

Scale Cylinder

Series CE1

ø12, ø20, ø32, ø40, ø50, ø63

How to Order

CE1 **L** **32** **200** **Nil** **Nil** **Nil** **Nil** **Nil**

Mounting bracket

B	Double end tapped (standard)
L	Foot type
F	Front flange type
G	Rear flange type
D	Double clevis type

Bore size

12	12mm
20	20mm
32	32mm
40	40mm
50	50mm
63	63mm

Standard cylinder stroke (mm)
Refer to the standard stroke table on page 10.

Cable length

Nil	0.5 m
L	3m

Connector

Nil	With connector
Z	Without connector

Auto switch type

Nil	Without auto switch
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* Refer to the table below for auto switch part numbers.

Number of auto switches

Nil	2pcs.
S	1pc.
3	3pcs.
n	"n" pcs.

Cushion
(applicable bore size ø40 to ø63)

Nil	Double-side cushion
N	Without cushion
R	Front cushion
H	Rear cushion

Applicable counter

Series CEU1
Series CEU5

<Options>

Extension cable **CE1-R** **05** **Nil**

Cable length

05	5m
10	10m
15	15m
20	20m

Cable suffix

Nil	Extension cable
C	Extension cable & connector

Applicable auto switch types

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Rail mounting		Direct mounting		*Lead wire length (m)				Applicable load					
					DC	AC	ø12 to ø63		ø32, ø40 only		0.5 (Nil)	3 (L)	5 (Z)	None (N)						
							Vertical	Lateral	Vertical	Lateral										
Reed switch	-	Grommet	Yes	3 wire (NPN equiv.)	24V	5V	-	-	A76H	A96V	A96	●	●	-	-	IC circuit	-			
								-	A72	A72H	-	-	●	●	-			-	-	-
								-	A73	A73H	-	-	●	●	●			●		
		Connector	No	2 wire	24V	5V, 12V	100V or less	-	-	-	A93V	A93	●	●	-	-	IC circuit	Relay PLC		
										-	A73C	-	-	●	●	●			●	
										-	A80C	-	-	●	●	●			●	
	Diagnostic indication (2 color indicator)	Grommet	Yes	2 wire	24V	-	-	-	-	A79W	-	-	●	●	-	-	-	-		
-									-	-	-	●	●	-	-					
Solid state switch	-	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	-	-	-	F7NV	F79	-	-	●	●	○	-	IC circuit	-	
									-	-	F9NV	F9N	●	●	-	-	-			-
									-	F7PV	F7P	-	-	●	●	○				
		Connector	No	2 wire	24V	12V	-	-	-	-	F9PV	F9P	●	●	-	-	-	-		
										-	F7BV	J79	-	-	●	●			○	-
	Diagnostic indication (2 color indicator)	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	-	-	-	F79C	-	-	●	●	●	●	-	-		
									-	F7NWV	-	F9NWV	F9NW	●	●	○			-	
									-	F79W	-	-	●	●	○	-			IC circuit	
									-	F7PW	-	-	●	●	○	-				
									-	-	F9PWV	F9PW	●	●	○	-			-	
									-	F7BWV	J79W	F9BWV	F9BW	●	●	○				-
Water resistant (2 color indicator)	Grommet	Yes	3 wire (PNP)	24V	12V	-	-	-	F7BA	-	F9BA	-	●	○	-	-	-			
								-	F7NT	-	-	-	●	○	-					
								-	F79F	-	-	●	●	○	-			IC circuit		
								-	F7LF	-	-	●	●	○	-					

* Lead wire length symbol 0.5m Nil (Example) A80C 5m Z (Example) A80CZ
3m L (Example) A80CL None N (Example) A80CN

* Solid state auto switches marked with a "O" are produced upon receipt of order.

* D-F7□WV types are not compatible with Z (5m) products.

