

Achieve rationalization of production lines

A stroke reading cylinder with position feedback

Series CE1

ø12, ø20, ø32, ø40, ø50, ø63

Measurement is possible throughout the full stroke range.

Tolerances of preset values can be set. (CEU1)

Tolerances can be set for preset values.

The home position can be anywhere within the cylinder stroke.

→ When the counter is reset by pressing the cylinder rod to the reference plane, that point becomes the home position.

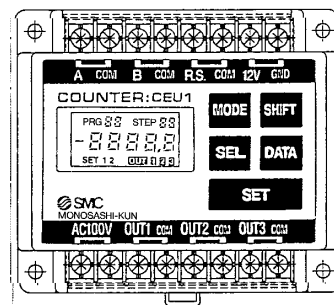
Stroke Reading Cylinder (CE1)



- Resolution: 0.1mm
- Water resistance improved by changing the sensor unit filler

- Power supply voltage 12 to 24V DC
- Numerous stroke variations
- Improved noise resistance

3 Point Preset Counter (CEU1)



- Output terminal: 3 points
- DIN rail mountable
- Hold output, Comparison output, One shot output

Series Guide

Series CE1

Bore size (mm)	Standard stroke (mm)										Available stroke range		
	25	50	75	100	125	150	175	200	250	300		400	500
12	●	●	●	●	●	●							25 to 150
20	●	●	●	●	●	●	●						25 to 300
32		●	●	●	●	●	●	●					25 to 400
40				●	●	●	●	●	●	●	●		25 to 600
50								●		●		●	25 to 600
63								●		●		●	25 to 600

CEU1

Power supply voltage	Output transistor system	
	NPN	PNP
100V AC	●	●
24V DC	●	●

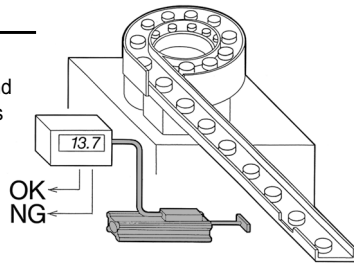
Extension cable

Cable length (m)			
5	10	15	20
●	●	●	●

Applications

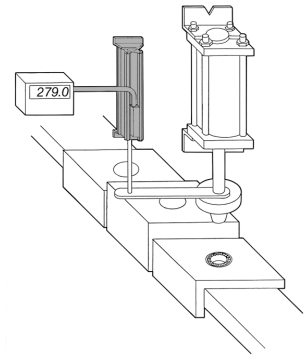
Parts inspection

Measures part dimensions, differentiates between good and defective articles, and prevents the mingling of different parts, etc.



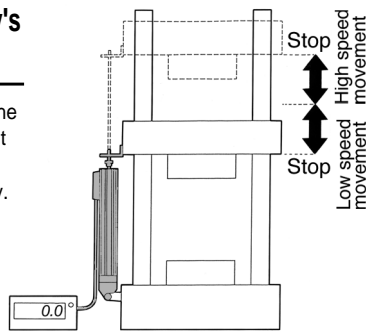
Confirmation of press-fit

Can confirm the press-fit of a hydraulic cylinder by detecting its stroke. Even if the size of the work piece changes, the point of press-in completion can be easily changed.



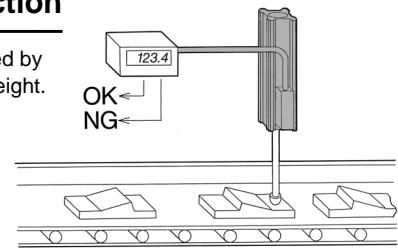
Detection of die assembly's deceleration point

Since the deceleration point of the die assembly can be set at will, it can be easily changed after replacement of the die assembly.



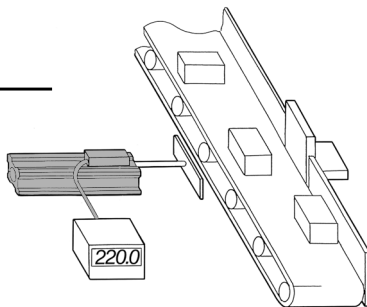
Identifying direction

Direction can be identified by measuring work piece height.



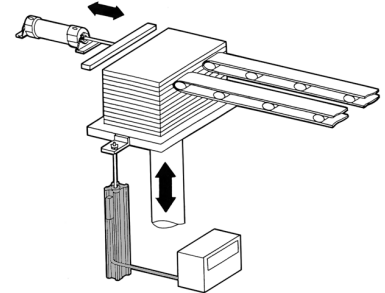
Length/breadth Positioning

Straightening of work piece positions is performed at the same time that longitudinal or transverse orientation is distinguished.



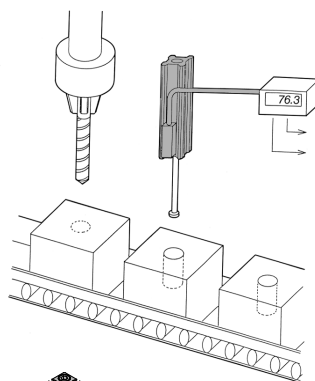
Detection of lifter position

Can continuously monitor a lifter's stroke.



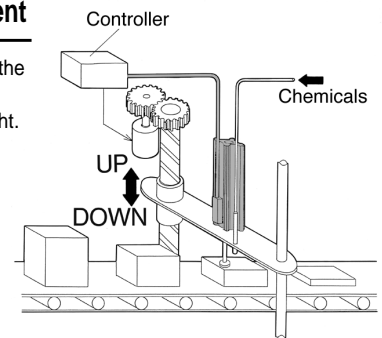
Inspection of machined holes

Can detect machined hole depth, burrs and foreign matter, etc.



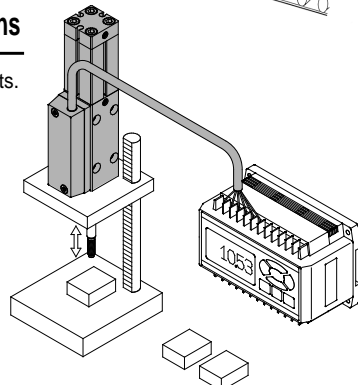
Nozzle height adjustment

Maintains a constant height of the nozzle from the work piece by measuring the work piece height.



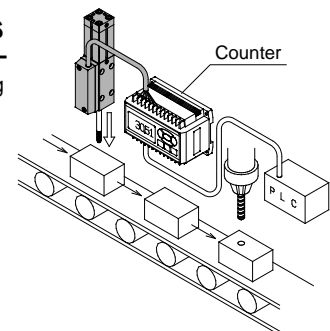
Measurement of dimensions

Can measure dimensions of parts.



Measurement of machining dimensions

Performs adjustment of machining depth, etc. by measuring the part dimensions before machining.



MK/MK2

RSQ/RSG

RSH

CE1

CE2

ML2B

ML1C

REA

REC

RHC

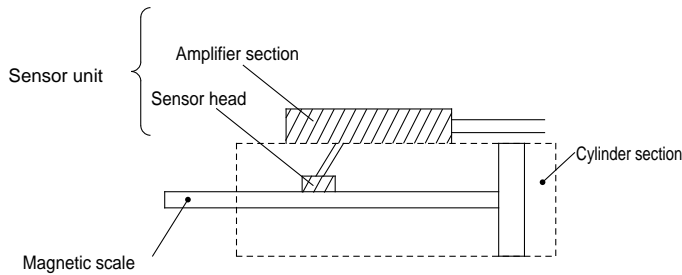
MTS

CC

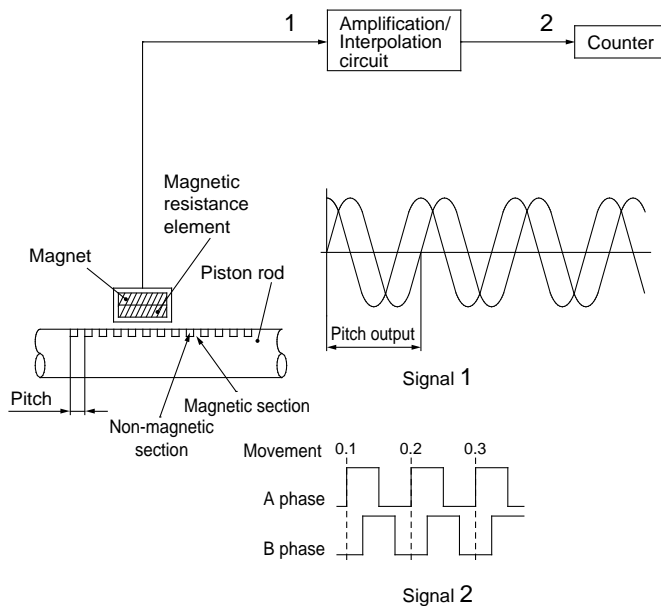
Series CE1

Measurement Principles

The amount of rod movement in the stroke reading cylinder is detected using an MR element (magnetic resistance element) whose resistance value changes due to magnetic force. The detection unit containing this MR element is called the sensor head. An amplifying circuit and a dividing circuit are required to produce output which can be read by the counter, and these are accommodated in the case on the cylinder. The sensor head and amplifier section together are referred to as the sensor unit.



