	14	M8	39	15	220 [7.76] (232 [8.18])
63 [2.480]	108	90	75	60	25.2	16.2	3.2	24	8.5	9	9	—	20 (20, 35)	4.4	14	M8	46	16	300 [10.58] (312 [11.01])
80 [3.150]	134	112	94	74	30.5	19.5	4.5	33	12	11	14	—	25	6.6	21	M12	59	22	644 [22.72]
100 [3.940]	160	134	114	90	35.5	23	6	40	14	14	16	—	30	14	21	M14	71	26	1172 [41.34]

Remark: Figures in parentheses ( ) are for square rod cylinders.
Two figures in parentheses ( ), Left side: for head side; Right side: for rod side

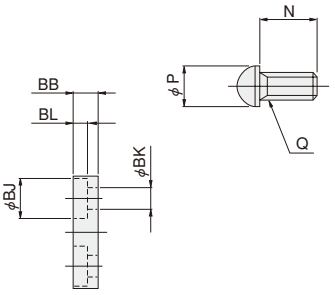
Dimensions of Flange Mounting Bracket (mm)

CAD φ12～φ40：CDA-OP3, φ50～φ100：CDA-OP4

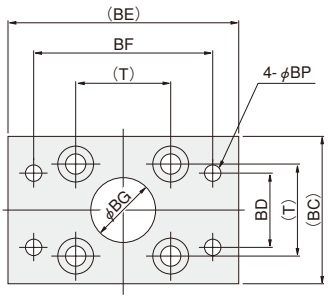
● φ12～φ16



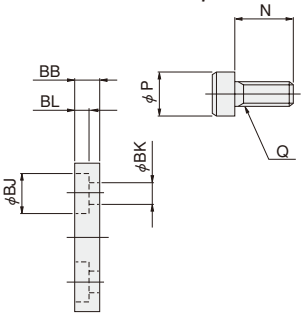
● Mounting screw For φ12～φ80



● φ20～φ100



● Mounting screw For φ100



Material: Steel

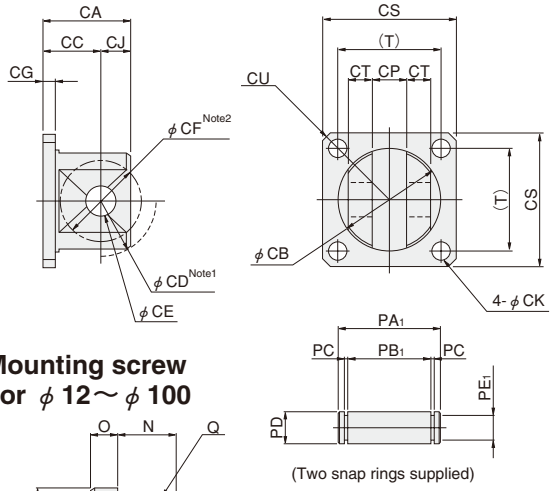
Bore mm [in.] / Code	N	P	Q	T	BB	BC	BD	BE	BF	BG	BJ	BK	BL	BP	Mass g [oz.]
12 [0.472]	12	9.5	M5	16.3	6	28	—	50	38	11	10	5.5	3.6	4.5	55 [1.94]
16 [0.630]	12	9.5	M5	19.8	6	32	—	54	42	11	10	5.5	3.6	4.5	71 [2.50]
20 [0.787]	12(18)	9.5	M5	24	6	36	24	58	46	15	10	5.5	3.6	4.5	101 [3.56] (105 [3.70])
25 [0.984]	14(22)	10.5	M6	28	8	42	28	68	54	17	11	6.6	4.3	5.5	160 [5.64] (165 [5.82])
32 [1.260]	14(25)	10.5	M6	34	8	48	34	72	58	22	11	6.6	4.3	5.5	186 [6.56] (196 [6.91])
40 [1.575]	20(30)	14	M8	40	8	58	40	84	68	28	15	9	5.3	6.6	335 [11.82] (351 [12.38])
50 [1.969]	20(35)	14	M8	48	8	66	40	102	82	38	15	9	5.3	9	447 [15.77] (471 [16.61])
63 [2.480]	20(35)	14	M8	60	8	78	50	116	96	40	15	9	5.3	9	591 [20.85] (615 [21.69])
80 [3.150]	25	21	M12	74	12	100	70	142	118	45	22	14	7.3	11	1414 [49.88]
100 [3.940]	30	21	M14	90	20	116	80	170	142	55	23	16	15.2	14	2606 [91.92]

Remark: Figures in parentheses ( ) are for square rod cylinders.

Dimensions of Clevis Mounting Bracket (mm)

CAD φ12～φ40：CDA-OP5, φ50～φ100：CDA-OP6

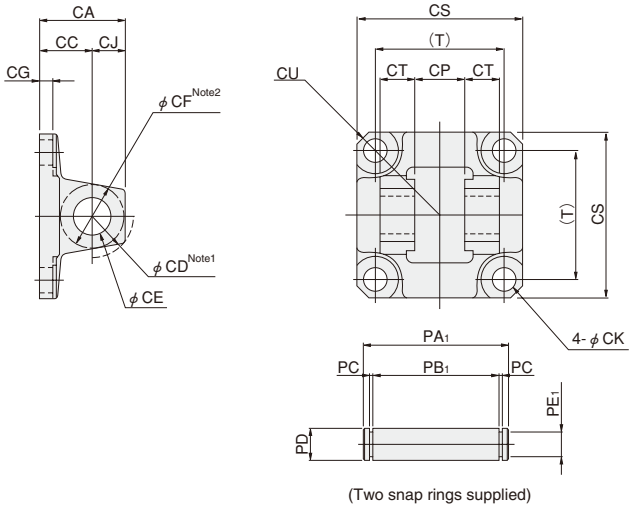
● φ12～φ40



(Two snap rings supplied)

● Mounting screw For φ12～φ100

● φ50～φ100



(Two snap rings supplied)

Material: Steel

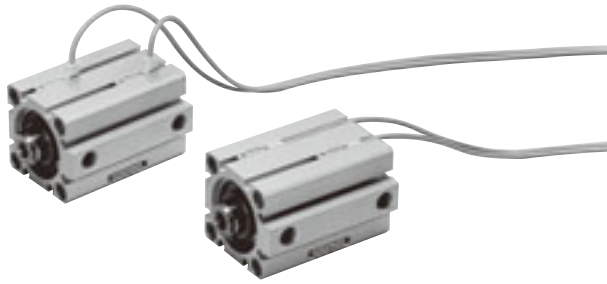
Bore mm [in.] / Code	N	O	P	Q	T	CA	CB	CC	CD	CE	CF	CG	CJ	CK	CP	CS	CT	CU	PA_1	PB_1	PC	PD	PE_1	Mass g [oz.]
12 [0.472]	12	5	8.5	M5	16.3	15	12	11	R 7.5	$4^{+0.03}_{0}$	R5	4	4	5.5	$4^{+0.2}_{+0.1}$	25	3	R16	15	10.6	0.7	4_{f8}	2.5	30 [1.06]
16 [0.630]	12	5	8.5	M5	19.8	17	16	12	R10	$5^{+0.03}_{0}$	R6	4	5	5.5	$5^{+0.2}_{+0.1}$	29	3.5	R19	17	12.6	0.7	5_{f8}	3	40 [1.41]
20 [0.787]	12	5	8.5	M5	24	25	22	17	R14	$8^{+0.04}_{0}$	R11	4	8	5.5	$8^{+0.4}_{+0.2}$	34	5.2	R22	24.4	19.6	0.9	8_{f8}	6	75 [2.65]
25 [0.984]	16	6	10	M6	28	25	26	17	R16	$8^{+0.04}_{0}$	R11	4	8	6.6	$8^{+0.4}_{+0.2}$	40	5.2	R25	24.4	19.6	0.9	8_{f8}	6	100 [3.53]
32 [1.260]	16	6	10	M6	34	29	34	19	R20	$10^{+0.04}_{0}$	R12.5	4	10	6.6	$12^{+0.4}_{+0.2}$	44	8	R29.5	34	29.2	0.9	10_{f8}	8	165 [5.82]
40 [1.575]	20	8	13	M8	40	29	34	19	R20	$10^{+0.04}_{0}$	R12.5	4	10	9	$12^{+0.4}_{+0.2}$	52	8	R35	34	29.2	0.9	10_{f8}	8	200 [7.05]
50 [1.969]	22	8	13	M8	48	32	—	19	R17	$14^{+0.08}_{0}$	R14	5	13	9 Counterbore φ17	$20^{+0.6}_{+0.3}$	63	12.5	R41.5	55	47	1.15	$14^{-0.030}_{-0.070}$	13.4	315 [11.11]
63 [2.480]	20	8	13	M8	60	32	—	19	R17	$14^{+0.08}_{0}$	R14	6	13	9 Counterbore φ20	$20^{+0.6}_{+0.3}$	76	15	R50.5	60	52	1.15	$14^{-0.030}_{-0.070}$	13.4	495 [17.46]
80 [3.150]	30	12	18	M12	74	52	—	32	R24	$20^{+0.1}_{0}$	R20	7	20	14 Counterbore φ22	$32^{+0.6}_{+0.3}$	95	16	R62.5	74	66	1.35	$20^{-0.040}_{-0.084}$	19	1110 [39.15]
100 [3.940]	30	14	21	M14	90	52	—	32	R24	$20^{+0.1}_{0}$	R21	7	20	16 Counterbore φ26	$32^{+0.6}_{+0.3}$	115	16	R75.5	74	66	1.35	$20^{-0.040}_{-0.084}$	19	1490 [52.56]

Notes: 1. CD = Swing range of clevis mounting bracket itself.
2. CF = Maximum radius of swing for mating bracket.

Remark: φ12～φ50 are mounted with 2 bolts.

JIG CYLINDERS C SERIES SENSOR SWITCHES

Solid State Type, Reed Switch Type



Order Codes

□ □ – CDAS

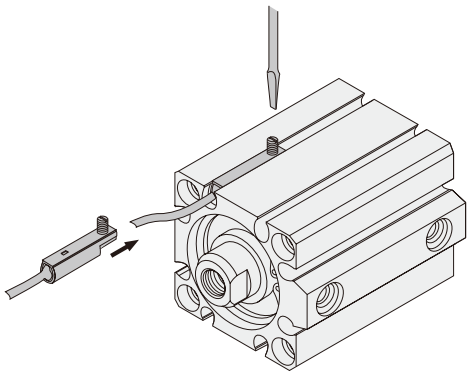
A —— 1000mm [39in.]
B —— 3000mm [118in.]

ZE135	Solid state type	with indicator lamp	DC10V～28V	Horizontal lead wire
ZE235	Solid state type	with indicator lamp	DC10V～28V	Vertical lead wire
ZE101	Reed switch type	without indicator lamp	DC5V～28V AC85～115V	Horizontal lead wire
ZE201	Reed switch type	without indicator lamp	DC5V～28V AC85～115V	Vertical lead wire
ZE155	Solid state type	with indicator lamp	DC4.5V～28V	Horizontal lead wire
ZE255	Solid state type	with indicator lamp	DC4.5V～28V	Vertical lead wire
ZE102	Reed switch type	with indicator lamp	DC10V～28V AC85～115V	Horizontal lead wire
ZE202	Reed switch type	with indicator lamp	DC10V～28V AC85～115V	Vertical lead wire

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

Moving Sensor Switch

- Loosening mounting screw allows the sensor switch to be moved along the switch mounting groove on the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1～0.2N·m [0.9～1.8in·lbf].



Minimum Cylinder Strokes When Using Sensor Switches

●Solid state type

mm

Bore size	2 pcs. mounting Note		1 pc. mounting
	1-surface mounting	2-surface mounting	
6～12 [0.236～0.472in.]	30	10	5
16～100 [0.630～3.940in.]	10		

Note: Two pieces can be mounted with 5mm stroke.
Take note that overlapping may occur, however.

●Reed switch type

mm

Bore size	2 pcs. mounting		1 pc. mounting
	1-surface mounting	2-surface mounting	
12 [0.472in.]	30	10	10
16～100 [0.630～3.940in.]	10		

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.

●Solid state type

mm [in.]

Item \ Bore	6 [0.236]	8 [0.315]	10 [0.394]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]	80 [3.150]	100 [3.940]
Operating range : ℓ	1.8～3.0 [0.071～0.118]	1.8～3.0 [0.071～0.118]	2.0～3.2 [0.079～0.126]	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]	3.5～7.5 [0.138～0.295]	4～8.5 [0.157～0.335]	4.5～9.5 [0.177～0.374]	4.5～9.0 [0.177～0.354]
Response differential : C	0.2 [0.008] or less			0.5 [0.02] or less									
Maximum sensing location	6 [0.236]												

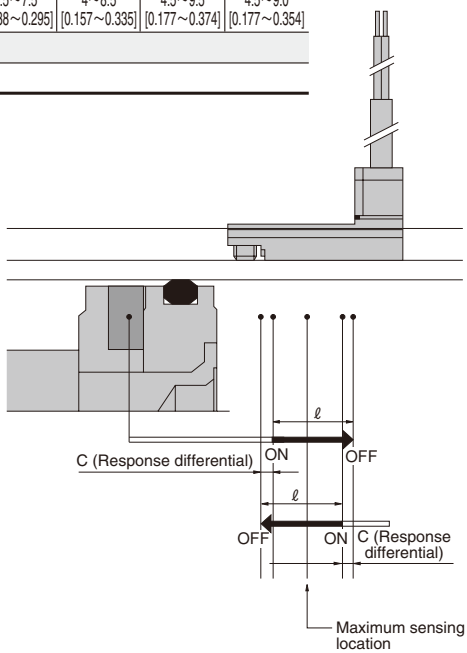
Remark: The above table shows reference values.

●Reed switch type

mm [in.]

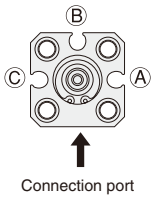
Item \ Bore	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]	80 [3.150]	100 [3.940]
Operating range : ℓ	4.5～8.5 [0.177～0.335]	5.5～9.5 [0.217～0.374]	9～13.5 [0.354～0.531]	10～15.5 [0.394～0.610]	8～12 [0.315～0.472]	8.5～14 [0.335～0.551]	9～15 [0.354～0.591]	10～16 [0.394～0.630]	11～16 [0.433～0.630]	11～16.5 [0.433～0.650]
Response differential : C	1.0 [0.039] or less	2.0 [0.079] or less							3.0 [0.118] or less	2.5 [0.098] or less
Maximum sensing location	10 [0.394]									

Remark: The above table shows reference values.



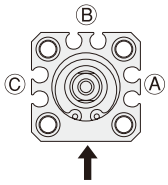
Mounting Sensor Switch

● ϕ6〜ϕ12



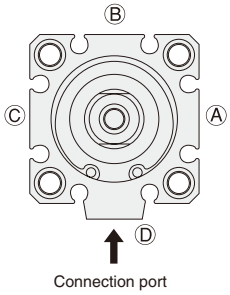
The standard mounting positions at shipping for the end of stroke detection on the rod side is either surface Ⓐ or surface Ⓒ, while the end of stroke detection on the head side is surface Ⓑ.
If mounting sensor switches on the same surface for detection of both ends is required, consult us.
(The sensor switch may sometimes protrude from the cylinder body.)

● ϕ16



Mounting on any of surfaces Ⓐ, Ⓑ, or Ⓒ allows detection of the end of stroke on the rod side and head side.
(The sensor switch may sometimes protrude from the cylinder body.)

● ϕ20〜ϕ100



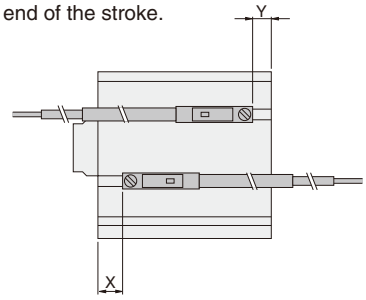
● The drawing is for ϕ 32.

Mounting on any of surfaces Ⓐ, Ⓑ, Ⓒ, or Ⓓ allows detection of the end of stroke on the rod side and head side.
(The sensor switch may sometimes protrude from the cylinder body.)
However, the **ZE2**□□ sensor switches cannot be mounted on the Ⓓ position in ϕ 32, ϕ 40, and ϕ 50.

Mounting Location of End of Stroke Detection Sensor Switch

When the sensor switch is mounted in the position shown in the diagram below (figures in the tables are reference values), the magnet reaches the sensor switch's maximum sensing location at the end of the stroke.

●Standard cylinder, Non-rotating cylinder



■Solid state type

●Double acting type

mm [in.]

Code \ Bore		6	8	10	12	16	20	25	32	40	50	63	80	100
X	Standard type	7.2 [0.283]	8 [0.315]	8.3 [0.327]	7 [0.276]	7 [0.276]	11 [0.433]	11 [0.433]	13.5 [0.531]	14.5 [0.571]	12.5 [0.492]	15 [0.591]	20 [0.787]	25 [0.984]
	With bumper (-R)	—	—	—	10 [0.394]	10 [0.394]	15 [0.591]	16 [0.630]	15.5 [0.610]	16.5 [0.650]	15.5 [0.610]	15 [0.591]	20 [0.787]	25 [0.984]
Y	Standard type	1 [0.039]	0.3 [0.012]	1 [0.039]	4 [0.157]	4 [0.157]	7.5 [0.295]	9 [0.354]	8.5 [0.335]	10.5 [0.413]	14.5 [0.571]	16 [0.630]	20 [0.787]	25 [0.984]
	With bumper (-R)	—	—	—	6 [0.236]	6 [0.236]	8.5 [0.335]	9 [0.354]	6.5 [0.256]	8.5 [0.335]	11.5 [0.453]	16 [0.630]	20 [0.787]	25 [0.984]

●Single acting push type

mm [in.]

Code \ Bore	6	8	10	12	16	20	25	32	40	50
X	17.2 [0.677]	18 [0.709]	18.3 [0.720]	15 [0.591]	15 [0.591]	14 [0.551]	14.5 [0.571]	15.5 [0.610]	17.5 [0.689]	17 [0.669]
Y	1 [0.039]	0.3 [0.012]	1 [0.039]	1 [0.039]	1 [0.039]	4.5 [0.177]	5.5 [0.217]	6.5 [0.256]	7.5 [0.295]	10.5 [0.413]

●Single acting pull type

mm [in.]

Code \ Bore	6	8	10	12	16	20	25	32	40	50
X	7.2 [0.283]	8 [0.315]	8.3 [0.327]	7 [0.276]	7 [0.276]	11 [0.433]	11 [0.433]	13.5 [0.531]	14.5 [0.571]	12.5 [0.492]
Y	11 [0.433]	10.3 [0.406]	11 [0.433]	9 [0.354]	9 [0.354]	12.5 [0.492]	14 [0.551]	13.5 [0.531]	15.5 [0.610]	14.5 [0.571]

■Reed switch type

●Double acting type

mm [in.]

Code \ Bore		12	16	20	25	32	40	50	63	80	100
X	Standard type	2.5 [0.098]	2.5 [0.098]	6.5 [0.256]	6.5 [0.256]	9 [0.354]	10 [0.394]	8 [0.315]	10.5 [0.413]	15.5 [0.610]	20.5 [0.807]
	With bumper (-R)	5.5 [0.217]	5.5 [0.217]	10.5 [0.413]	11.5 [0.453]	11 [0.433]	12 [0.472]	11 [0.433]	10.5 [0.413]	15.5 [0.610]	20.5 [0.807]
Y	Standard type	−0.5 [−0.020]	−0.5 [−0.020]	3 [0.118]	4.5 [0.177]	4 [0.157]	6 [0.236]	10 [0.394]	11.5 [0.453]	15.5 [0.610]	20.5 [0.807]
	With bumper (-R)	1.5 [0.059]	1.5 [0.059]	4 [0.157]	4.5 [0.177]	2 [0.079]	4 [0.157]	7 [0.276]	11.5 [0.453]	15.5 [0.610]	20.5 [0.807]

●Single acting push type

mm [in.]

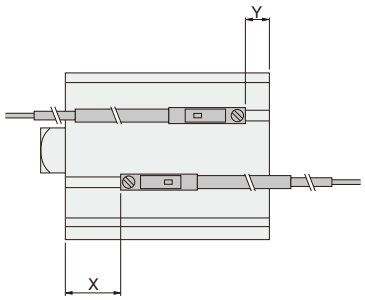
Code \ Bore	12	16	20	25	32	40	50
X	10.5 [0.413]	10.5 [0.413]	9.5 [0.374]	10 [0.394]	11 [0.433]	13 [0.512]	12.5 [0.492]
Y	−3.5 [−0.138]	−3.5 [−0.138]	0 [0]	1 [0.039]	2 [0.079]	3 [0.118]	6 [0.236]

●Single acting pull type

mm [in.]

Code \ Bore	12	16	20	25	32	40	50
X	2.5 [0.098]	2.5 [0.098]	6.5 [0.256]	6.5 [0.256]	9 [0.354]	10 [0.394]	8 [0.315]
Y	4.5 [0.177]	4.5 [0.177]	8 [0.315]	9.5 [0.374]	9 [0.354]	11 [0.433]	10 [0.394]

● Square rod cylinders with magnet



■ Solid state type

● Double acting type

mm [in.]

Code \ Bore		20	25	32	40	50	63
X	Standard type	17.5 [0.689]	17.5 [0.689]	22.5 [0.886]	24.5 [0.965]	27.5 [1.083]	30 [1.181]
	With bumper (-R)	21.5 [0.846]	22.5 [0.886]	24.5 [0.965]	26.5 [1.043]	30.5 [1.201]	30 [1.181]
Y	Standard type	10 [0.394]	9 [0.354]	14 [0.551]	14.5 [0.571]	14.5 [0.571]	16 [0.630]
	With bumper (-R)	8.5 [0.335]	9 [0.354]	6.5 [0.256]	8.5 [0.335]	11.5 [0.453]	16 [0.630]

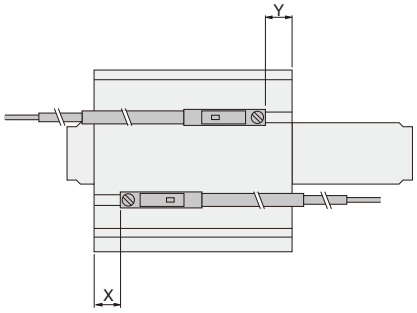
■ Reed switch type

● Double acting type

mm [in.]

Code \ Bore		20	25	32	40	50	63
X	Standard type	13 [0.512]	13 [0.512]	18 [0.709]	20 [0.787]	23 [0.906]	25.5 [1.004]
	With bumper (-R)	17 [0.669]	18 [0.709]	20 [0.787]	22 [0.866]	26 [1.024]	25.5 [1.004]
Y	Standard type	5 [0.197]	4.5 [0.177]	4 [0.157]	6 [0.236]	10 [0.394]	11.5 [0.453]
	With bumper (-R)	4 [0.157]	4.5 [0.177]	2 [0.079]	4 [0.157]	7 [0.276]	11.5 [0.453]

● Double rod cylinders with magnet



■ Solid state type

● Double acting type

mm [in.]

Code \ Bore		6	8	10	12	16	20	25	32	40	50	63	80	100
X	Standard type	7.2 [0.283]	8 [0.315]	8.3 [0.327]	7 [0.276]	7 [0.276]	11 [0.433]	11 [0.433]	13.5 [0.531]	14.5 [0.571]	12.5 [0.492]	15.5 [0.610]	20.5 [0.807]	25 [0.984]
	With bumper (-R)	—	—	—	10 [0.394]	10 [0.394]	15 [0.591]	16 [0.630]	15.5 [0.610]	16.5 [0.650]	14 [0.551]	15 [0.591]	20.5 [0.807]	25 [0.984]
Y	Standard type	5.5 [0.217]	5.8 [0.228]	6 [0.236]	10 [0.394]	10 [0.394]	14 [0.551]	14.5 [0.571]	15.5 [0.610]	17.5 [0.689]	16.5 [0.650]	18 [0.709]	26.5 [1.043]	31.5 [1.240]
	With bumper (-R)	—	—	—	12 [0.472]	12 [0.472]	15 [0.591]	14.5 [0.571]	6.5 [0.256]	15.5 [0.610]	15 [0.591]	18 [0.709]	26.5 [1.043]	31.5 [1.240]

● Single acting type

mm [in.]

Code \ Bore	12	16	20	25	32	40	50
X	15 [0.591]	15 [0.591]	14 [0.551]	14.5 [0.571]	15.5 [0.610]	17.5 [0.689]	16.5 [0.650]
Y	7 [0.276]	7 [0.276]	11 [0.433]	11 [0.433]	13.5 [0.531]	14.5 [0.571]	12.5 [0.492]

■ Reed switch type

● Double acting type

mm [in.]

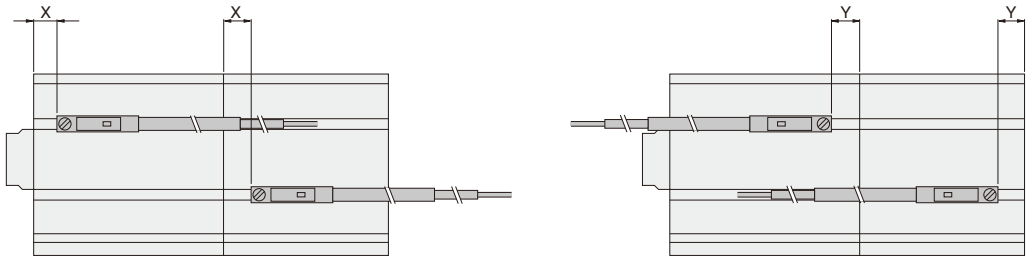
Code \ Bore		12	16	20	25	32	40	50	63	80	100
X	Standard type	2.5 [0.098]	2.5 [0.098]	6.5 [0.256]	6.5 [0.256]	9 [0.354]	10 [0.394]	8 [0.315]	10.5 [0.413]	16 [0.630]	20.5 [0.807]
	With bumper (-R)	5.5 [0.217]	5.5 [0.217]	10.5 [0.413]	11.5 [0.453]	11 [0.433]	12 [0.472]	9.5 [0.374]	10.5 [0.413]	16 [0.630]	20.5 [0.807]
Y	Standard type	5.5 [0.217]	5.5 [0.217]	9.5 [0.374]	10 [0.394]	11 [0.433]	13 [0.512]	12 [0.472]	13.5 [0.531]	22 [0.866]	27 [1.063]
	With bumper (-R)	7.5 [0.295]	7.5 [0.295]	10.5 [0.413]	10 [0.394]	2 [0.079]	11 [0.433]	10.5 [0.413]	13.5 [0.531]	22 [0.866]	27 [1.063]

● Single acting type

mm [in.]

Code \ Bore	12	16	20	25	32	40	50
X	10.5 [0.413]	10.5 [0.413]	9.5 [0.374]	10 [0.394]	11 [0.433]	13 [0.512]	12 [0.472]
Y	2.5 [0.098]	2.5 [0.098]	6.5 [0.256]	6.5 [0.256]	9 [0.354]	10 [0.394]	8 [0.315]

●Tandem cylinders with magnet



■Solid state type

●Double acting type

mm [in.]

