

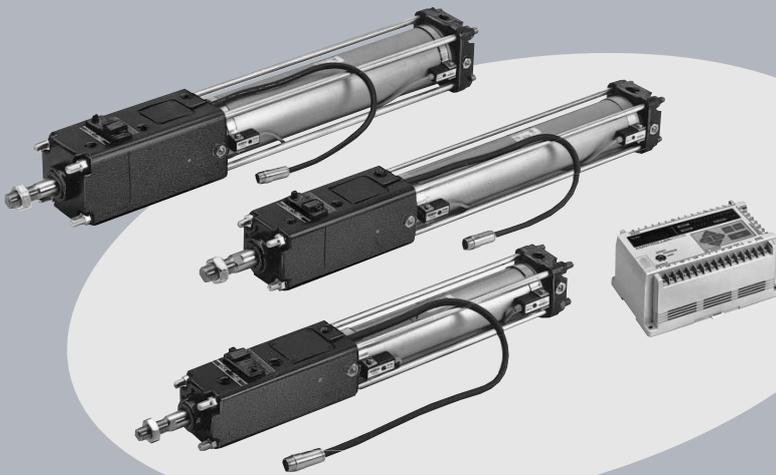


# Stroke Reading Cylinder with Brake

## Series CE2

ø40, ø50, ø63, ø80, ø100

Brake mechanism added  
to a stroke reading cylinder  
which can measure  
stroke length.



- RE<sup>A</sup><sub>B</sub>
- REC
- C□X
- C□Y
- MQ<sup>Q</sup><sub>M</sub>
- RHC
- MK(2)
- RS<sup>Q</sup><sub>G</sub>
- RS<sup>H</sup><sub>A</sub>
- RZQ
- MI<sup>W</sup><sub>S</sub>
- CEP1
- CE1
- CE2**
- ML2B
- C<sup>1</sup><sub>G</sub>5-S
- CV
- MVGQ
- CC
- RB
- J
- D-
- X
- 20-
- Data

# Stroke Reading Cylinder with Brake/*CE2* Controller/*CEU2*

A cylinder capable of highly reproducible positioning (stopping accuracy of  $\pm 0.5$  mm) has been created by adding a brake mechanism to a stroke reading cylinder which can measure stroke length.

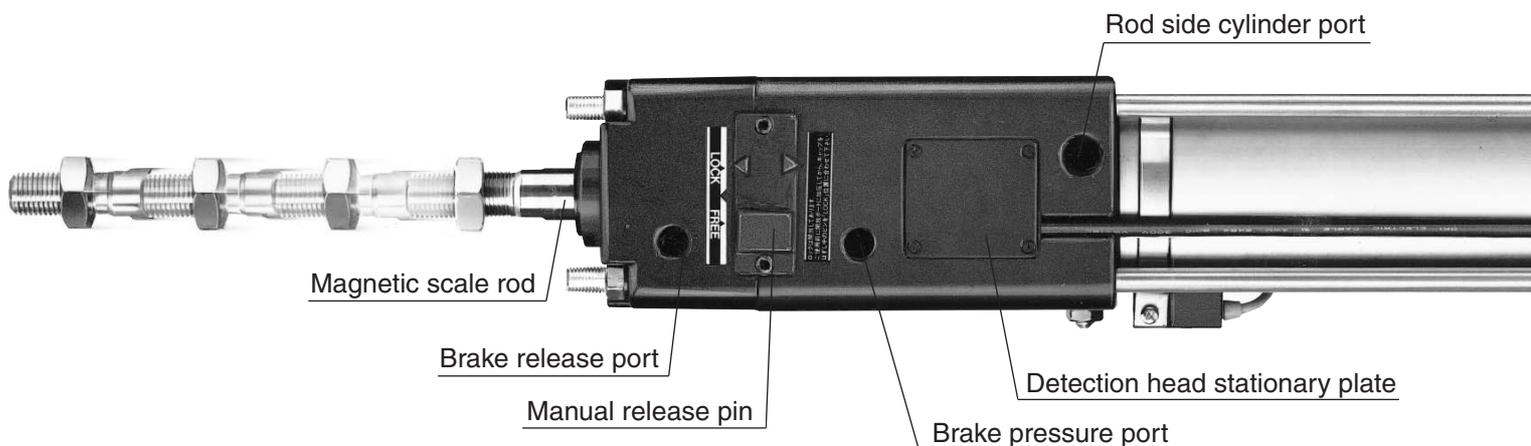
## Brake mechanism

**Employs a combination spring and pneumatic lock type.**

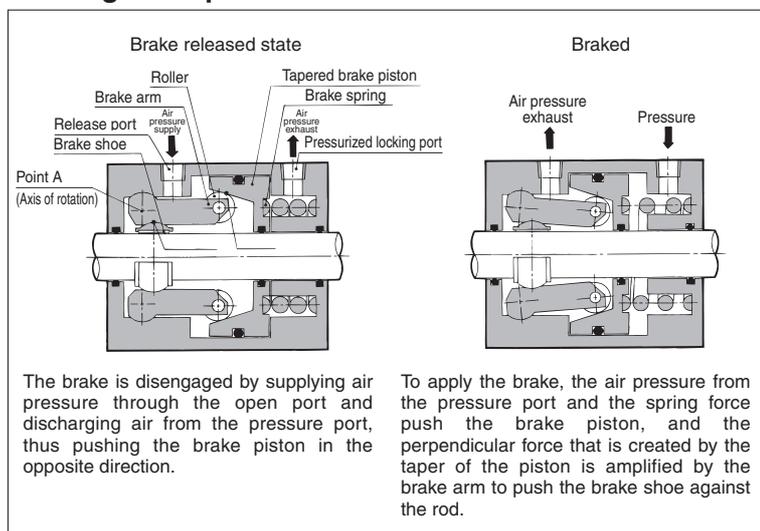
When there is a drop in air pressure, the workpiece is held by a spring lock.

**Locking in both directions is possible.**

Locking in either side of cylinder stroke is possible, too.



## Working Principle of Brake Mechanism

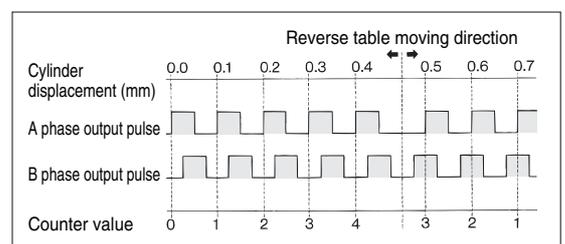


## Measuring

**Smallest measuring unit 0.1 mm**

Magnetic scale rod and built-in detection head

Relation between displacement and output pulse on stroke reading cylinder



ø40, ø50, ø63, ø80, ø100



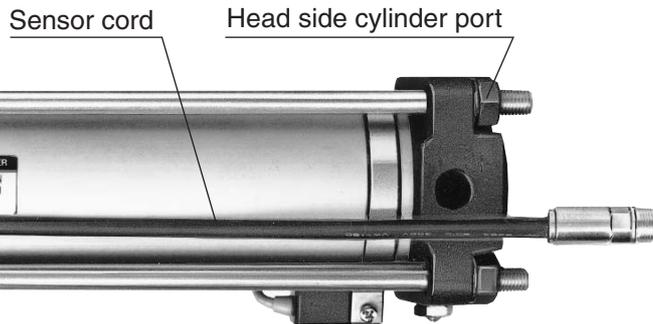
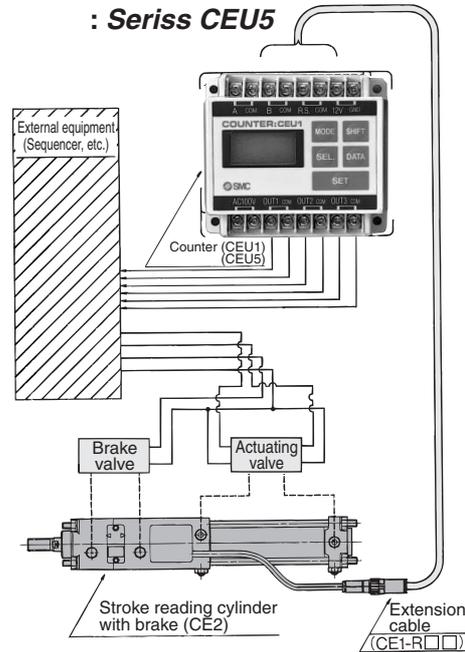
3 point preset counter: **Series CEU1**  
Multi-counter : **Series CEU5**