* The standard cable length for F7BA, F9BA and F7NT is 3m. D-F7BAL, D-F9BAL, F7NTL

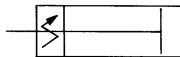
Scale Cylinder *Series CE1*

Cylinder Specifications



Fluid	Air		
Proof pressure	1.5MPa {15.3kgf/cm ² }		
Maximum operating pressure	1.0MPa {10.2kgf/cm ² }		
Minimum operating pressure	ø12	ø20 to ø63	
	0.07MPa {0.71kgf/cm ² }	0.05MPa {0.51kgf/cm ² }	
Piston speed	70 to 500mm/s		
Ambient & fluid temperature	0°C to 60°C (without freezing)		
Humidity	25 to 85% RH (without condensation)		
Lubrication	Non-lube		
Stroke length tolerance range	ø12, ø20: $+1.0_0$	ø32, ø40, ø50, ø63: $+1.6_0$	
Air cushion	ø12, ø20, ø32 without	ø40, ø50, ø63 with	
Thread tolerance	JIS Class 2		
Rod non-rotating accuracy	ø12	ø20	ø32, ø40, ø50, ø63
	±2°	±1°	±0.8°
Mounting	Double end tapped (standard), Foot type, Flange type, Double clevis type		
Auto switch	Reed type, Solid state type		

Symbol



Bracket Part Nos.

Bore size (mm)	*Foot	Flange	Double clevis
12	CQ-L012	CQ-F012	CQ-D012
20	CQ-L020	CQ-F020	CQ-D020
32	CQ-L032	CQ-F032	CQ-D032
40	CQ-L040	CQ-F040	CQ-D040
50	CQ-L050	CQ-F050	CQ-D050
63	CQ-L063	CQ-F063	CQ-D063

Note 1) When ordering foot type brackets, 2pcs. should be arranged for each cylinder.

Note 2) The following parts are included with each mounting bracket.

- Foot, Flange/Body mounting bolts
- Double clevis/Clevis pin, C type snap ring for shaft,
- Body mounting bolts

Auto switch mounting bracket part nos.

Bore size (mm)	Mounting bracket no.	Note	Applicable switch
12 20	BQ-1	<ul style="list-style-type: none"> Switch mounting screw (M3 x 0.5 x 8ℓ) Square nut 	D-A7, A8 D-A7□H, A80H D-A73C, A80C
32 40 50 63	BQ-2	<ul style="list-style-type: none"> Switch mounting screw (M3 x 0.5 x 10ℓ) Switch spacer Switch mounting nut 	D-A79W D-F7□V D-F7, J7 D-J79C D-F7□WV D-F79W, J79W

Sensor Specifications

Cable	ø7, 6-core twisted pair shielded wire (oil, heat & flame resistant cable) (Standard with connector ... made by TAJIMI ELECTRONICS CO., LTD., R04-J8M7.3)	
Transmission distance	23m (when using P/A cable and counter)	
Position detection system	Magnetic scale rod <non-rotating>	Sensor head <cable length 50cm, 3m> <incremental type>
Magnetic resistance	145 gauss	
Power supply	12 to 24VDC (±10%) (power supply ripple: 1% or less)	
Current consumption	40mA	
Resolution	0.1mm/pulse	
Accuracy	±0.2mm ^{Note 1)}	
Output type	Open collector (24VDC, 40mA)	
Output signal	A/B phase difference output	
Insulation resistance	500VDC, 50MΩ or more (between case and 12E)	
Vibration resistance	33.3Hz, 6.8G 2 hrs. each in X, Y directions 4 hrs. in Z direction based upon JIS D1601	
Impact resistance	30G 3 times each in X, Y, Z directions	
Enclosure	IP65 (IEC Standard) ^{Note 2)}	
Extension cable (optional)	5m, 10m, 15m, 20m (Connector ... made by TAJIMI ELECTRONICS CO., LTD., R04-P8F7.3)	

Note 1) This includes the digital display error of the counter (CEU1).

Note 2) The cylinder section does not have a water resistant enclosure.

Standard Strokes

Bore size (mm)	Stroke (mm)											
	25	50	75	100	125	150	175	200	250	300	400	500
12	●	●	●	●	●	●	-	-	-	-	-	-
20	●	●	●	●	●	●	●	●	-	-	-	-
32	-	●	●	●	●	●	●	●	●	●	-	-
40	-	-	-	●	●	●	●	●	●	●	●	●
50	-	-	-	-	-	-	-	●	-	●	-	●
63	-	-	-	-	-	-	-	●	-	●	-	●

* Contact P/A regarding non-standard strokes.

When the bore size is 12mm and the stroke length is 100mm or more, particular care should be taken regarding an offset load on the rod.