Code \ Bore		12	16	20	25	32	40	50	63	80	100
X	Standard type	7 [0.276]	7 [0.276]	11 [0.433]	11 [0.433]	13.5 [0.531]	14.5 [0.571]	12.5 [0.492]	15 [0.591]	20 [0.787]	25 [0.984]
	With bumper (-R)	10 [0.394]	10 [0.394]	15 [0.591]	16 [0.630]	15.5 [0.610]	16.5 [0.650]	15.5 [0.610]	15 [0.591]	20 [0.787]	25 [0.984]
Y	Standard type	4 [0.157]	4 [0.157]	7.5 [0.295]	9 [0.354]	8.5 [0.335]	10.5 [0.413]	14.5 [0.571]	16 [0.630]	20 [0.787]	25 [0.984]
	With bumper (-R)	6 [0.236]	6 [0.236]	8.5 [0.335]	9 [0.354]	6.5 [0.256]	8.5 [0.335]	11.5 [0.453]	16 [0.630]	20 [0.787]	25 [0.984]

●Single acting push type

mm [in.]

Code \ Bore	12	16	20	25	32	40	50
X	15 [0.591]	15 [0.591]	14 [0.551]	14.5 [0.571]	15.5 [0.610]	17.5 [0.689]	16.5 [0.650]
Y	1 [0.039]	1 [0.039]	4.5 [0.177]	5.5 [0.217]	6.5 [0.256]	7.5 [0.295]	10.5 [0.413]

■Reed switch type

●Double acting type

mm [in.]

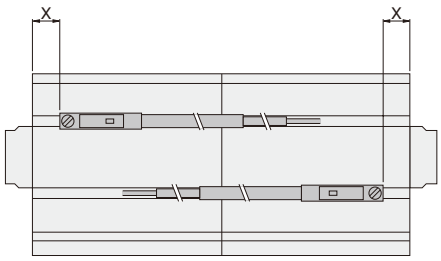
Code \ Bore		12	16	20	25	32	40	50	63	80	100
X	Standard type	2.5 [0.098]	2.5 [0.098]	6.5 [0.256]	6.5 [0.256]	9 [0.354]	10 [0.394]	8 [0.315]	10.5 [0.413]	15.5 [0.610]	20.5 [0.807]
	With bumper (-R)	5.5 [0.217]	5.5 [0.217]	10.5 [0.413]	11.5 [0.453]	11 [0.433]	12 [0.472]	11 [0.433]	10.5 [0.413]	15.5 [0.610]	20.5 [0.807]
Y	Standard type	−0.5 [−0.020]	−0.5 [−0.020]	3 [0.118]	4.5 [0.177]	4 [0.157]	6 [0.236]	10 [0.394]	11.5 [0.453]	15.5 [0.610]	20.5 [0.807]
	With bumper (-R)	1.5 [0.059]	1.5 [0.059]	4 [0.157]	4.5 [0.177]	2 [0.079]	4 [0.157]	7 [0.276]	11.5 [0.453]	15.5 [0.610]	20.5 [0.807]

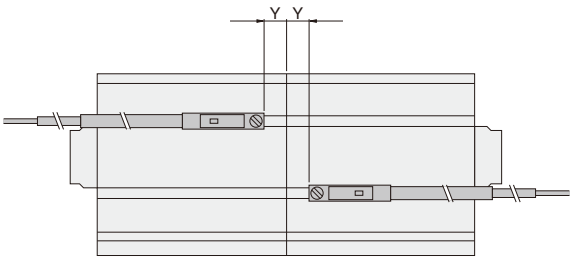
●Single acting push type

mm [in.]

Code \ Bore	12	16	20	25	32	40	50
X	10.5 [0.413]	10.5 [0.413]	9.5 [0.374]	10 [0.394]	11 [0.433]	13 [0.512]	12 [0.472]
Y	−3.5 [−0.138]	−3.5 [−0.138]	0 [0]	1 [0.039]	2 [0.079]	3 [0.118]	6 [0.236]

●Dual stroke cylinders with magnet





■Solid state type

●Double acting type

mm [in.]

Code \ Bore		12	16	20	25	32	40	50	63	80	100
X	Standard type	7 [0.276]	7 [0.276]	11 [0.433]	11 [0.433]	13.5 [0.531]	14.5 [0.571]	12.5 [0.492]	15 [0.591]	20 [0.787]	25 [0.984]
	With bumper (-R)	10 [0.394]	10 [0.394]	15 [0.591]	16 [0.630]	15.5 [0.610]	16.5 [0.650]	14 [0.551]	15 [0.591]	20 [0.787]	25 [0.984]
Y	Standard type	4 [0.157]	4 [0.157]	7.5 [0.295]	9 [0.354]	8.5 [0.335]	10.5 [0.413]	14.5 [0.571]	16 [0.630]	20 [0.787]	25 [0.984]
	With bumper (-R)	6 [0.236]	6 [0.236]	8.5 [0.335]	9 [0.354]	6.5 [0.256]	8.5 [0.335]	13.5 [0.531]	16 [0.630]	20 [0.787]	25 [0.984]

●Single acting push type

mm [in.]

Code \ Bore	12	16	20	25	32	40	50
X	15 [0.591]	15 [0.591]	14 [0.551]	14.5 [0.571]	15.5 [0.610]	17.5 [0.689]	16.5 [0.650]
Y	1 [0.039]	1 [0.039]	7.5 [0.295]	5.5 [0.217]	6.5 [0.256]	7.5 [0.295]	10.5 [0.413]

●Single acting pull type

mm [in.]

Code \ Bore	12	16	20	25	32	40	50
X	7 [0.276]	7 [0.276]	11 [0.433]	11 [0.433]	13.5 [0.531]	14.5 [0.571]	12.5 [0.492]
Y	9 [0.354]	9 [0.354]	12.5 [0.492]	14 [0.551]	13.5 [0.531]	15.5 [0.610]	14.5 [0.571]

■Reed switch type

●Double acting type

mm [in.]

Code \ Bore		12	16	20	25	32	40	50	63	80	100
X	Standard type	2.5 [0.098]	2.5 [0.098]	6.5 [0.256]	6.5 [0.256]	9 [0.354]	10 [0.394]	8 [0.315]	10.5 [0.413]	15.5 [0.610]	20.5 [0.807]
	With bumper (-R)	5.5 [0.217]	5.5 [0.217]	10.5 [0.413]	11.5 [0.453]	11 [0.433]	12 [0.472]	9.5 [0.374]	10.5 [0.413]	15.5 [0.610]	20.5 [0.807]
Y	Standard type	−0.5 [−0.020]	−0.5 [−0.020]	3 [0.118]	4.5 [0.177]	4 [0.157]	6 [0.236]	10 [0.394]	11.5 [0.453]	15.5 [0.610]	20.5 [0.807]
	With bumper (-R)	1.5 [0.059]	1.5 [0.059]	4 [0.157]	4.5 [0.177]	2 [0.079]	4 [0.157]	9 [0.354]	11.5 [0.453]	15.5 [0.610]	20.5 [0.807]

●Single acting push type

mm [in.]

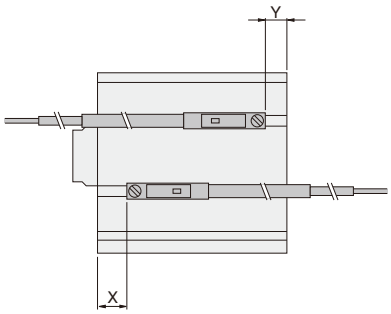
Code \ Bore	12	16	20	25	32	40	50
X	10.5 [0.413]	10.5 [0.413]	9.5 [0.374]	10 [0.394]	11 [0.433]	13 [0.512]	12 [0.472]
Y	−3.5 [−0.138]	−3.5 [−0.138]	3 [0.118]	1 [0.039]	2 [0.079]	3 [0.118]	6 [0.236]

●Single acting pull type

mm [in.]

Code \ Bore	12	16	20	25	32	40	50
X	2.5 [0.098]	2.5 [0.098]	6.5 [0.256]	6.5 [0.256]	9 [0.354]	10 [0.394]	8 [0.315]
Y	4.5 [0.177]	4.5 [0.177]	8 [0.315]	9.5 [0.374]	9 [0.354]	11 [0.433]	10 [0.394]

●Lateral load resistant cylinders with magnet



■Solid state type

●Double acting type

mm [in.]

Code \ Bore	12	16	20	25	32	40	50	63	80	100
X	10 [0.394]	10 [0.394]	15 [0.591]	16 [0.630]	15.5 [0.610]	16.5 [0.650]	15.5 [0.610]	17.5 [0.689]	26.5 [1.043]	31.5 [1.240]
Y	6 [0.236]	6 [0.236]	8.5 [0.335]	9 [0.354]	6.5 [0.256]	8.5 [0.335]	11.5 [0.453]	13.5 [0.531]	18.5 [0.728]	23.5 [0.925]

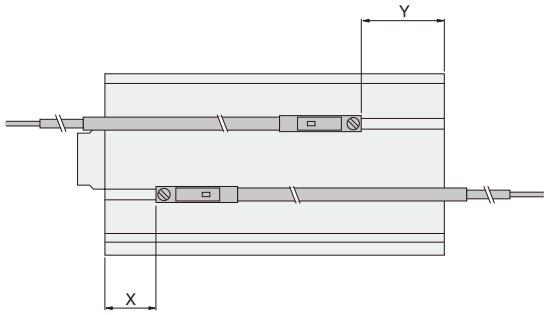
■Reed switch type

●Double acting type

mm [in.]

Code \ Bore	12	16	20	25	32	40	50	63	80	100
X	5.5 [0.217]	5.5 [0.217]	10.5 [0.413]	11.5 [0.453]	11 [0.433]	12 [0.472]	11 [0.433]	13 [0.512]	22 [0.866]	27 [1.063]
Y	1.5 [0.059]	1.5 [0.059]	4 [0.157]	4.5 [0.177]	2 [0.079]	4 [0.157]	7 [0.276]	9 [0.354]	14 [0.551]	19 [0.748]

●Long stroke cylinders with magnet



■Solid state type

●Double acting type

mm [in.]

Code \ Bore	12	16	20	25	32	40	50	63	80	100
X	15 [0.591]	15 [0.591]	20 [0.787]	21 [0.827]	20.5 [0.807]	21.5 [0.846]	20.5 [0.807]	22.5 [0.886]	31.5 [1.240]	36.5 [1.437]
Y	12 [0.472]	12 [0.472]	15 [0.591]	14.5 [0.571]	13.5 [0.531]	15.5 [0.610]	12.5 [0.492]	13.5 [0.531]	18.5 [0.728]	23.5 [0.925]

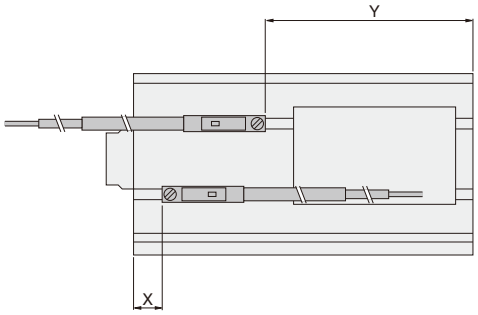
■Reed switch type

●Double acting type

mm [in.]

Code \ Bore	12	16	20	25	32	40	50	63	80	100
X	10.5 [0.413]	10.5 [0.413]	15.5 [0.610]	16.5 [0.650]	16 [0.630]	17 [0.669]	16 [0.630]	18 [0.709]	27 [1.063]	32 [1.260]
Y	7.5 [0.295]	7.5 [0.295]	10.5 [0.413]	10 [0.394]	9 [0.354]	11 [0.433]	8 [0.315]	9 [0.354]	14 [0.551]	19 [0.748]

●End keep cylinder with magnet



■Solid state type

●Head side end keep

mm [in.]

Code \ Bore	16	20	25	32	40	50	63
X	15.5 [0.610]	20.5 [0.807]	21.5 [0.846]	20.5 [0.807]	21.5 [0.846]	20.5 [0.807]	22.5 [0.886]
Y	36.5 [1.437]	34.5 [1.358]	34.5 [1.358]	43.5 [1.713]	45.5 [1.791]	51.5 [2.028]	54.5 [2.146]

■Solid state type

●Rod side end keep

mm [in.]

Code \ Bore	16	20	25	32	40	50	63
X	35.5 [1.398]	35.5 [1.398]	36.5 [1.437]	45.5 [1.791]	46.5 [1.831]	55.5 [2.185]	57.5 [2.264]
Y	11.5 [0.453]	14.5 [0.571]	14.5 [0.571]	13.5 [0.531]	15.5 [0.610]	11.5 [0.453]	13.5 [0.531]

■Reed switch type

●Head side end keep

mm [in.]

Code \ Bore	16	20	25	32	40	50	63
X	11 [0.433]	16 [0.630]	17 [0.669]	16 [0.630]	17 [0.669]	16 [0.630]	16 [0.630]
Y	32 [1.260]	30 [1.181]	30 [1.181]	39 [1.535]	41 [1.614]	47 [1.850]	50 [1.969]

■Reed switch type

●Rod side end keep

mm [in.]

Code \ Bore	16	20	25	32	40	50	63
X	31 [1.220]	31 [1.220]	32 [1.260]	41 [1.614]	42 [1.654]	51 [2.008]	53 [2.087]
Y	7 [0.276]	10 [0.394]	10 [0.394]	9 [0.354]	11 [0.433]	7 [0.276]	9 [0.354]

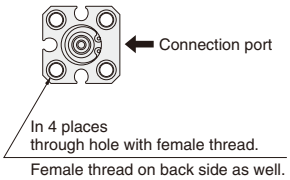
Body mounting

Jig cylinder mounting holes include both through holes with female mounting thread, and dedicated female mounting threads, for a variety of mountings. For details, see the diagrams below.

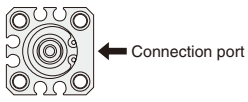
■Standard cylinders, Double rod cylinders

●Standard cylinders ●Double rod cylinders ●Lateral load resistant cylinders
●Long stroke cylinders ●End keep cylinders

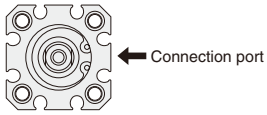
●ϕ6～ϕ12



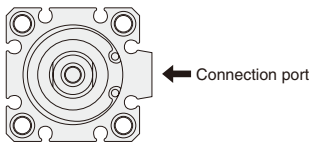
●ϕ16



●ϕ20, ϕ25



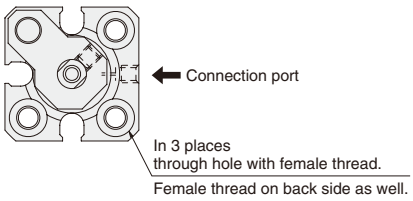
●ϕ32～ϕ100



Remark: Mounting methods are the same regardless of bore sizes.

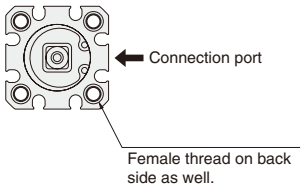
■Non-rotating cylinders

●ϕ6, ϕ8, ϕ10

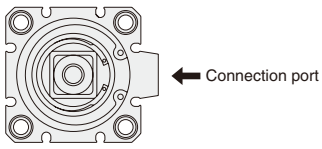


■Square rod cylinders

●ϕ20, ϕ25



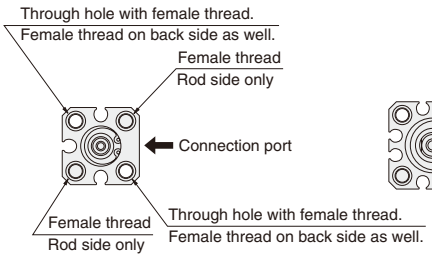
●ϕ32～ϕ63



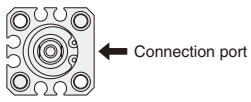
Remark: Mounting methods are the same regardless of bore sizes.
However, the mounting method for “with centering location” differs from the figure above. See p.153.

■Tandem cylinders

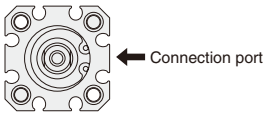
●ϕ12



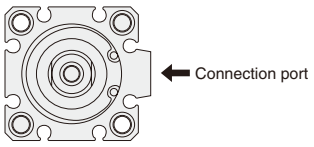
●ϕ16



●ϕ20, ϕ25



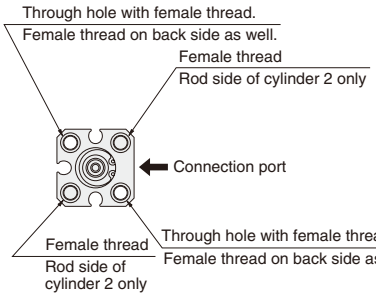
●ϕ32～ϕ100



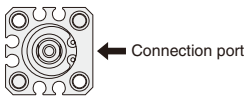
Remark: Mounting methods are the same regardless of bore sizes.

■Dual stroke cylinders

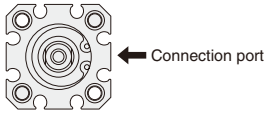
●ϕ12



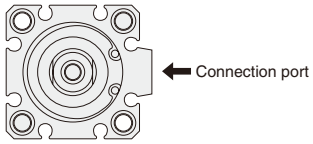
●ϕ16



●ϕ20, ϕ25



●ϕ32～ϕ100



Remark: Mounting methods are the same regardless of bore sizes.

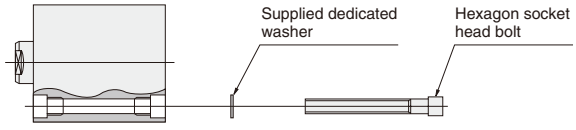
Notes: 1. Avoid applying lateral loads on the piston rod, with the exception of Lateral load resistant cylinders, Long stroke cylinders, and End keep cylinders.
2. When using through holes for mounting, always use the supplied dedicated washers. (except ϕ6, ϕ8, and ϕ10)
3. Mount an external stopper, etc., to prevent the cylinder from being subjected to direct shocks during operation.

●Tightening thread of the end of piston rod

Since a tool (thin wrench) has been prepared for holding the piston rod when tightening the rod end thread, consult us.

Order code: L115069

● Always use the supplied dedicated washer whenever using a through bolt to directly mount the cylinder body in place.※ Use the bolts shown in the table below to mount in place.
And for bolts used for direct mounting, see p.209.



※Washer not available for bore sizes ϕ6, ϕ8, and ϕ10.

Bore size mm [in.]	6 [0.236]	8 [0.315]	10 [0.394]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]	80 [3.150]	100 [3.940]
Hexagon socket head bolt nominal size	M3	M3	M3	M3	M3	M3	M4	M4	M5	M6	M6	M8	M10

Bracket mounting

- Foot mounting brackets cannot be installed on tandem cylinders and dual stroke cylinders.
- Flange mounting brackets cannot be installed on the head side of tandem cylinders and the stroke 1 side of dual stroke cylinders.
- Clevis mounting brackets cannot be installed on anything except for lateral load resistant cylinders, long stroke cylinders, and end keep cylinders.

Non-standard stroke

- In most cases, body cutting is used for the manufacturing for non-standard strokes.
  However, body cutting is not used for strokes of less than 5mm for ϕ 12 [0.472in.]$\sim\phi$40 [1.575in.], and strokes of less than 10mm for ϕ50 [1.969in.]$\sim\phi$100 [3.940in.]. The collar packed is used for these cases. Moreover, sizes ϕ6 [0.236in.] $\sim\phi$10 [0.394in.] are collar packed only. For delivery, consult us.
  Rod side end keep cylinders cannot be collar packed.
- Dimensions

1. Additional strokes obtained by body cutting remain classed as non-standard strokes.
2. Additional strokes obtained by collar packed are classed as standard strokes in the longer one.

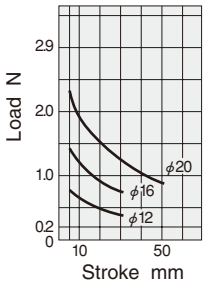
Lateral Load

- Keep the lateral load on the rod end of the lateral load resistant cylinder, long stroke cylinder, and end keep cylinder, at or below the values shown in the graphs below.
  Note: Avoid applying lateral load on any cylinder types other than the lateral load resistant cylinder, long stroke cylinder, and end keep cylinder.

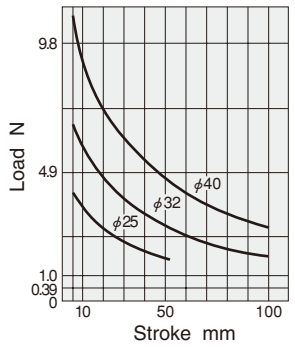
●Lateral load resistant cylinders

● Standard type (CBDA)

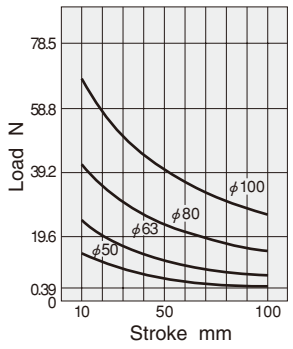
● ϕ 12 [0.472in.]$\sim$ ϕ 20 [0.787in.]



● ϕ 25 [0.984in.]$\sim$ ϕ 40 [1.575in.]



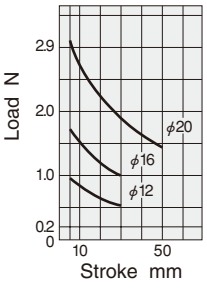
● ϕ 50 [1.969in.]$\sim$ ϕ 100 [3.940in.]



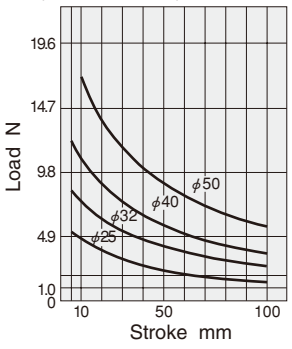
1N = 0.2248lbf.
1mm = 0.0394in.

● Cylinder with magnet (CBDAS)

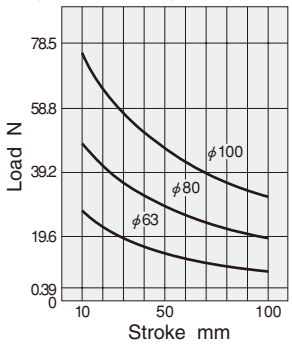
● ϕ 12 [0.472in.]$\sim$ ϕ 20 [0.787in.]



● ϕ 25 [0.984in.]$\sim$ ϕ 50 [1.969in.]



● ϕ 63 [2.480in.]$\sim$ ϕ 100 [3.940in.]

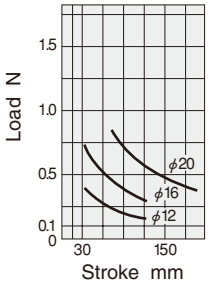


1N = 0.2248lbf.
1mm = 0.0394in.

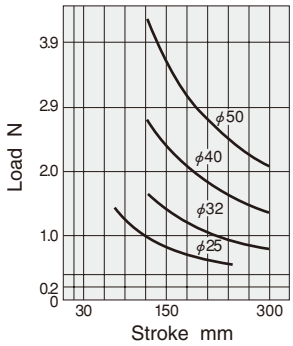
●Long stroke cylinders, End keep cylinders

●Standard type (CCDA,CCDAK)

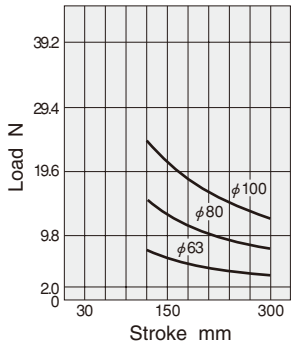
● ϕ 12 [0.472in.]$\sim$ ϕ 20 [0.787in.]



● ϕ 25 [0.984in.]$\sim$ ϕ 50 [1.969in.]



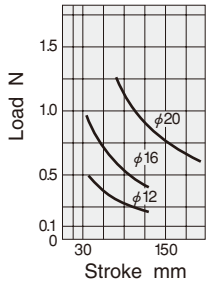
● ϕ 63 [2.480in.]$\sim$ ϕ 100 [3.940in.]



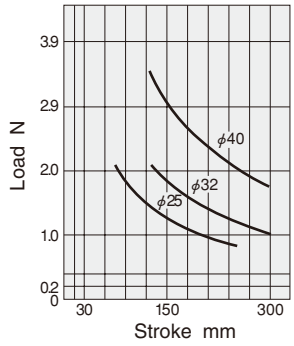
1N = 0.2248lbf.
1mm = 0.0394in.

●Cylinder with magnet (CCDAS, CCDAKS)

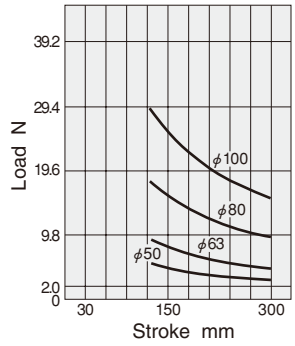
● ϕ 12 [0.472in.]$\sim$ ϕ 20 [0.787in.]



● ϕ 25 [0.984in.]$\sim$ ϕ 40 [1.575in.]



● ϕ 50 [1.969in.]$\sim$ ϕ 100 [3.940in.]



1N = 0.2248lbf.
1mm = 0.0394in.

Single acting cylinders

Standard cylinders single acting push type
Standard cylinders single acting pull type
Double rod cylinders single acting type
Tandem cylinders single acting push type
Dual stroke cylinders single acting push type
Dual stroke cylinders single acting pull type

If in the above types' application, air is being continuously applied from a connection port, and the spring remains in a compressed state for long periods of time, the piston may sometimes fail to return to its original position even after the air is exhausted. If equipment is to be used in this way over long periods of time, consult us.

End keep cylinder

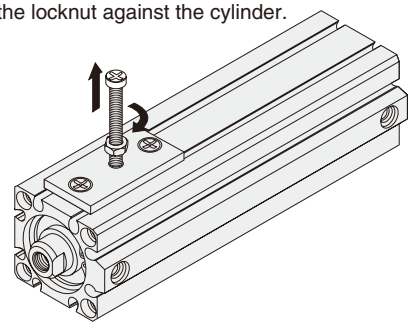
● Control circuit

1. For control of Jig end keep cylinders, we recommend the use of 2-position, 4-, 5-port valves. Avoid the use of a control circuit of ABR connections (exhaust centers) with 3-position valves that exhaust air from 2 ports.
2. Always use meter-out control for speed control. Meter-in control may result in failure of the locking mechanism to release.

Notes: 1. It is dangerous to supply air to a connection port on a side with a locking mechanism while already exhausted, because the piston rod could suddenly extend (retract). In addition, it could also cause galling of the lock piston and piston rod, resulting in defective operation. Always supply air to the connection port on the opposite side to ensure back pressure is applied.
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 on the opposite side of the locking mechanism.
3. Connect the valve port A (NC) to the connection port on the side with the locking mechanism.

● Manual operation of the locking 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.] below head length into the manual override opening, 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.



Notes: 1. It is dangerous to release the lock when a load (weight) is present on the piston rod, because it may cause a sudden fall or cause the unintended piston rod's extension (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. Because water, oil, dust, etc., entering via the manual override opening could be a cause of defective locking or other erratic operation, use a cover, etc., for protection when using in locations subject to dripping water, dripping oil, or to large amounts of dust, etc.