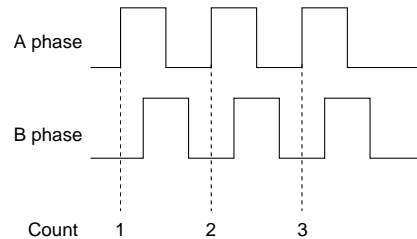
The stroke reading cylinder is equipped with the capability of outputting the piston stroke movement as a pulse signal. The measurement principles are shown in the drawing below.



- ① A scale of magnetic layers and non-magnetic layers with a pitch of 0.8mm is cut into the piston rod.
- ② With movement of the piston rod, a sin, cos 2-phase signal (Signal 1) is received by the magnetic resistance element. For this wave form, 1 pitch (0.8mm) becomes exactly 1 cycle.
- ③ This is amplified and divided into 1/8 parts. As a result, a 90° phase difference pulse signal of 0.1mm/pulse (Signal 2) is output.
- ④ By measuring this pulse signal with the counter, it is possible to detect the piston position with a resolution of 0.1mm.

A/B Phase Difference Output (90° phase difference output)

When movement is expressed by a single line of pulses, it is impossible to accurately identify the current position, because pulse waves appear in both upward and downward directions. Accordingly, in A/B phase difference output, two lines of pulses are provided, wherein one line detects the movement and the other distinguishes the direction.



Counting Speed (kHz, kcps)

Counting speed indicates the number of pulses that can be counted per second. If the scale cylinder is operated at high speeds, pulse waves are output in shorter cycles. The counting speed of the counter must be higher than the pulse speed for the maximum piston speed when operating. Since the stroke reading cylinder outputs one pulse for each 0.1mm of movement, 5,000 pulses will be output for each 500mm of movement. Therefore, a speed of 500mm/s is equivalent to 5kcps (kHz), but a counting speed 2 to 3 times greater is recommended for actual operation.

Accuracy

The accuracy is the difference between the dimensions based upon the signals of the stroke reading cylinder and the absolute dimensions.

The maximum display error that will appear on the counter's digital display is equal to twice (± 1 count) the resolution when the home position is reset and when dimensions are measured.



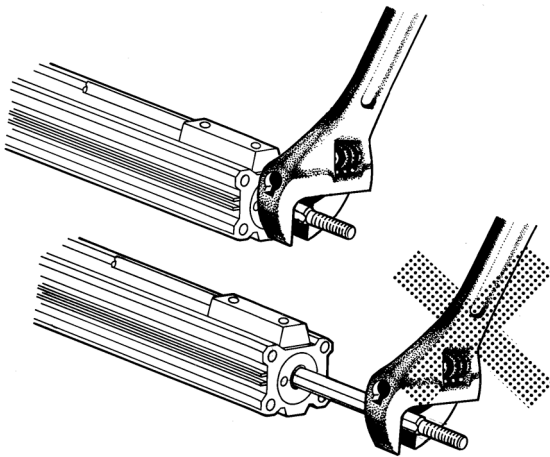
Series CE/Precautions

Be sure to read before handling. Refer to p.0-39 to 0-46 for Safety Instructions, and actuator and auto switch precautions.

⚠ Caution

Mounting

- When screwing a nut or fitting, etc. onto the threaded section at the end of the piston rod, return the piston rod to its fully retracted position, and grasp the exposed portion of the rod across two parallel sides with a wrench. In the case of the high precision scale cylinder, there are no parallel sides. Secure the work piece with a double nut.
Note) Do not apply rotational torque to the piston rod.



- The load on the piston rod should normally be applied in an axial direction.
 - In case a load is applied that is not in the axial direction of the cylinder, the load itself should be controlled with a guide.
 - When mounting the cylinder, it should be carefully aligned.
- Applications which apply rotational torque to the piston rod should be avoided.
- Be careful to avoid scratches or dents, etc. on the sliding sections of the piston rod.

Sensor Unit

- The sensor unit is adjusted to the proper position at the time of shipment. Therefore, the sensor unit should not be removed from the body under any circumstances.
- The cylinder should be protected from contact with liquids such as coolants or coolant water.
- The sensor cable should not be pulled with a strong force.
- Since the scale cylinder sensor uses a magnetic system, malfunction may occur if there is a strong magnetic field near the sensor. The cylinder can be used in an external magnetic field of 145 gauss or less.

This is equivalent to a magnetic field from a welding unit using a welding current of about 15,000 amperes, at a radius of approximately 18cm. When operating in a magnetic field greater than this, the sensor unit should be shielded with a magnetic material.

- Switches or relays, etc. should not be installed in the power supply line (12 to 24V DC).

Operating Environment

Do not operate the cylinder in an environment in which water splashes on it continuously.

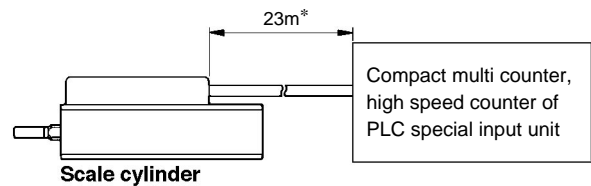
Although the sensor unit complies with the IP65 construction of the IEC standard, the cylinder unit does not have a waterproof construction. Contact SMC for use in an environment in which water splashes on the unit.

⚠ Caution

Effects of Noise

When the stroke reading cylinder is used near a motor, welding machine or other source of noise generation, there is a possibility of miscounting. In this case, noise should be suppressed as much as possible and the following countermeasures should be taken.

- Connect the shield wire to FG (frame ground).
- The maximum transmission distance for the stroke reading cylinder is 23m, but since the output signal is a pulse output, the sensor cable should be wired separately from other power lines.

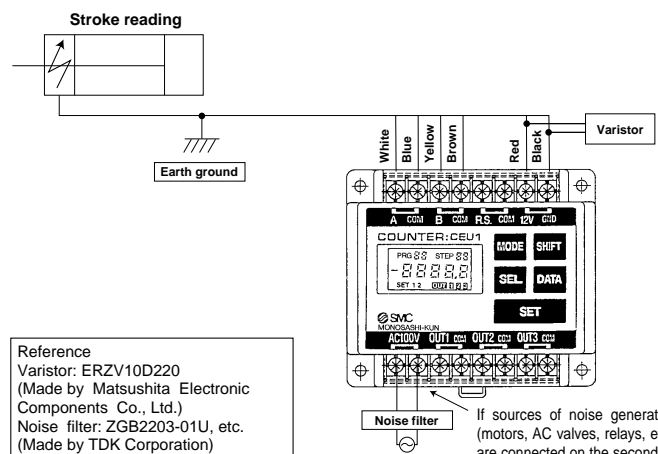


* When using SMC extension cable and counter.

Noise Countermeasures

Methods of dealing with noise are given below.

- Connect only the shield wire to FG (frame ground).
- Use a power source separate from large motors and AC valves, etc.
- Run the stroke reading cylinder's cable away from other power lines.
- Install a noise filter in the 100V AC power line, and install a varistor in the DC power supply of the sensor cable.



Reference
Varistor: ERZV10D220
(Made by Matsushita Electronic Components Co., Ltd.)
Noise filter: ZGB2203-01U, etc.
(Made by TDK Corporation)

If sources of noise generation (motors, AC valves, relays, etc.) are connected on the secondary side of the noise filter, the filter will have no effect.

<Counting speed of counter>

When the speed of the scale cylinder is greater than the counting speed of the counter, the counter will miscount.