## System configuration

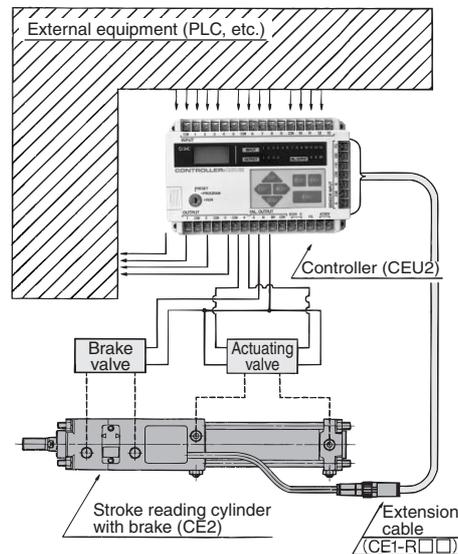
### For safety measures

Stroke reading cylinder with brake + Counter

- Prevents dropping from raised positions during intermediate stops.



### Controller: **Series CEU2**

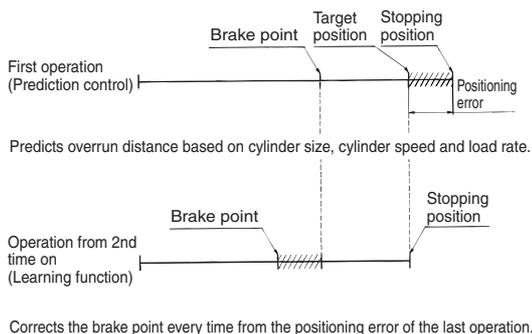


### For precision positioning (Stopping accuracy ±0.5 mm)

Stroke reading cylinder with brake + Controller (Brake positioning system)

- Positioning with high reproducibility has been achieved by prediction control and learning function.
- The stop position will be automatically redressed by re-try function.

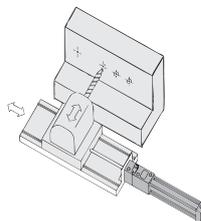
#### Prediction control and learning function



#### Application example

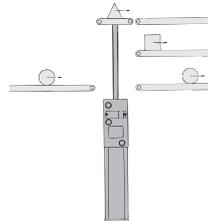
##### 1. For positioning of hole drilling

This system can position the drill at the location in which a hole is to be drilled.



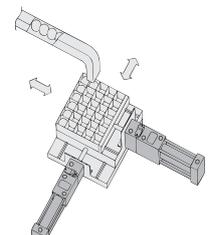
##### 2. For sorting workpieces

Sorts workpieces by positioning the cylinder according to the workpiece.



##### 3. For placing workpieces in boxes

By adopting an X-Y table configuration, the cylinder can position workpieces in boxes.



RE<sup>A</sup><sub>B</sub>

REC

C□X

C□Y

MQ<sup>Q</sup><sub>M</sub>

RHC

MK(2)

RS<sup>Q</sup><sub>G</sub>

RS<sup>H</sup><sub>A</sub>

RZQ

MI<sup>W</sup><sub>S</sub>

CEP1

CE1

**CE2**

ML2B

C<sup>1</sup>/<sub>6</sub>5-S

CV

MVGQ

CC

RB

J

D-

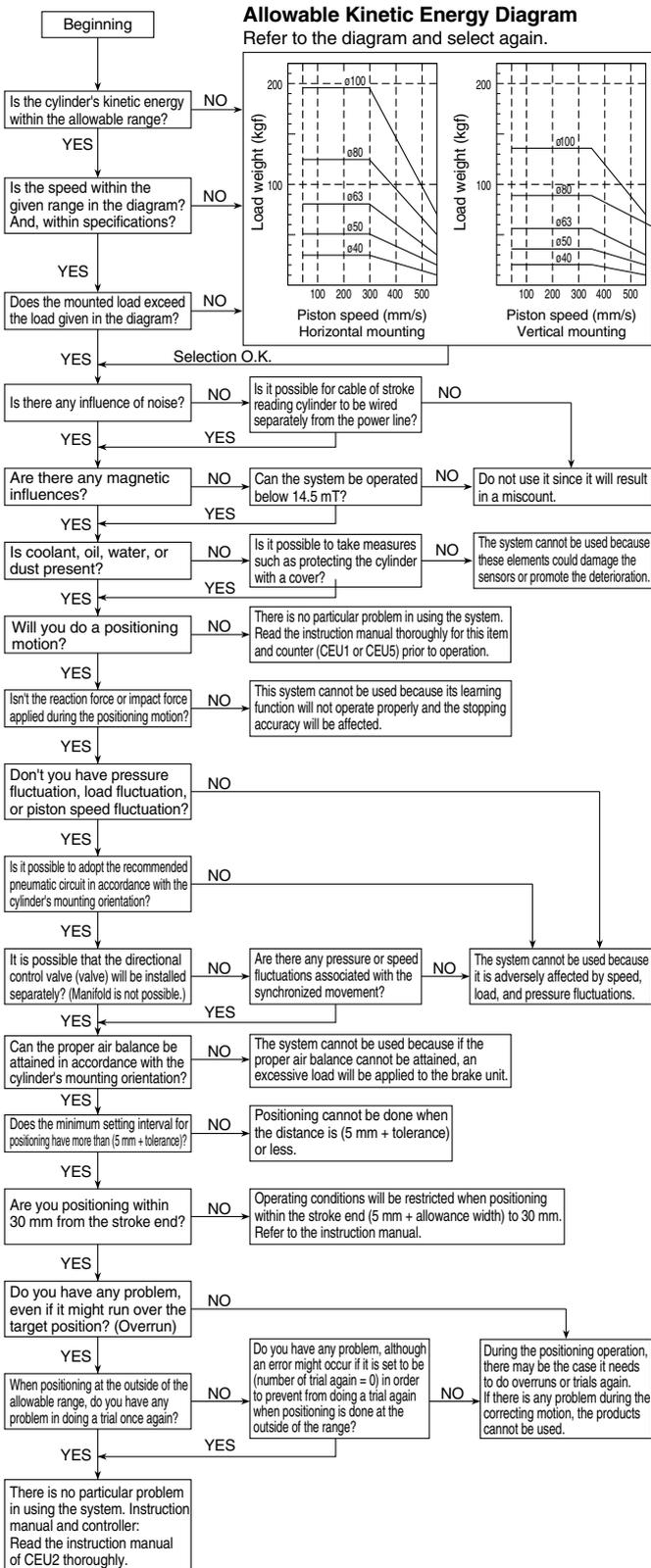
-X

20-

Data

# Flow Chart to Confirm Utility of Stroke Reading Cylinder with Brake

Depending on the operating conditions, stable stopping accuracy may not be obtained. Therefore, make sure to follow the flow chart shown below.