Series CE1

Weight Table (without Mounting Bracket/Connector)

Unit: kg (without brackets)

Bore size (mm)	Cylinder stroke (mm)											
	25	50	75	100	125	150	175	200	250	300	400	500
12	0.29	0.33	0.36	0.4	0.43	0.47	–	–	–	–	–	–
20	0.51	0.58	0.65	0.72	0.79	0.86	0.93	1.0	–	–	–	–
32	–	0.94	1.05	1.15	1.26	1.36	1.47	1.58	1.79	2.0	–	–
40	–	–	–	1.7	1.83	1.95	2.08	2.2	2.45	2.7	3.2	3.7
50	–	–	–	–	–	–	–	3.4	–	4.1	–	5.5
63	–	–	–	–	–	–	–	4.2	–	5.0	–	6.6

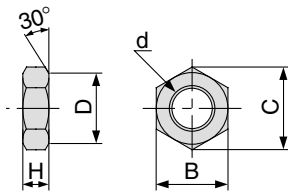
Proper Auto Switch Mounting Position

Refer to p.32 regarding dimensions for the proper auto switch mounting position (stroke end).

Rod End Nut Dimensions

(1pc. is included as standard.)

Materials: ϕ 12, ϕ 20 Steel
 ϕ 32 to ϕ 63 Rolled steel



Part No.	Applicable bore size (mm)	d	H	B	C	D
NTJ-015A	12	M5 x 0.8	4	8	9.2	7.8
NT-02	20	M8 x 1.25	5	13	15.0	12.5
NT-04	32, 40	M14 x 1.5	8	22	25.4	21.0
NT-05	50, 63	M18 x 1.5	11	27	31.2	26

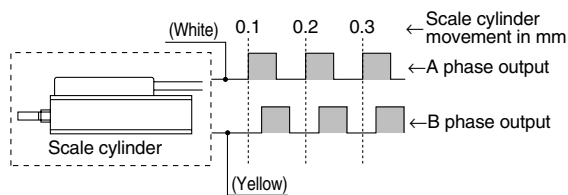
Electrical Wiring

Output type

The output signal of the scale cylinder is A/B phase difference output (open collector output) as shown in the figure below.

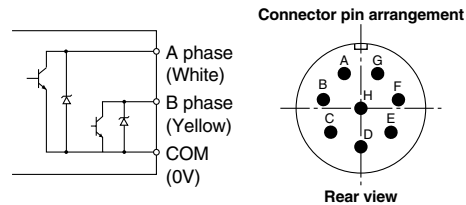
The relation between the movement distance and the signal output of the scale cylinder is that for each 0.1mm of movement a one pulse signal is output to both output terminals A and B.

Furthermore, the maximum response speed of the sensor for the scale cylinder is at a maximum cylinder speed of 1500mm/s (15kcps).



Input/Output

The input/output of the scale cylinder is performed by a ϕ 7 shielded twisted pair wire from the sensor section plus a connector.



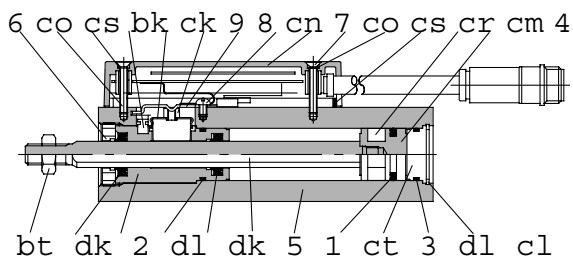
Output circuit of scale cylinder (Brown, Blue)

Signal table

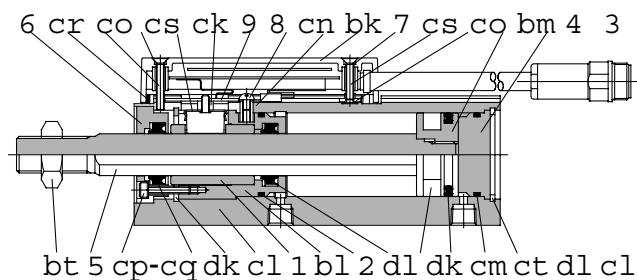
Wire color	Signal name	Connector pin symbol
White	A phase	A
Yellow	B phase	B
Brown, Blue	COM(0V)	C, D
Red	12V, 24V (power supply)	E
Black	0V (power supply)	F
(Shield)	Shield	G