For the CE1 (when measuring to 0.1mm), a counter should be used with a counting speed of 10kHz (kcps) or more.

<Malfunction due to lurching and bounding>

When lurching or bounding occurs at the beginning or end of strokes, or due to other causes, the cylinder speed momentarily increases, and there is a possibility of exceeding the counting speed of the counter or the response speed of the sensor, thereby causing a miscount.

The product should be used under conditions such that lurching and bounding will not occur.

Technical Data for Operation

The instruction manuals should be read before using the Series CE1 scale cylinder and CEU1 3 point preset counter.

MK/MK2

RSQ/RSG

RSH

CE1

CE2

ML2B

ML1C

REA

REC

RHC

MTS

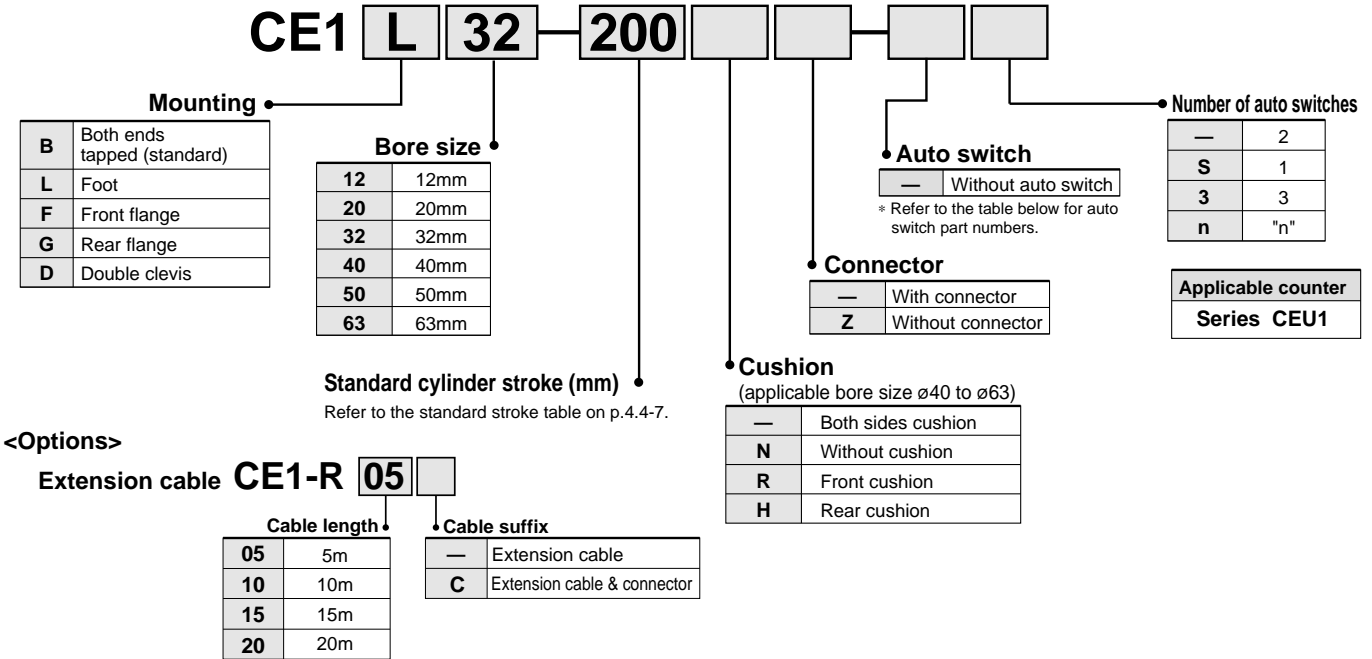
CC

Stroke Reading Cylinder

Series CE1

ø12, ø20, ø32, ø40, ø50, ø63

How to Order



Applicable auto switches/Refer to the p.5.3-2 for further information on auto switch.

Style	Special function	Electrical entry	Indicator	Wiring (output)	Load voltage		Rail mounting		Direct mounting		Lead wire* (m)				Applicable load											
					DC	AC	ø12 to ø63		ø32, ø40 only		0.5 (—)	3 (L)	5 (Z)	— (N)												
							Perpendicular	In-line	Perpendicular	In-line																
Reed switch	—	Grommet	Yes	3 wire (NPN Equiv.)	—	5V	—	A76H	A96V	A96	●	●	—	—	IC	Relay PLC										
											—	200V	A72	A72H			—	—	●	●	—	—				
				2 wire	24V	5V,12V ≤ 100V	—	—	—	—	—	—	—	—	●		●	—	—	IC						
															12V		100V	A73	A73H		—	—	●	●	●	—
															—		—	A80	A80H		A90V	A90	●	●	—	—
				Connector	No	—	—	—	—	—	—	—	—	—	●		●	●	●	IC						
															5V,12V ≤ 24V		—	A80C	—		—	—	●	●	●	●
Diagnostic indication (2 color)	Grommet	Yes	—	—	—	—	—	—	—	—	●	●	—	—	—											
Solid state switch	—	Grommet	Yes	3 wire (NPN)	—	5V,12V	—	F7NV	F79	—	—	●	●	○	—	IC										
												12V	—	F9NV	F9N		—	—	●	●	—	—				
				3 wire (PNP)	—	5V,12V	—	—	—	—	—	—	—	—	●	●	○	—	IC							
															—	—	F9PV	F9P		—	—	●	●	—	—	
				2 wire	12V	—	—	—	—	—	—	—	—	—	●	●	○	—	—							
															—	—	F9BV	F9B		—	—	●	●	—	—	
															—	—	J79	—		—	—	●	●	○	—	
	Connector	No	—	—	—	—	—	—	—	—	—	●	●	●	●	—										
												—	—	J79C	—		—	—	●	●	—	—				
	Diagnostic indication (2 color)	Grommet	Yes	Yes	3 wire (NPN)	24V	5V,12V	—	F7NVV	—	F9NVV	F9NVV	●	●	○	—	IC									
													—	—	F79W	—		—	—	●	●	○	—			
					3 wire (PNP)	—	5V,12V	—	—	—	—	—	—	—	—	●	●	○	—	—						
																—	—	F7PW	—		—	—	●	●	○	—
					2 wire	12V	—	—	—	—	—	—	—	—	—	●	●	○	—	—						
—																—	F9PWV	F9PW	—		—	●	●	○	—	
—																—	F7BVV	J79W	F9BVV		F9BW	●	●	○	—	
Water resistant (2 color)	—	—	—	—	—	—	—	—	—	—	—	●	○	—	—											
											—	—	F7BA	—		F9BA	—	—	●	○	—					
With timer	—	—	—	—	—	—	—	—	—	—	—	●	○	—	IC											
Diagnostic indication (2 color)	—	—	—	—	—	—	—	—	—	—	●	●	○	—												
Latch with diagnostic output (2 color)	—	—	—	4 wire (NPN)	—	—	—	—	—	—	●	●	○	—	—											



* Lead wire length symbol 0.5m..... (Example) A80C 5m.....Z (Example) A80CZ

3m.....L (Example) A80CL —.....N (Example) A80CN

* Solid state auto switches marked with a "○" are manufactured 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

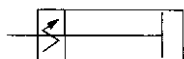
PLC: Programmable Logic Controller

Cylinder Specifications



Preset counter

Symbol



Mounting Bracket Part No.

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 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 snap ring for shaft,
Body mounting bolts

Auto Switch Mounting Bracket Part No.