Sensor switch

In the standard cylinder, a magnet for the sensor switch is not built-in.
To install a sensor switch, a cylinder with a built-in magnet for the sensor switch is required.

Notes: 1. For the sensor switch mounting location and moving ranges, see p.199.
2. Contact protection measures are required for connecting inductive loads to reed sensor switches or for when capacitive surges are generated. For contact protection measures, see p.1566.

Piping

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

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.

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.

OPTIONAL ROD END SHAPE PATTERNS

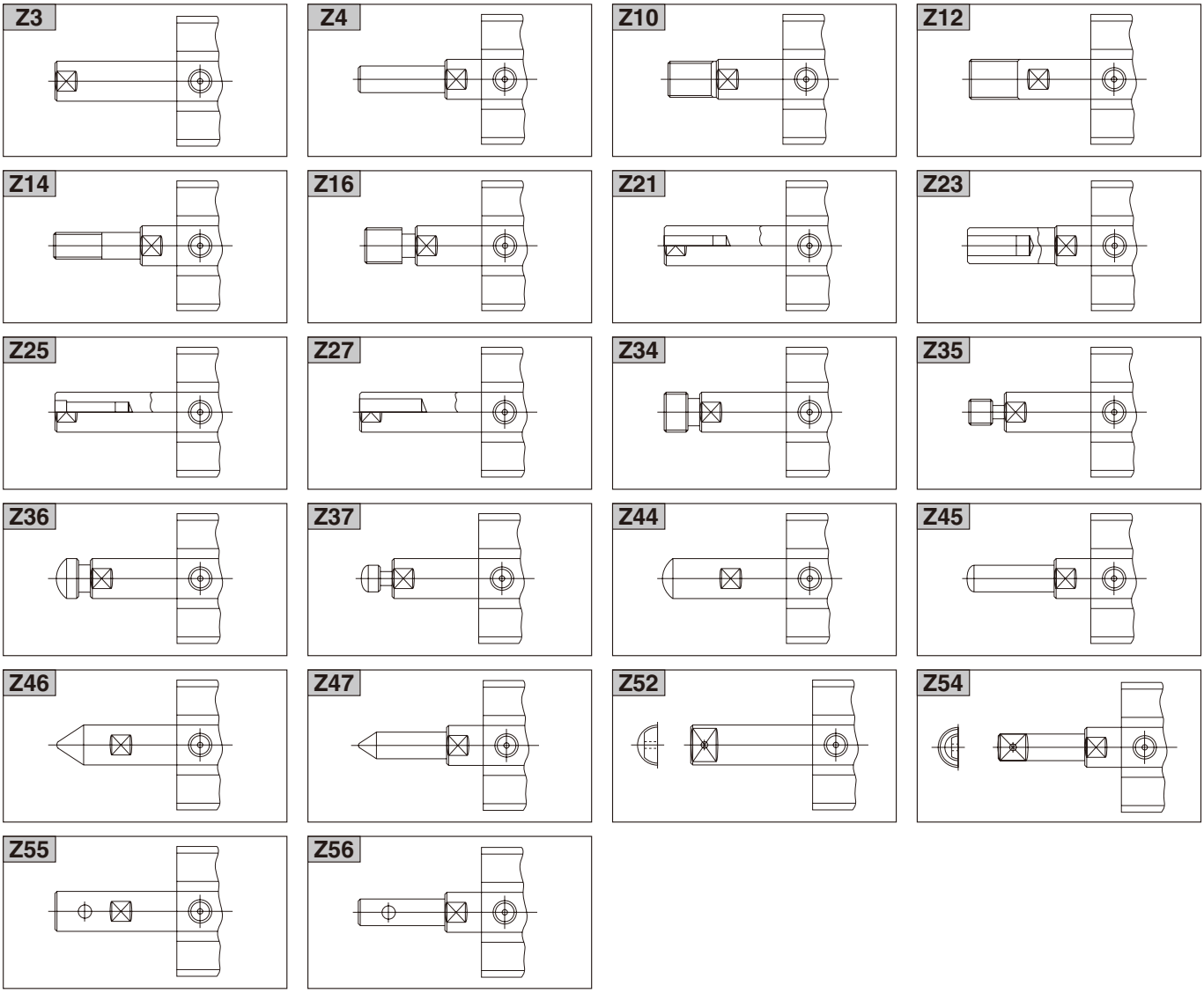
Use an order form of rod end pattern and fill the items on the selected one from among 22 types of optional patterned shapes to obtain made-to-order cylinders of non-standard rod end shapes. The optional rod end shapes can be applied to the entire Jig Cylinders C Series. For the order form containing the optional patterned shapes, contact us.
(Except ϕ6, ϕ8, ϕ10)

Order Codes

C [ ] [ ] [ ] – [ ] – [ ] – W Remark column [ ]

- Cylinder type
- Cylinder specification
- Bore size × Stroke (For tandem and dual cylinders, use Bore size × Stroke1 × Stroke2)
- Bumper
- Sensor switch model and number
- Rod end shape pattern code

Piston Rod End Shape Pattern Diagrams (22 Types)



MOUNTING SCREWS FOR JIG CYLINDERS

●Some types of mounting screws specifically for the Jig Cylinders are available.
Use the order codes below to place orders.

List of Order Codes

① Mounting screw type: JIS B 1176 Hexagon socket head cap screws
② Surface treatment: Nickel plated

Applicable cylinder bore size mm [in.]	Mounting screw order code	Screw size	Number of supplied screws
6 [0.236] 8 [0.315] 10 [0.394] 12 [0.472] 16 [0.630] 20 [0.787]	CRK124	M3×25	2
	CRK125	M3×30	
	CRK126	M3×35	
	CRK127	M3×40	
	CRK128	M3×45	
	CRK129	M3×50	
	CRK130	M3×30	4
	CRK131	M3×35	
	CRK132	M3×40	
	CRK133	M3×45	
	CRK134	M3×50	
25 [0.984] 32 [1.260]	CRK135	M4×30	4
	CRK136	M4×35	
	CRK137	M4×40	
	CRK138	M4×45	
	CRK139	M4×50	
	CRK140	M4×55	
	CRK141	M4×60	
	CRK142	M4×65	
	CRK143	M4×70	
	CRK144	M4×75	
40 [1.575]	CRK145	M5×35	4
	CRK146	M5×40	
	CRK147	M5×45	
	CRK148	M5×50	
	CRK149	M5×55	
	CRK150	M5×60	
	CRK151	M5×65	
	CRK152	M5×70	
	CRK153	M5×75	
	CRK154	M5×80	
	CRK155	M5×85	
	CRK156	M5×90	
	CRK157	M5×100	
	CRK158	M5×110	
50 [1.969] 63 [2.480]	CRK159	M6×40	4
	CRK160	M6×45	
	CRK161	M6×50	
	CRK162	M6×55	
	CRK163	M6×60	
	CRK164	M6×65	
	CRK165	M6×70	
	CRK166	M6×75	
	CRK167	M6×80	
	CRK168	M6×85	
	CRK169	M6×90	
	CRK170	M6×100	
	CRK171	M6×110	
	CRK172	M6×120	
	CRK173	M6×130	
	CRK174	M6×140	
	CRK175	M6×150	

Applicable cylinder bore size mm [in.]	Mounting screw order code	Screw size	Number of supplied screws
80 [3.150]	CRK176	M8×60	4
	CRK177	M8×65	
	CRK178	M8×70	
	CRK179	M8×75	
	CRK180	M8×80	
	CRK181	M8×85	
	CRK182	M8×90	
	CRK183	M8×95	
	CRK184	M8×100	
	CRK185	M8×110	
	CRK186	M8×120	
	CRK187	M8×130	
	CRK188	M8×140	
	CRK189	M8×150	
	CRK190	M8×160	
	CRK191	M8×170	
100 [3.940]	CRK192	M10×65	4
	CRK193	M10×70	
	CRK194	M10×75	
	CRK195	M10×80	
	CRK196	M10×85	
	CRK197	M10×90	
	CRK198	M10×95	
	CRK199	M10×100	
	CRK200	M10×110	
	CRK201	M10×120	
	CRK202	M10×130	
	CRK203	M10×140	
	CRK204	M10×150	
	CRK205	M10×160	
	CRK206	M10×170	

KOGANEI

ACTUATORS GENERAL CATALOG

JIG CYLINDERS C SERIES
STROKE-ADJUSTING CYLINDERS

INDEX

RoHS directive compliant products

⚠ **Caution** **Before use, be sure to read the "Safety Precautions" on p. 57.**

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.

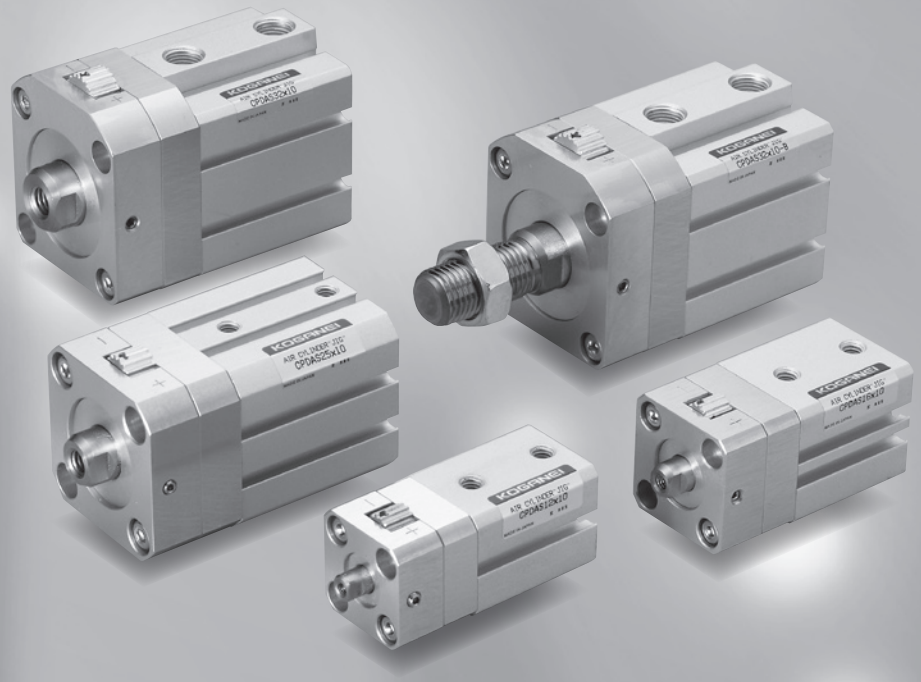
Push total stroke

−5mm
[-0.197 in]

CPDA □

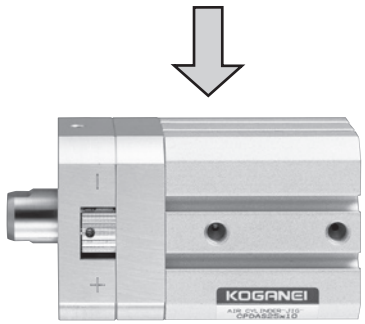
Rotating the adjusting gear towards the plus (+) side (rightwards when viewed from the piston rod side) lengthens the push stroke.

Image of previous stroke adjusting cylinder

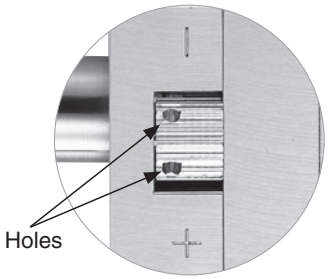


Stroke adjusting method

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.



After stroke adjusting



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.

● 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.

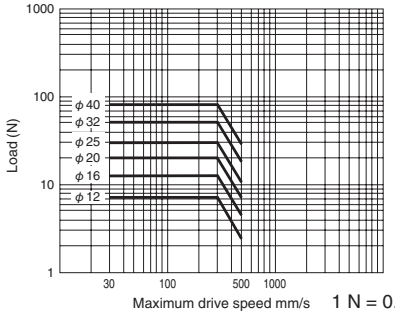
$$Ex=\frac{m}{2}v^2$$

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

J [ft•lbf]

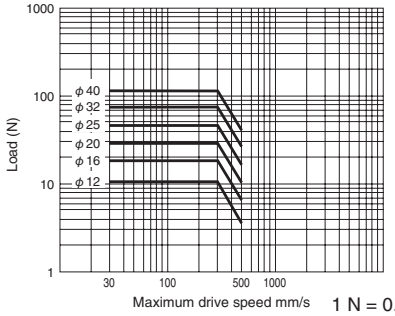
Cylinder bore mm [in]	Allowable kinetic energy	
	Without bumper	With bumper
12 [0.472]	0.032 [0.024]	0.048 [0.035]
16 [0.630]	0.057 [0.042]	0.086 [0.063]
20 [0.787]	0.090 [0.066]	0.135 [0.100]
25 [0.984]	0.140 [0.103]	0.210 [0.155]
32 [1.260]	0.230 [0.170]	0.344 [0.254]
40 [1.575]	0.359 [0.265]	0.538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

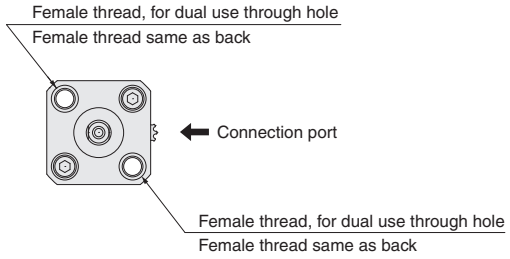
Standard cylinders do not have a sensor switch magnet built in. To mount a sensor switch, a sensor cylinder with a built-in sensor switch magnet is required.

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

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)

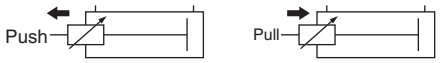
Item / Model	Cylinder bore mm [in]	Stroke adjusting range mm [in]	Total adjusting gear rotations (Rotation)	Amount of adjustment per adjusting gear rotation mm	Required number of adjusting gear rotations to adjust by 1 mm
CPDA(S)	**12 [0.472]**	0 to –5 [0 to -0.197]	6.7	(0.8 [0.031])	(1.3)
	16 [0.630]	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]

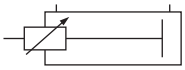
Cylinder bore mm [in]	Piston Rod diameter mm [in]	Operation	Pressure area mm² [in²]	Air pressure MPa [psi] 0.1 [15]	0.2 [29]	0.3 [44]	0.4 [58]	0.5 [73]	0.6 [87]	0.7 [102]
12 [0.472]	6 [0.236]	Push side	113.0 [0.2]	11.3 [2.540]	22.6 [5.081]	33.9 [7.621]	45.2 [10.161]	56.5 [12.702]	67.8 [15.242]	79.1 [17.782]
		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

■Bumper

Blank: No bumper
-R: With bumper

■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

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

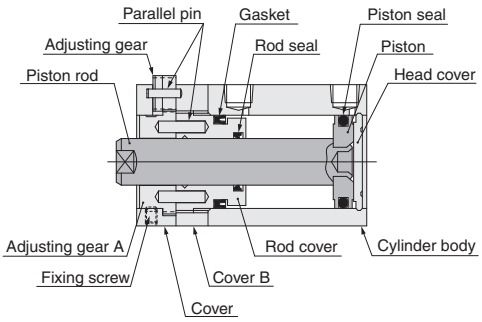
- See table for bore and stroke.
- For details about cylinder joints for male thread and cylinder rod ends, refer to the sensor switch page of the actuator general catalog.
- For the order number of a sensor switch only, see page 28.

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.

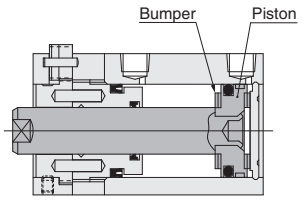
Inner Construction and Major Parts

● Double acting type (**CPDA**)

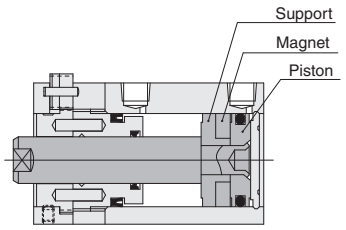
● **φ12 [0.472] ～ φ 40 [1.575]**



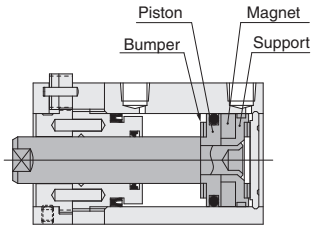
● **With bumper**



● **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]

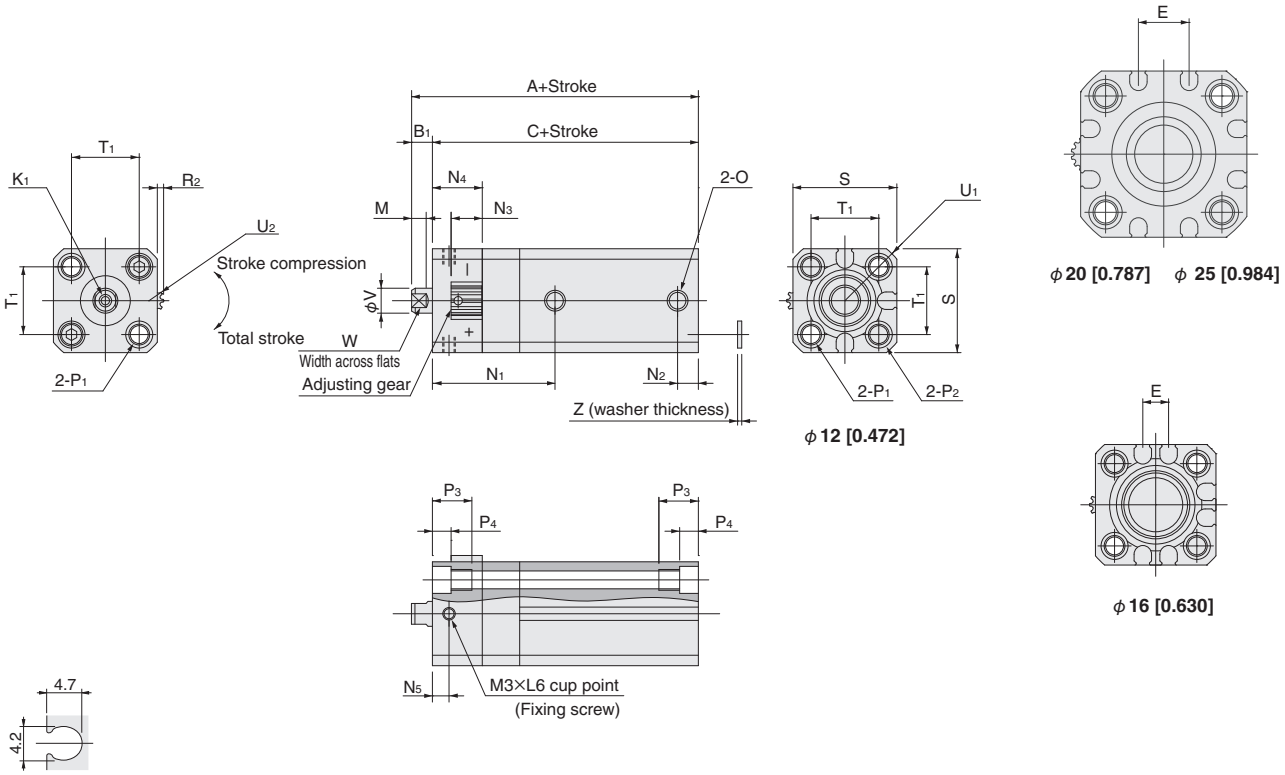
Cylinder bore mm [in]	Zero stroke Mass	Additional mass for each 1mm stroke	Mass added by bumper	Additional mass of cylinder with magnet	Additional mass of sensor switch[Note2]	
					ZE□□□A **ZE□□□G**	**ZE□□□B**
12 [0.472]	64.9 [2.289]	1.28 [0.045]	6.42 [0.226]	6.59 [0.232]	15 [0.529]	35 [1.235]
16 [0.630]	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]



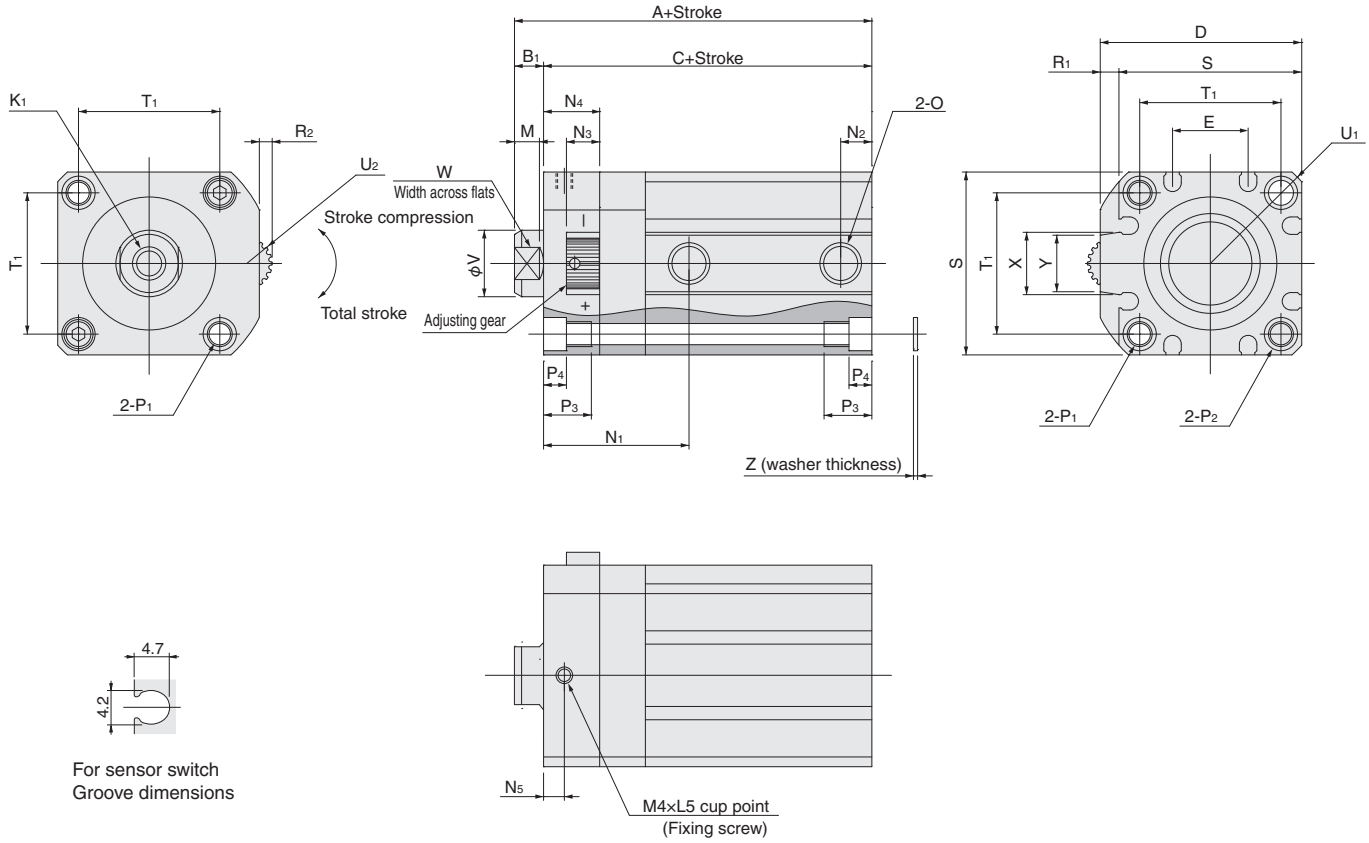
For sensor switch
Groove dimensions

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])

● ϕ **32 [1.260] • ϕ 40 [1.575]**

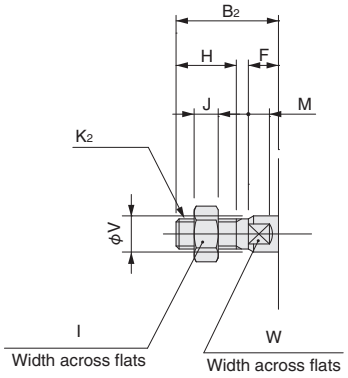


Bore \ Code	Model: Standard cylinder (**CPDA**) A	B1	C	Cylinder with magnet (**CPDAS**) A	B1	C	Standard cylinder with bumper (**CPDA-R**) A	B1	C	Cylinder with magnet and bumper (**CPDAS-R**) A	B1	C	D	E	K1	M	N1	N2	N3	N4	N5	O
32 [1.260]	56 [2.205]	7 [0.276]	49 [1.929]	66 [2.598]	7 [0.276]	59 [2.323]	61 [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

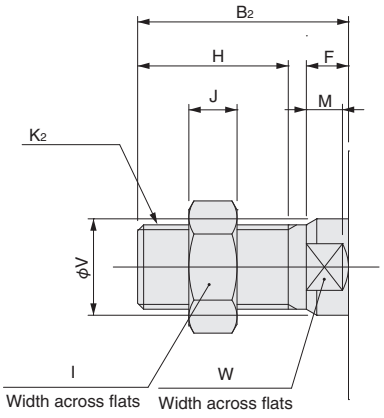
Bore \ Code	P1	P2	P3	P4	R1	R2	S	T1	U1	U2	V	W	X	Y	Z	Applicable through bolt
32 [1.260]	ϕ5.1 [0.201] (through hole) counter bore ϕ8 [0.315] (both sides) and M6×1 (both sides)	Counter bore ϕ8 [0.315] and M6×1	11.5 [0.453]	5.5 [0.217]	4.5 [0.177]	3.1 [0.122]	44 [1.732]	34 [1.339]	R29.5	R6.11	16 [0.630]	14 [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]



Code / Bore	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.