Construction

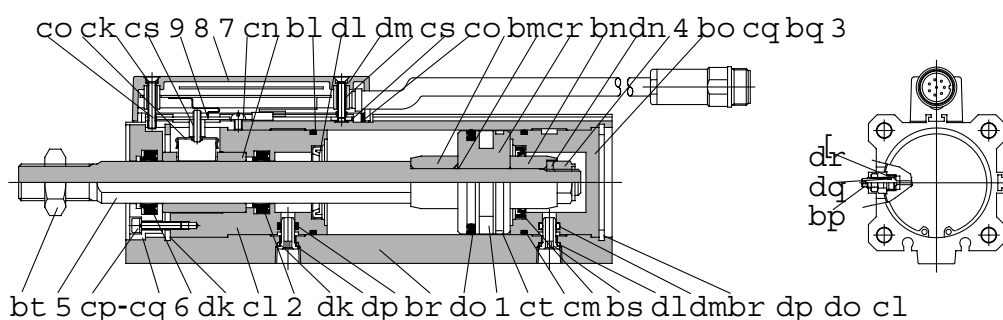
ø12, ø20



ø32



ø40 to ø63



Parts list

No.	Description	Material	Note
1	Cylinder body	Aluminum alloy	
2	Rod cover	Brass	ø12, ø20
		Aluminum alloy	ø32 to ø63
3	Head cover	Aluminum alloy	
4	Piston	Magnetic material	ø12
		Aluminum alloy	ø20 to ø63 (built-in magnet)
5	Piston rod	Stainless steel	
6	Rod cover disk	Aluminum alloy	
7	Sensor unit	—	
8	Sensor setting bracket	Stainless steel	
9	Sensor setting piece assembly	—	ø20 to ø63
10	Pin	Stainless steel	ø12 to ø32
11	Sensor guide	Lead-bronze casting	ø32 to ø63
12	Case setting nut	Carbon steel	ø32 to ø63
13	Cushion ring A	Rolled steel	ø40 to ø63
14	Cushion ring B	Rolled steel	ø40 to ø63
15	Cushion valve	—	ø40 to ø63
16	Piston nut	Rolled steel	ø40 to ø63
17	Port joint	Stainless steel	ø40 to ø63

Parts list

No.	Description	Material	Note
18	Wear ring	Resin	ø40 to ø63
19	Rod end nut	Steel	ø12, ø20
		Rolled steel	ø32 to ø63
20	Sensor setting plate	Cold rolled special steel strip	
21	C type snap ring	Carbon steel	
22	Plastic magnet	—	
23	Cross recessed round head screw	Carbon steel wire	
24	Cross recessed countersunk head screw	Carbon steel wire	
25	Hexagon socket head cap screw	Chrome molybdenum steel	
26	Spring washer	Steel wire	
27	Case gasket	NBR	
28	Case screw gasket	NBR	
29	Piston seal	NBR	
30	Rod seal	NBR	
31	Gasket	NBR	
32	Cushion seal	NBR	
33	Piston gasket	NBR	
34	Port seal	NBR	
35	Joint seal	NBR	
36	Valve seal	NBR	
37	Valve retainer seal	NBR	