## Handling Technical Material

Be sure to read before handling brake positioning system (CE2+CEU2).

## Precautions

Be sure to read before handling. For Safety Instructions and Actuator Precautions, refer to page 10-24-3 to 10-24-6.

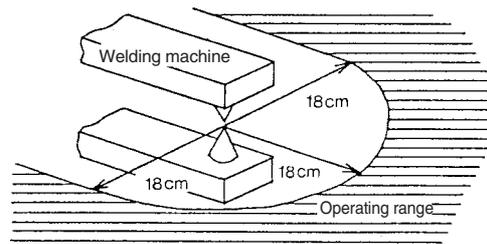
### Caution

#### Sensor

Because a magnetic system is adopted in the sensor unit of the stroke reading cylinder with brake, the presence of a strong magnetic fields in the vicinity of the sensor could lead to a malfunction.

Operate the system with an external magnetic field of 14.5 mT.

This is equivalent to a magnetic field of approximately 18 cm in radius from a welding area using a welding amperage of almost 15,000 amperes. To use the system in a magnetic field that exceeds this value, use a magnetic material to shield the sensor unit.

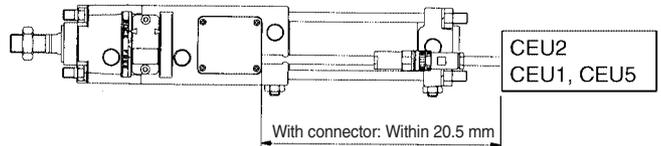


The sensor unit is adjusted to an appropriate position at the time of shipment. Therefore, never detach the sensor unit from the body. Make sure that water does not splash on the sensor unit (enclosure IP65). Do not pull on the sensor cord.

#### Noise

Operating the stroke reading cylinder with brake in the vicinity of equipment that generates noise, such as a motor or a welder, could result in miscounting. Therefore, minimize the generation of noise as much as possible, and keep the wiring separate.

Also, the maximum transmission distance of the stroke reading cylinder with brake is 20.5 m. Make sure that the wiring does not exceed this distance. Besides, when the transmission distance is over 20.5 m, use the dedicated transmission box (Part no. CE1-H0374).



## How to Manually Disengage the Lock and Change from the Unlocked to the Locked State

### Manual unlocking

To manually disengage the lock, perform the following steps:

- Loosen the two hexagon socket head cap bolts and remove the pin guide.
- As viewed from the end of the rod, the pin is tilted 15° to the left of the center. Using a wooden mallet so as not to scratch the pin, rotate it 30° clockwise.
- Rotating the pin 30° while moving it towards the rod end enables the lock to disengage.
- To re-engage the lock, perform the following steps.

### How to manually change from an unlocked state to a locked state

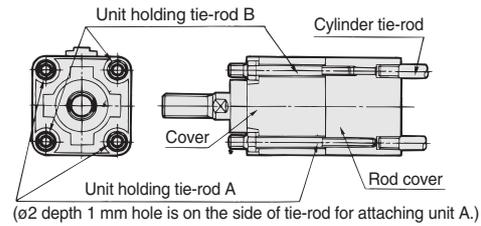
To change from an unlocked state to a locked state: Unlike the procedure for manually disengaging the lock, never rotate the pin by striking it, as it could bend or damage the pin. The lock is disengaged at the time of shipment. Therefore, after performing the mounting and centering adjustments, make sure to perform these steps before operating the unit:

- Loosen the two hexagon socket head cap bolts and remove the pin guide.
- As viewed from the end of the rod, the pin is tilted 15° to the right of the center.
- Supply air pressure of 0.3 MPa to the unlocking port.
- Using a wooden or plastic rod, such as the handle of a wooden mallet, push the pin and rotate it 30° counterclockwise.
- Inside the pin guide, there is a slotted hole that is slightly larger than the pin. Align the pin with the slotted hole and secure them to the cover, using the hexagon socket bolts that were removed in step 1. The protruding portion of the pin guide will then align with the LOCK mark on the nameplate that is attached to the cover surface.

## Caution on Handling

### ⚠ Caution

- Operate the cylinder in such a way that the load is always applied in the axial direction.  
In case the load is applied in a direction other than the axial direction of the cylinder, provide a guide to constrain the load itself. In such a case, take precautions to prevent off-centering. If the piston rod and the load are off-centered, the speed of the movement of the piston could fluctuate, which could affect the piston's stopping accuracy and shorten the life of the brake unit.
- If there is a large amount of dust in the operating environment, use a cylinder with a bellows to prevent the intrusion of dust.  
Also, be aware that the operating temperature range is between 0 and 60°C.
- The brake unit and the cylinder rod cover area are assembled as shown in the diagram on the right. For this reason, unlike ordinary cylinders, it is not possible to use the standard style mounted directly onto a machine by screwing in the cylinder tie-rods.  
Furthermore, when replacing mounting brackets, the unit holding tie-rods may get loosen. Tighten them once again in such a case.  
Use a socket wrench when replacing mounting brackets or retightening the unit holding tie-rods.



Bore size (mm)	Mounting bracket nut			Unit holding tie-rod	
	Nut	Width across flats	Socket	Width across flats	Socket
40	JIS B 1181 Class 3 M8 x 1.25	13	JIS B 4636 2 point angle socket 13	10	JIS B 4636 2 point angle socket 10
50				13	JIS B 4636 2 point angle socket 13
63	JIS B 1181 Class 3 M10 x 1.25	17	JIS B 4636 2 point angle socket 17	13	JIS B 4636 2 point angle socket 13
80	JIS B 1181 Class 3 M12 x 1.75	19	JIS B 4636 2 point angle socket 19	17	JIS B 4636 2 point angle socket 17
100					

## Operating Cautions

### Counting speed of the counter

Be aware that if the speed of the stroke reading cylinder with brake is faster than the counting speed of the counter, the counter will miscount.

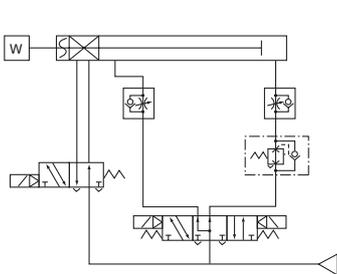
Use CEU1, CEU2, CEU5.  
Cylinder speed < Counting speed of the counter  
(Cylinder speed 500 mm/sec = Counting speed of the counter 5 kcps)

### Miscounting by lurching or bounding

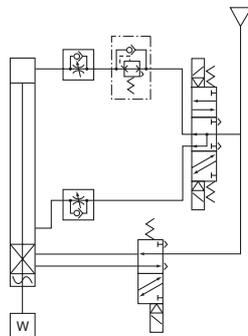
If the stroke reading cylinder with brake lurches or bounds during an IN or OUT movement, or due to other factors, be aware that the cylinder speed could increase momentarily, possibly exceeding the counter's counting speed or the sensor's response speed, which could lead to miscounting.