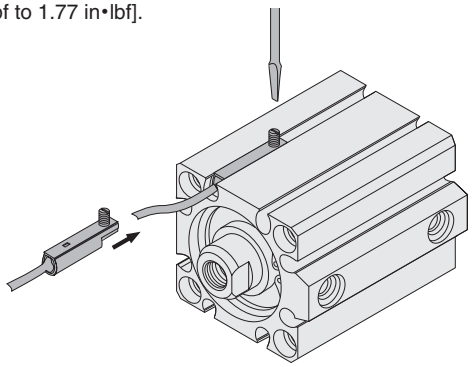
● Reed Switch Type

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]		

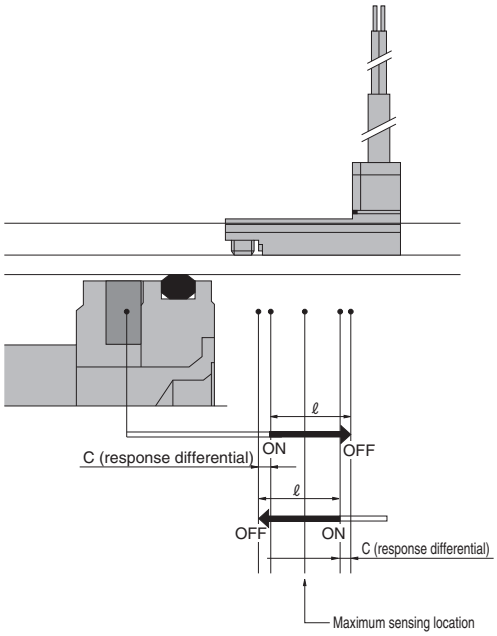
Moving Sensor Switch

- 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]

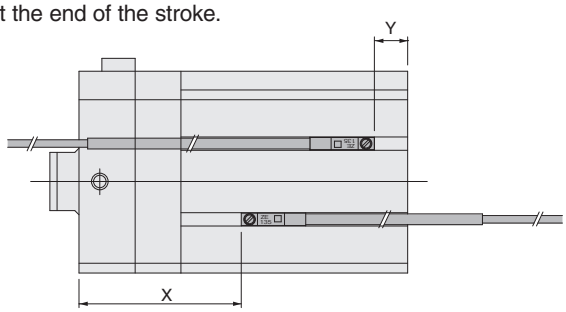
Item \ Bore	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Operating range: ℓ	4.5~8.5 [0.177~0.335]	5.5~9.5 [0.217~0.374]	9~13.5 [0.354~0.531]	10~15.5 [0.394~0.61]	8~12 [0.315~0.472]	8.5~14 [0.335~0.551]
Response differential: C	1.0 [0.039] or less	2.0 [0.079] or less				
Maximum sensing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

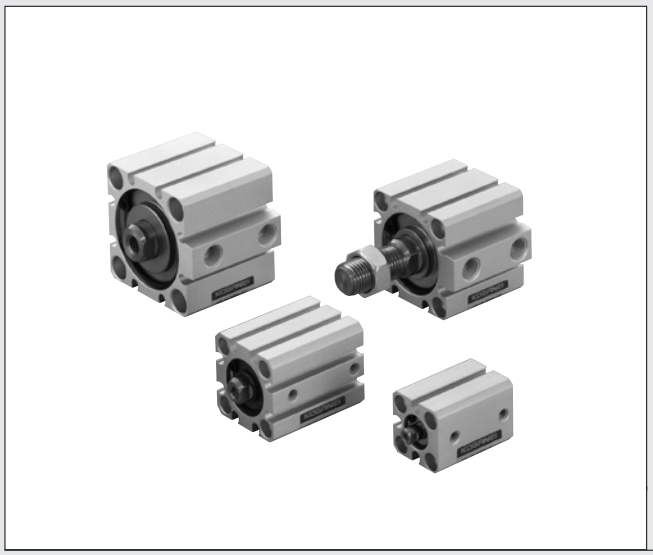
Code \ Bore		12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
X	Standard type	28 [1.102]	29 [1.142]	33 [1.299]	35 [1.378]	39 [1.535]	42 [1.654]
	With bumper (**-R**)	31 [1.220]	33 [1.299]	38 [1.496]	39 [1.535]	41 [1.614]	44 [1.732]
Y	Standard type	4 [0.157]	4 [0.157]	7.5 [0.295]	8 [0.315]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



KOGANEI

ACTUATORS GENERAL CATALOG

JIG CYLINDERS C SERIES
LOW-FRICTION CYLINDER

Low friction cylinders
INDEX

RoHS directive compliant products

⚠ **Caution** **Before use, be sure to read the "Safety Precautions" on p. 57.**

JIG CYLINDERS C SERIES
Low friction cylinders

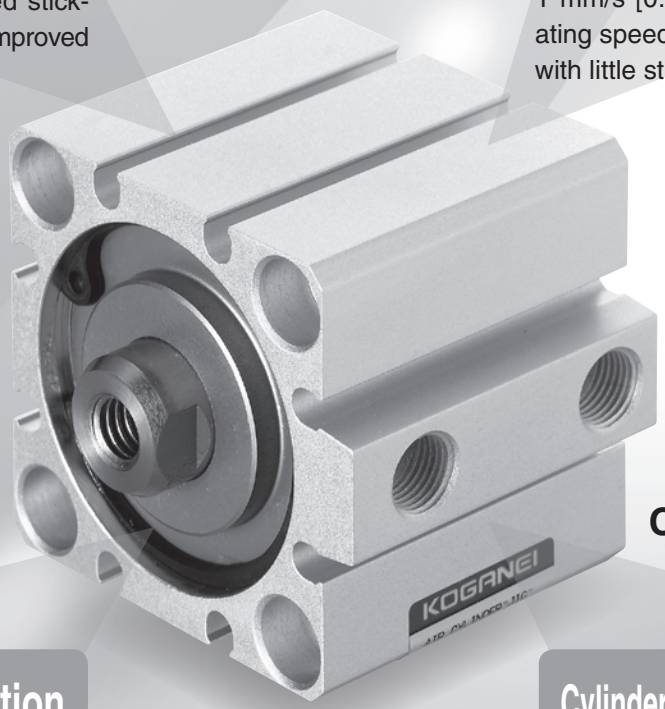
New C Series jig cylinders that provide both low pressure operation and low speed operation.
Minimum operating pressure from 0.01 MPa [1 psi], minimum operating speed of 1 mm/s [0.039 in/sec].

Low friction

Low sliding friction and reduced stick-slip following non-operation for improved response delay.
Support for pressing pressure control, tension control, etc.

Low-speed operation

1 mm/s [0.039 in/sec] minimum operating speed provides smooth operation with little stick-slip.



CDAZ □

Low-pressure operation

Minimum operating pressure from 0.01 ～0.1 MPa [1～15 psi].

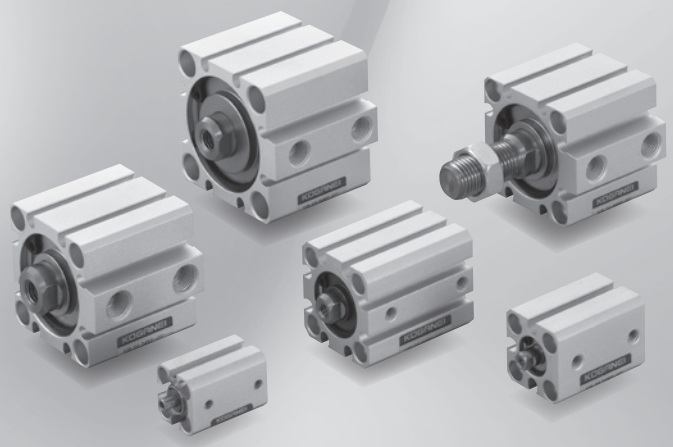
Cylinder bore mm [in]	Minimum operating pressure (MPa [psi])
6 [0.236]	0.1 [15]
8 [0.315]	0.06 [9]
10 [0.394]	0.03 [4]
12 [0.472]	0.03 [4]
16 [0.630]	0.02 [3]
20 [0.787]	0.02 [3]
25 [0.984]	0.02 [3]
32 [1.260]	0.01 [1]
40 [1.575]	0.01 [1]

(Measurement method: JIS B8377-1 standard)

The same applies to the clean specification.

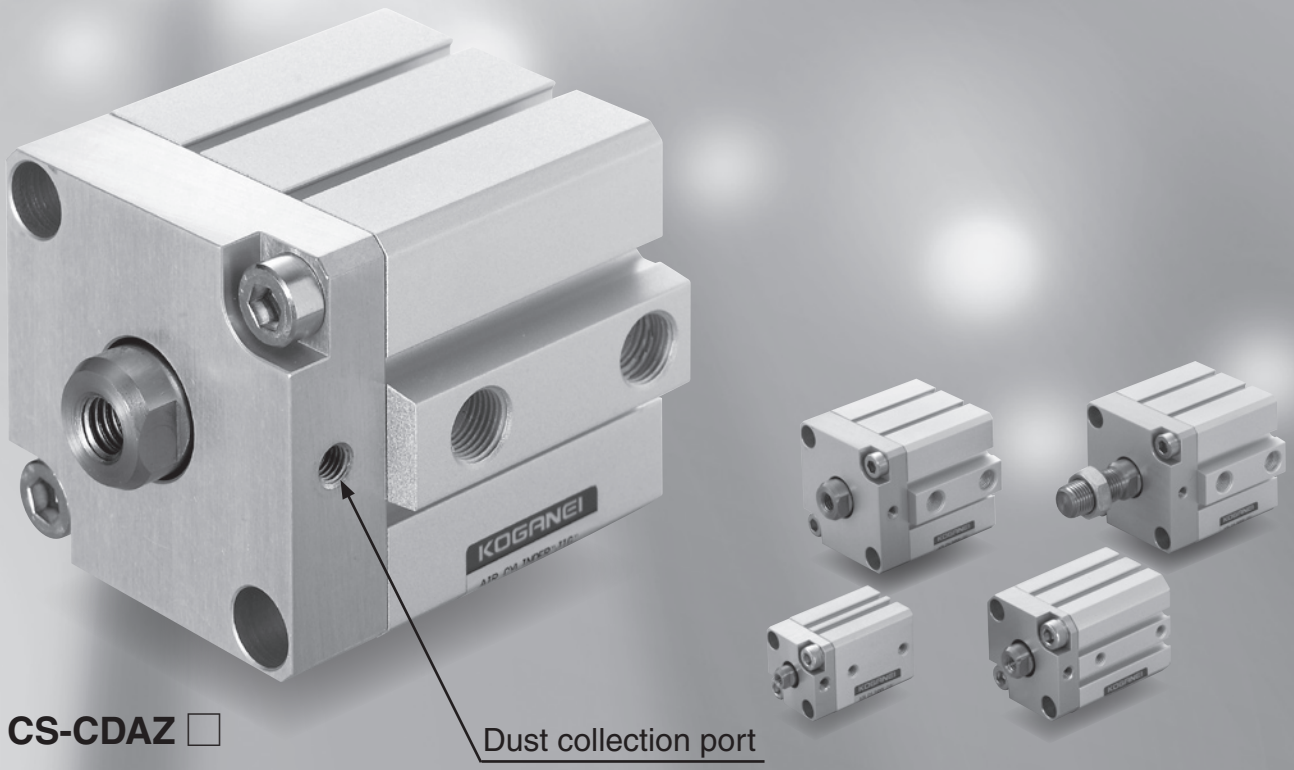
Cylinder bores from ϕ 6 [0.236]

Bores from ϕ6 [0.236] to ϕ40 [1.575] meet a wide range of needs.



Clean specification low friction cylinders

JIS/ISO Class 4 equivalent cleanliness (FED-STD Class 10 equivalent) clean specification also available (based on Koganei standards).



CS-CDAZ □

Low friction cylinders, clean specification low-friction cylinders

Bore size and stroke (mm [in])

Cylinder bore	Standard stroke											
6 [0.236]	5 [0.197]	10 [0.394]	15 [0.591]	20 [0.787]	—	—	—	—	—	—	—	—
8 [0.315]	5 [0.197]	10 [0.394]	15 [0.591]	20 [0.787]	—	—	—	—	—	—	—	—
10 [0.394]	5 [0.197]	10 [0.394]	15 [0.591]	20 [0.787]	—	—	—	—	—	—	—	—
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]

⚠ CAUTION

- Be sure to thoroughly wash your hands following contact with the grease used for low friction cylinders and clean specification low friction cylinders. Grease on the hands can become heated when smoking and can cause grease to adhere to the cigarette, which creates the risk of noxious gas being emitted when the grease burns. Grease that is used on the outside is chemically very stable at normal temperatures, but generates noxious gas at temperatures above 260℃ [500 ℉].
  Before use, be sure to read the safety precautions at the front of the general personal catalog.
- Low friction cylinders, clean specification low-friction cylinders are not non-ion specification.

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.

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.

Lubrication

Do not supply oil.

Bracket mounting

1. A foot bracket cannot be mounted on a low friction cylinder with spigot joint that has a cylinder bore of φ 40 [1.575] (**-G**). Cannot be mounted on a clean specification low friction cylinder with spigot joint (**-G**), of any cylinder bore.
2. A flange bracket cannot be mounted on the rod side of a low friction cylinder with spigot joint that has a cylinder bore of φ 40 [1.575] (**-G**). Cannot be mounted on the rod side of a clean specification low friction cylinder with spigot joint (**-G**), of any cylinder bore.
3. A clevis bracket cannot be mounted on a clean specification low friction cylinder.

Disassembly and assembly

Note the following before replacing a seal. Be sure to cut off all air supply completely, and confirm that residual pressure inside the product or in piping connected to the product is zero. To disassemble, remove the snap ring and then pull out the rod. The snap ring can fly off when it is being removed, so caution is required. Doing so creates the risk of injury.
The snap ring can fly off when it is being removed, so caution is required. A snap ring flying off creates the risk of material damage. When assembling, check to make sure that the snap ring is engaged securely. Incomplete assembly results in a dangerous situation that creates the risk of material damage and life-threatening injury.

Mid-stroke

● The mid-stroke manufacturing method basically uses tube cutting.
However, strokes up to 5 mm [0.197 in] with cylinder bores of φ12 [0.472] to φ 40 [1.575] use collar stoppers.
φ6 [0.236], φ 8 [0.315], and φ 10 [0.394] cylinder bore mid-strokes are special handling (collar stoppers). Contact your nearest Koganei sales office for information about availability.
● Dimensions

1. In the case of tube cutting, the add stroke is the mid-stroke.
2. For the add stroke in the case of a collar stopper, the longer stroke becomes the standard stroke.

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 ㉕.
2. Contact protection measures are required for connections that result in an inductive load on a reed 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.

Other

1. Avoid use that subjects the piston rod to lateral load.
2. Minimum operating pressure is measured based on JIS B8377-1.
Measurement Method Summary: With no load, horizontal mounting, a minimum operating pressure is applied to each size cylinder and then stopped. A full stroke is performed to check for vibration or any other abnormality.

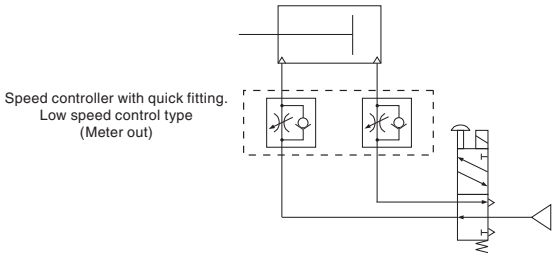
Piping and mounting

Piping

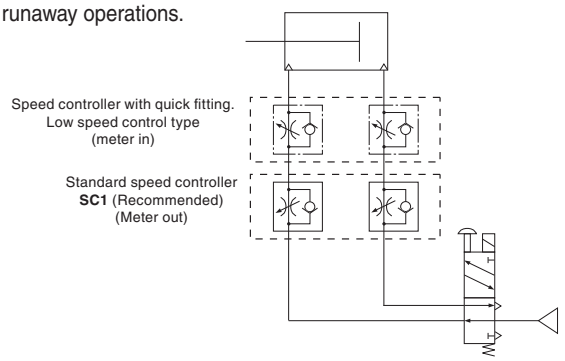
Refer to the diagrams below in the case of low-speed operation of a low friction cylinder.

Recommended circuit

1. Basic circuit
Uses meter out speed controller.



2. Rod pop-out prevention circuit
Using the cylinder in combination with the speed controller shown in the following diagram is effective for controlling speed and preventing runaway operations.



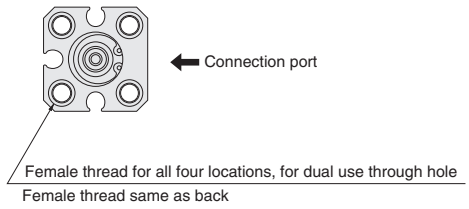
Note: Install the speed controller as close as possible to the cylinder.

Installing the main unit

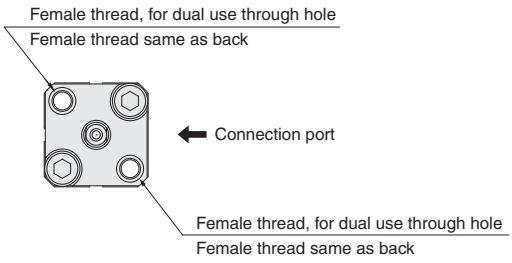
To allow for a variety of possible mounting methods, the jig cylinder mounting holes are available as a combination of female threaded holes and as through holes, or as female threaded holes only.
For details, refer to the diagrams below. The mounting method is the same regardless of the cylinder bore.

Note: When fixing the main unit with direct through bolts, be sure to use the attached special washers (not included with ϕ 6 [0.236], ϕ 8 [0.315], ϕ 10 [0.394] cylinder bores).

● **Low friction cylinders**



● **Clean specification low friction cylinders**

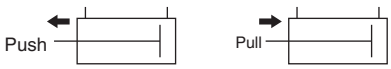


* The head side (back surface) has dual use female thread/ through holes at two locations. The other two locations are female thread only.

Thrust

Determine the thrust required by the load and working air pressure, 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**

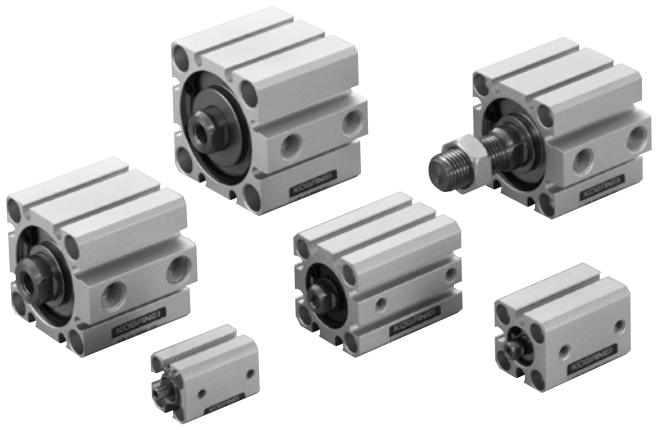


N [lbf]

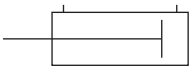
Cylinder bore mm [in]	Piston Rod diameter mm [in]	Operation	Pressure area mm²	Air pressure MPa [psi]						
				0.1 [15]	0.2 [29]	0.3 [44]	0.4 [58]	0.5 [73]	0.6 [87]	0.7 [102]
6 [0.236]	4 [0.157]	Push side	28.3 [0.044]	2.8 [0.629]	5.7 [1.281]	8.5 [1.911]	11.3 [2.540]	14.1 [3.170]	17.0 [3.822]	19.8 [4.451]
		Pull side	15.7 [0.024]	1.6 [0.360]	3.1 [0.697]	4.7 [1.057]	6.3 [1.416]	7.9 [1.776]	9.4 [2.113]	11.0 [2.473]
8 [0.315]	5 [0.197]	Push side	50.3 [0.078]	5.0 [1.124]	10.1 [2.271]	15.1 [3.395]	20.1 [4.519]	25.1 [5.643]	30.2 [6.789]	35.2 [7.913]
		Pull side	30.6 [0.047]	3.1 [0.697]	6.1 [1.371]	9.2 [2.068]	12.3 [2.765]	15.3 [3.440]	18.4 [4.136]	21.4 [4.811]
10 [0.394]	5 [0.197]	Push side	78.5 [0.122]	7.9 [1.776]	15.7 [3.530]	23.6 [5.305]	31.4 [7.059]	39.3 [8.835]	47.1 [10.589]	55.0 [12.364]
		Pull side	58.9 [0.091]	5.9 [1.326]	11.8 [2.653]	17.7 [3.979]	23.6 [5.305]	29.5 [6.632]	35.3 [7.936]	41.2 [9.262]
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 [5.71]	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
LOW FRICTION CYLINDERS

Double Acting Type



Symbol



Specifications

Item \ Cylinder bore mm [in]	6 [0.236]	8 [0.315]	10 [0.394]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Operating type	Double acting type								
Media	Air								
Maximum operating pressure MPa [psi]	0.7 [102]								
Proof pressure MPa [psi]	1.05 [152]								
Operating temperature range ℃ [˚F]	0 ～ 60 [32 ～ 140]								
Cushion	None			Rubber bumper type					
Lubrication	No								
Port size	M3×0.5			M5×0.8				Rc1/8	

Minimum operating pressure

Item \ Cylinder bore mm [in]	6 [0.236]	8 [0.315]	10 [0.394]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Minimum operating pressure MPa [psi]	0.1 [15]	0.06 [9]	0.03 [4]		0.02 [3]			0.01 [1]	

Operating speed range

Item \ Cylinder bore mm [in]	6 [0.236]	8 [0.315]	10 [0.394]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Operating speed range mm/s [in/sec]	1[Note] ～ 500 [0.039 ～ 19.7]								

Note: When using ϕ6 [0.236] at 1 mm/s [0.039 in/sec], apply air pressure of at least 0.3 MPa [44 psi].
When using ϕ8 [0.315] to ϕ40 [1.575] at 1 mm/s [0.039 in/sec], apply air pressure of at least 0.15 MPa [22 psi].
When using reed switch type sensor switches, operates at cylinder speed of 30 mm/s [1.181 in/sec] or higher.

Bore Size and Stroke

For information about mid-stroke, refer to page 34.

mm [in]

Operating type	Bore	Standard stroke	
		Standard cylinders	Cylinder with magnet
Double acting type	6 [0.236]	5 [0.197], 10 [0.394], 15 [0.591], 20 [0.787]	5 [0.197], 10 [0.394], 15 [0.591], 20 [0.787]
	8 [0.315]		
	10 [0.394]		
	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 $^{+1}_{0}$ [0.039]
2: ϕ6 [0.236], ϕ8 [0.315], and ϕ10 [0.394] cylinder bore mid-strokes are special handling (collar stoppers).
3: ϕ12 [0.472] to ϕ40 [1.575] cylinder bore mid-strokes basically are tube cut.
However, strokes up to 5 mm [0.197 in] with cylinder bores of ϕ12 [0.472] to ϕ40 [1.575] are not tube cut.
In this case, a collar stopper is used.

Order Codes for Low Friction Cylinders

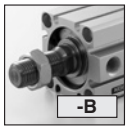
■ Operating type

DA: Double acting type

■ Rod end specification

Female thread

Male thread



■ Mounting type

Basic mounting type

Foot mounting type[Note2]

Flange mounting type[Note 3]

Clevis mounting type (with pin)[Note 4]

■ Sensor switch type[Note6] (For cylinder with magnet)

Blank : No sensor switch

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

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

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

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

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

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

-ZE101: With ZE101[Note 4]
- 2-lead wire, contact type
- No indicator lamp
- 5～28 VDC
  85～115 VAC
- Horizontal lead wire

-ZE102: With ZE102[Note 4]
- 2-lead wire, contact type
- With indicator lamp
- 10～28 VDC
  85～115 VAC
- Horizontal lead wire

-ZE201: With ZE201[Note 4]
- 2-lead wire, contact type
- No indicator lamp
- 5～28 VDC
  85～115 VAC
- Vertical lead wire

-ZE202: With ZE202[Note 4]
- 2-lead wire, contact type
- With indicator lamp
- 10～28 VDC
  85～115 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

■ Low friction cylinder

■ Cylinder specification

Blank: Standard cylinder[Note 1]
S: Cylinder with magnet

■ Centering location[Note 5]

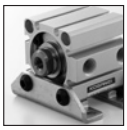
Blank: No centering location
-G: With centering location

Basic type			Bore size × stroke							
C	DA	Z	S	×	-B	-G	-1 -3 -7	-ZE135 -ZE155 -ZE175 -ZE235 -ZE255 -ZE275 -ZE101 -ZE102 -ZE201 -ZE202	A B G	1 2 ⋮ n

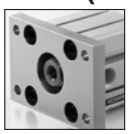
- See table for bore size and stroke.
- For details about cylinder joints for male thread and cylinder rod ends, refer to the general personal catalog.
- For the order number of a sensor switch only, see page 49.
- Mounting brackets are attached when shipped.
- When the stroke of a ϕ12 [0.472] or ϕ16 [0.630] foot bracket is less than 10 mm [0.394 in], it may be impossible to mount two sensor switches due to interference between the foot bracket and sensor switch. For details, contact your nearest Koganei sales office.

Note 1: Low friction standard cylinders do not have a sensor switch magnet built in.
2: Cannot be mounted on a cylinder with spigot joint, which has a ϕ40 [1.575] cylinder bore (**-G**). Not available for cylinder bores ϕ6 [0.236], ϕ8 [0.315], or ϕ10 [0.394].
3: Cannot be mounted on the rod side of a cylinder with spigot joint, which has a ϕ40 [1.575] cylinder bore (**-G**). Not available for cylinder bores ϕ6 [0.236], ϕ8 [0.315], or ϕ10 [0.394].
4: Not available for cylinder bores ϕ6 [0.236], ϕ8 [0.315], or ϕ10 [0.394].
5: Not available for cylinder bores ϕ6 [0.236] to ϕ12 [0.472].
6: For details about sensor switches, see the general personal catalog.

Additional Parts (To be ordered separately)



Foot mounting bracket (page 47)



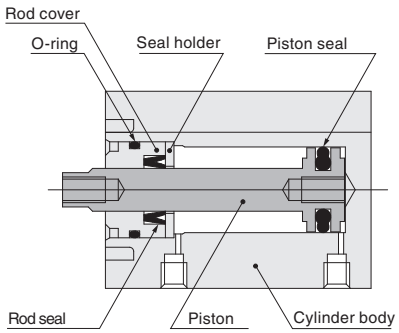
Flange mounting bracket (page 48)

Clevis mounting bracket (page 48)

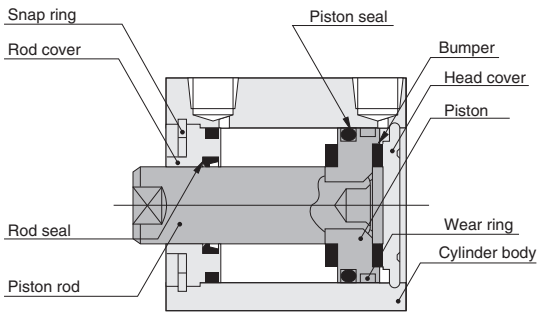
Inner Construction and Major Parts

● **Double acting type (CDAZ)**

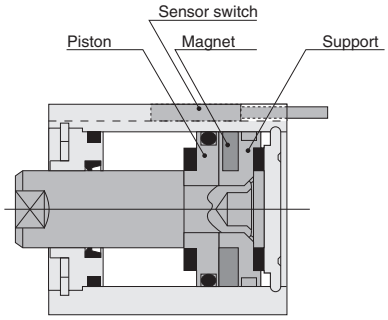
● **φ6 [0.236] ～φ 10 [0.394]**



● **φ12 [0.472] ～φ 40 [1.575]**



● **Cylinder with magnet**



Major Parts and Materials

Article \ Cylinder bore mm [in]	6 [0.236]	8 [0.315]	10 [0.394]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Cylinder body	Aluminum alloy (anodized)								
Piston	Stainless steel			Aluminum alloy (special anti-rust treated)					
Piston rod	—			Stainless steel (with chrome plating)				Hard steel (with chrome plating)	
Gasket	Synthetic rubber (NBR)								
Rod cover	Aluminum alloy (special anti-abrasion treated)								
Bumper	—			Synthetic rubber (NBR)					
Magnet	Neodymium magnet			Plastic magnet					
Support	Copper alloy			Aluminum alloy (special anti-rust treated)					
Snap ring	—			Hard steel (phosphoric acid salt coating)					
Wear ring	—			Synthetic resin					

Seal Repair Kit

Bore mm [in]	Model	Set contents
12 [0.472]	SRK-CDAZ12	Piston seal: 1 Rod seal: 1 O-ring: 1
16 [0.630]	SRK-CDAZ16	
20 [0.787]	SRK-CDAZ20	
25 [0.984]	SRK-CDAZ25	
32 [1.260]	SRK-CDAZ32	
40 [1.575]	SRK-CDAZ40	

Note 1: There is no seal repair kit available for cylinder bores φ6 [0.236], φ8 [0.315], or φ10 [0.394].
2: Use special grease. For information about grease, contact Koganei.