Bore size (mm)	Mounting bracket	Note	Applicable switch
12 20	BQ-1	• Switch mounting screw (M3 X 0.5 X 8 ℓ) • Square nut	D-A7, A8 D-A7□H, A80H D-A73C, A80C
32 40 50 63	BQ-2	• Switch mounting screw (M3 X 0.5 X 10 ℓ) • Switch spacer • Switch mounting nut	D-A79W D-F7□V D-F7, J7 D-J79C D-F7□WV D-F79W, J79W

Fluid	Air		
Proof pressure	1.5MPa		
Maximum operating pressure	1.0MPa		
Minimum operating pressure	ø12	ø20 to ø63	
	0.07MPa	0.05MPa	
Piston speed	70 to 500mm/s		
Ambient and fluid temperature	0°C to 60°C (No freezing)		
Lubrication	Non-lube		
Stroke length tolerance range	ø12, ø20: $+1.0_0$		ø32, ø40, ø50, ø63: $+1.6_0$
	ø12, ø20, ø32 Without		ø40, ø50, ø63 With
Thread tolerance	JIS Class 2		
Rod non-rotating accuracy	ø12	ø20	ø32, ø40, ø50, ø63
	$\pm 2^\circ$	$\pm 1^\circ$	$\pm 0.8^\circ$
Mounting	Both ends tapped (standard), Foot, Flange, Double clevis		

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 SMC cable and counter)		
Position detection system	Magnetic scale rod	Sensor head < cable length 50cm, 3m >	
	< non-rotating >	< incremental >	
Magnetic resistance	145 gauss		
Power supply	12 to 24V DC ($\pm 10\%$) (Power supply ripple: 1% or less)		
Current consumption	40mA		
Resolution	0.1mm/pulse		
Accuracy	$\pm 0.05\text{mm}$		
Output style	Open collector (24V DC, 40mA)		
Output signal	A/B phase difference output		
Insulation resistance	500V DC, 50MΩ or more (between bowl and 12E)		
Vibration resistance	33.3Hz, 6.8G 2hrs. each in X, Y directions 4hrs. in Z direction based upon JIS D1601		
Impact resistance	30G 3 times each in X, Y, Z directions		
Extension cable (Optional)	5m, 10m, 15m, 20m (Connector ... made by TAJIMI ELECTRONICS CO., LTD., R04-P8F7.3)		

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 SMC 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.

MK/MK2

RSQ/RSG

RSH

CE1

CE2

ML2B

ML1C

REA

REC

RHC

MTS

CC

Series CE1

Weight (Without mounting bracket/Connector)

Unit: kg

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

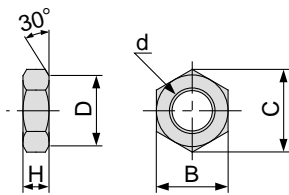
Refer to p.4.4-16 regarding dimensions for the proper auto switch mounting position (stroke end).

Rod End Nut Dimensions

(1 piece is included as standard.)

Materials: $\phi 12, \phi 20$ Steel

$\phi 32$ to $\phi 63$ Rolled steel



Part No.	Bore (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

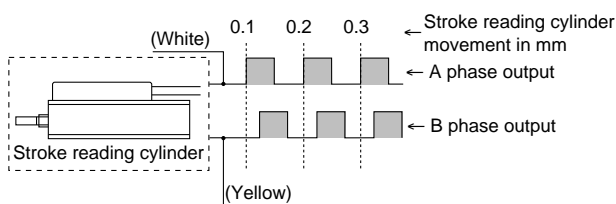
Electrical Wiring

Output style

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

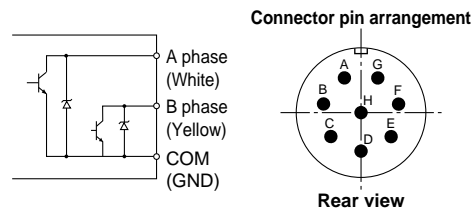
The relation between the movement distance and the signal output of the stroke reading cylinder is that for each 0.1mm or movement a one pulse signal is output to both output terminals A and B.

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



Input/Output

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



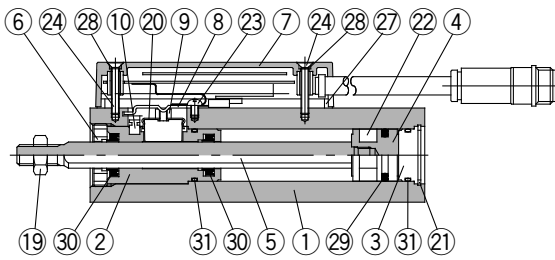
Output circuit of scale cylinder (Brown, Blue)

Signal table

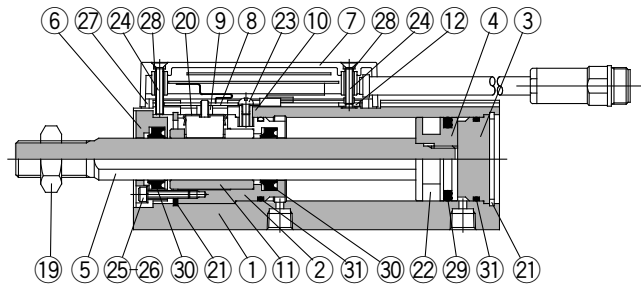
Wire color	Signal name	Connector pin symbol
White	A phase	A
Yellow	B phase	B
Brown, Blue	COM (GND)	C, D
Red	12V, 24V (power supply)	E
Black	GND (0V)	F
(Shield)	Shield GND (connected to F.G.)	G

Construction

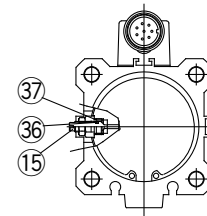
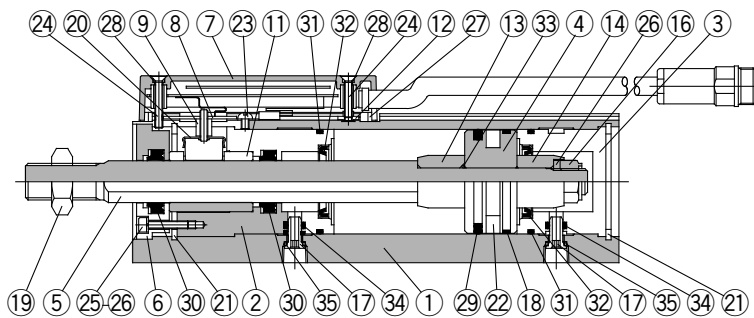
ø12, ø20



ø32



ø40 to ø63



Component Parts

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

Component Parts

No.	Description	Material	Note
⑱	Wear ring	Resin	ø40 to ø63
⑲	Rod end nut	Carbon steel	
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 SMC regarding the replacement of seals.

MK/MK2

RSQ/RSG

RSH

CE1

CE2

ML2B

ML1C

REA

REC

RHC

MTS

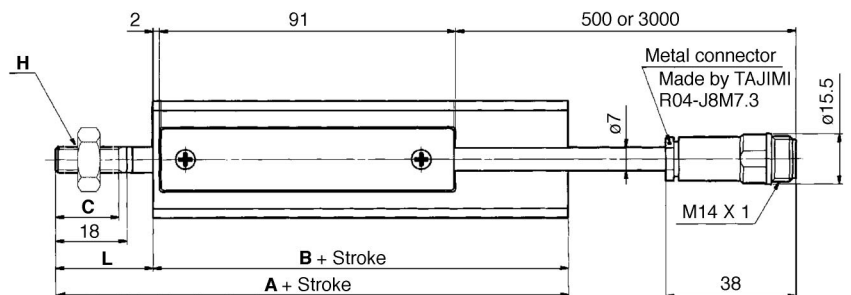
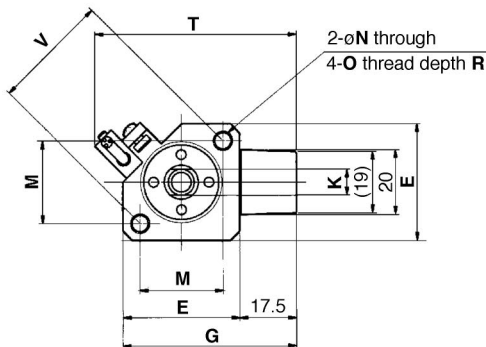
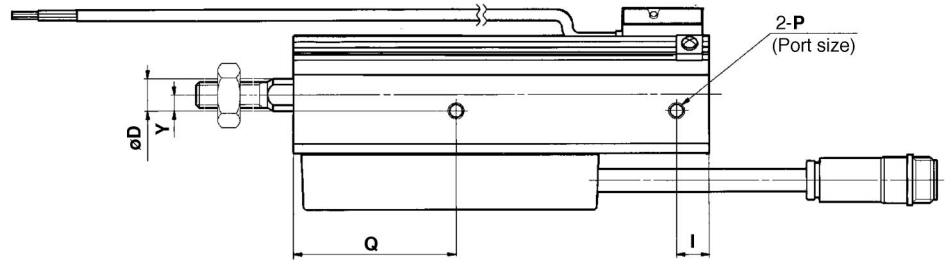
CC