## Example of Recommended Pneumatic

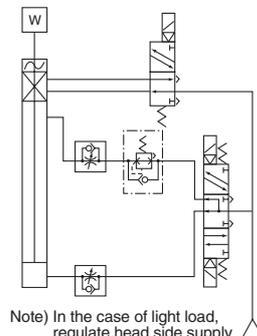
### Horizontal mounting



### Vertical flat mounting



### Vertical overhead mounting



## Recommended Pneumatic Equipment

Bore size (mm)	Directional control valve	Brake valve	Regulator	Piping	Silencer	Speed controller
40	VFS24□OR	VFS21□O	AR425	Nylon ø8/6 or larger	AN200-02	AS4000-02
50	VFS24□OR	VFS21□O	AR425	Nylon ø10/7.5 or larger	AN200-02	AS4000-02
63	VFS34□OR	VFS21□O	AR425	Nylon ø12/9 or larger	AN300-03	AS4000-03
80	VFS44□OR	VFS31□O	AR425	Nylon ø12/9 or larger	AN300-03	AS420-03
100	VFS44□OR	VFS31□O	AR425	Nylon ø12/9 or larger	AN400-04	AS420-04

## Caution on Pneumatic Circuit Design

### Air balance

Unlike the conventional pneumatic cylinder that performs a simple reciprocal movement, the stroke reading cylinder with a brake also makes intermediate stops. Thus, it must maintain the proper air balance in a stopped state.

Therefore, the proper air balance must be established in accordance with the mounting orientation of the cylinder.

Use caution the piston rod may be lunched when the next motion gets started after the intermediate stops or commence the operation after the reverse motion gets done, unless the air balance is taken. It may result in degrading its accuracy.

### Supply pressure

If line pressure is used directly as supply pressure, any fluctuation in pressure will appear in the form of changes in cylinder characteristics. Therefore, make sure to use a pressure regulator to convert line pressure into supply pressure for the actuating valve and the brake valve. In order to actuate multiple cylinders at once, use a pressure regulator that can handle a large air flow volume and also consider installing a surge tank.



# Stroke Reading Cylinder with Brake

## Series CE2

ø40, ø50, ø63, ø80, ø100

### How to Order

**CE2** **B** **40** **100** **Y7BW**

**Mounting style**

<b>B</b>	Basic style
<b>L</b>	Foot style
<b>F</b>	Rod side flange style
<b>G</b>	Head side flange style
<b>C</b>	Single clevis style
<b>D</b>	Double clevis style
<b>T</b>	Center trunnion style

**Bore size**

<b>40</b>	40 mm
<b>50</b>	50 mm
<b>63</b>	63 mm
<b>80</b>	80 mm
<b>100</b>	100 mm

**Cylinder stroke (mm)**  
Refer to "Standard Stroke" on page 10-12-49.

**Number of auto switches**

<b>Nil</b>	2 pcs.
<b>S</b>	1 pc.
<b>n</b>	"n" pcs.

**Applicable counter/Controller**

Series CEU1
Series CEU5
Series CEU2

**Auto switch**

<b>Nil</b>	Without auto switch
------------	---------------------

\* For the applicable auto switch model, refer to the table below.  
\* D-Z7□/Z80/Y59□/Y69□/Y7□ types are shipped together, (not assembled).  
(But, only the mounting bracket for the above models is assembled when shipping.)

**Suffix for cylinder**

Rod boot	<b>J</b>	Nylon tarpaulin
	<b>K</b>	Neoprene cross
Cushion	<b>Nil</b>	With cushion on both ends
	<b>N</b>	Without cushion
	<b>R</b>	With on rod end bumper
	<b>H</b>	With on head end cushion
Connector	<b>Nil</b>	With connector
	<b>Z</b>	Without connector

### Applicable Auto Switch/Refer to page 10-20-1 for further information on auto switches.

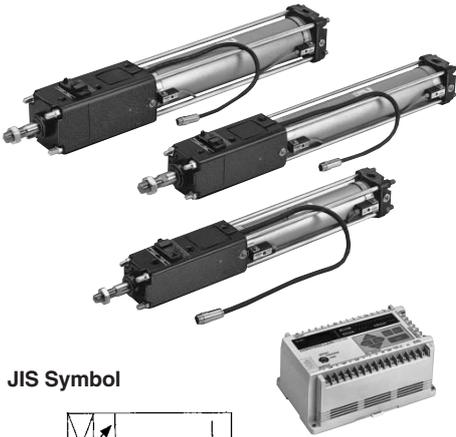
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)*			Pre-wire connector	Applicable load				
					DC	AC	Tie-rod mounting	Band mounting	0.5 (Nil)	3 (L)	5 (Z)						
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	<b>Z76</b>	—	●	●	—	—	IC circuit	—		
				2-wire	24 V	12 V	100 V	—	<b>Z73</b>	—	●	●	●	—	—	Relay, PLC	
							—	—	<b>B53</b>	—	●	●	●	—	—	PLC	
		100 V, 200 V					—	<b>A54</b>	<b>B54</b>	●	●	●	—	—	Relay, PLC		
		Terminal conduit		—	—	—	—	—	<b>A33C</b>	<b>A33</b>	—	—	—	—	—	PLC	
				DIN terminal	—	—	—	—	<b>A34C</b>	<b>A34</b>	—	—	—	—	—	—	Relay, PLC
Diagnostic indication (2-color indication)	Grommet	—	—	—	—	<b>A44C</b>	<b>A44</b>	—	—	—	—	—	—	—			
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	<b>Y59A</b>	<b>G59</b>	●	●	○	○	—	IC circuit		
				3-wire (PNP)				<b>Y7P</b>	<b>G5P</b>	●	●	○	○	—	—		
				2-wire	—	—	100 V, 200 V	<b>J51</b>	—	●	●	○	—	—	—		
				—				12 V	<b>Y59B</b>	<b>K59</b>	●	●	○	○	—	—	
				Terminal conduit	3-wire (NPN)	24 V	5 V, 12 V	—	<b>G39C</b>	<b>G39</b>	—	—	—	—	—	—	IC circuit
					2-wire				<b>K39C</b>	<b>K39</b>	—	—	—	—	—	—	—
		Diagnostic indication (2-color indication)		Grommet	3-wire (NPN)	24 V	5 V, 12 V	—	<b>Y7NW</b>	<b>G59W</b>	●	●	○	○	—	IC circuit	
					3-wire (PNP)				<b>Y7PW</b>	<b>G5PW</b>	●	●	○	○	—	—	
					2-wire				<b>Y7BW</b>	<b>K59W</b>	●	●	○	○	—	—	
					—				<b>Y7BA</b>	<b>G5BA</b>	—	●	○	○	—	—	
		Water resistant (2-color indication)		Grommet	—	—	—	—	<b>F59F</b>	<b>G59F</b>	●	●	○	○	—	IC circuit	
		With diagnostic output (2-color indication)							—	—	—	—	—	—	—	—	—

\* Lead wire length symbols: 0.5 m ..... Nil  
3 m ..... L  
5 m ..... Z

(Example) A54  
(Example) A54L  
(Example) A54Z

\* Solid state switches marked with "○" are produced upon receipt of order.

- Since there are other applicable auto switches than listed, refer to page 10-12-53 for details.
- For details about auto switches with pre-wire connector, refer to page 10-20-66.



JIS Symbol



**Made to Order Specifications**  
(For details, refer to page 10-21-1.)

Symbol	Specifications
-XC18	NPT finish piping port

**Model**

Series	Type	Action	Bore size (mm)	Rod Action
<b>CE2</b>	Non-lube	Double acting	40, 50, 63, 80, 100	Spring and pneumatic lock

**Rod Boot Material**

Symbol	Rod boot material	Maximum ambient temperature
<b>J</b>	Nylon tarpaulin	60°C
<b>K</b>	Neoprene cross	110°C*

\* Maximum ambient temperature for the rod boot itself.