Mass

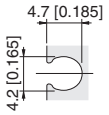
g [oz]

Bore size mm [in]	Zero stroke Mass	Additional mass for each 1 mm stroke	Additional mass of cylinder with magnet	Mass of mounting brackets			Additional mass of sensor switch[Note]	
				Foot bracket	Flange bracket	Clevis bracket	ZE □□□ A ZE □□□ G	ZE □□□ B
6 [0.236]	10.3 [0.363]	0.74 [0.026]	3.9 [0.138]	—	—	—	15 [0.529]	35 [1.235]
8 [0.315]	13.9 [0.490]	0.95 [0.034]	5.4 [0.190]	—	—	—		
10 [0.394]	18.9 [0.667]	1.12 [0.040]	6.8 [0.240]	—	—	—		
12 [0.472]	28.3 [0.998]	1.28 [0.045]	8 [0.282]	50 [1.764]	55 [1.940]	30 [1.058]		
16 [0.630]	39.9 [1.407]	1.62 [0.057]	11 [0.388]	62 [2.187]	71 [2.504]	40 [1.411]		
20 [0.787]	66.1 [2.332]	2.26 [0.080]	27 [0.952]	84 [2.963]	101 [3.6]	75 [2.646]		
25 [0.984]	91.5 [3.228]	3.11 [0.110]	39 [1.376]	104 [3.7]	160 [5.6]	100 [3.5]		
32 [1.260]	140.1 [4.9]	4.11 [0.145]	28 [0.988]	126 [4.4]	186 [6.6]	165 [5.8]		
40 [1.575]	236.1 [8.3]	4.47 [0.158]	37 [1.305]	160 [5.6]	335 [11.8]	200 [7.1]		

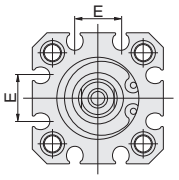
Note: Sensor switch types A, B, and G are lead wire lengths. A: 1000 mm [39 in], B: 3000 mm [118 in], G: 300 mm [11.8 in], with M8 connector

Dimensions of Low Friction Double Acting Type (mm [in])

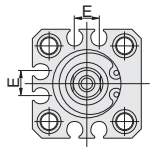
● φ6 [0.236] ～ φ 25 [0.984]



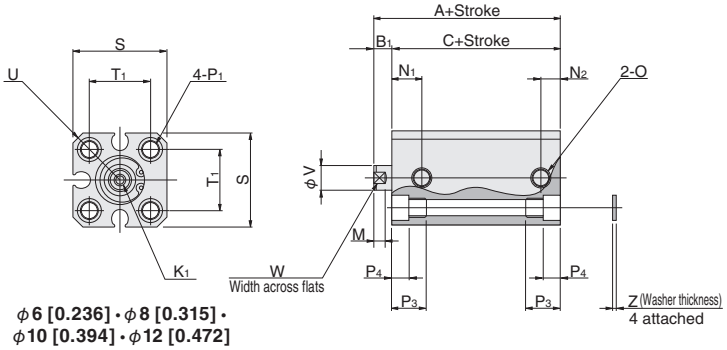
For sensor switch
Groove dimensions



φ20 [0.787] • φ25 [0.984]



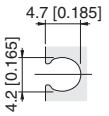
φ16 [0.630]



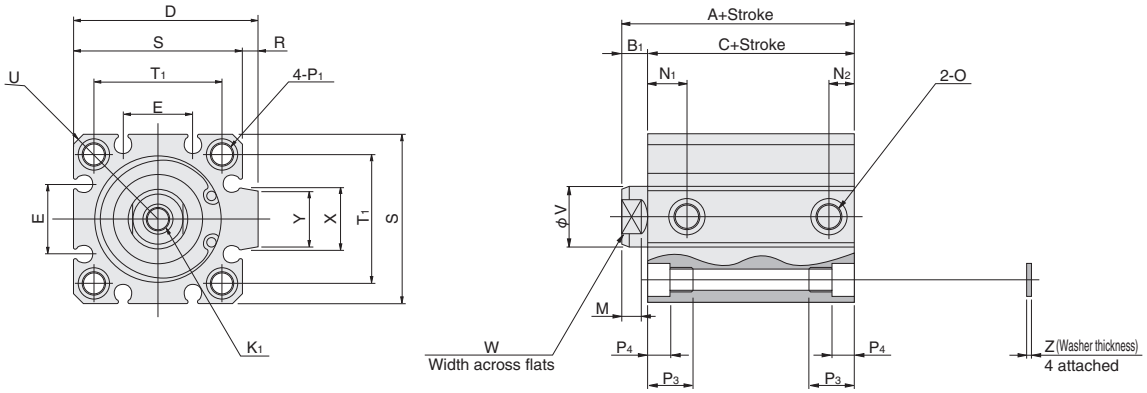
φ6 [0.236] • φ8 [0.315] •
φ10 [0.394] • φ12 [0.472]

● Diagram shows φ12 [0.472].

● φ32 [1.260] • φ 40 [1.575]



For sensor switch
Groove dimensions

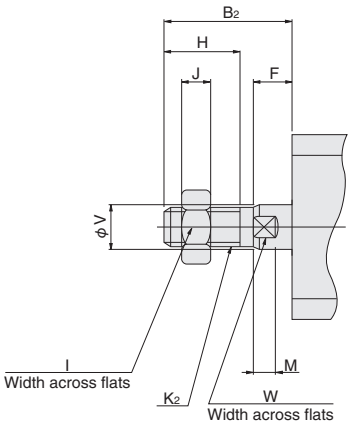


Model / Bore / Code	Standard cylinder (**CDAZ**)			Cylinder with magnet (**CDAZS**)			D	E	K1	M	N1	N2	O
	A	B1	C	A	B1	C							
6 [0.236]	19 [0.748]	5 [0.197]	14 [0.551]	24 [0.945]	5 [0.197]	19 [0.748]	—	—	M2.5×0.45, depth 5 [0.197]	3 [0.118]	6.5 [0.256]	3.5 [0.138]	M3×0.5
8 [0.315]	20 [0.787]	5 [0.197]	15 [0.591]	25 [0.984]	5 [0.197]	20 [0.787]	—	—	M3×0.5, depth 5 [0.197]	3 [0.118]	7.5 [0.295]	3.5 [0.138]	M3×0.5
10 [0.394]	21 [0.827]	5 [0.197]	16 [0.630]	26 [1.024]	5 [0.197]	21 [0.827]	—	—	M3×0.5, depth 5 [0.197]	3 [0.118]	8 [0.315]	4 [0.157]	M3×0.5
12 [0.472]	27 [1.063]	5 [0.197]	22 [0.866]	32 [1.260]	5 [0.197]	27 [1.063]	—	—	M3×0.5, depth 6 [0.236]	3.5 [0.138]	8 [0.315]	5 [0.197]	M5×0.8
16 [0.630]	27.5 [1.083]	5.5 [0.217]	22 [0.866]	32.5 [1.280]	5.5 [0.217]	27 [1.063]	—	6.2 [0.244]	M4×0.7, depth 8 [0.315]	3.5 [0.138]	8 [0.315]	5 [0.197]	M5×0.8
20 [0.787]	30 [1.181]	5.5 [0.217]	24.5 [0.965]	40 [1.575]	5.5 [0.217]	34.5 [1.358]	—	12.2 [0.480]	M5×0.8, depth 10 [0.394]	4.5 [0.177]	9.5 [0.374]	5 [0.197]	M5×0.8
25 [0.984]	32 [1.260]	6 [0.236]	26 [1.024]	42 [1.654]	6 [0.236]	36 [1.417]	—	12.2 [0.480]	M6×1, depth 10 [0.394]	5 [0.197]	10.5 [0.413]	5 [0.197]	M5×0.8
32 [1.260]	35 [1.378]	7 [0.276]	28 [1.102]	40 [1.575]	7 [0.276]	33 [1.299]	48.5 [1.909]	18.2 [0.717]	M8×1.25, depth 12 [0.472]	6 [0.236]	9.5 [0.374]	7.5 [0.295]	Rc1/8
40 [1.575]	38 [1.496]	7 [0.276]	31 [1.220]	43 [1.693]	7 [0.276]	36 [1.417]	56.5 [2.224]	18.2 [0.717]	M8×1.25, depth 12 [0.472]	6 [0.236]	10.5 [0.413]	7.5 [0.295]	Rc1/8

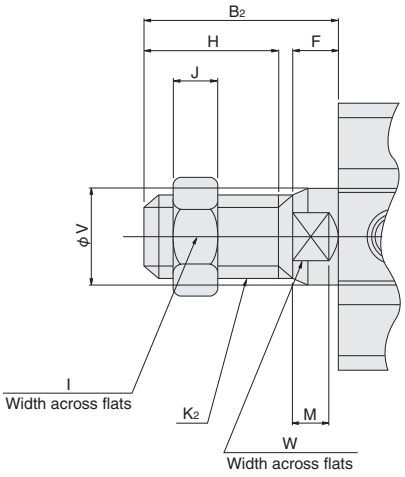
Bore / Code	P1	P3	P4	R	S	T1	U	V	W	X	Y	Z	Applicable through bolt
6 [0.236]	φ3.3 [0.13] (through hole) counter bore φ6 [0.236] (both sides) and M4×0.7 (both sides)	9.5 [0.374]	3.5 [0.138]	—	19 [0.748]	11 [0.433]	R12	4 [0.157]	3.5 [0.138]	—	—	—	M3
8 [0.315]	φ3.3 [0.13] (through hole) counter bore φ6.2 [0.244] (both sides) and M4×0.7 (both sides)	9.5 [0.374]	3.5 [0.138]	—	21 [0.827]	13 [0.512]	R13.5	5 [0.197]	4 [0.157]	—	—	—	M3
10 [0.394]	φ3.3 [0.13] (through hole) counter bore φ6.2 [0.244] (both sides) and M4×0.7 (both sides)	9.5 [0.374]	3.5 [0.138]	—	23 [0.906]	15 [0.591]	R15	5 [0.197]	4 [0.157]	—	—	—	M3
12 [0.472]	φ4.3 [0.169] (through hole) counter bore φ6.5 [0.256] (both sides) and M5×0.8 (both sides)	9.5 [0.374]	4.5 [0.177]	—	25 [0.984]	16.3 [0.642]	R16	6 [0.236]	5 [0.197]	—	—	1 [0.039]	M3
16 [0.630]	φ4.3 [0.169] (through hole) counter bore φ6.5 [0.256] (both sides) and M5×0.8 (both sides)	9.5 [0.374]	4.5 [0.177]	—	29 [1.142]	19.8 [0.780]	R19	8 [0.315]	6 [0.236]	—	—	1 [0.039]	M3
20 [0.787]	φ4.3 [0.169] (through hole) counter bore φ6.5 [0.256] (both sides) and M5×0.8 (both sides)	9.5 [0.374]	4.5 [0.177]	—	34 [1.339]	24 [0.945]	R22	10 [0.394]	8 [0.315]	—	—	1 [0.039]	M3
25 [0.984]	φ5.1 [0.201] (through hole) counter bore φ8 [0.315] (both sides) and M6×1 (both sides)	11.5 [0.453]	5.5 [0.217]	—	40 [1.575]	28 [1.102]	R25	12 [0.472]	10 [0.394]	—	—	1 [0.039]	M4
32 [1.260]	φ5.1 [0.201] (through hole) counter bore φ8 [0.315] (both sides) and M6×1 (both sides)	11.5 [0.453]	5.5 [0.217]	4.5 [0.177]	44 [1.732]	34 [1.339]	R29.5	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)	15.5 [0.610]	7.5 [0.295]	4.5 [0.177]	52 [2.047]	40 [1.575]	R35	16 [0.630]	14 [0.551]	15 [0.591]	13.6 [0.535]	1.6 [0.063]	M5

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

● **ϕ6 [0.236] ～ ϕ 25 [0.984]**



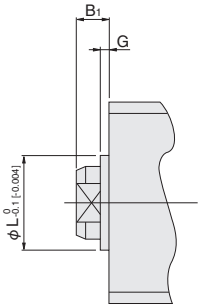
● **ϕ32 [1.260] • ϕ 40 [1.575]**



Bore \ Code	B_2	F	H	I	J	K_2	M	V	W
6 [0.236]	15 [0.591]	5 [0.197]	8 [0.315]	5.5 [0.217]	1.8 [0.071]	M3×0.5	3 [0.118]	4 [0.157]	3.5 [0.138]
8 [0.315]	15 [0.591]	5 [0.197]	8 [0.315]	7 [0.276]	2.4 [0.094]	M4×0.7	3 [0.118]	5 [0.197]	4 [0.157]
10 [0.394]	15 [0.591]	5 [0.197]	8 [0.315]	7 [0.276]	2.4 [0.094]	M4×0.7	3 [0.118]	5 [0.197]	4 [0.157]
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.

Dimensions of Centering Location (mm [in])

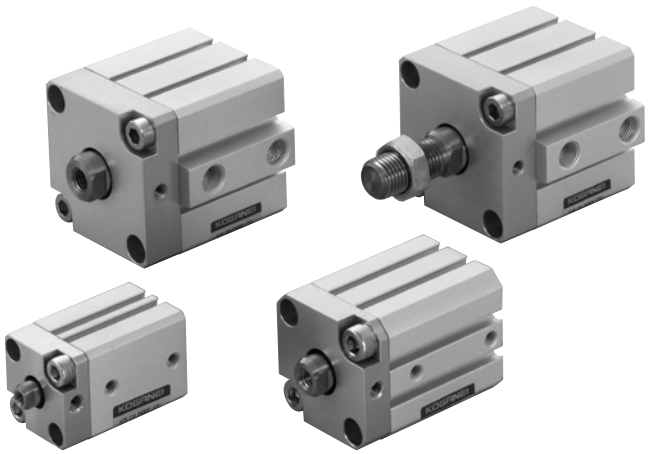


Bore \ Code	B_1	G	L
16 [0.630]	5.5 [0.217]	1.5 [0.059]	9.4 [0.370]
20 [0.787]	5.5 [0.217]	1.5 [0.059]	12 [0.472]
25 [0.984]	6 [0.236]	2 [0.079]	15 [0.591]
32 [1.260]	7 [0.276]	2 [0.079]	21 [0.827]
40 [1.575]	7 [0.276]	2 [0.079]	29 [1.142]

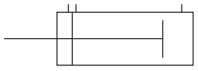
●Not available for **ϕ6 [0.236]**, **ϕ8 [0.315]**, **ϕ10 [0.394]**, and **ϕ12 [0.472]**

JIG CYLINDERS C SERIES
CLEAN SPECIFICATION LOW FRICTION CYLINDERS

Double Acting Type



Symbol



Specifications

Item \ Cylinder bore mm [in]	6 [0.236]	8 [0.315]	10 [0.394]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Operating type	Double acting type								
Media	Air								
Maximum operating pressure MPa [psi]	0.7 [102]								
Proof pressure MPa [psi]	1.05 [152]								
Operating temperature range ℃ [˚F]	0 ～ 60 [32 ～ 140]								
Cushion	None			Rubber bumper type					
Lubrication	No								
Port size	M3×0.5			M5×0.8				Rc1/8	
Dust collection port	M3×0.5			M5×0.8					
Cleanliness	Class 4 equivalent (FED-STD Class 10 equivalent) (Vacuum suction from dust collection port. Based on Koganei standards. For details, refer to page 44.)								

Minimum Operation Pressure

Item \ Cylinder bore mm [in]	6 [0.236]	8 [0.315]	10 [0.394]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Minimum operating pressure MPa [psi]	0.1 [15]	0.06 [9]	0.03 [4]		0.02 [3]			0.01 [1]	

Operating Speed Range

Item \ Cylinder bore mm [in]	6 [0.236]	8 [0.315]	10 [0.394]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Operating speed range mm/s [in/sec]	1[Note] ～ 500 [0.039 ～ 19.7]								

Note: When using ϕ6 [0.236] at 1 mm/s [0.039 in/sec], apply air pressure of at least 0.3 MPa [44 psi].
When using ϕ8 [0.315] to ϕ40 [1.575] at 1 mm/s [0.039 in/sec], apply air pressure of at least 0.15 MPa [22 psi].
When using reed switch type sensor switches, operates at cylinder speed of 30 mm/s [1.181 in/sec] or higher.

Bore Size and Stroke

For information about mid-stroke, refer to page 34.

mm [in]

Operating type	Bore	Standard stroke	
		Standard cylinders	Cylinder with magnet
Double acting type	**6 [0.236]**	5 [0.197], 10 [0.394], 15 [0.591], 20 [0.787]	5 [0.197], 10 [0.394], 15 [0.591], 20 [0.787]
	8 [0.315]		
	10 [0.394]		
	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 $^{+1}_{0}$ [0.039]
2: ϕ6 [0.236], ϕ8 [0.315], and ϕ10 [0.394] cylinder bore mid-strokes are special handling (collar stoppers).
3: ϕ12 [0.472] to ϕ40 [1.575] cylinder bore mid-strokes basically are tube cut.
However, strokes up to 5 mm [0.197 in] with cylinder bores of ϕ12 [0.472] to ϕ40 [1.575] are not tube cut.
In this case, a collar stopper is used.

Order Codes for Clean Specification Low Friction Cylinders

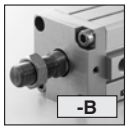
■ Operating type

DA: Double acting type

■ Rod end specification

Female thread

Male thread

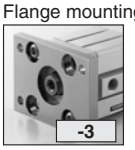


■ Mounting type

Basic mounting type

Foot mounting type[Note2]

Flange mounting type[Note 3]



■ Sensor switch type[Note6]
(For cylinder with magnet)

Blank : No sensor switch

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

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

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

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

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

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

-ZE101: With ZE101[Note 4]
- 2-lead wire, contact type
- No indicator lamp
- 5～28 VDC
  85～115 VAC
- Horizontal lead wire

-ZE102: With ZE102[Note 4]
- 2-lead wire, contact type
- With indicator lamp
- 10～28 VDC
  85～115 VAC
- Horizontal lead wire

-ZE201: With ZE201[Note 4]
- 2-lead wire, contact type
- No indicator lamp
- 5～28 VDC
  85～115 VAC
- Vertical lead wire

-ZE202: With ZE202[Note 4]
- 2-lead wire, contact type
- With indicator lamp
- 10～28 VDC
  85～115 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

■ Low friction cylinder

■ Cylinder specification

Blank: Standard cylinder[Note 1]
S: Cylinder with magnet

■ Centering location[Note 5]

Blank: No centering location
-G: With centering location

Clean specification	Basic type				Bore size × stroke							
CS-	C	DA	Z	S	×	-B	-G	-1 -3	-ZE135 -ZE155 -ZE175 -ZE235 -ZE255 -ZE275 -ZE101 -ZE102 -ZE201 -ZE202	A B G	1 2 ⋮ n

● See table of bore and stroke.

● For details about cylinder joints for male thread and cylinder rod ends, refer to the general personal catalog.

● For the order number of a sensor switch only, see page 49.

● Mounting brackets are attached when shipped.

● When the stroke of a ϕ12 [0.472] or ϕ16 [0.630] foot bracket is less than 10 mm [0.394 in], it may be impossible to mount two sensor switches due to interference between the foot bracket and sensor switch. For details, contact your nearest Koganei sales office.

Note 1: Clean specification low friction standard cylinders do not have a sensor switch magnet built in.
2: Cannot be mounted on a cylinder with spigot joint (**-G**). Not available for cylinder bores ϕ6 [0.236], ϕ8 [0.315], or ϕ10 [0.394].
3: Cannot be mounted on the rod side a cylinder with spigot joint (**-G**). Not available for cylinder bores ϕ6 [0.236], ϕ8 [0.315], or ϕ10 [0.394].
4: Not available for cylinder bores ϕ6 [0.236], ϕ8 [0.315], or ϕ10 [0.394].
5: Not available for cylinder bores ϕ6 [0.236] to ϕ12 [0.472].
6: For details about sensor switches, see the general personal catalog.

Additional Parts (To be ordered separately)

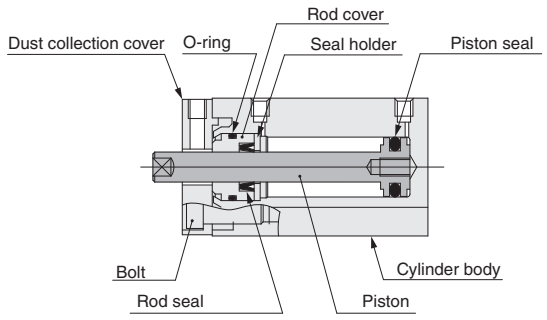
Foot mounting bracket
(page 47)

Flange mounting bracket
(page 48)

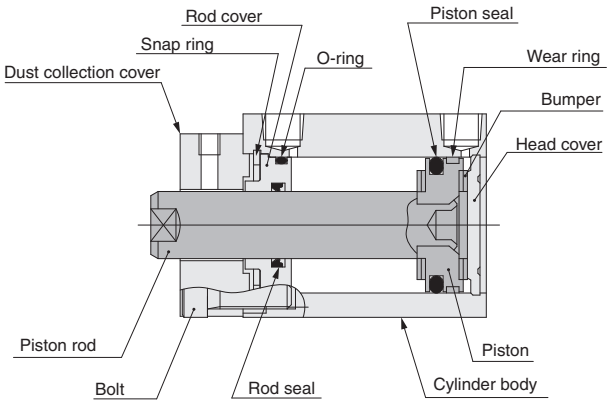
Inner Construction and Major Parts

● **Double acting type (CS-CDAZ)**

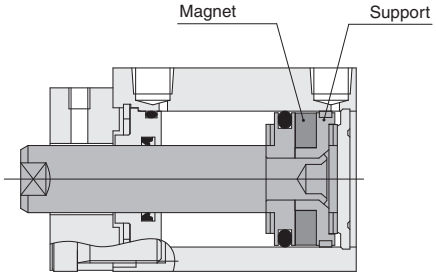
● **φ6 [0.236] ～φ 10 [0.394]**



● **φ12 [0.472] ～φ 40 [1.575]**



● **Cylinder with magnet**



Major Parts and Materials

Article \ Cylinder bore mm [in]	6 [0.236]	8 [0.315]	10 [0.394]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Cylinder body	Aluminum alloy (anodized)								
Piston	Stainless steel			Aluminum alloy (special anti-rust treated)					
Piston rod	—			Stainless steel (with chrome plating)				Hard steel (with chrome plating)	
Gasket	Synthetic rubber (NBR)								
Rod cover	Aluminum alloy (special anti-abrasion treated)								
Bumper	—			Synthetic rubber (NBR)					
Magnet	Neodymium magnet			Plastic magnet					
Support	Copper alloy			Aluminum alloy (special anti-rust treated)					
Snap ring	—			Steel (nickel plated)					
Wear ring	—			Synthetic resin					
Dust collection cover	Aluminum alloy (anodized)								
Bolt	Stainless steel			Steel (nickel plated)					Stainless steel

Seal Repair Kit

Bore mm [in]	Model	Set contents
12 [0.472]	**SRK-CDAZ12**	Piston seal: 1 Rod seal: 1 O-ring: 1
16 [0.630]	**SRK-CDAZ16**	
20 [0.787]	**SRK-CDAZ20**	
25 [0.984]	**SRK-CDAZ25**	
32 [1.260]	**SRK-CDAZ32**	
40 [1.575]	**SRK-CDAZ40**	

Note 1: There is no seal repair kit available for cylinder bores φ6 [0.236], φ8 [0.315], or φ10 [0.394].
2: Use special grease. For information about grease, contact Koganei.

Mass

g [oz]

Bore size mm [in]	Zero stroke Mass	Additional mass for each 1 mm stroke	Additional mass of cylinder with magnet	Mass of mounting brackets		Additional mass of sensor switch[Note]	
				Foot bracket	Flange bracket	**ZE □□□ A** **ZE □□□ G**	**ZE □□□ B**
6 [0.236]	17.2 [0.607]	0.74 [0.026]	3.9 [0.138]	—	—	15 [0.529]	35 [1.235]
8 [0.315]	22.7 [0.801]	0.95 [0.034]	5.4 [0.190]	—	—		
10 [0.394]	29.3 [1.034]	1.12 [0.040]	6.8 [0.240]	—	—		
12 [0.472]	49.3 [1.739]	1.28 [0.045]	8 [0.282]	50 [1.764]	55 [1.940]		
16 [0.630]	67.9 [2.395]	1.62 [0.057]	11 [0.388]	62 [2.187]	71 [2.504]		
20 [0.787]	100.2 [3.5]	2.26 [0.080]	27 [0.952]	84 [2.963]	101 [3.6]		
25 [0.984]	146.1 [5.2]	3.11 [0.110]	39 [1.376]	104 [3.7]	160 [5.6]		
32 [1.260]	235.7 [8.3]	4.11 [0.145]	28 [0.988]	126 [4.4]	186 [6.6]		
40 [1.575]	347.0 [12.2]	4.47 [0.158]	37 [1.305]	160 [5.6]	335 [11.8]		

Note: Sensor switch types 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

Cleanliness Evaluation (Clean Specification Low Friction Cylinders)

Cleanliness evaluation methods for current clean specification pneumatic equipment are not defined by JIS or other standards. Because of this, Koganei devises its own independent measurement methods for cleanliness and carries out evaluation accordingly.

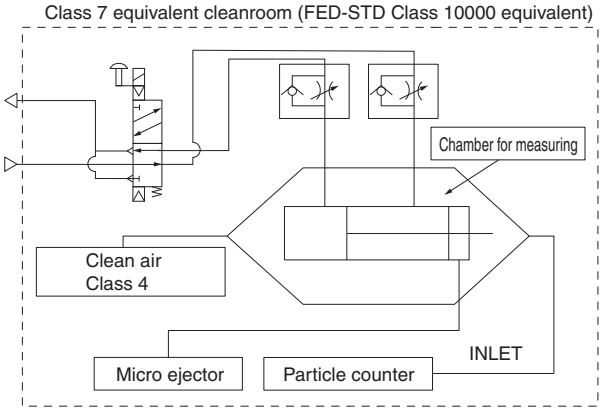
Jig cylinder C series clean specification low friction cylinder dust volume is measured using the method described below.