Series CE1

Dimensions $\varnothing 12, \varnothing 20$

Both ends tapped

CE1B Bore size Stroke



Bore (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

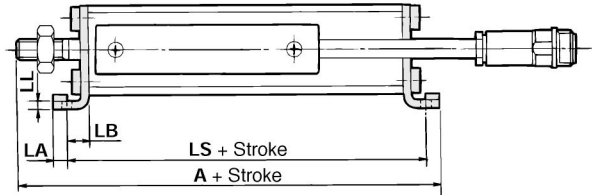
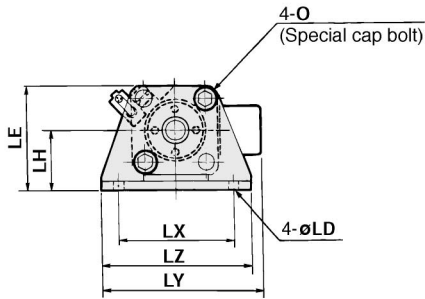
Bore (mm)	N	O	P	Q	R	T*	V	Y
12	—	M4 X 0.7	M5 X 0.8	47	7	53.5	22	7
20	5.5	M6 X 1	M5 X 0.8	50	15	62.5	36	5

* Refer to p.4.4-8 regarding the rod end nut which is included. * Dimensions for auto switch model D-F79W.

Stroke Reading Cylinder *Series CE1*

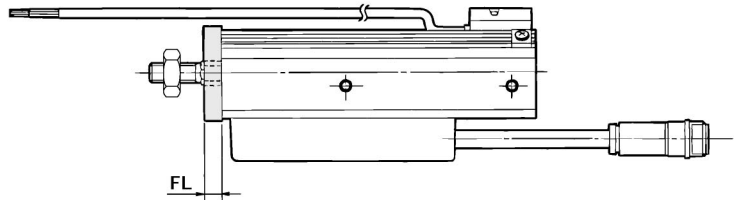
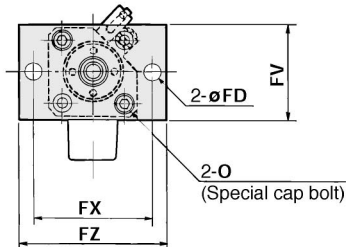
Foot

CE1L Bore size — Stroke



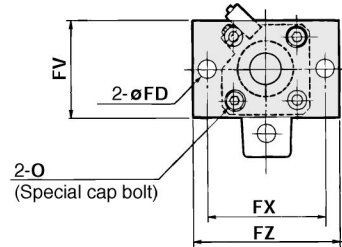
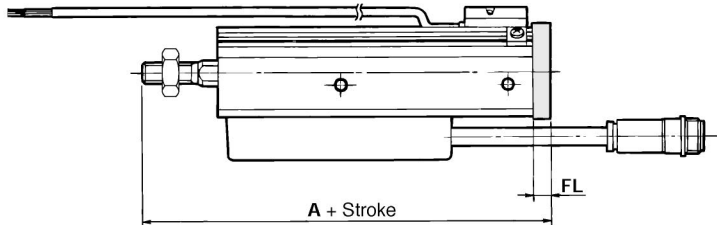
Front flange

CE1F Bore size — Stroke



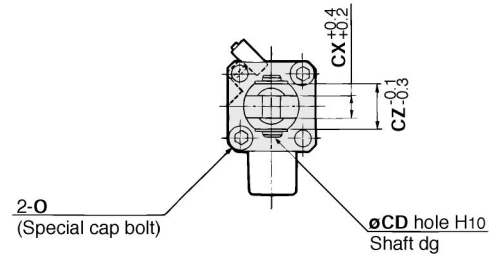
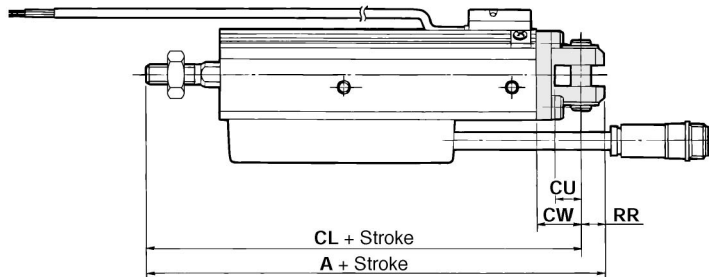
Rear flange

CE1G Bore size — Stroke



Double clevis

CE1D Bore size — Stroke



- MK/MK2
- RSQ/RSG
- RSH
- CE1**
- CE2
- ML2B
- ML1C
- REA
- REC
- RHC
- MTS
- CC

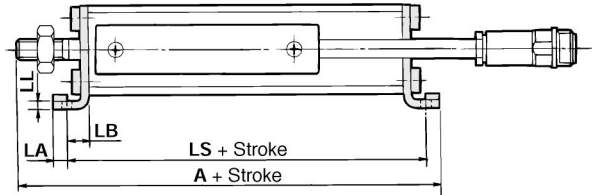
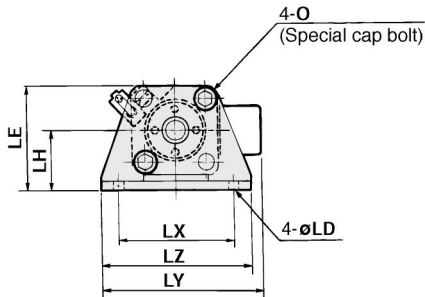
Bore (mm)	Foot												Front flange, Rear flange					Rear flange	Double clevis						
	A	LA	LB	LD	LE	LH	LL	LS	LX	LY	LZ	FD	FL	FV	FX	FZ	A	A	CD	CL	CU	CW	CX	CZ	RR
12	106.5	4.5	8	4.5	29.5	17	2	85	34	52	44	4.5	5.5	25	45	55	99.5	114	5	108	7	14	5	10	6
20	121	5.8	9.2	6.6	42	24	3.2	96.4	48	66.5	62	6.6	8	39	48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

(mm)

Stroke Reading Cylinder *Series CE1*

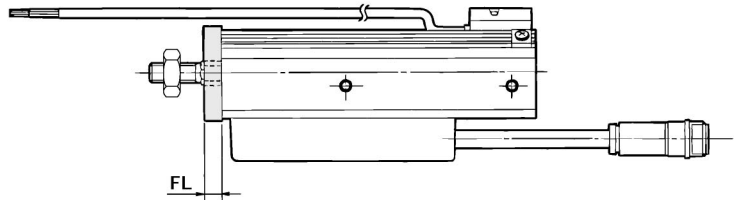
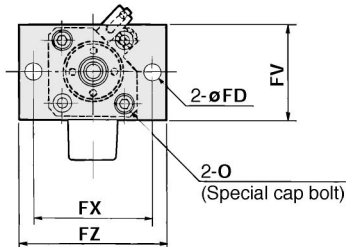
Foot

CE1L Bore size — Stroke



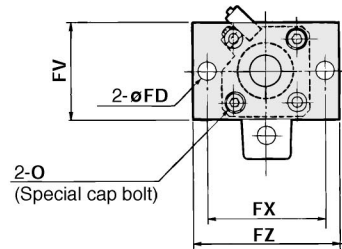
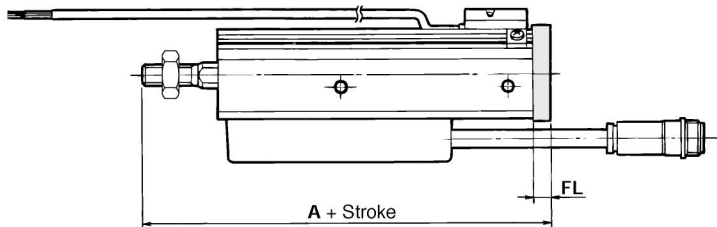
Front flange