**Auto Switch Mounting Bracket Part No.**

Auto switch model	Bore size (mm)				
	40	50	63	80	100
D-A5□/A6□ D-A59W D-F5□/J5□ D-F5□W/J59W D-F5NTL D-F5BAL/F59F	BT-04	BT-04	BT-06	BT-08	BT-08
D-A3□/A44 D-G39/K39	BD1-04M	BD1-05M	BD1-06M	BD1-08M	BD1-10M
D-B5□/B64 D-B59W D-G5□/K59 D-G5□W/K59W D-G5BAL D-G59F/G5NTL	BA-04	BA-05	BA-06	BA-08	BA-10
D-A3□C/A44C D-G39C/K39C	BA3-040	BA3-050	BA3-063	BA3-080	BA3-100
D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W D-Y7□WV D-Y7BAL	BA4-040	BA4-040	BA4-063	BA4-080	BA4-080

\* Mounting bolt is attached to D-A3□C, A44C, G39C, and K39C.  
\* To order, indicate as shown below, according to the cylinder size.  
(Example) ø40.....D-A3□C-4, ø63.....D-A3□C-6, ø100.....D-A3□C-10  
ø50.....D-A3□C-5, ø80.....D-A3□C-8

**Cylinder Specifications**

Bore size (mm)	40	50	63	80	100
Fluid	Air (Non-lube)				
Proof pressure	1.5 MPa				
Maximum operating pressure	Driving pressure 1 MPa; Brake pressure 0.5 MPa				
Minimum operating pressure	Driving pressure 0.1 MPa; Brake pressure 0.3 MPa				
Piston speed	50 to 500 mm/s*				
Ambient temperature	0 to 60°C (No freezing)				
Brake system	Spring and pneumatic lock type				
Sensor cord length	ø7-500 mm Oil-resistant				
Thread tolerance	JIS Class 2				
Stroke length tolerance	Up to 250 mm: $^{+1.0}_0$ , 251 mm to 1000 mm $^{+1.4}_0$				

\* Be aware of the constraints in the allowable kinetic energy.

**Sensor Specifications**

Cable	ø7, 6 core twisted pair shielded wire (Oil, Heat & Flame resistant cable)
Maximum transmission distance	20.5 m (when using SMC cable and counter)
Position detection method	Magnetic scale rod/Sensor head <Incremental type>
Magnetic field resistance	14.5 mT
Power supply	10.8 to 13.2 VDC (Power supply ripple: 1% or less)
Current consumption	40 mA
Resolution	0.1 mm/pulse
Accuracy	±0.2 mm <sup>Note</sup>
Output type	Open collector (Max. 35 VDC, 80 mA)
Output signal	A/B phase difference output
Insulation resistance	500 VDC, 50 MΩ or more (between case and 12E)
Vibration resistance	33.3 Hz, 6.8 G 2 hrs. each in X, Y directions 4 hrs. in Z direction based upon JIS D 1601
Impact resistance	30 G, 3 times at X, Y, Z
Enclosure	IP65 (IEC standard) Except connector part
Extension cable (Option)	5 m, 10 m, 15 m, 20 m

Note) Digital error under Controller (CEU2), Counter (CEU1 or CEU5) is included. Besides, the whole accuracy after mounting on an equipment may be varied depending on the mounting condition and surroundings. As an equipment, calibration should be done by customer.

**Standard Stroke**

Bore size (mm)	Standard stroke (mm)		Range of manufacturable stroke	
	Without rod boot	With rod boot	Without rod boot	With rod boot
<b>40</b>	25 to 850	25 to 700	Up to 1200	Up to 950
<b>50</b>	25 to 800	25 to 650	Up to 1150	Up to 900
<b>63</b>	25 to 800	25 to 650	Up to 1150	Up to 900
<b>80</b>	25 to 750	25 to 600	Up to 1100	Up to 900
<b>100</b>	25 to 750	25 to 600	Up to 1100	Up to 850

**Weight**

Bore size (mm)		40	50	63	80	100
Basic weight	Basic style	2.18	3.39	5.29	8.66	12.09
	Foot style	2.37	3.61	5.63	9.33	13.08
	Flange style	2.55	3.84	6.08	10.11	14.01
	Single clevis style	2.41	3.73	5.92	9.77	13.87
	Double clevis style	2.45	3.82	6.08	10.06	14.39
	Trunnion style	3.63	3.92	6.18	10.36	14.49
Additional weight per each 20 mm of stroke	Aluminum tube	0.22	0.28	0.37	0.52	0.65
	Mounting bracket					
Accessory bracket	Single knuckle	0.23	0.26	0.26	0.60	0.83
	Double knuckle	0.32	0.38	0.38	0.73	1.08
	Knuckle pin	0.05	0.05	0.05	0.14	0.19

RE<sup>A</sup><sub>B</sub>

REC

C□X

C□Y

MQ<sup>Q</sup><sub>M</sub>

RHC

MK(2)