1. Samples being measured

CS-CDAZ40×100 (Load: 288 g [10.2 oz])

2. Measurement conditions

2-1 Test circuit: With suction from dust collection port



2-2 Sample operation conditions

Operating frequency: 0.5 Hz
Average operating speed: 300 mm/s [11.8 in/sec]
Applied pressure: 0.5 MPa [73 psi]
Suction conditions: Micro ejector: ME05; Primary: 0.5 MPa [73 psi] application; Tubing used: ϕ6 [0.236]
Mounting direction: Horizontal
Chamber volume used: 8.3 ℓ

3. Particle counter used

Manufacturer/Model: RION Co., Ltd./KM20
Suction flow: 28.3 ℓ /min (ANR) [1.000 ft^3/min (SCFM)]
Passable particle sizes: 0.1 μm, 0.2 μm, 0.3 μm, 0.5 μm, 0.7 μm, 1.0 μm

4. Measurement methodology

4-1 Measurement system dust emission volume check

Measurement for nine minutes with the particle counter without operation of the test sample in accordance with conditions 1 and 2 to confirm a count value no greater than 1.

4-2 Actual measurement

Operation of the test sample in accordance with conditions 1 and 2 for 36 minutes, total value measurement for the latter 18 minutes.

4-3 Re-confirmation

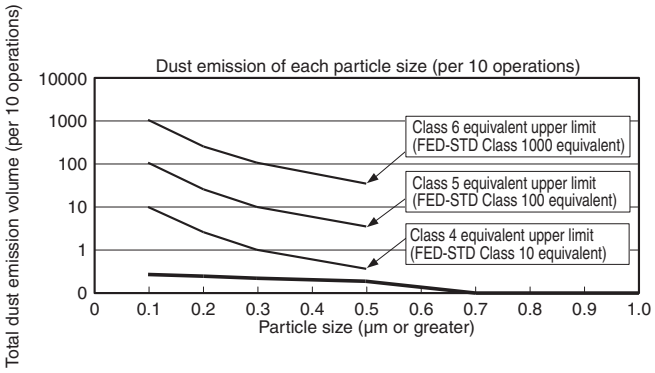
Performance of check 4-1 again to re-check measurement system dust emission.

4-4 Measurement value conversion

Conversion of the total value obtained during the latter 18 minutes of 4-2 to a value per 10 operations of the cylinder.

5. Measurement result precautions[Note]

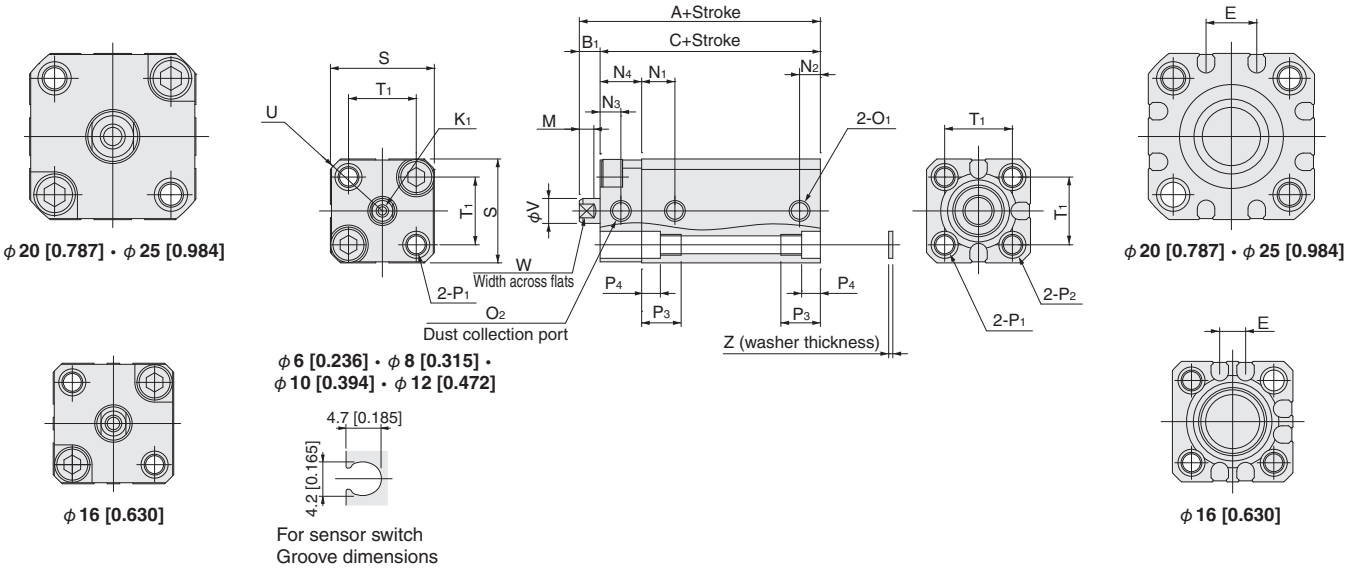
● Suction from dust collection port



Note: The individual particle size graphs are for measurements following one million product operations.

Dimensions of Clean Specification Double Acting Low Friction Cylinders (mm [in])

● φ6 [0.236] ～ φ 25 [0.984]



φ20 [0.787] • φ25 [0.984]

φ6 [0.236] • φ8 [0.315] • φ10 [0.394] • φ12 [0.472]

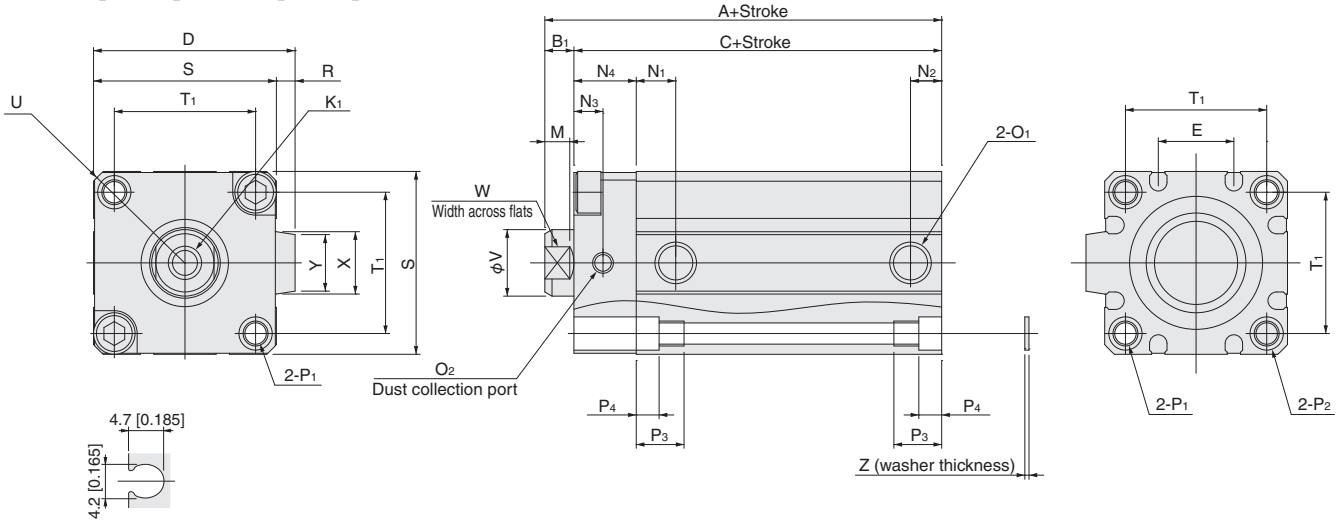
φ16 [0.630]

For sensor switch
Groove dimensions

φ20 [0.787] • φ25 [0.984]

φ16 [0.630]

● φ32 [1.260] • φ 40 [1.575]



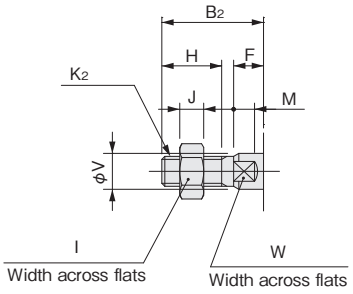
For sensor switch
Groove dimensions

Model / Code / Bore	Standard cylinder (**CS-CDAZ**)			Cylinder with magnet (**CS-CDAZS**)			D	E	K1	M	N1	N2	N3	N4	O1	O2
	A	B1	C	A	B1	C										
6 [0.236]	24 [0.945]	5 [0.197]	19 [0.748]	29 [1.142]	5 [0.197]	24 [0.945]	—	—	M2.5×0.45, depth 5 [0.197]	3 [0.118]	6.5 [0.256]	3.5 [0.138]	2.5 [0.098]	5 [0.197]	M3×0.5	M3×0.5
8 [0.315]	25 [0.984]	5 [0.197]	20 [0.787]	30 [1.181]	5 [0.197]	25 [0.984]	—	—	M3×0.5, depth 5 [0.197]	3 [0.118]	7.5 [0.295]	3.5 [0.138]	2.5 [0.098]	5 [0.197]	M3×0.5	M3×0.5
10 [0.394]	26 [1.024]	5 [0.197]	21 [0.827]	31 [1.220]	5 [0.197]	26 [1.024]	—	—	M3×0.5, depth 5 [0.197]	3 [0.118]	8 [0.315]	4 [0.157]	2.5 [0.098]	5 [0.197]	M3×0.5	M3×0.5
12 [0.472]	37 [1.457]	5 [0.197]	32 [1.260]	42 [1.654]	5 [0.197]	37 [1.457]	—	—	M3×0.5, depth 6 [0.236]	3.5 [0.138]	8 [0.315]	5 [0.197]	5 [0.197]	10 [0.394]	M5×0.8	M5×0.8
16 [0.630]	37.5 [1.476]	5.5 [0.217]	32 [1.260]	42.5 [1.673]	5.5 [0.217]	37 [1.457]	—	6.2 [0.244]	M4×0.7, depth 8 [0.315]	3.5 [0.138]	8 [0.315]	5 [0.197]	5 [0.197]	10 [0.394]	M5×0.8	M5×0.8
20 [0.787]	40 [1.575]	5.5 [0.217]	34.5 [1.358]	50 [1.969]	5.5 [0.217]	44.5 [1.752]	—	12.2 [0.480]	M5×0.8, depth 10 [0.394]	4.5 [0.177]	9.5 [0.374]	5 [0.197]	5 [0.197]	10 [0.394]	M5×0.8	M5×0.8
25 [0.984]	42 [1.654]	6 [0.236]	36 [1.417]	52 [2.047]	6 [0.236]	46 [1.811]	–	12.2 [0.480]	M6×1, depth 10 [0.394]	5 [0.197]	10.5 [0.413]	5 [0.197]	5 [0.197]	10 [0.394]	M5×0.8	M5×0.8
32 [1.260]	50 [1.969]	7 [0.276]	43 [1.693]	55 [2.165]	7 [0.276]	48 [1.890]	48.5 [1.909]	18.2 [0.717]	M8×1.25, depth 12 [0.472]	6 [0.236]	9.5 [0.374]	7.5 [0.295]	7 [0.276]	15 [0.591]	Rc1/8	M5×0.8
40 [1.575]	53 [2.087]	7 [0.276]	46 [1.811]	58 [2.283]	7 [0.276]	51 [2.008]	56.5 [2.224]	18.2 [0.717]	M8×1.25, depth 12 [0.472]	6 [0.236]	10.5 [0.413]	7.5 [0.295]	7 [0.276]	15 [0.591]	Rc1/8	M5×0.8

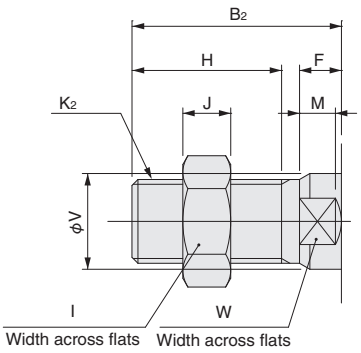
Code / Bore	P1	P2	P3	P4	R	S	T1	U	V	W	X	Y	Z	Applicable through bolt
6 [0.236]	φ3.3 [0.13] (through hole) counter bore φ6 [0.236] (both sides) and M4×0.7 (both sides)	Counter bore φ6 [0.236] and M4×0.7	9.5 [0.374]	3.5 [0.138]	—	19 [0.748]	11 [0.433]	R12	4 [0.157]	3.5 [0.138]	—	—	—	M3
8 [0.315]	φ3.3 [0.13] (through hole) counter bore φ6.2 [0.244] (both sides) and M4×0.7 (both sides)	Counter bore φ6.2 [0.244] and M4×0.7	9.5 [0.374]	3.5 [0.138]	—	21 [0.827]	13 [0.512]	R13.5	5 [0.197]	4 [0.157]	—	—	—	M3
10 [0.394]	φ3.3 [0.13] (through hole) counter bore φ6.2 [0.244] (both sides) and M4×0.7 (both sides)	Counter bore φ6.2 [0.244] and M4×0.7	9.5 [0.374]	3.5 [0.138]	—	23 [0.906]	15 [0.591]	R15	5 [0.197]	4 [0.157]	—	—	—	M3
12 [0.472]	φ4.3 [0.169] (through hole) counter bore φ6.5 [0.256] (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]	—	25 [0.984]	16.3 [0.642]	R16	6 [0.236]	5 [0.197]	—	—	1 [0.039]	M3
16 [0.630]	φ4.3 [0.169] (through hole) counter bore φ6.5 [0.256] (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]	—	29 [1.142]	19.8 [0.780]	R19	8 [0.315]	6 [0.236]	—	—	1 [0.039]	M3
20 [0.787]	φ4.3 [0.169] (through hole) counter bore φ6.5 [0.256] (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]	—	34 [1.339]	24 [0.945]	R22	10 [0.394]	8 [0.315]	—	—	1 [0.039]	M3
25 [0.984]	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]	—	40 [1.575]	28 [1.102]	R25	12 [0.472]	10 [0.394]	—	—	1 [0.039]	M4
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]	44 [1.732]	34 [1.339]	R29.5	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]	52 [2.047]	40 [1.575]	R35	16 [0.630]	14 [0.551]	15 [0.591]	13.6 [0.535]	1.6 [0.063]	M5

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

● **ϕ6 [0.236] ～ ϕ 25 [0.984]**



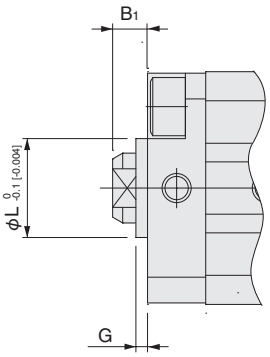
● **ϕ32 [1.260] • ϕ 40 [1.575]**



Bore \ Code	B2	F	H	I	J	K2	M	V	W
6 [0.236]	15 [0.591]	5 [0.197]	8 [0.315]	5.5 [0.217]	1.8 [0.071]	M3×0.5	3 [0.118]	4 [0.157]	3.5 [0.138]
8 [0.315]	15 [0.591]	5 [0.197]	8 [0.315]	7 [0.276]	2.4 [0.094]	M4×0.7	3 [0.118]	5 [0.197]	4 [0.157]
10 [0.394]	15 [0.591]	5 [0.197]	8 [0.315]	7 [0.276]	2.4 [0.094]	M4×0.7	3 [0.118]	5 [0.197]	4 [0.157]
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.

Dimensions of Centering Location (mm [in])



Bore \ Code	B1	G	L
16 [0.630]	5.5 [0.217]	1.5 [0.059]	12 [0.472]
20 [0.787]	5.5 [0.217]	1.5 [0.059]	15 [0.591]
25 [0.984]	6 [0.236]	2 [0.079]	17 [0.669]
32 [1.260]	7 [0.276]	2 [0.079]	21 [0.827]
40 [1.575]	7 [0.276]	2 [0.079]	29 [1.142]

●Not available for **ϕ6 [0.236]**, **ϕ8 [0.315]**, **ϕ10 [0.394]** , and **ϕ12 [0.472]**

JIG CYLINDERS C SERIES MOUNTING BRACKETS

Foot Mounting Bracket, Flange Mounting Bracket, Clevis Mounting Bracket

Order Codes of Mounting Bracket Only

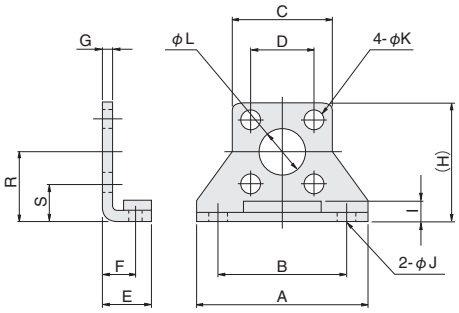
CS – □ – **CDAZ** □

- Bore size **ϕ12 [0.472]** to **ϕ40 [1.575]**[Note4]
- Cylinder type
  - **CDAZ** —— For low friction cylinders
- Mounting brackets
  - **1** —— Foot bracket[Note1]
    - ● Two per set.
  - **3** —— Flange bracket[Note2]
  - **7** —— Clevis bracket[Note3]
- Clean specification

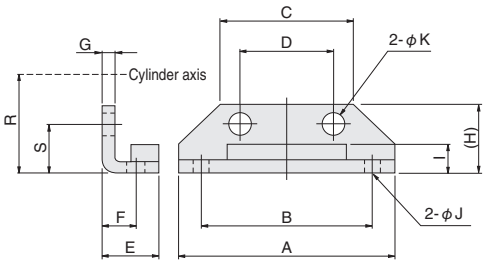
Note 1: Cannot be mounted on a low friction cylinder with a cylinder with spigot joint, which has a ϕ40 [1.575] cylinder bore (**-G**).
Cannot be mounted on a clean specification low friction cylinder with spigot joint, of any cylinder bore (**-G**).
2: Cannot be mounted on the rod side of a low friction cylinder with spigot joint, which has a ϕ40 [1.575] cylinder bore (**-G**).
Cannot be mounted on the rod side of a clean specification low friction cylinder with spigot joint (**-G**), of any cylinder bore.
3: Cannot be mounted on a clean specification low friction cylinder.
4: Not available for cylinder bores ϕ6 [0.236], ϕ8 [0.315], or ϕ10 [0.394].

Dimensions of Foot Mounting Bracket (mm [in])

● **ϕ12 [0.472] · ϕ 16 [0.630]**

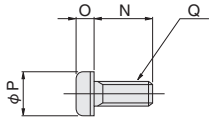


● **ϕ20 [0.787] ～ ϕ 40 [1.575]**



● **Mounting screw (4 attached)**

● **For ϕ 12 [0.472] ～ϕ 40 [1.575]**



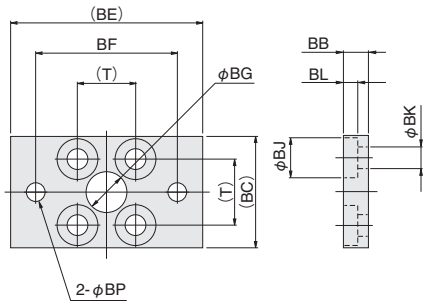
Material: Steel

Bore \ Code	A	B	C	D	E	F	G	H	I	J	K	L	N [lbf]	O	P	Q	R	S	Weight g
12 [0.472]	44 [1.732]	34 [1.339]	25 [0.984]	16.3 [0.642]	12.5 [0.492]	8 [0.315]	2 [0.079]	29.5 [1.161]	4.5 [0.177]	4.5 [0.177]	5.5 [0.217]	11 [0.433]	12 (12, 22) [0.472 (0.472, 0.866)]	2.7 [0.106]	9.5 [0.374]	M5	17 [0.669]	8.9 [0.350]	50 (54) [1.764 (1.905)]
16 [0.630]	48 [1.890]	38 [1.496]	29 [1.142]	19.8 [0.780]	13 [0.512]	8 [0.315]	2 [0.079]	33.5 [1.319]	4.5 [0.177]	4.5 [0.177]	5.5 [0.217]	11 [0.433]	12 (12, 22) [0.472 (0.472, 0.866)]	2.7 [0.106]	9.5 [0.374]	M5	19 [0.748]	9.1 [0.358]	62 (66) [2.187 (2.328)]
20 [0.787]	54 [2.126]	44 [1.732]	34 [1.339]	24 [0.945]	15 [0.591]	9.2 [0.362]	3.2 [0.126]	16.5 [0.650]	7 [0.276]	4.5 [0.177]	5.5 [0.217]	–	12 (12, 22) [0.472 (0.472, 0.866)]	2.7 [0.106]	9.5 [0.374]	M5	24 [0.945]	12 [0.472]	84 (88) [2.963 (3.104)]
25 [0.984]	64 [2.520]	52 [2.047]	40 [1.575]	28 [1.102]	16.5 [0.650]	10.7 [0.421]	3.2 [0.126]	17.5 [0.689]	6 [0.236]	5.5 [0.217]	6.6 [0.260]	–	14 (14, 25) [0.551 (0.551, 0.984)]	3.3 [0.130]	10.5 [0.413]	M6	26 [1.024]	12 [0.472]	104 (109) [3.7 (3.8)]
32 [1.260]	68 [2.677]	56 [2.205]	44 [1.732]	34 [1.339]	17 [0.669]	11.2 [0.441]	3.2 [0.126]	19 [0.748]	8 [0.315]	5.5 [0.217]	6.6 [0.260]	–	14 (14, 30) [0.551 (0.551, 1.181)]	3.3 [0.130]	10.5 [0.413]	M6	30 [1.181]	13 [0.512]	126 (134) [4.4 (4.7)]
40 [1.575]	78 [3.071]	64 [2.520]	52 [2.047]	40 [1.575]	18.2 [0.717]	11.2 [0.441]	3.2 [0.126]	19 [0.748]	7 [0.276]	6.6 [0.260]	9 [0.354]	–	20 (20, 35) [0.787 (0.787, 1.378)]	4.4 [0.173]	14 [0.551]	M8	33 [1.299]	13 [0.512]	160 (172) [5.6 (6.1)]

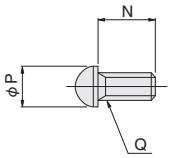
Remarks: Values in parentheses are clean specification.
When there are two values in parentheses, the left value is for the head side while the right value is for the rod side.
Note: When mounting for clean specification, remove the dust collection cover fixing bolt (1), and secure with the mounting screw that comes with the bracket.

Dimensions of Flange Mounting Bracket (mm [in])

● **ϕ12 [0.472] · ϕ 16 [0.630]**

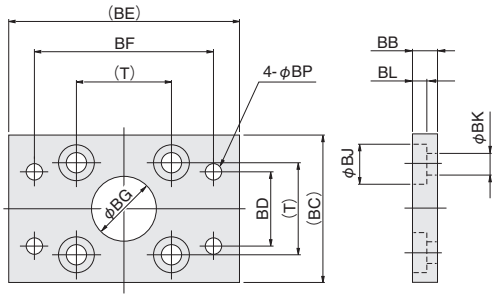


● **Mounting screw[Note]**
For ϕ 12 [0.472] ~ ϕ 40 [1.575]



Note: Low friction cylinders are those below.
ϕ12 [0.472], ϕ16 [0.630]: Two screws attached
ϕ20 [0.787] to ϕ40 [1.575]: Four screws attached
For clean specification low friction cylinders, two screws for the rod side (all sizes) are attached, and two screws for the head side.

● **ϕ20 [0.787] ~ ϕ 40 [1.575]**



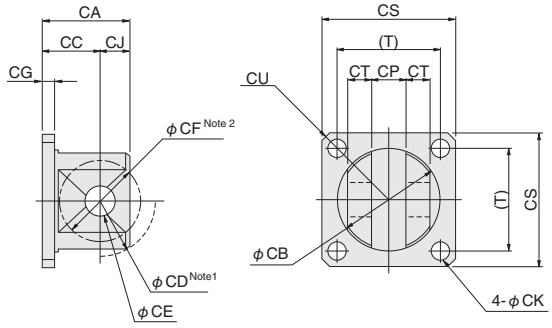
Material: Steel

Bore \ Code	N	P	Q	T	BB	BC	BD	BE	BF	BG	BJ	BK	BL	BP	Weight g
12 [0.472]	12 (12, 22) [0.472 (0.472, 0.866)]	9.5 [0.374]	M5	16.3 [0.642]	6 [0.236]	28 [1.102]	—	50 [1.969]	38 [1.496]	11 [0.433]	10 [0.394]	5.5 [0.217]	3.6 [0.142]	4.5 [0.177]	55 (60) [1.940 (2.116)]
16 [0.630]	12 (12, 22) [0.472 (0.472, 0.866)]	9.5 [0.374]	M5	19.8 [0.780]	6 [0.236]	32 [1.260]	—	54 [2.126]	42 [1.654]	11 [0.433]	10 [0.394]	5.5 [0.217]	3.6 [0.142]	4.5 [0.177]	71 (76) [2.504 (2.681)]
20 [0.787]	12 (12, 22) [0.472 (0.472, 0.866)]	9.5 [0.374]	M5	24 [0.945]	6 [0.236]	36 [1.417]	24 [0.945]	58 [2.283]	46 [1.811]	15 [0.591]	10 [0.394]	5.5 [0.217]	3.6 [0.142]	4.5 [0.177]	101 (106) [3.6 (3.7)]
25 [0.984]	14 (14, 25) [0.551 (0.551, 0.984)]	10.5 [0.413]	M6	28 [1.102]	8 [0.315]	42 [1.654]	28 [1.102]	68 [2.677]	54 [2.126]	17 [0.669]	11 [0.433]	6.6 [0.260]	4.3 [0.169]	5.5 [0.217]	160 (170) [5.6 (6.0)]
32 [1.260]	14 (14, 30) [0.551 (0.551, 1.181)]	10.5 [0.413]	M6	34 [1.339]	8 [0.315]	48 [1.890]	34 [1.339]	72 [2.835]	58 [2.283]	22 [0.866]	11 [0.433]	6.6 [0.260]	4.3 [0.169]	5.5 [0.217]	186 (200) [6.6 (7.1)]
40 [1.575]	20 (20, 35) [0.787 (0.787, 1.378)]	14 [0.551]	M8	40 [1.575]	8 [0.315]	58 [2.283]	40 [1.575]	84 [3.307]	68 [2.677]	28 [1.102]	15 [0.591]	9 [0.354]	5.3 [0.209]	6.6 [0.260]	335 (359) [11.8 (12.7)]

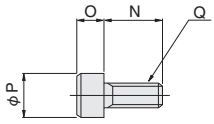
Remarks: Values in parentheses are clean specification.
When there are two values in parentheses, the left value is for the head side while the right value is for the rod side.