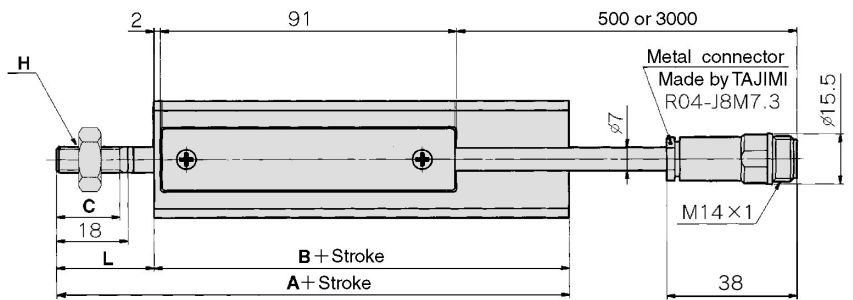
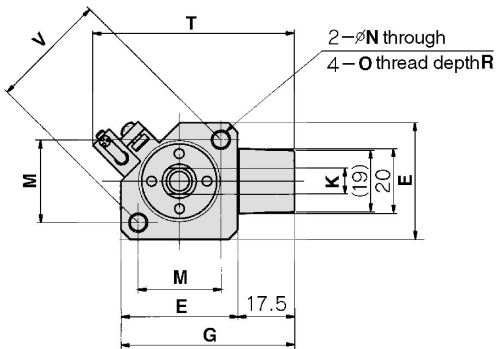
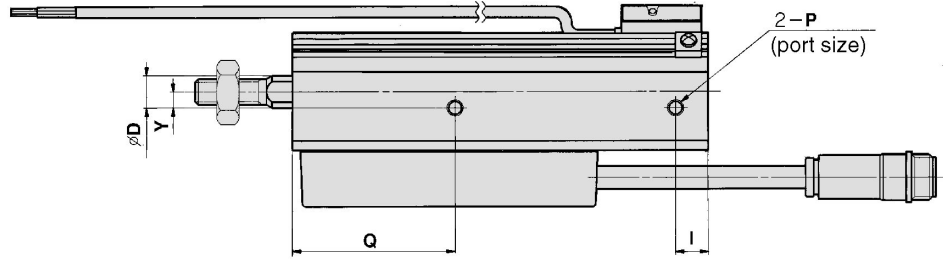
* Since there is a possibility of improper operation, contact P/A regarding the replacement of seals.

Series CE1

Ø12, Ø20/Dimensions

Double end tapped

CE1B Bore size Stroke



												(mm)
Bore size (mm)	Standard stroke	A	B	C	D	E	G	H	I	K	L	M
12	25, 50, 75, 100, 125, 150	94	69	15	6	25	42.5	M5 x 0.8	16	5.2	25	15.5
20	25, 50, 75, 100, 125, 150, 175, 200	106	78	15.5	10	36	53.5	M8 x 1.25	10	8	28	25.5

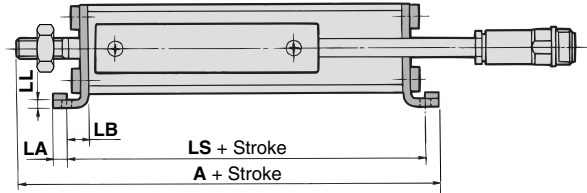
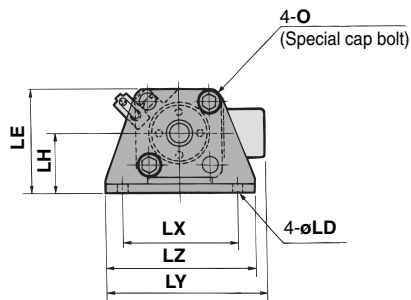
Bore size (mm)	N	O	P	Q	R	*T	V	Y
12	-	M4 x 0.7	M5 x 0.8	47	7	53.5	22	7
20	5.5	M6 x 1	M5 x 0.8	50	15	62.5	36	5

* Refer to page 11 regarding the rod end nut which is included. * Dimensions for auto switch model D-F79W.

Scale Cylinder *Series CE1*

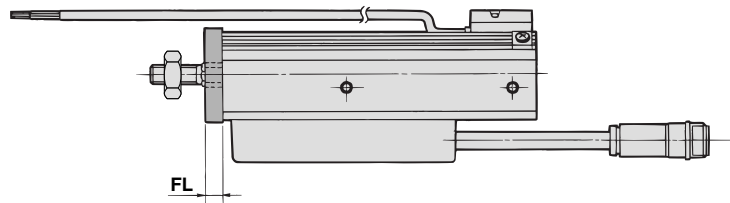
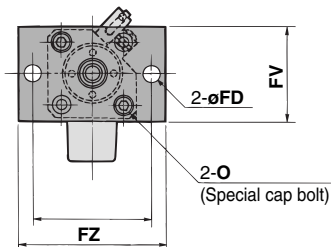
Foot type

CE1L **Bore size** — **Stroke**



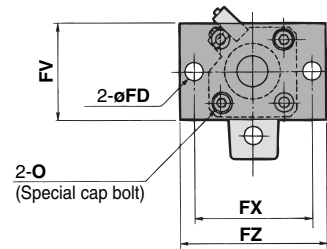
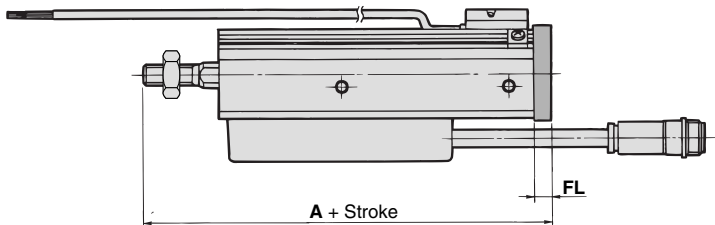
Front flange type