CE1F Bore size — Stroke



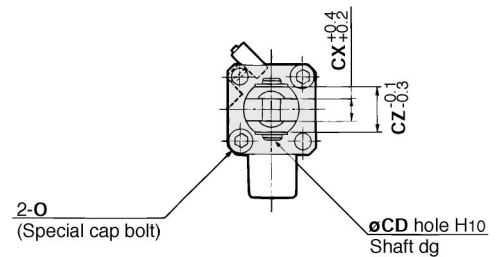
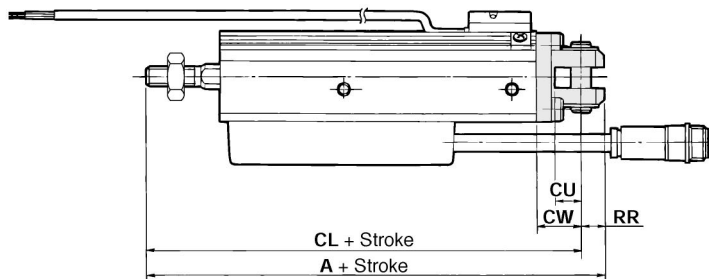
Rear flange

CE1G Bore size — Stroke



Double clevis

CE1D Bore size — Stroke



- MK/MK2
- RSQ/RSG
- RSH
- CE1**
- CE2
- ML2B
- ML1C
- REA
- REC
- RHC
- MTS
- CC

Bore (mm)	Foot												Front flange, Rear flange					Rear flange	Double clevis						
	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

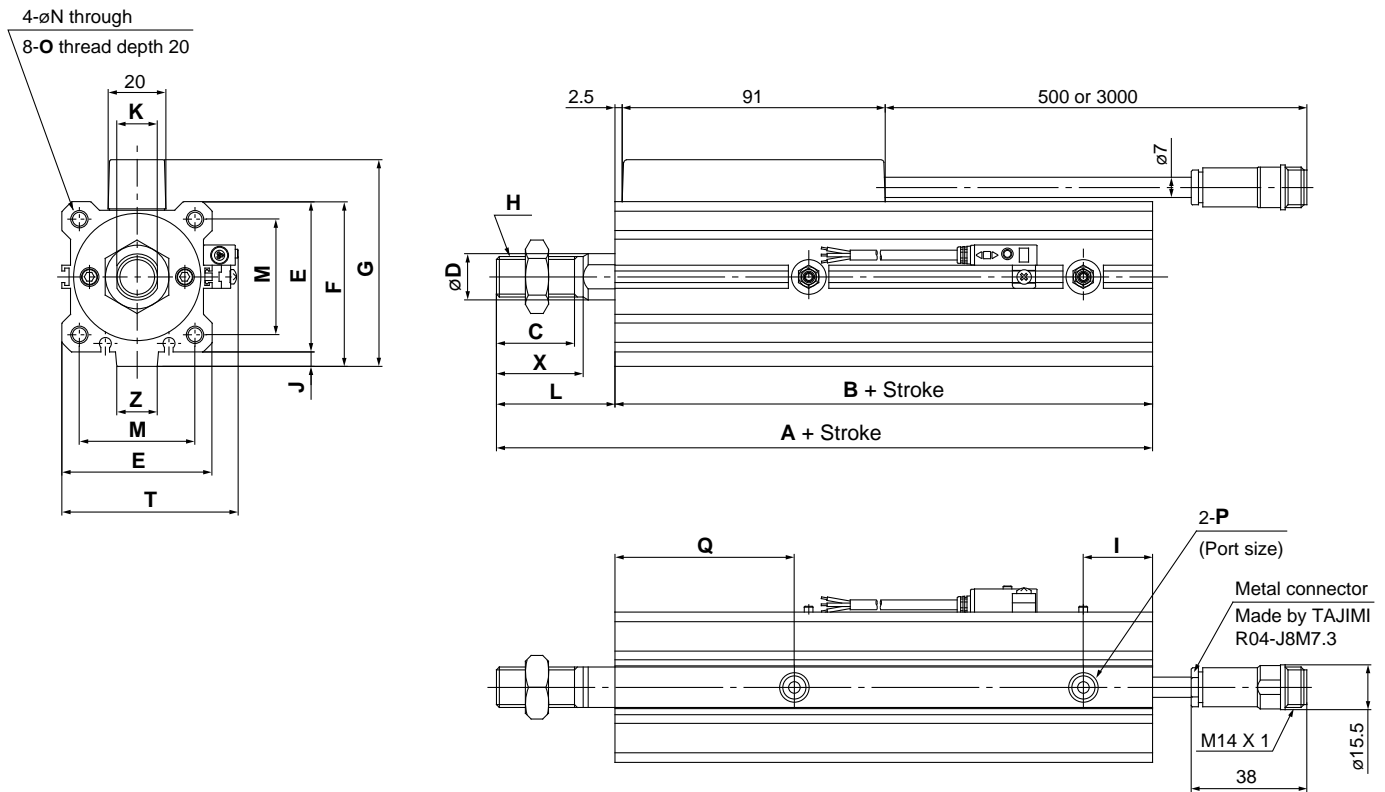
(mm)

Series CE1

Dimensions $\varnothing 32$, $\varnothing 40$, $\varnothing 50$, $\varnothing 63$

Both ends tapped

CE1B Bore size Stroke



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

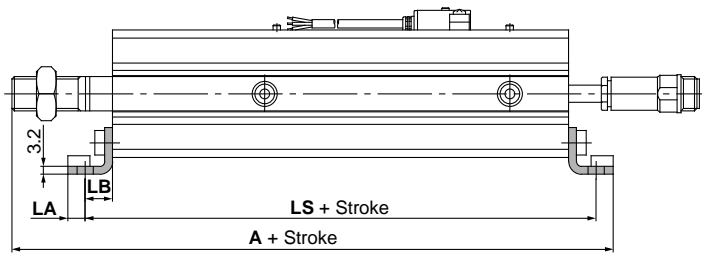
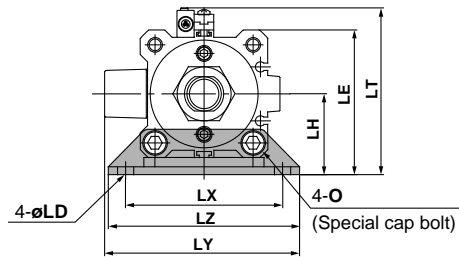
Bore size (mm)	L	M	N	O	P	Q	T*	X	Z
32	41	34	5.5	M6 X 1	Rc(PT) 1/8	56	57.5	30	14
40	41	40	5.5	M6 X 1	Rc(PT) 1/8	62	64.5	30	14
50	49	50	6.6	M8 X 1.25	Rc(PT) 1/4	61.5	76.5	35	19
63	49	60	9	M10 X 1.5	Rc(PT) 1/4	64	89.5	35	19

* Refer to p.4.4-8 regarding the rod end nut which is included. * Dimensions for auto switch model D-F79W.

Stroke Reading Cylinder *Series CE1*

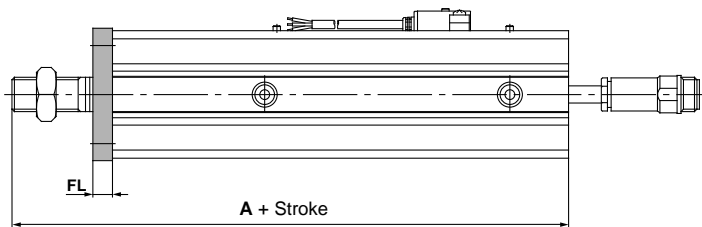
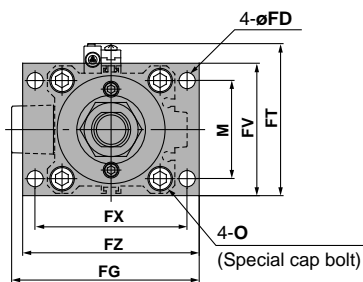
Foot

CE1L **Bore size** — **Stroke**



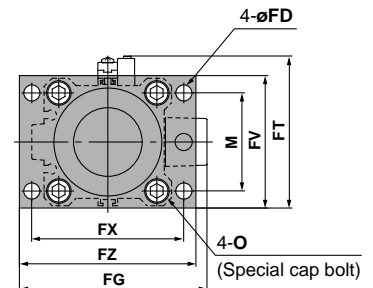
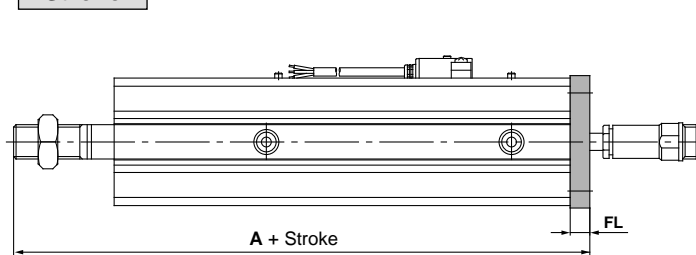
Front flange