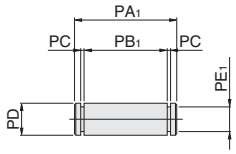
Dimensions of Clevis Mounting Bracket (mm [in])

● **ϕ12 [0.472] ~ ϕ 40 [1.575]**



● **Mounting screw (2 attached)**
For ϕ 12 [0.472] ~ ϕ 40 [1.575]





(Two snap rings attached)

Material: Steel

Bore \ Code	N	O	P	Q	T	CA	CB	CC	CD	CE	CF	CG	CJ	CK	CP	CS	CT	CU	PA_1	PB_1	PC	PD	PE_1	Weight g
12 [0.472]	12 [0.472]	5 [0.197]	8.5 [0.335]	M5	16.3 [0.642]	15 [0.591]	12 [0.472]	11 [0.433]	R7.5	4 [0.157] $^{+0.03}_{0}$	R 5	4 [0.157]	4 [0.157]	5.5 [0.217]	4 [0.157] $^{+0.2}_{+0.1}$	25 [0.984]	3 [0.118]	R16	15 [0.591]	10.6 [0.417]	0.7 [0.028]	4 [0.157]$_{f8}$	2.5 [0.098]	30 [1.058]
16 [0.630]	12 [0.472]	5 [0.197]	8.5 [0.335]	M5	19.8 [0.780]	17 [0.669]	16 [0.630]	12 [0.472]	R10	5 [0.197] $^{+0.03}_{0}$	R 6	4 [0.157]	5 [0.197]	5.5 [0.217]	5 [0.197] $^{+0.2}_{+0.1}$	29 [1.142]	3.5 [0.138]	R19	17 [0.669]	12.6 [0.496]	0.7 [0.028]	5 [0.197]$_{f8}$	3 [0.118]	40 [1.411]
20 [0.787]	12 [0.472]	5 [0.197]	8.5 [0.335]	M5	24 [0.945]	25 [0.984]	22 [0.866]	17 [0.669]	R14	8 [0.315] $^{+0.04}_{0}$	R11	4 [0.157]	8 [0.315]	5.5 [0.217]	8 [0.315] $^{+0.4}_{+0.2}$	34 [1.339]	5.2 [0.205]	R22	24.4 [0.961]	19.6 [0.772]	0.9 [0.035]	8 [0.315]$_{f8}$	6 [0.236]	75 [2.646]
25 [0.984]	16 [0.630]	6 [0.236]	10 [0.394]	M6	28 [1.102]	25 [0.984]	26 [1.024]	17 [0.669]	R16	8 [0.315] $^{+0.04}_{0}$	R11	4 [0.157]	8 [0.315]	6.6 [0.260]	8 [0.315] $^{+0.4}_{+0.2}$	40 [1.575]	5.2 [0.205]	R25	24.4 [0.961]	19.6 [0.772]	0.9 [0.035]	8 [0.315]$_{f8}$	6 [0.236]	100 [3.5]
32 [1.260]	16 [0.630]	6 [0.236]	10 [0.394]	M6	34 [1.339]	29 [1.142]	34 [1.339]	19 [0.748]	R20	10 [0.394] $^{+0.04}_{0}$	R12.5	4 [0.157]	10 [0.394]	6.6 [0.260]	12 [0.472] $^{+0.4}_{+0.2}$	44 [1.732]	8 [0.315]	R29.5	34 [1.339]	29.2 [1.150]	0.9 [0.035]	10 [0.394]$_{f8}$	8 [0.315]	165 [5.8]
40 [1.575]	20 [0.787]	8 [0.315]	13 [0.512]	M8	40 [1.575]	29 [1.142]	34 [1.339]	19 [0.748]	R20	10 [0.394] $^{+0.04}_{0}$	R12.5	4 [0.157]	10 [0.394]	9 [0.354]	12 [0.472] $^{+0.4}_{+0.2}$	52 [2.047]	8 [0.315]	R35	34 [1.339]	29.2 [1.150]	0.9 [0.035]	10 [0.394]$_{f8}$	8 [0.315]	200 [7.1]

Note 1: CD = Swing range of the clevis itself.
2: CF = Maximum allowable swing radius of the opposing bracket.
Remark: Installation is by two bolts.

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

ZE101: Contact type	Without indicator	5 ～ 28 VDC 85 ～ 115 VAC	Horizontal lead wire
ZE102: Contact type	With indicator	10 ～ 28 VDC 85 ～ 115 VAC	Horizontal lead wire
ZE201: Contact type	Without indicator	5 ～ 28 VDC 85 ～ 115 VAC	Vertical lead wire
ZE202: Contact type	With indicator	10 ～ 28 VDC 85 ～ 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	
6~12 [0.236~0.472]	30 [1.181]	10 [0.394]	5 [0.197]
16~40 [0.63~1.575]	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.

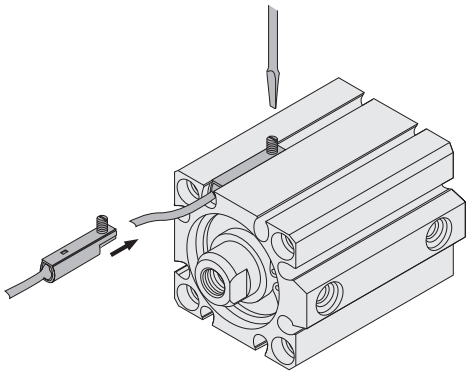
● Reed Switch Type

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 [0.63~1.575]	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 to 0.2 N•m [0.885 to 1.770 in•lbf].



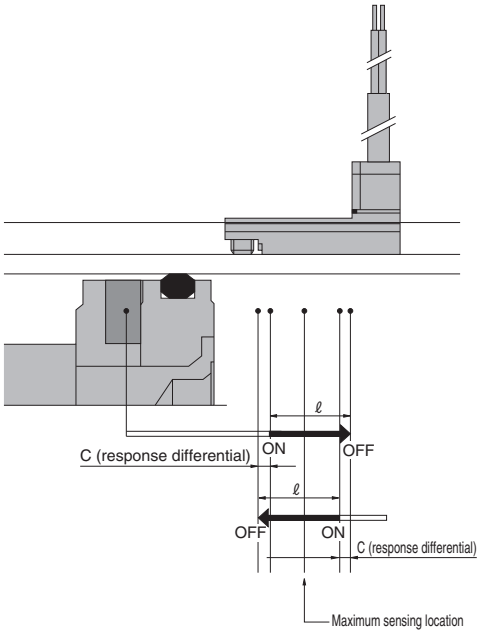
Sensor Switch Operating Range, Response Differential, and Maximum Sensing Location

- 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	6 [0.236]	8 [0.315]	10 [0.394]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Operating range: ℓ	1.8~3.0 [0.071~0.118]	1.8~3.0 [0.071~0.118]	2.0~3.2 [0.079~0.126]	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	0.2 [0.008] or less			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]

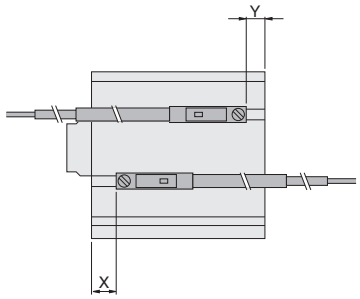
Item \ Bore	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Operating range: ℓ	4.5~8.5 [0.177~0.335]	5.5~9.5 [0.217~0.374]	9~13.5 [0.354~0.531]	10~15.5 [0.394~0.61]	8~12 [0.315~0.472]	8.5~14 [0.335~0.551]
Response differential: C	1.0 [0.039] or less	2.0 [0.079] or less				
Maximum sensing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

● Low friction cylinders



■ Solid State Type

● Double acting type

mm [in]

Code \ Bore	6 [0.236]	8 [0.315]	10 [0.394]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
X	6.5 [0.256]	7.5 [0.295]	8 [0.315]	10 [0.394]	10 [0.394]	15 [0.591]	15 [0.591]	15 [0.591]	16 [0.630]
Y	0.4 [0.016]	0.5 [0.020]	1 [0.039]	6 [0.236]	5 [0.197]	8 [0.315]	9 [0.354]	6 [0.236]	8 [0.315]

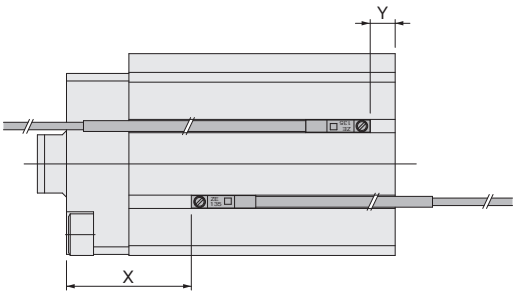
■ Reed Switch Type

● Double acting type

mm [in]

Code \ Bore	6 [0.236]	8 [0.315]	10 [0.394]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
X	—	—	—	5.5 [0.217]	6 [0.236]	10.5 [0.413]	11 [0.433]	11 [0.433]	12 [0.472]
Y	—	—	—	1.5 [0.059]	1 [0.039]	4 [0.157]	5 [0.197]	2 [0.079]	4 [0.157]

● Clean specification low friction cylinders



■ Solid State Type

● Double acting type

mm [in]

Code \ Bore	6 [0.236]	8 [0.315]	10 [0.394]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
X	11.5 [0.453]	12.5 [0.492]	13 [0.512]	20 [0.787]	20 [0.787]	25 [0.984]	25 [0.984]	30 [1.181]	31 [1.220]
Y	0.4 [0.016]	0.5 [0.020]	1 [0.039]	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	6 [0.236]	8 [0.315]	10 [0.394]	12 [0.472]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
X	—	—	—	15.5 [0.610]	16 [0.630]	20.5 [0.807]	21 [0.827]	26 [1.024]	27 [1.063]
Y	—	—	—	1.5 [0.059]	1 [0.039]	4 [0.157]	5 [0.197]	2 [0.079]	4 [0.157]

Safety Precautions (Air Cylinders and General Actuators)

Always read these precautions carefully before use.

Before selecting and using the product, please read all the Safety Precautions carefully to ensure proper product use.
The Safety Precautions shown below are to help you use the product safely and correctly, and to prevent injury or damage to you, other people, and assets beforehand.
Follow the Safety Precautions for: ISO4414 (Pneumatic fluid power—Recommendations for the application of equipment to transmission and control systems), JIS B 8370 (Pneumatic system regulations)

The directions are ranked according to degree of potential danger or damage:
"DANGER!", "WARNING!", "CAUTION!", and "ATTENTION!"

⚠ **DANGER**	Expresses situations that can be clearly predicted as dangerous. If the noted danger is not avoided, it could result in death or serious injury. It could also result in damage or destruction of assets.
⚠ **WARNING**	Expresses situations that, while not immediately dangerous, could become dangerous. If the noted danger is not avoided, it could result in death or serious injury. It could also result in damage or destruction of assets.
⚠ **CAUTION**	Expresses situations that, while not immediately dangerous, could become dangerous. If the noted danger is not avoided, it could result in light or semi-serious injury. It could also result in damage or destruction of assets.
⚠ **ATTENTION**	While there is little chance of injury, this content refers to points that should be observed for appropriate use of the product.

■This product was designed and manufactured as parts for use in General Industrial Machinery.

- In the selection and handling of the equipment, the system designer or other person with fully adequate knowledge and experience should always read the Safety Precautions, Catalog, Owner's Manual and other literature before commencing operation. Making mistakes in handling is dangerous.
- After reading the Owner's Manual, Catalog, etc., always place them where they can be easily available for reference to users of this product.
- If transferring or lending the product to another person, always attach the Owner's Manual, Catalog, etc., to the product where they are easily visible, to ensure that the new user can use the product safely and properly.
- The danger, warning, and caution items listed under these "Safety Precautions" do not cover all possible cases. Read the Catalog and Owner's Manual carefully, and always keep safety first.

⚠ DANGER

- Do not use the product for the purposes listed below:
  1. Medical equipment related to maintenance or management of human lives or bodies.
  2. Mechanical devices or equipment designed for the purpose of moving or transporting people.
  3. Critical safety components in mechanical devices.

  This product has not been planned or designed for purposes that require advanced stages of safety. It could cause injury to human life.
- Do not use the product in locations with or near dangerous substances such as flammable or ignitable substances. This product is not explosion-proof. It could ignite or burst into flames.
- When mounting the product and workpiece, always firmly support and secure them in place. Dropping or falling the product or improper operation could result in injury.
- When mounting the Flat Rodless cylinder, always mount it with an end plate tightened with mounting bolts at 4 counterbore locations (left and right).
  Failure to firmly secure the end plate could result in separation of the connection between the cylinder barrel and the end plate, leading to possible injury.
- Persons who use a pacemaker, etc., should keep a distance of at least 1 meter [3.28ft.] away from the product. There is a possibility that the pacemaker will malfunction due to the strong magnet built into the product.
- Never attempt to remodel the product. It could result in abnormal operation leading to injury, electric shock, fire, etc.
- Never attempt inappropriate disassembly, or assembly of the product relating to its basic inner construction, or to its performance or functions. It could result in injury, electric shock, fire, etc.
- Do not splash water on the product. Spraying it with water, washing it, or using it underwater could result in malfunction of the product leading to injury, electric shock, fire, etc.
- While the product is in operation, avoid touching it with your hands or otherwise approaching too close. In addition, do not make any adjustments to the interior or to the attached mechanisms (shock absorbers, stroke adjusting mechanism, sensor switch mounting location, disconnection of piping tubes or plugs, etc.). The actuator can move suddenly, possibly resulting in injury.
- When operating the product, always install speed controllers, and gradually loosen the needle valve from a choked state to adjust the speed increasing. Failure to make this adjustment could result in sudden movements, putting lives at risk.
- Do not apply loads exceeding the allowable buckling and bending strength to piston rod. It could reduce operating life or cause abnormal wearing or other damage to the rod and tube.
- Connect axial center of the piston rod and movement direction of load to surely bring them in line. If not, applying excessive force to the piston rod and tube could cause abnormal wearing or other damage to them.

⚠ WARNING

- Do not use the product in excess of its specification range. Such use could result in product breakdowns, function stop, damage, or drastically reduce the operating life.
- Before supplying air or electricity to the device and before starting operation, always conduct a safety check of the area of machine operation. Unintentional supply of air or electricity could possibly result in electric shock, or in injury caused by contact with moving parts.
- Do not touch the terminals and the miscellaneous switches, etc., while the device is powered on. There is a possibility of electric shock and abnormal operation.
- Do not throw the product into fire.
  The product could explode and/or release toxic gases.
- Do not sit on the product, place your foot on it, or place other objects on it.
  Accidents such as falling could result in injury. Dropping or toppling the product may result in injury, or it might also damage or break it, resulting in abnormal or erratic operation, runaway, etc.
- When conducting any kind of operation for the product, such as maintenance, inspection, repair, or replacement, always turn off the air supply completely and confirm that residual pressure inside the product or in piping connected to the product is zero before proceeding. In particular, be aware that residual air will still be in the air compressor or air storage tank. The actuator could abruptly move if residual air pressure remains inside the piping, causing injury.
- Do not use the actuator for equipment whose purpose is absorbing the shocks and vibrations of mechanical devices. It could break and possibly result in injury or in damage to mechanical devices.
- Avoid scratching the cords for the sensor switch lead wires, etc.
  Letting the cords be subject to scratching, excessive bending, pulling, rolling up, or being placed under heavy objects or squeezed between 2 objects, may result in current leaks or defective continuity that lead to fire, electric shock, or abnormal operation.
- For the cylinder rod bushing, when the bore size is 16mm [0.630in.] or less, avoid applying a lateral load with a cylinder thrust force of 1/40 or

more generated by the nominal pressure, or when the bore size is 20mm [0.787in.] or more, avoid applying a lateral load with a cylinder thrust force of 1/20 or more. Such loads could reduce operating life or cause galling or other damage to the rod and tube.

- Do not subject the sensor switch to an external magnetic field during actuator operation. Unintended movements could result in damage to the equipment or in personal injury.
- Use within the recommended load and specified speed. Use exceeding the recommended load and specified speed could cause unintended movement of the rod and plate, and increase the possibility of damage to equipment or of personal injury.
- Use safety circuits or system designs to prevent damage to machinery or injury to personnel when the machine is shut down due to emergency stop or electrical power failure.
- Use under the conditions described below is subject to regulation under the Japanese High Pressure Gas Safety Law. Violation of this law can result in penalties to individuals or the corporation. Before use, perform procedures mandated by the supervising authorities.
  1. Pressurized gases at gauge pressures of 1MPa [145psi.] or more are used at room temperature. (Acetylene gas and liquefied gas are subject to even stricter standards.)
  2. Compressed air at gauge pressures of 5MPa [725psi.] or more are used. For details, see the Japanese High Pressure Gas Safety Law.
- Install relief valves, etc., to ensure that the actuator does not exceed its specified pressure when such pressure is rising due to external forces on the actuator. Excessive pressure could lead to breakdown and damage.
- In initial operations after the equipment has been idle for 48 hours or more, or has been in storage, there is a possibility that contacting parts may stick, resulting in equipment operation delays or sudden movements. For these initial operations, always run a test operation before use to check that operating performance is normal.

⚠ CAUTION

- Always wash your hands thoroughly after coming into contact with the grease used in the Low Speed Cylinders. If you light a cigarette with greasy hands, grease adhering to the cigarette could release toxic gases along with the cigarette smoke.
- Do not apply lubrication to the Low Speed Cylinders. Supplying oil could result in erratic operation.
- Do not use the product in locations that are subject to direct sunlight (ultraviolet rays), dust, salt, iron powder, high humidity, or in the ambient atmospheres that include organic solvents, phosphate ester type hydraulic oil, sulphur dioxide, chlorine gas, acids, etc. It could lead to an early shutdown of some functions or a sudden degradation of performance, and result in a reduced operating life. For the materials used, see Major Parts and Materials.
- When installing the product, leave room for adequate working space around it. Failure to ensure adequate working space will make it more difficult to conduct daily inspections or maintenance, which could eventually lead to system shutdown or damage to the product.
- For mounting or transport of heavy products, use a lift, supporting tool, or several people, to provide firm support, and proceed with due caution to ensure personal safety.
- Do not bring floppy disks or magnetic media, etc., within 1 meter [3.28ft.] of the product. There is the possibility that the data on the floppy disks will be destroyed due to the magnetism of the magnet.
- Do not use the sensor switch in locations subject to large electrical currents or strong magnetic fields. It could result in erratic operation. In addition, do not use magnetized materials in the mounting bracket. The magnetism could leak, possibly resulting in erratic operation.
- Do not place too closely to magnets. Placing near magnets or in locations subject to large magnetic fields can magnetize the main body or table, resulting in erratic operation of sensor switches or in other operating problems caused by metal powders sticking to parts.
- Never use other companies' sensor switches with these products. It could possibly cause erratic operation or out of control.
- Do not scratch, dent, or deform the actuator by climbing on the product, using it as a scaffold, or placing objects on top of it. It could result in damaged or broken a product that results in operation shutdown or degraded performance.
- Always post an "operations in progress" sign for installations, adjustments, or other operations, to avoid unintentional supplying of air, electrical power, etc. Such accidental supplies may cause electric shock or sudden activation of the product that could result in physical injury.
- Do not pull on the cords of the lead wires, etc., of the sensor switches mounted on the actuators, grab them when lifting or carrying, or place heavy objects or excessive loads on them. Such action could result in current leaks or defective continuity that lead to fire, electric shock, or abnormal operation.

⚠ ATTENTION

- When considering the possibility of using this product in situations or environments not specifically noted in the Catalog or Owner's Manual, or in applications where safety is an important requirement such as in an airplane facility, combustion equipment, leisure equipment, safety equipment, and other places where human life or assets may be greatly affected, take adequate safety precautions such as an application with enough margins for ratings and performance or fail-safe measure.
  Be sure to consult us about such applications.
- Always check the catalog and other reference materials for product wiring and plumbing setup.
- Use a protective cover, etc., to ensure that human bodies do not come into direct contact with the operating portion of mechanical devices, etc.
- Do not control in a way that would cause workpieces to fall during power failure. Take control measures so that they prevent the table or workpieces, etc., from falling during power failure or emergency stop of the mechanical devices.
- When handling the product, wear protective gloves, safety glasses, safety shoes, etc., to keep safety.
- When the product can no longer be used, or is no longer necessary, dispose of it appropriately as industrial waste.
- Pneumatic equipment can exhibit degraded performance and function over its operating life. Always conduct daily inspections of the pneumatic equipment, and confirm that all requisite system functions are satisfied, to prevent accidents from happening.
- For inquiries about the product, contact your nearest Koganei sales office or Koganei overseas department. The address and telephone number is shown on the back cover of this catalog.

⚠ OTHERS

- Always observe the following items.
  1. When using this product in pneumatic systems, always use genuine KOGANEI parts or compatible parts (recommended parts).
  When conducting maintenance and repairs, always use genuine KOGANEI parts or compatible parts (recommended parts). Always observe the required methods.
  2. Do not attempt inappropriate disassembly or assembly of the product relating to basic configurations, or its performance or functions.

  Koganei cannot be responsible if these items are not properly observed.

Design and selection

⚠ Warning

1. Check the specifications.
As use of this component over the specified ranges of voltage, current, temperature, shock, etc., could result in breakdown or abnormal operation, always read the specifications carefully to ensure correct use.

2. Avoid mounting actuators in close proximity.
Mounting 2 or more actuators with sensor switches in close proximity could result in erratic operation of the sensor switches, due to magnetic field interference with the system.
Follow the instructions of each cylinder series when written in the catalog.

3. Caution about sensor switch ON time for positioning detection at intermediate stroke position.
Take caution that if the sensor switch is mounted at an intermediate position of the actuator stroke for detection of the piston travel, the sensor switch actuation time may be too short when the actuator speed is very rapid, so that the load (programmable controller, etc.) may fail to activate.
Maximum cylinder speed for positioning detection

$$V\ (mm/s)\ [in./sec.] = \frac{\text{Sensor switch actuation range (mm) [in.]}}{\text{Time required for activating load (ms)}} \times 1000$$

4. Keep wiring as short as possible.
The solid state sensor switch lead wire length should be within 30m [98ft.] as stipulated in the EN standards. For the reed sensor switch, if the lead wire is long (10m [33ft.] or more), capacitive surges will shorten the operating life of the sensor switch. If long wiring is needed, install the protection circuit mentioned in the catalog. If the load is inductive or capacitive, also install the protection circuit mentioned in the catalog.

5. Avoid repeated or excessive bending or pulling of lead wires.
Applying repeated bending stress or tension force on the lead wire could result in wire breakage.

6. Check for leakage current.
Two-lead wire solid state sensor switches produce leakage current to activate their internal circuits, and the current flows even when in the turned off condition. Check to ensure they satisfy the following inequality.

Input off current of programmable controller > Leakage current

If the above inequality cannot be satisfied, select a 3-lead wire solid state sensor switch, instead. Also note that parallel connection of a total of *n* sensor switches will multiply the amount of leakage current by *n* times.

⚠ Caution

1. Check for sensor switch internal voltage drop.
Series connection of reed sensor switches with indicator lamps or 2-lead wire solid state sensor switches causes increasing internal voltage drop, and the load may fail to activate. A total of *n* sensor switches will lead to *n* times the internal voltage drop. Ensure that the system satisfies the following inequality.

Supply voltage – Internal voltage drop × *n* > Minimum operating voltage for load

In relays with rated voltage of less than 24VDC, check to see whether the above inequality is satisfied, even in the case of *n* = 1. If the above inequality cannot be satisfied, select a reed sensor switch without indicator lamp.

2. Do not use our sensor switches with other companies' actuators.
The sensor switches are designed for use with Koganei actuators. Use with other companies' actuators could lead to abnormal operation.

Installation and adjustment

⚠ Warning

1. Do not subject the sensor switch to an external magnetic field during actuator operation.
Unintended movements could result in damage to the equipment or in personal injury.

⚠ Caution

1. Ensure a safe installation environment for the actuators with sensor switches.
Do not use sensor switches in places where large current or magnetic fields are present. This could lead to unintentional operation. Do not use magnetic material for the mounting brackets. It could result in erratic operation.

2. Install sensor switches in the center of their operating range.
Adjust the mounting position of a sensor switch so that the piston stops in the center of its operating range (the range while the sensor turns ON). Operations can be unstable if mounted at the end of the operating range (at the boundary near ON and OFF). Also be aware that the operating range can vary with changes in temperature.

3. Follow the tightening torque of sensor switches when mounting.
Over-tightening beyond the allowed tightening torque may damage the mounting screws, mounting brackets, sensor switches, etc. In addition, insufficient tightening torque could cause the sensor switch position to be changed, resulting in operation instability.
For the tightening torque, follow the instructions of each cylinder series.

4. Do not carry the actuator grabbing its sensor switch lead wires.
After mounting a sensor switch to an actuator, do not grab and lift the lead wires to carry the actuator. Never do this, as it could result in lead wire disconnections, and could also apply stress to the interior of the sensor switch, resulting in breakage of internal elements.

5. Do not drop switches, or bump them against others.
During handling of switches, do not apply excessive shocks ($294.2 m/s^2$ [30G] or more) such as hitting, dropping, or bumping. In reed sensor switches, the contact reed can be activated unintentionally, causing it to send or break sudden signals. It can also cause changes in the contact interval that lead to changes in sensor switch sensitivity and result in erratic operation. Even if the sensor switch case is undamaged, the inner parts of the sensor switch may suffer breakdown or cause erratic operation.

CAD drawing data catalog is available.

KOGANEI

ACTUATORS GENERAL CATALOG

CYLINDER JOINTS CYLINDER ROD ENDS

CONTENTS

⚠ Caution Before use, be sure to read the “Safety Precautions” on p. 57.

CYLINDER JOINTS

- ●Aligning the axial center and correcting the parallelism can be performed easily.
- ●High machining accuracy for aligning the axial center is not required.
- ●Time taken for installation can be greatly reduced.
- ●The overall shape is simple and small, allowing simple handling.
- ●A dust seal is provided preventing any breakdown due to foreign objects or dust.

Specifications

Model	Applicable cylinder rod thread size	Applicable cylinder and bore size							Maximum thrust of applicable cylinder at 1MPa[145psi.] N [lbf.]	Maximum tensile strength load N [lbf.]	Allowable eccentricity U mm[in.]	Swivel angle
		Pen	Multi	Jig C (male thread specification :- B)	Slim	Twinport	DYNA	JC				
CJ-3×0.5	M3×0.5	6	6	—	—	—	—	—	19.6 [4.4]	3334.3[750]	0.5[0.020]	±5°
CJ-4×0.7	M4×0.7	10	10	—	—	—	—	—	58.8 [13.2]	3334.3 [750]	0.5[0.020]	
CJ-5×0.8	M5×0.8	16	16	12	—	—	—	—	137.3 [30.9]	5884 [1323]	0.5[0.020]	
CJ-6×1	M6×1	—	—	16	16	16	—	—	176.5 [39.7]	5884 [1323]	0.5[0.020]	
CJ□-8×1-□	M8×1	—	—	20	20, 25※	20, 25	—	20	305 [68.6] (475.6 [106.9])※	20594 [4631]	0.5[0.020]	
CJ□-10×1.25-□	M10×1.25	—	—	25	25, 32	25, 32	32	25	780.6 [175.5]	31381.3 [11025]	0.75[0.0295]	
CJ□-12×1.25-□	M12×1.25	—	—	—	—	—	—	—	686.5 [154.3]	449033.3 [11025]	1[0.039]	
CJ□-14×1.5-□	M14×1.5	—	—	32, 40	40, 50, 63	40	40	32, 40	3026.3 [680.3]	449033.3 [11025]	1[0.039]	
CJ□-18×1.5-□	M18×1.5	— —	— —	50, 63	—	—	50 63	50,63	1906.4 [428.6] 3026.3 [680.3]	62762.6 [14112]	1.25[0.0492]	
CJ□-22×1.5-□	M22×1.5	—	—	80	—	—	80	80	4879.7 [1097]	112776.5 [25352]	2[0.079]	
CJ□-26×1.5-□	M26×1.5	—	—	100	—	—	100	100	7624.7 [1714]	122583.1 [27557]	2.5[0.098]	

※: For square rod cylinders.