CE1F **Bore size** — **Stroke**



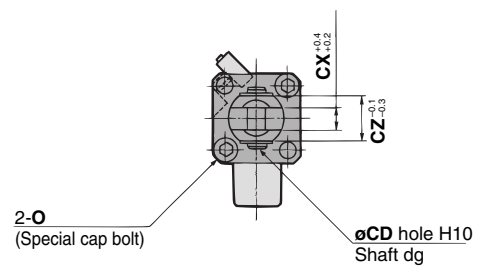
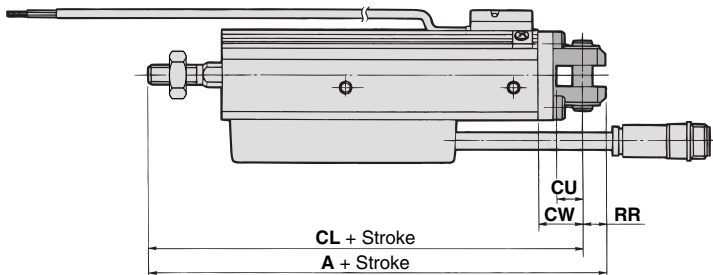
Rear flange type

CE1G **Bore size** — **Stroke**



Double clevis type

CE1D **Bore size** — **Stroke**



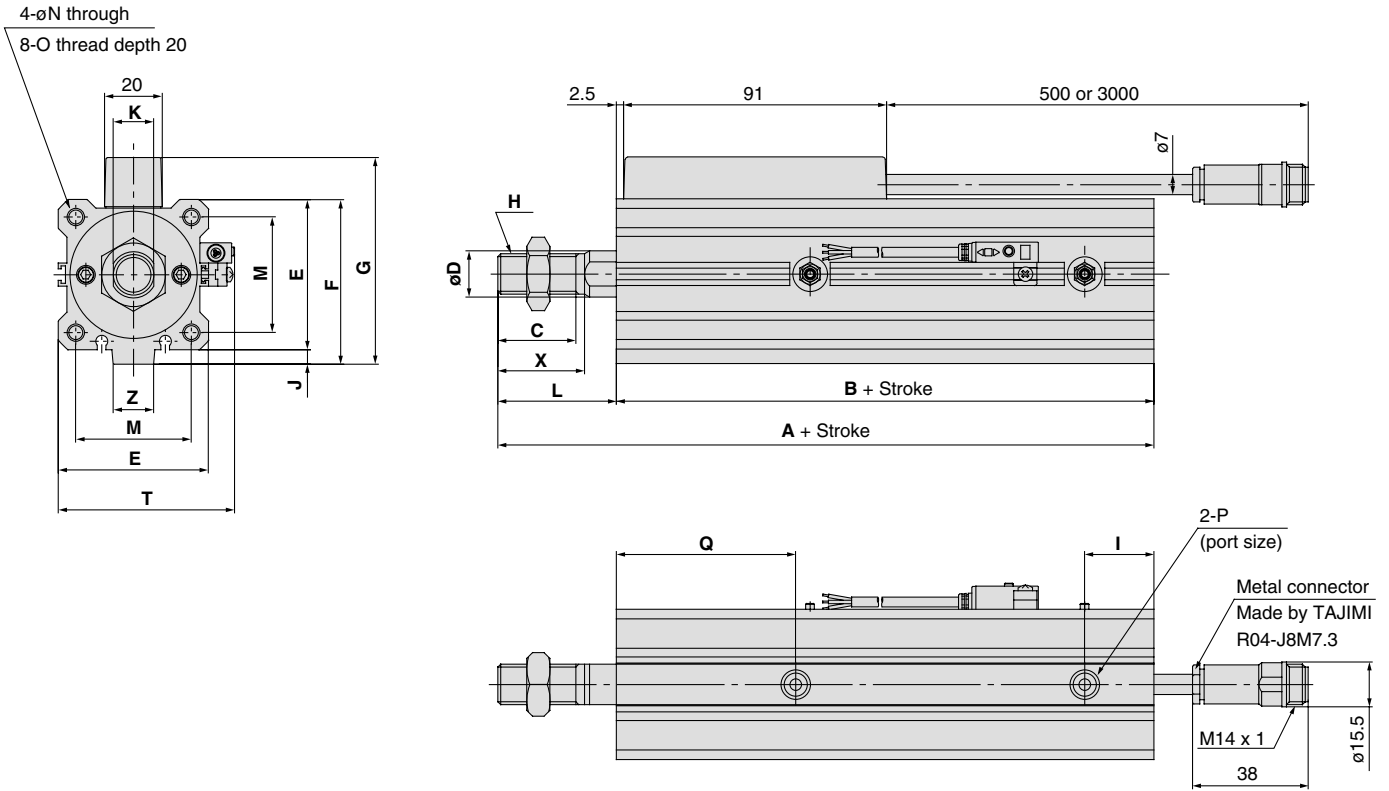
Bore size (mm)	Foot type												Front flange type, Rear flange type					Rear flange type	Double clevis type						
	A	LA	LB	LD	LE	LH	LL	LS	LX	LY	LZ	FD	FL	FV	FX	FZ	A	A	CD	CL	CU	CW	CX	CZ	RR
12	106.5	4.5	8	4.5	29.5	17	2	85	34	52	44	4.5	5.5	25	45	55	99.5	114	5	108	7	14	5	10	6
20	121	5.8	9.2	6.6	42	24	3.2	96.4	48	66.5	62	6.6	8	39	48	60	114	133	8	124	12	18	8	16	9