RS<sup>Q</sup><sub>G</sub>

RS<sup>H</sup><sub>A</sub>

RZQ

MI<sup>W</sup><sub>S</sub>

CEP1

CE1

**CE2**

ML2B

C<sup>1</sup>/<sub>5</sub>-S

CV

MVGQ

CC

RB

J

D-

-X

20-

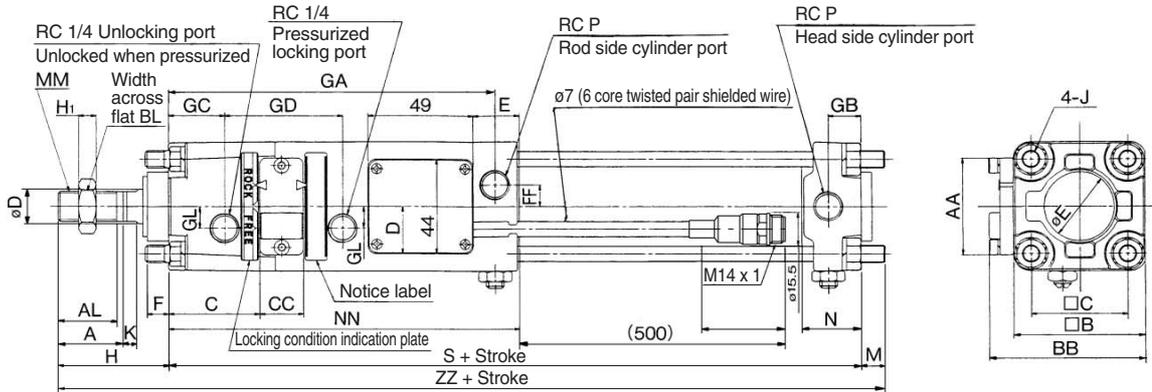
Data

# Series CE2

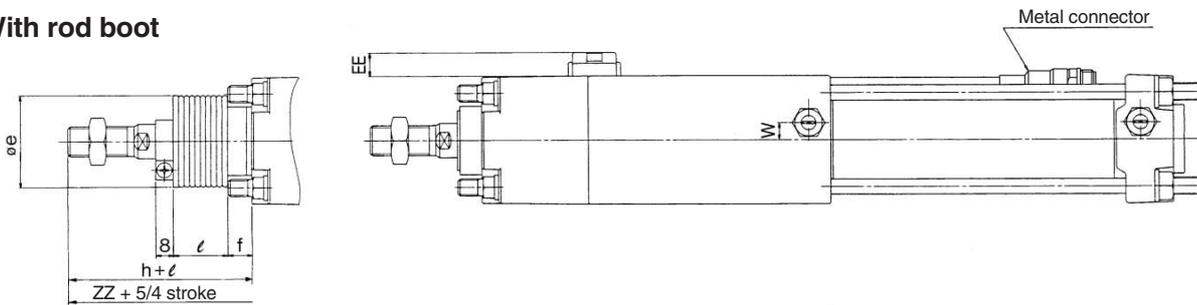


Dimensions:  $\varnothing 40$  to  $\varnothing 100$

## Basic style



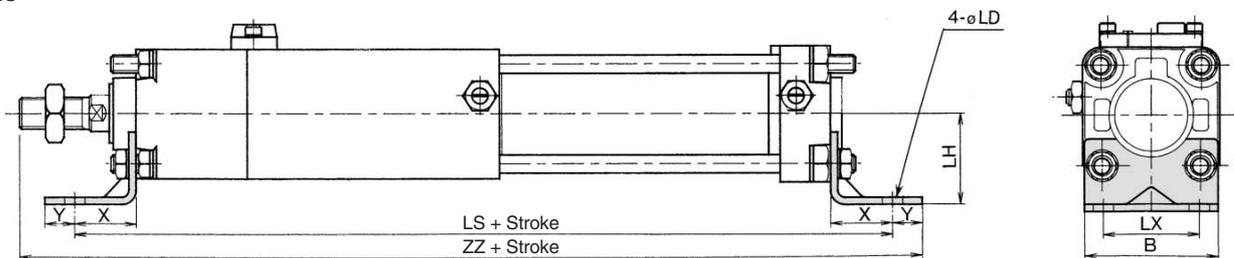
## With rod boot



Bore size (mm)	Stroke range		A	AA	AL	BB	BL	□B	C	CC	□C	D	D	E	EE	E	F	FF	GA	GB	GC	GD	GL	H <sub>1</sub>	J	K	M
	Without rod boot	With rod boot																									
40	25 to 850	25 to 700	30	45	27	71.5	22	60	42	20	44	22	16	21	11	32	10	10	150.5	15	26	54	10	8	M8 x 1.25	6	11
50	25 to 800	25 to 650	35	50	32	80.5	27	70	46	21	52	24	20	28.5	10	40	10	12	162.5	17	27	59	13	11	M8 x 1.25	9	11
63	25 to 800	25 to 650	35	60	32	98.5	27	85	48.5	23	64	24	20	28.5	13	40	10	15	174	17	26	67	18	11	M10 x 1.25	9	13.5
80	25 to 750	25 to 600	40	70	37	117.5	32	102	55	23	78	26.5	25	36	15	52	14	17	189	21	30	72	23	13	M12 x 1.75	11	16.5
100	25 to 750	25 to 600	40	80	37	131.5	41	116	56.5	25	92	35.5	30	36	15	52	14	19	198	21	31	76	25	16	M12 x 1.75	11	16.5

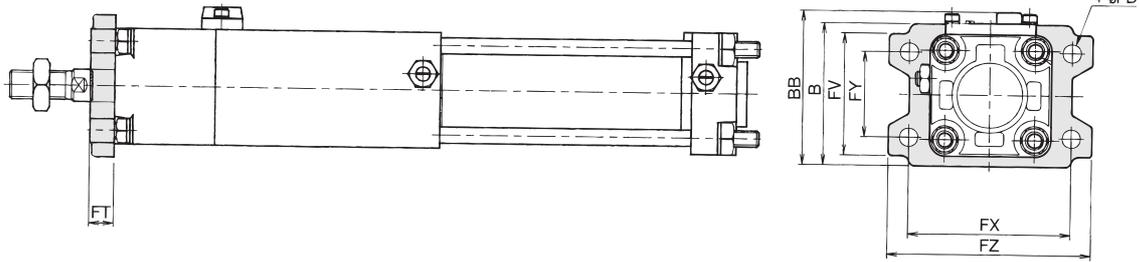
Bore size (mm)	MM	N	NN	P	S	W	Without rod boot		With rod boot				
							H	ZZ	e	f	h	l	ZZ
40	M14 x 1.5	27	161.5	1/4	218.5	8	51	280.5	43	11.2	59	1/4 stroke	288.5
50	M18 x 1.5	30	175.5	3/8	235.5	0	58	304.5	52	11.2	66		312.5
63	M18 x 1.5	31	187	3/8	254	0	58	326	52	11.2	66		334
80	M22 x 1.5	37	205	1/2	284	0	71	372	65	12.5	80		381
100	M26 x 1.5	40	214	1/2	300	0	72	389	65	14	81		398

## Foot style

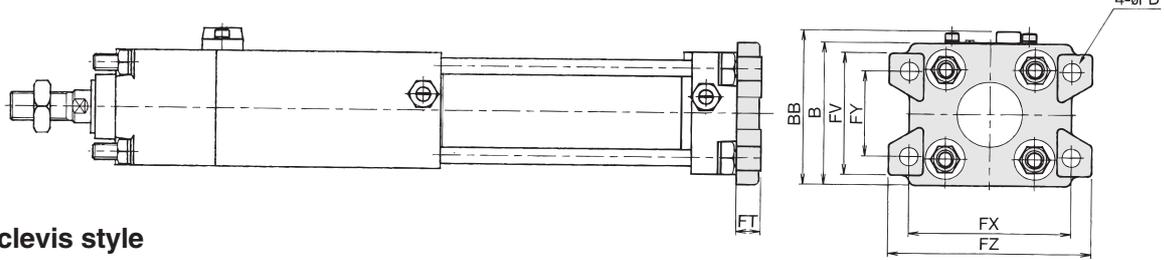


Bore size (mm)	B	LH	LS	LX	X	Y	ZZ	LD
40	58.5	40	272.5	42	27	13	309.5	9
50	68.5	45	289.5	50	27	13	333.5	9
63	83	50	322	59	34	16	362	11.5
80	100	65	372	76	44	16	415	13.5
100	114	75	386	92	43	17	432	13.5