Order Codes

●For CJ-3×0.5, CJ-4×0.7, CJ-5×0.8, CJ-6×1

CJ — □

Cylinder joint

Thread size
- **3×0.5** —— M3×0.5
- **4×0.7** —— M4×0.7
- **5×0.8** —— M5×0.8
- **6×1** —— M6×1

●For CJ□-8×1～CJ□-26×1.5

CJ — □ — □ — □

Cylinder joint

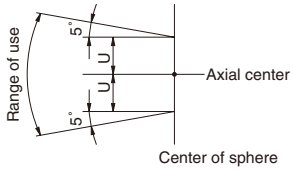
Type
- **S** — Short nose type
- **L** — Long nose type

Mounting bracket
- **Blank** —— No mounting bracket
- **1** —— Foot mounting type
- **3** —— Flange mounting type

Notes: 1. The mounting brackets are included at shipping.
2. The foot mounting bracket cannot be installed on the S-type (short nose type).

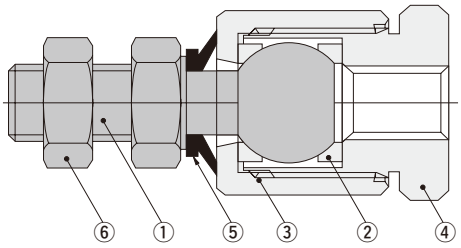
Nominal thread size
- **8×1** —— M 8×1
- **10×1.25** —— M10×1.25
- **12×1.25** —— M12×1.25
- **14×1.5** —— M14×1.5
- **18×1.5** —— M18×1.5
- **22×1.5** —— M22×1.5
- **26×1.5** —— M26×1.5

Allowable Eccentricity and Swivel Angle



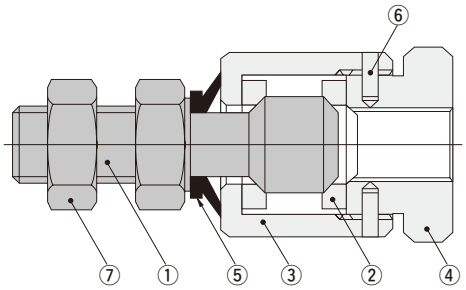
Inner Construction, Major Parts and Materials

●CJ-3 ×0.5, CJ-4 ×0.7, CJ-5 ×0.8



No.	Parts	Materials	Remarks
①	Stud	Steel	Nickel plated
②	Ring	Steel	—
③	Case	Brass	Nickel plated
④	Socket	Brass	
⑤	Dust seal	Synthetic rubber	NBR
⑥	Nut	Mild steel	Zinc plated

●CJ-6 ×1～CJ□-14 ×1.5

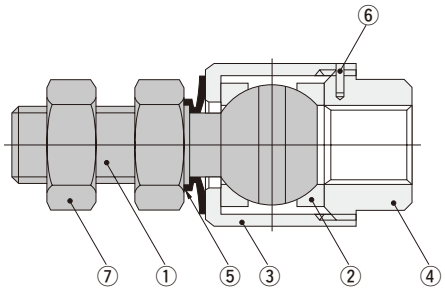


The diagram shows CJ□-8×1～14×1.5.

No.	Parts	Materials	Remarks
①	Stud	Steel	Nickel plated
②	Ring	Special steel	—
③	Case	Steel (Brass)	Nickel plated
④	Socket	Steel (Brass)	
⑤	Dust seal	Synthetic rubber	NBR
⑥	Pin	Special steel	It is not available in CJ-6×1.
⑦	Nut	Mild steel	Zinc plated

Note: Inside the parentheses, "( )" is for CJ-6×1.

●CJ□-18 ×1.5～CJ□-26 ×1.5



No.	Parts	Materials	Remarks
①	Stud	Steel	Nickel plated
②	Ring	Special steel	—
③	Case	Steel	Nickel plated
④	Socket	Steel	Nickel plated
⑤	Dust seal	Synthetic rubber	NBR
⑥	Pin	Special steel	—
⑦	Nut	Mild steel	Zinc plated

Mass

kg [oz.]

Item \ Size	3×0.5	4×0.7	5×0.8	6×1
Cylinder joint alone	0.011 [0.39]	0.012 [0.42]	0.023 [0.81]	0.025 [0.88]

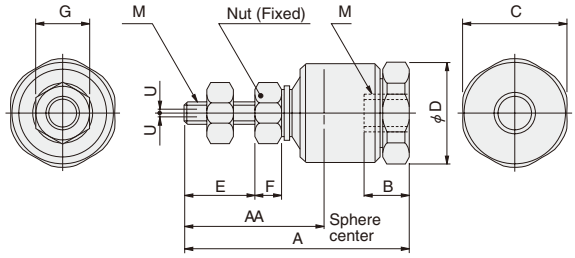
kg [lb.]

Item \ Size	Short nose type (CJS)							Long nose type (CJL)						
	8×1	10×1.25	12×1.25	14×1.5	18×1.5	22×1.5	26×1.5	8×1	10×1.25	12×1.25	14×1.5	18×1.5	22×1.5	26×1.5
Cylinder joint alone	0.05 [0.11]	0.10 [0.22]	0.20 [0.44]	0.21 [0.46]	0.36 [0.79]	0.67 [1.48]	1.27 [2.80]	0.055 [0.121]	0.105 [0.232]	0.213 [0.470]	0.24 [0.53]	0.41 [0.90]	0.75 [1.65]	1.18 [2.60]
With foot mounting bracket	—	—	—	—	—	—	—	0.09 [0.20]	0.17 [0.37]	0.36 [0.79]	0.39 [0.86]	1.00 [2.21]	1.69 [3.73]	2.32 [5.12]
With flange mounting bracket	0.10 [0.22]	0.21 [0.46]	0.26 [0.57]	0.47 [1.04]	0.95 [2.09]	1.93 [4.26]	2.52 [5.56]	0.090 [0.198]	0.165 [0.364]	0.272 [0.600]	0.49 [1.08]	0.95 [2.09]	1.96 [4.32]	2.57 [5.67]

Dimensions (mm)

●CJ-3 ×0.5, CJ-4 ×0.7, CJ-5 ×0.8

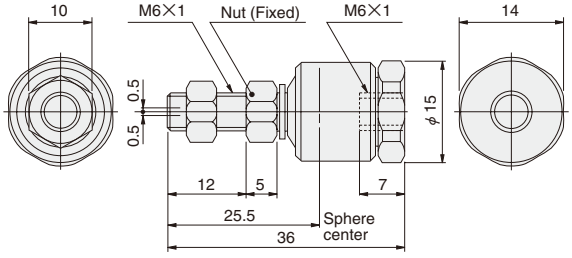
CJ1



Model	M		A	B	C	D	E	F	G	AA	Allowable eccentricity U
	Nominal size	Pitch									
CJ-3×0.5	3	0.5	23	5	12	13	7	2.4	5.5	15.6	0.5
CJ-4×0.7	4	0.7	25.5	5	12	13	8.8	3.2	7	18.1	0.5
CJ-5×0.8	5	0.8	33	7	14	15	10.5	4	8	22.4	0.5

●CJ-6 ×1

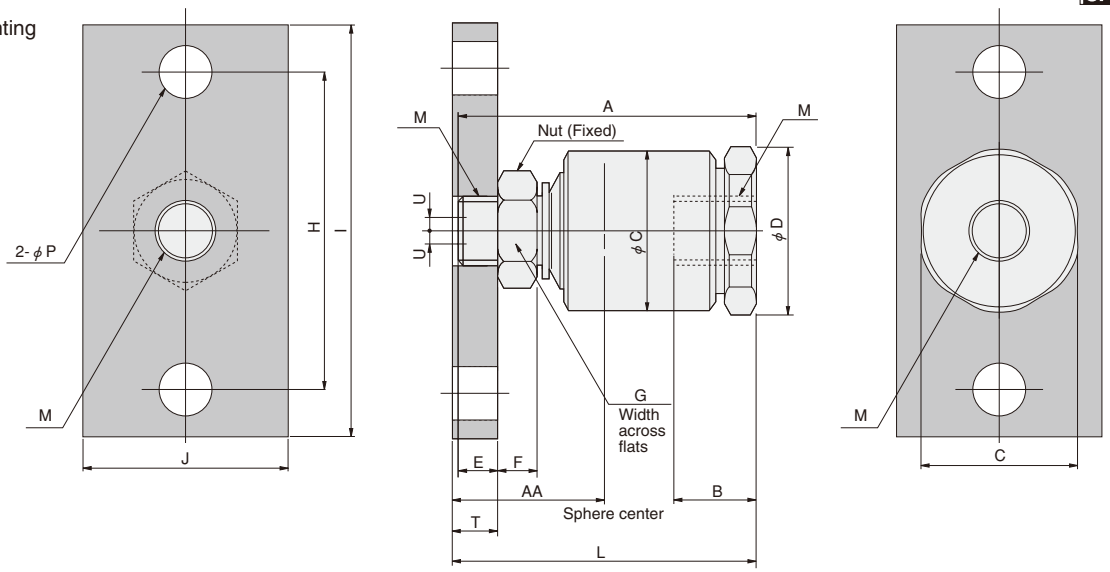
CJ1



●CJS-8 ×1-3,CJS-10 ×1.25-3,CJS-12 ×1.25-3,CJS-14 ×1.5-3

CJ2

Short nose type
(with flange mounting bracket)

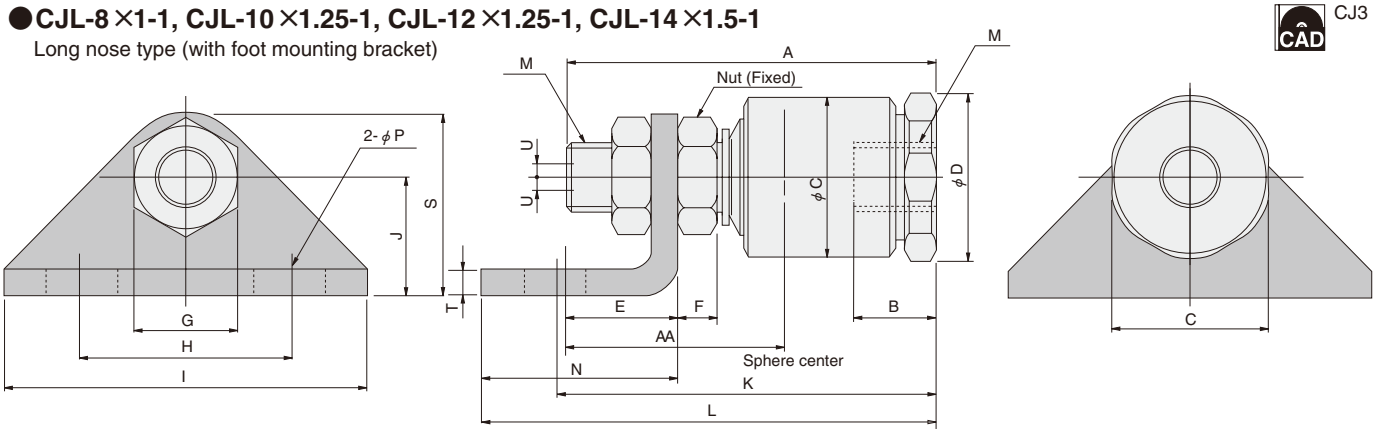


Model	M		Short nose type body							With flange mounting bracket							Allowable eccentricity
	Nominal size	Pitch	A	B	C	D	E	F	G	AA	H	I	J	L	P	T	U
CJS-8×1	8	1	38	10	19	20	4	5	12	22.5	40	52	25	40	7	6	0.5
CJS-10×1.25	10	1.25	48	12	24	25.5	7	6	14	29.5	44	56	32	50	7	9	0.75
CJS-12×1.25	12	1.25	59.5	16	30	32	7	7	17	34.5	44	56	32	61.5	7	9	1.0
CJS-14×1.5	14	1.5	63.5	16	30	32	10	8	19	38.5	60	80	38	65.5	11	12	1.0

●CJL-8 ×1-1, CJL-10 ×1.25-1, CJL-12 ×1.25-1, CJL-14 ×1.5-1

CJ3

Long nose type (with foot mounting bracket)

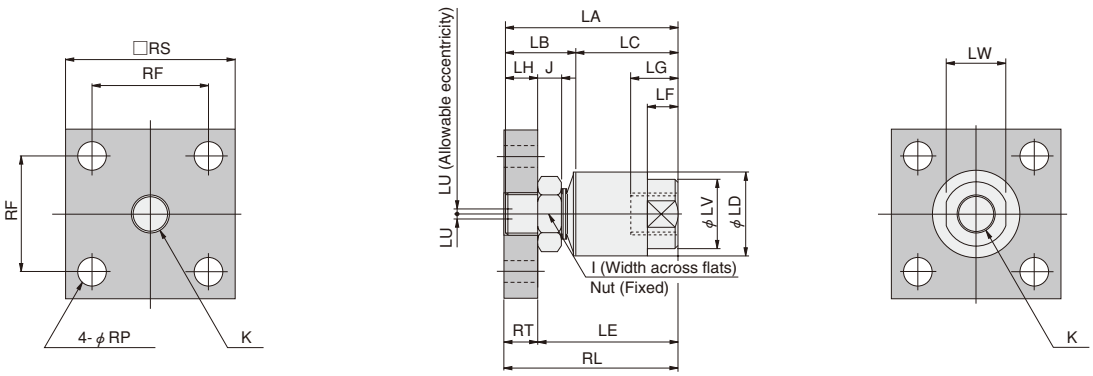


Model	M		Long nose type body							With foot mounting bracket										Allowable eccentricity
	Nominal size	Pitch	A	B	C	D	E	F	G	AA	H	I	J	K	L	N	P	S	T	U
CJL-8×1	8	1	47	10	19	20	13	5	12	30.5	26	44	15	48	59	25	9	23	3.2	0.5
CJL-10×1.25	10	1.25	57	12	24	25.5	16	6	14	37.5	26	44	19	59	71	30	9	29	5	0.75
CJL-12×1.25	12	1.25	70.5	16	30	32	18	7	17	44.5	26	44	19	70.5	82.5	30	9	29	5	1.0
CJL-14×1.5	14	1.5	72.5	16	30	32	19	8	19	46.5	36	64	22	83.5	98.5	45	11	34	6	1.5

Dimensions (mm)

●CJS-18×1.5-3, CJS-22×1.5-3, CJS-26×1.5-3

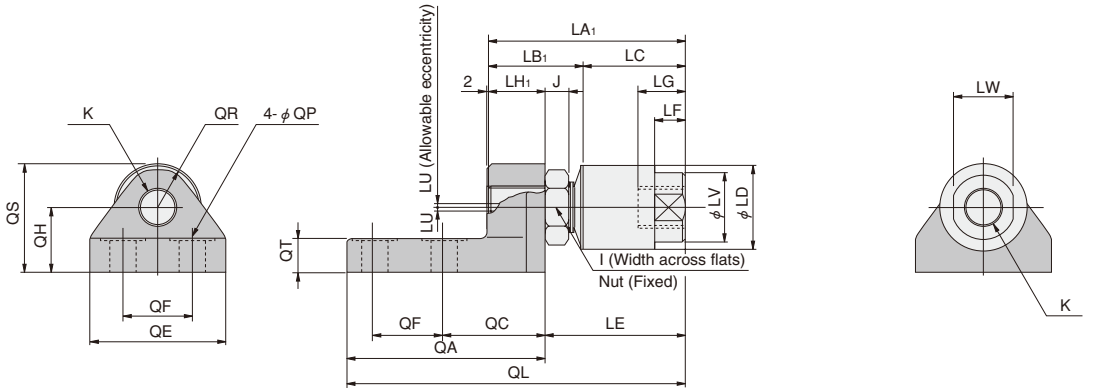
Short nose type (with flange mounting bracket)



Model	Short nose type body														With flange mounting bracket				
	l	J	K	LA	LB	LC	LD	LE	LF	LG	LH	LU	LV	LW	RF	RL	RP	RS	RT
CJS-18×1.5	27	11	M18×1.5	77	31	46	38	64	14	21	13	1.25	29	27	50	79	11	75	15
CJS-22×1.5	32	13	M22×1.5	93	38	55	49	77	16	25	16	2	34	32	62	95	14	100	18
CJS-26×1.5	36	14	M26×1.5	109	44	65	57	90	21	30	19	2.5	44	41	70	111	14	100	21

●CJL-18×1.5-1, CJL-22×1.5-1, CJL-26×1.5-1

Long nose type (with foot mounting bracket)



Model	Long nose type body														With foot mounting bracket								
	l	J	K	LA_1	LB_1	LC	LD	LE	LF	LG	LH_1	LU	LV	LW	QA	QC	QE	QF	QH	QL	QP	QR	QS	QT
CJL-18×1.5	27	11	M18×1.5	88	42	46	38	64	14	21	24	1.25	29	27	89	45	60	32	28	153	11	16	47	14
CJL-22×1.5	32	13	M22×1.5	105	50	55	49	77	16	25	28	2	34	32	99	49	68	36	35	176	14	19	59.5	18
CJL-26×1.5	36	14	M26×1.5	122	57	65	57	90	21	30	32	2.5	44	41	103	53	68	36	42	193	14	21	70.5	21

Handling Instructions and Precautions

- The cylinder joint is for air cylinders. Consult us for any use other than for the air cylinder.
- The cylinder joint stud can rotate, but primarily the cylinder joint is not designed as a rotary joint, so it should not be used as a rotary joint.
- It cannot be used again after disassembled.
- The lubricant has been filled in the body.
- The threaded depth in the cylinder rod socket should be within the value shown in the catalog. As a guide, it should be in a position about 1 or 2 rotations back from where it reaches the bottom.
- Be sure not to let any foreign objects or dust enter inside through the socket female thread before installation.

CYLINDER ROD ENDS

Thread size M3 × 0.5 ~ M26 × 1.5

A flexible motion ensures cylinder functions!

- Eleven types are available by thread size.
  Suitable for ϕ 6 [0.236in.]~ ϕ 100 [3.940in.] bore cylinders.
- Because it uses a fluoro plastic liner, no lubrication is required and it is maintenance free.

Specifications

Item / Model	Thread size	Applicable cylinder and bore size							The max. cylinder thrust of applicable cylinder at 0.97Mpa N [lbf.]	Allowable radial static load N [lbf.]	Mass g [oz.]
		Pen	Multi mount	Jig C (male thread specification :- B)	Slim	Twinport	DYNA	JC			
CRE-3×0.5	M3×0.5	6	6	—	—	—	—	—	27.5 [6.2]	1863.3 [419]	10 [0.35]
CRE-4×0.7	M4×0.7	10	10	—	—	—	—	—	76.5 [17.2]	3334.3 [750]	12 [0.42]
CRE-5×0.8	M5×0.8	16	16	12	—	—	—	—	195.2 [43.9]	5785.9 [1301]	18 [0.63]
CRE-6×1	M6×1	—	—	16	16[Note 1]	16	—	—	305.0 [68.6]	7355.0 [1654]	26 [0.92]
CRE-8×1	M8×1	—	—	20	20, 25[Note 2]	20	—	20	475.6 [106.9]	14121.6 [3175]	45 [1.59]
CRE-10×1.25	M10×1.25	—	—	25	20, 25, 32	25, 32	32	25	780.6 [175.5]	19711.4 [4432]	75 [2.65]
CRE-12×1.25	M12×1.25	—	—	—	—	—	—	—	780.6 [175.5]	23437.9 [5270]	115 [4.06]
CRE-14×1.5	M14×1.5	—	—	32, 40	40, 50, 63	40	40	32, 40	3026.3 [680.3]	25497.3 [5733]	147 [5.19]
CRE-18×1.5	M18×1.5	—	—	50, 63	—	—	50, 63	50, 63	3026.3 [680.3]	31283.2 [7034]	268 [9.45]
CRE-22×1.5	M22×1.5	—	—	80	—	—	80	80	4879.8 [1097]	48641.0 [10934]	452 [15.94]
CRE-26×1.5	M26×1.5	—	—	100	—	—	100	100	7623.7 [1714]	50504.2 [11353]	648 [22.86]

Notes: 1. For the square rod cylinders.
2. Only for the block cylinders.

Order Codes

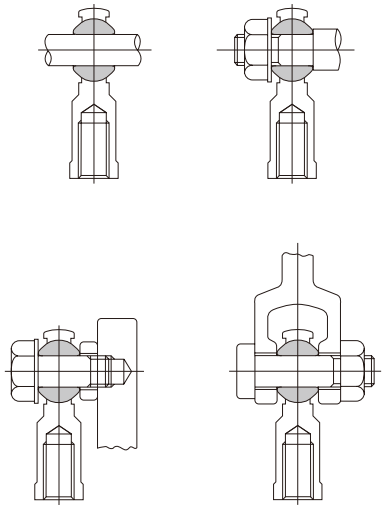
CRE — □

Cylinder rod end

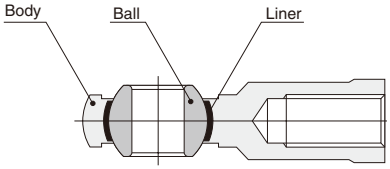
Thread size

3×0.5	M3×0.5	(Hole diameter for pin ϕ 3 [0.118in.])
4×0.7	M4×0.7	(Hole diameter for pin ϕ 4 [0.157in.])
5×0.8	M5×0.8	(Hole diameter for pin ϕ 5 [0.197in.])
6×1	M6×1	(Hole diameter for pin ϕ 6 [0.236in.])
8×1	M8×1	(Hole diameter for pin ϕ 8 [0.315in.])
10×1.25	M10×1.25	(Hole diameter for pin ϕ 10 [0.394in.])
12×1.25	M12×1.25	(Hole diameter for pin ϕ 12 [0.472in.])
14×1.5	M14×1.5	(Hole diameter for pin ϕ 14 [0.551in.])
18×1.5	M18×1.5	(Hole diameter for pin ϕ 18 [0.709in.])
22×1.5	M22×1.5	(Hole diameter for pin ϕ 22 [0.866in.])
26×1.5	M26×1.5	(Hole diameter for pin ϕ 25 [0.984in.])

Mounting Examples



Inner Construction, Major Parts and Materials

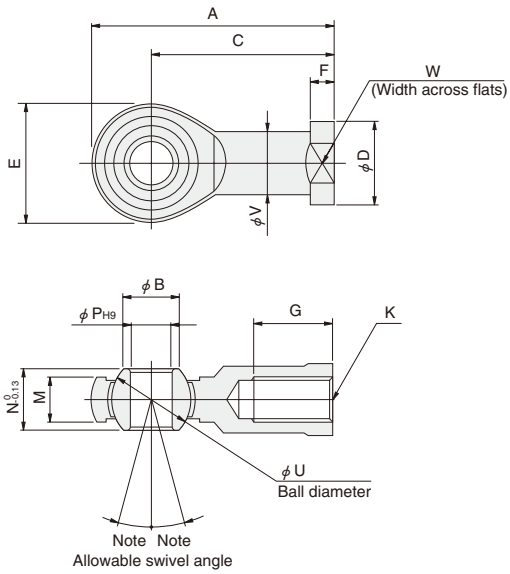


Parts	Materials
Body	Carbon steel (zinc plated)
Ball	Bearing steel (chrome plated)
Liner	Fluoro plastic

Dimensions (mm)

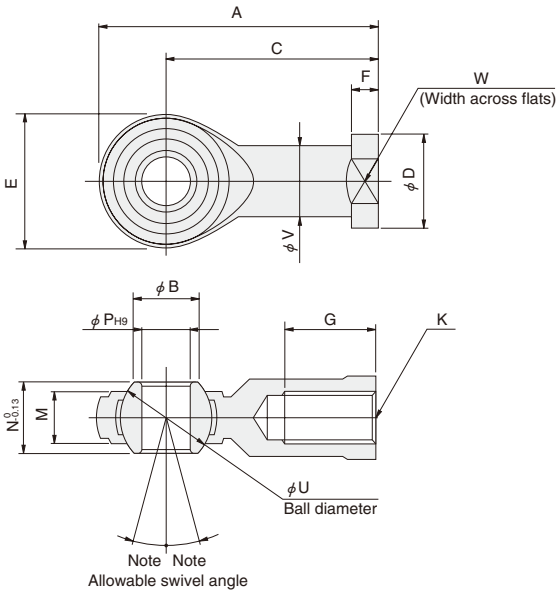
●CRE-3×0.5～10×1.25

RODEND-1



●CRE-12×1.25～26×1.5

RODEND-2

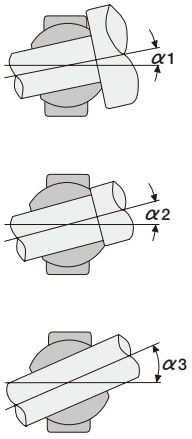


Note: The allowable swivel angle varies depending on the mating shaft. For details, see the table in Handling Instructions and Precautions.

Model / Code	A	B	C	D	E	F	G	K	M	N	P	U	V	W
CRE-3×0.5	27	5.1	20	8	14	3	6	M3×0.5	4.5	6	3	7.938	6.5	7
CRE-4×0.7	32	7.4	24	10	16	3.5	8	M4×0.7	5.2	7	4	9.525	8	8
CRE-5×0.8	35	7.7	27	11	16	4	10	M5×0.8	6	8	5	11.112	9	9
CRE-6×1	39	9	30	13	18	5	12	M6×1	6.7	9	6	12.700	10	11
CRE-8×1	47	10.4	36	16	22	5	16	M8×1	9	12	8	15.875	12.5	14
CRE-10×1.25	56	12.9	43	19	26	6.5	20	M10×1.25	10.5	14	10	19.050	15	17
CRE-12×1.25	65	15.4	50	22	30	6.5	22	M12×1.25	12	16	12	22.225	17.5	19
CRE-14×1.5	74	16.8	57	25	34	8	27	M14×1.5	14	19	14	25.400	20	22
CRE-18×1.5	92	21.8	71	31	42	10	36	M18×1.5	16.5	23	18	31.750	25	27
CRE-22×1.5	109	25.8	84	37	50	12	43	M22×1.5	20	28	22	38.100	30	32
CRE-26×1.5	122	29.6	94	42	56	12	48	M26×1.5	22	31	25	42.863	33.5	36

Handling Instructions and Precautions

- The cylinder rod end is for the air cylinder only. Consult us for any use other than for the air cylinder.
- It cannot be disassembled.
- Because it uses a fluoro plastic liner, no lubrication is required and it is maintenance free.
- The ball rotates in any direction, but do not use the cylinder rod end exceeding allowable swivel angle. Moreover, the allowable swivel angle varies depending on the mating shaft. See the table below.



Allowable swivel angle

Model	α1	α2	α3
CRE-3×0.5	6°	20°	35°
CRE-4×0.7	6°	20°	35°
CRE-5×0.8	8°	13°	30°
CRE-6×1	8°	13°	30°
CRE-8×1	9°	13°	25°
CRE-10×1.25	9°	13°	25°
CRE-12×1.25	9°	13°	25°
CRE-14×1.5	10°	14°	24°
CRE-18×1.5	10°	14°	24°
CRE-22×1.5	10°	15°	23°
CRE-26×1.5	10°	15°	23°