Series CE1

ø32, ø40, ø50, ø63/Dimensions

Double end tapped

CE1B



Bore size (mm)	Standard stroke	A	B	C	D	E	F	G	H	I	J	K
32	50, 75, 100, 125, 150, 175, 200, 250, 300	131	90	27	16	45	49.5	64	M14 x 1.5	14	4.5	14
40	100, 125, 150, 175, 200, 250, 300, 400, 500	177	136	27	16	52	57	71.5	M14 x 1.5	24	5	14
50	200, 300, 500	193	144	32	20	64	71	85.5	M18 x 1.5	22.5	7	18
63	200, 300, 500	194	145	32	20	77	84	98.5	M18 x 1.5	21	7	18

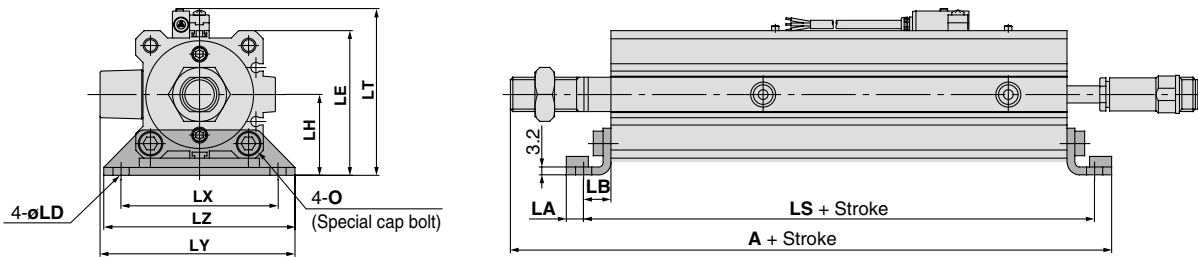
Bore size (mm)	L	M	N	O	P	Q	*T	X	Z
32	41	34	5.5	M6 x 1	Rc(PT) 1/8	56	57.5	30	14
40	41	40	5.5	M6 x 1	Rc(PT) 1/8	62	64.5	30	14
50	49	50	6.6	M8 x 1.25	Rc(PT) 1/4	61.5	76.5	35	19
63	49	60	9	M10 x 1.5	Rc(PT) 1/4	64	89.5	35	19

* Refer to page 11 regarding the rod end nut which is included. * Dimensions for auto switch model D-F79W.