CE1F **Bore size** — **Stroke**



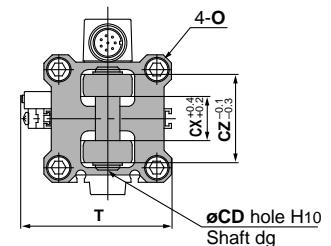
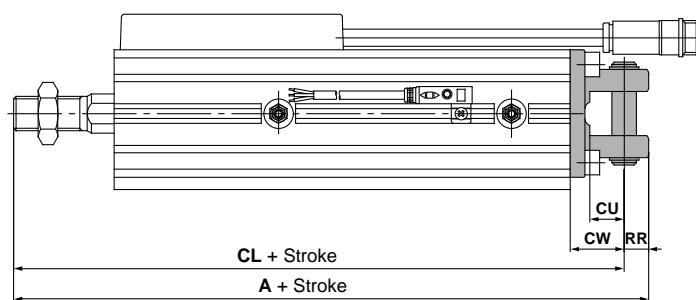
Rear flange

CE1G **Bore size** — **Stroke**



Double clevis

CE1D **Bore size** — **Stroke**



- MK/MK2
- RSQ/RSG
- RSH
- CE1**
- CE2
- ML2B
- ML1C
- REA
- REC
- RHC
- MTS
- CC

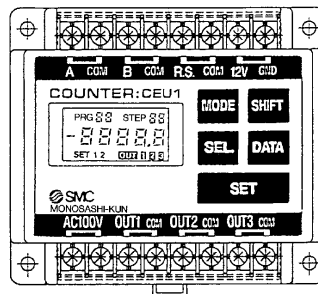
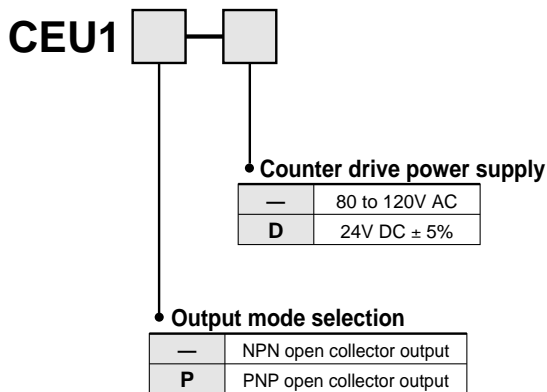
Bore size (mm)	Foot											Front flange, Rear flange							Rear flange	Double clevis									
	A	LA	LB	LD	LE	LH	LS	LT*	LX	LY	LZ	FD	FG	FL	FT*	FV	FX	FZ	M	A	A	CD	CL	CU	CW	CX	CZ	RR	T
32	148	5.8	11.2	6.6	52.5	30	112.4	65	57	72.5	71	5.5	69.5	8	59	48	56	65	34	139	161	10	151	14	20	18	36	10	57.5
40	195.2	7	11.2	6.6	59	33	168.4	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	103.5	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.

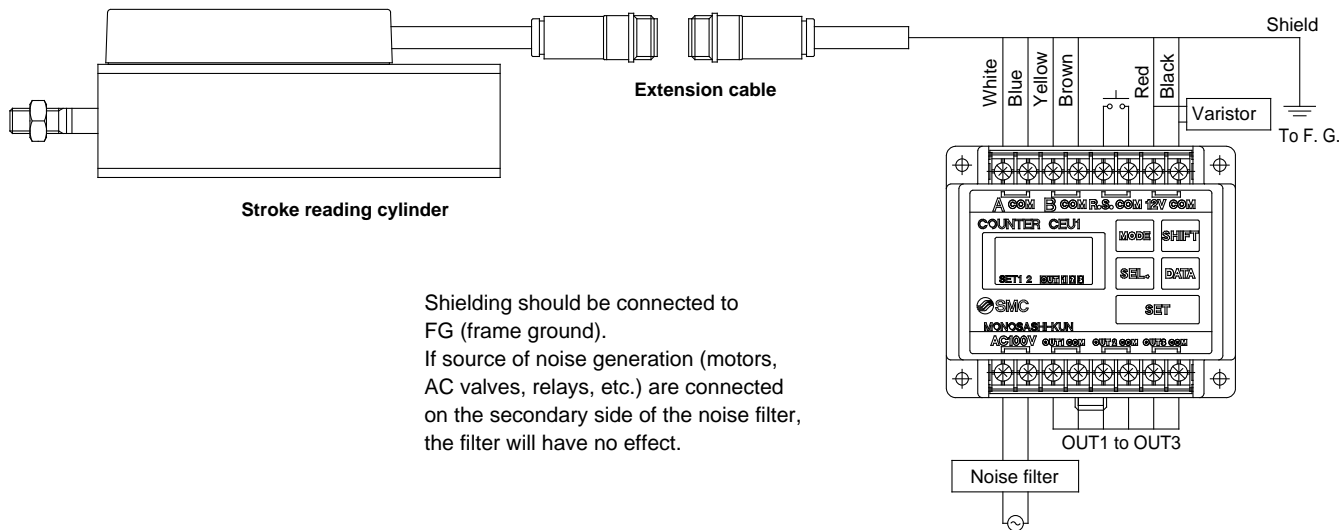
3 Point Preset Counter/series CEU1 Extension Cable/series CE1-R

3 Point Preset Counter

How to Order

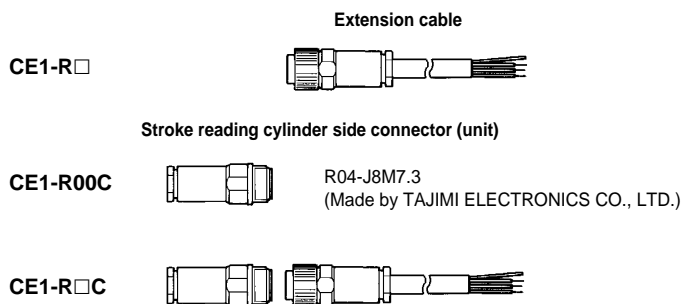
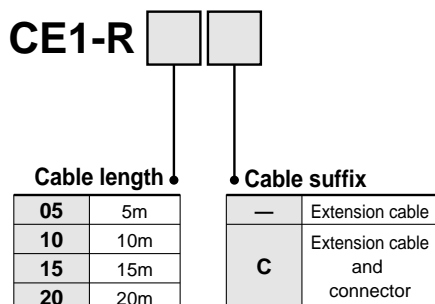


Connection Method



Extension Cable

How to Order



3 Point Preset Counter/Specifications



Model	CEU1	CEU1P	CEU1-D	CEU1P-D
Style	3 point preset counter			
Mounting	Surface mounting (DIN rail or screw stop)			
Operating system	Adding-subtracting style			
Operation modes	Operating mode, Data setting mode			
Reset system	External reset terminal			
Display system	LCD (with back light)			
Pulse signal system	90° phase difference input			
Number of digits	5 digit display (-9999.9 to 9999.9)			
Memory holding (storage medium)	E ² ROM (warning display after writing \approx 65,000 times: F_L) (except value of counter)			
Count input	No-voltage pulse input			
Input signal style	Count input, Reset input			
Reset input	R. S. and COM terminals are shorted for 10ms or more (pulse input)			
Counting speed	20kHz (kcps)			
Sensor power supply	12V DC \pm 10%, 60mA			
Output transistor mode	NPN open collector (Max.30V DC, 50mA)	PNP open collector (Max.30V DC, 50mA)	NPN open collector (Max.30V DC, 50mA)	PNP open collector (Max.30V DC, 50mA)
Preset output configuration	Compare/Hold/One-shot (100ms Fixed pulse)			
Power supply voltage	100V AC (\pm 20%), 50/60Hz		24V DC (\pm 10%) (Power ripple 10% or less)	
Withstand voltage	Between case and AC line: 1500V AC for 1min. Between case and 12VDC: 500V AC for 1min			
Insulation resistance	Between case and AC line: 500V DC, 50M Ω or more			
Ambient temperature	0 to 50°C (No freezing)			
Ambient humidity	35 to 85% RH (No condensation)			
Noise resistance	Square wave noise from a noise simulator (pulse duration 1 μ s) 100V AC line \pm 1500V, 24V DC line \pm 36V I/O line \pm 600V			
Vibration resistance	Endurance 10 to 55Hz; amplitude 0.75mm; X, Y, Z for 2 hours each			
Impact resistance	Endurance 10G; X, Y, Z directions, 3 times each			
Output delay time	5ms or less			
Power consumption	10VA (100V AC/50Hz) 5W			
Weight	250g			