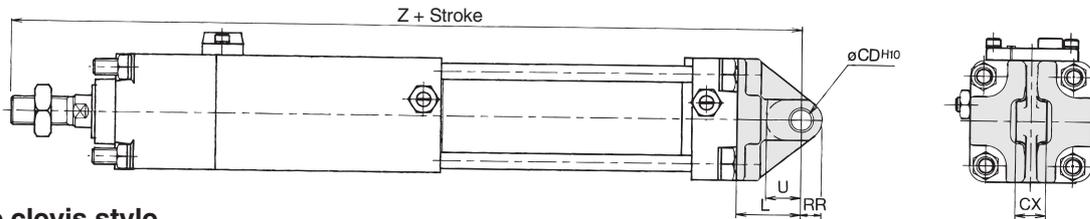
## Rod side flange style



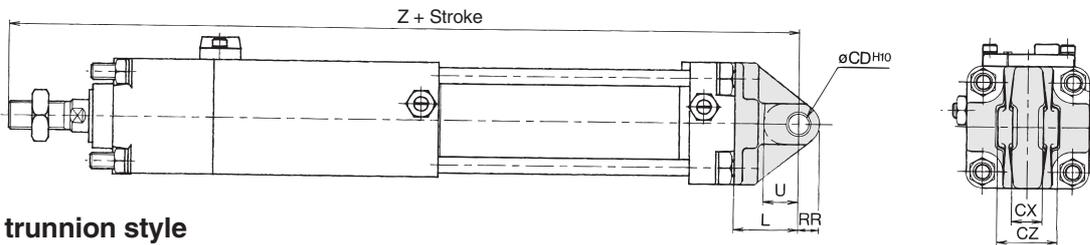
## Head side flange style



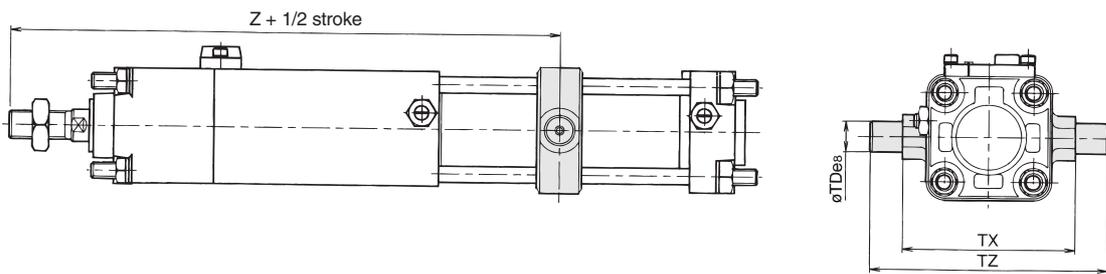
## Single clevis style



## Double clevis style



## Center trunnion style



Bore size (mm)	Rod side flange, Head side flange						Rod side flange		Single clevis, Double clevis						Double clevis		Center trunnion		
	FT	FV	FX	FY	FZ	FD	B	BB	CD <sup>H10</sup>	CX	L	RR	U	Z	CZ	TDes	TX	TZ	Z
40	12	60	80	42	100	9	71	76.5	10 <sup>+0.058/0</sup>	15 <sup>+0.3/0.1</sup>	30	10	16	299.5	29.5	15 <sup>-0.032/-0.059</sup>	85	117	224.5
50	12	70	90	50	110	9	81	88.5	12 <sup>+0.070/0</sup>	18 <sup>+0.3/0.1</sup>	35	12	19	328.5	38	15 <sup>-0.032/-0.059</sup>	95	127	248.5
63	15	86	105	59	130	11.5	101	106	16 <sup>+0.070/0</sup>	25 <sup>+0.3/0.1</sup>	40	16	23	352	49	18 <sup>-0.032/-0.059</sup>	110	148	263
80	18	102	130	76	160	13.5	119	112.5	20 <sup>+0.084/0</sup>	31.5 <sup>+0.3/0.1</sup>	48	20	28	403	61	25 <sup>-0.040/-0.073</sup>	140	192	297
100	18	116	150	92	180	13.5	133	139.5	25 <sup>+0.084/0</sup>	35.5 <sup>+0.3/0.1</sup>	58	25	36	430	64	25 <sup>-0.040/-0.073</sup>	162	214	309

## Mounting Bracket Part No.

Bore size (mm)	40	50	63	80	100
Axial foot *	CA1-L04	CA1-L05	CA1-L06	CA1-L08	CA1-L10
Flange	CA1-F04	CA1-F05	CA1-F06	CA1-F08	CA1-F10
Single clevis	CA1-C04	CA1-C05	CA1-C06	CA1-C08	CA1-C10
Double clevis **	CA1-D04	CA1-D05	CA1-D06	CA1-D08	CA1-D10

\* When ordering axial foot style brackets, 2 pcs. Should be ordered for each cylinder.  
 \*\* Clevis pin, flat washer and cotter pin are shipped together with double clevis style.

RE<sup>A</sup><sub>B</sub>

REC

C□X

C□Y

MQ<sup>Q</sup><sub>M</sub>

RHC

MK(2)