Scale Cylinder *Series CE1*

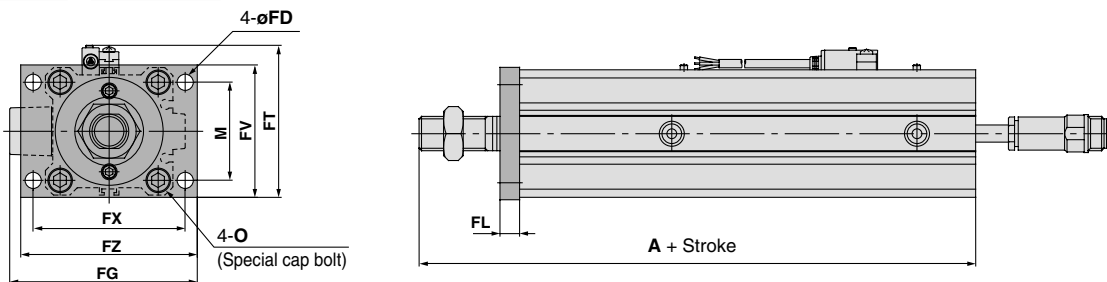
Foot type

CE1L **Bore size** — **Stroke**



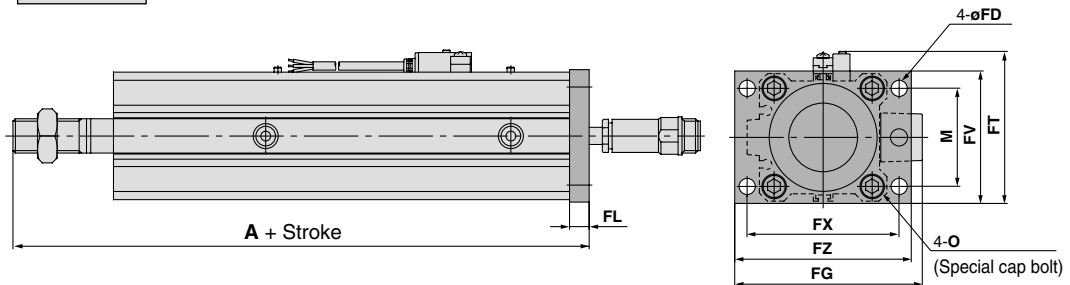
Front flange type

CE1F **Bore size** — **Stroke**



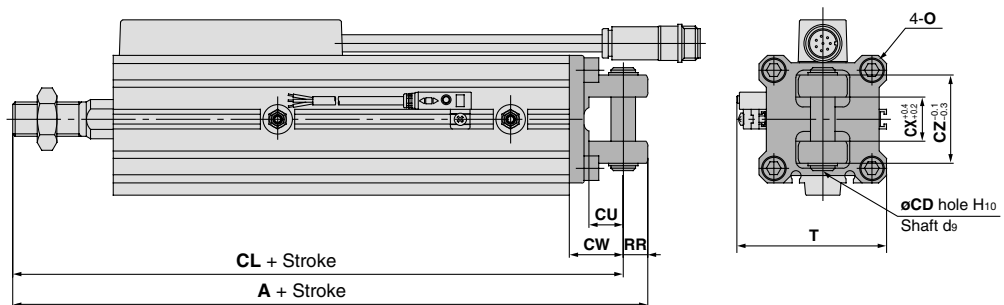
Rear flange type

CE1G **Bore size** — **Stroke**



Double clevis type

CE1D **Bore size** — **Stroke**



Bore size (mm)	Foot type											Front flange type, Rear flange type							Rear flange type	Double clevis type									
	A	LA	LB	LD	LE	LH	LS	*LT	LX	LY	LZ	FD	FG	FL	*FT	FV	FX	FZ	M	A	A	CD	CL	CU	CW	CX	CZ	RR	T
32	148	5.8	11.2	6.6	52.5	30	112.4	65	57	72.5	71	5.5	69.5	8	59	48	56	65	34	139	161	10	151	14	20	18	36	10	57.5
40	195.2	7	11.2	6.6	59	33	158.4	71.5	64	79.5	78	5.5	76.5	8	65.5	54	62	72	40	185	209	10	199	14	22	18	36	10	64.5
50	215.7	8	14.7	9	71	39	173.4	83.5	79	94	95	6.6	91	9	78	67	76	89	50	202	235	14	221	20	28	22	44	14	76.5
63	219.2	9	16.2	11	84.5	46	177.4	97	95	109.5	113	9	107	9	91	80	92	108	60	203	238	14	224	20	30	22	44	14	89.5

* Dimensions for auto switch model D-F79W.