MK/MK2

RSQ/RSG

RSH

CE1

CE2

ML2B

ML1C

REA

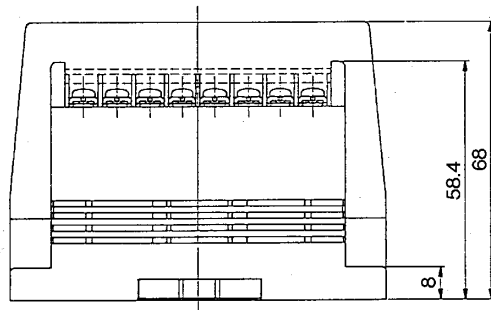
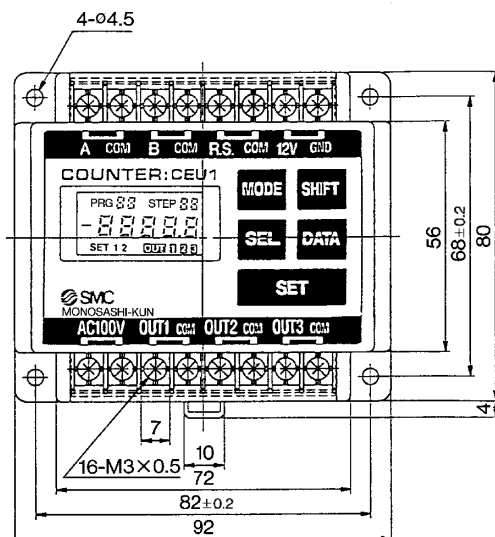
REC

RHC

MTS

CC

Dimensions

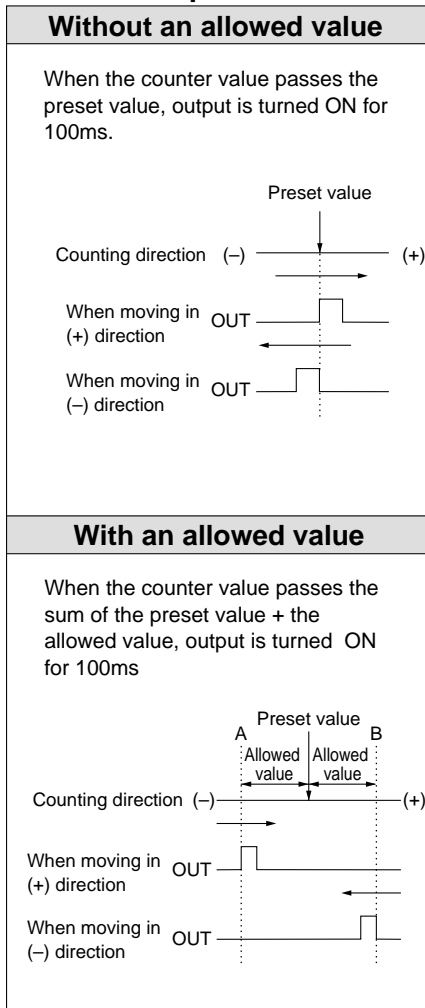


Contact SMC if an external output function (RS-232C, BCD) or multiple output is needed.

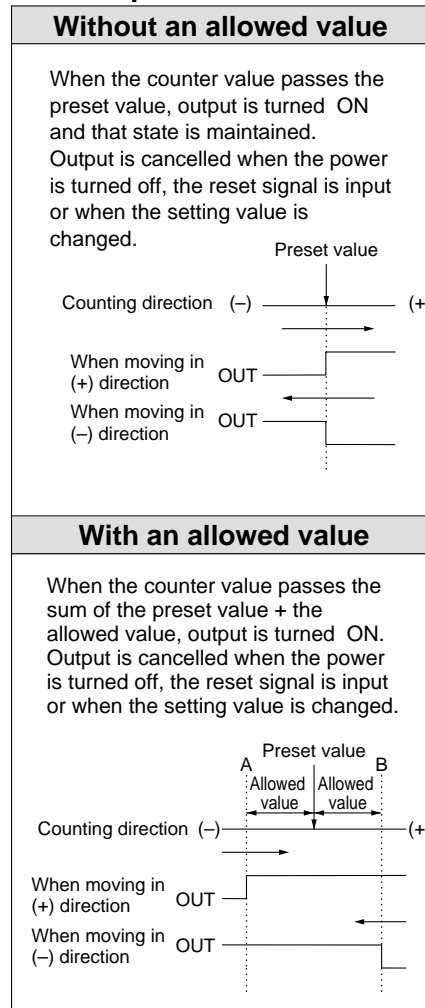
Series CE1

Operating Conditions for Each Output Mode

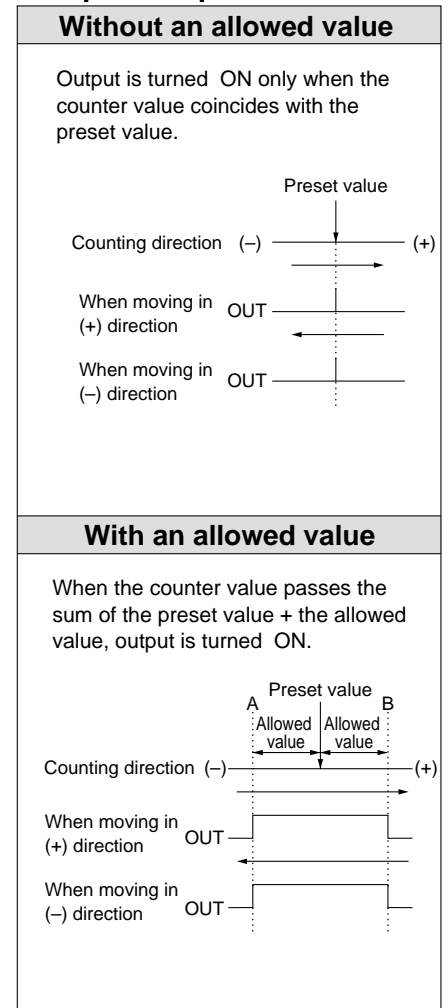
One-shot output



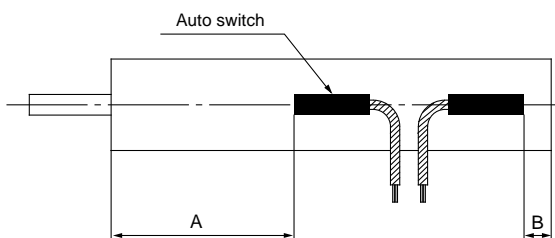
Hold output



Compare output



Proper Auto Switch Mounting Positions (Stroke End)



Proper Auto Switch Mounting Positions (Series CE1) (mm)

Auto switch model	Symbol	Bore size (mm)					
		12	20	32	40	50	63
D-A7, A8	A	40.5	47	55	79	82	85.5
	B	4	13	17	39	44	41.5
D-A7□H, A80H, A73C, A80C, D-F7□, J79, F7□V, J79C	A	41	47.5	55.5	79.5	82.5	86
	B	4.5	13.5	17.5	39.5	44.5	42
D-A79W	A	38	44.5	52.5	76.5	79.5	83
	B	2	10.5	14.5	36.5	41.5	39
D-F7BA, F7□W, F7□F, J79W	A	45	51.5	59.5	83.5	86.5	90
	B	8.5	17.5	21.5	43.5	48.5	46
D-F7□WV	A	41.5	48	56	80	83	86.5
	B	5	14	18	40	45	42.5
D-A9□□	A	39.5	46	54	78	81	40.5
	B	3	12	16	38	43	81.5
D-F7NT	A	46	52.5	60.5	84.5	87.5	91
	B	9.5	18.5	22.5	44.5	49.5	47
D-F9□□	A	43.5	50	58	82	85	88.5
	B	7	16	20	42	47	44.5
D-F9□W□	A	42.5	49	57	81	84	87.5
	B	6	15	19	41	46	43.5