RS<sup>Q</sup><sub>G</sub>RS<sup>H</sup><sub>A</sub>

RZQ

MI<sup>W</sup><sub>S</sub>

CEP1

CE1

**CE2**

ML2B

C<sup>1</sup>/<sub>5</sub>-S

CV

MVGQ

CC

RB

J

D-

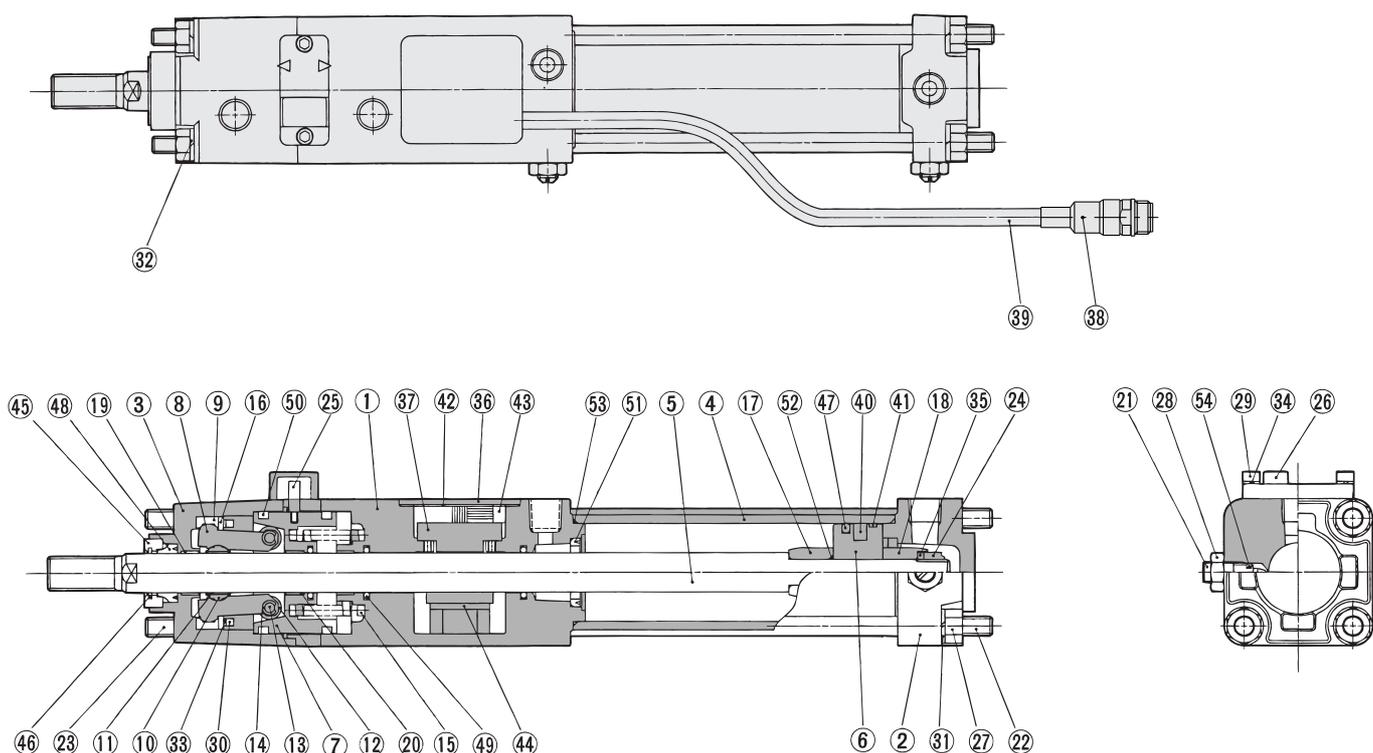
-X

20-

Data

# Series CE2

## Construction



### Component Parts

No.	Description	Material	Note
①	Rod cover	Aluminum alloy	Black painted after hard anodized
②	Head cover	Aluminum alloy	Black painted
③	Cover	Aluminum alloy	Black painted after hard anodized
④	Cylinder tube	Aluminum alloy	Hard anodized
⑤	Piston rod	Free-cutting steel	Hard chrome plated
⑥	Piston	Aluminum alloy	Chromated
⑦	Brake piston	Carbon steel	Nitrided
⑧	Brake arm	Carbon steel	Nitrided
⑨	Arm holder	Carbon steel	Nitrided
⑩	Brake shoe holder	Carbon steel	Nitrided
⑪	Brake shoe	Special friction material	
⑫	Roller	Chromium molybdenum steel	Nitrided
⑬	Pin	Chrome bearing steel	Heat treated
⑭	Snap ring	Stainless steel	JIS B 2805E
⑮	Brake spring	Steel wire	Dacrodized
⑯	Retaining plate	Rolled steel plate	Zinc chromated
⑰	Cushion ring A	Rolled steel	Electroless nickel plated
⑱	Cushion spear B	Rolled steel	Electroless nickel plated
⑲	Bushing	Lead-bronze casted	
⑳	Bushing	Lead-bronze casted	
㉑	Cushion valve	Rolled steel plate	Electroless nickel plated
㉒	Tie-rod	Carbon steel	Chromated
㉓	Unit holding tie-rod	Carbon steel	Chromated

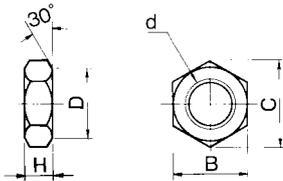
No.	Description	Material	Note
㉔	Piston nut	Rolled steel plate	Zinc chromated
㉕	Non-rotating pin	Carbon steel	High frequency quenched
㉖	Pin guide	Carbon steel	Black painted after hard anodized
㉗	Tie-rod nut	Carbon steel	Black zinc chromated
㉘	Lock nut	Carbon steel	Nickel plated
㉙	Hexagon socket head cap screw	Chromium molybdenum steel	Black zinc chromated
㉚	Hexagon socket head cap screw	Stainless steel	
㉛	Spring washer	Steel wire	Black zinc chromated
㉜	Spring washer	Steel wire	Black zinc chromated
㉝	Spring washer	Steel wire	Black zinc chromated
㉞	Spring washer	Steel wire	Black zinc chromated
㉟	Spring washer	Steel wire	Zinc chromated
㊱	Bracket assembly	Carbon steel	
㊲	Detection head assembly	—	
㊳	Connector	—	
㊴	Cable	—	
㊵	Rubber magnet	NBR	
㊶	Wear ring	Resin	
㊷	Gasket	NBR	
㊸	Bushing	NBR	
㊹	Amp cushion	NBR	
㊺	Seal retainer	Aluminum alloy	
㊻	Coil scraper	Phosphor bronze	

### Seal List

No.	Description	Material	Part no.				
			Bore size (mm)				
			40	50	63	80	100
㉔	Piston seal	NBR	NLP-40A	NLP-50A	NLP-63A	NLP-80A	NLP-100A
㉕	Rod seal A	NBR	PDU-16Z	PDU-20Z	PDU-20Z	PDU-25Z	PDU-30Z
㉖	Rod seal B	NBR	PSD-22 x 16	PSD-27 x 20	PSD-27 x 20	PSD-33 x 25	PSD-38 x 30
㉗	Brake piston seal	NBR	P44	P50	P60	P75	P90
㉘	Cushion seal	NBR	DSM-20	DSM-25	DSM-25	DSM-30	DSM-35
㉙	Piston gasket	NBR	CA40-1606	CA63-1608	CA63-1608	CA80-1609	CA100-1610
㉚	Tube gasket	NBR	CA40-1601	CA50-1602	CA63-1603	CA80-1604	CA100-1605
㉛	Cushion valve seal	NBR	P3	P3	P3	P5	P5

\* Since there is a possibility of improper operation, please contact SMC regarding the replacement of seals.

## Accessory Dimensions: Rod End Nut

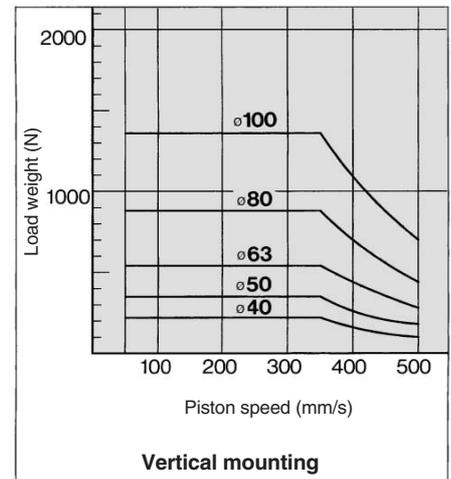
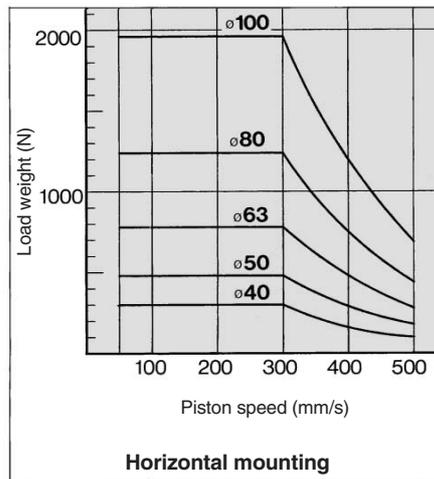


Material: Rolled steel

Part no.	Applicable bore size (mm)	d	H	B	C	D
NT-04	40	M14 x 1.5	8	22	25.4	21
NT-05	50, 63	M18 x 1.5	11	27	31.2	26
NT-08	80	M22 x 1.5	13	32	37.0	31
NT-10	100	M26 x 1.5	16	41	47.3	39

## Allowable Kinetic Energy

Operate the stroke reading cylinder with brake within the proper allowable kinetic energy. It must not be operated out of the allowable range, which is shown in the graph on the right. All sizes must be operated within this range. (Supply pressure 0.5 MPa)



## Operating Range

Auto switch model	Bore size (mm)				
	40	50	63	80	100
D-Z7□/Z80	8	7	9	9.5	10.5
D-A3□/A44	9	10	11	11	11
D-A3□C, D-A44C					
D-A5□/A6□					
D-B5□/B64	13	13	14	14	15
D-A59W					
D-B59W					
D-Y5□/Y6□	8	7	5.5	6.5	6.5
D-Y7P/Y7PV					
D-Y7□W/Y7□WV					
D-Y7BAL	3.5	3.5	5	5	5
D-F5□/J5□	4	4	4.5	4.5	4.5
D-F5□W/J59W					
D-F5BAL/F5NTL					
D-F59F					
D-G5□/K59	5	6	6.5	6.5	7
D-G5□W/K59W					
D-G5NTL/G5BAL					
D-G59F	6	7	7.5	7.5	8
D-G39/K39	9	9	10	10	11
D-G39C, D-K39C					

\* Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately 30% dispersion.)  
There may be the case it will vary substantially depending on an ambient environment.

Other than the models listed in "How to Order", the following auto switches are applicable.

For detailed specifications, refer to page 10-20-1.

Type	Model	Electrical entry (Fetching direction)	Features
Reed switch	D-A53/A56	Grommet (In-line)	Without indicator light
	D-A64/A67		
	D-B64		
	D-Z80		
Solid state switch	D-F59/F5P/J59	Grommet (In-line)	2-color indication 2-color indication Water resistant
	D-F59W/F5PW/J59W		
	D-F5BAL		
	D-F5NTL	Grommet (Perpendicular)	With timer
	D-G5NTL		
	D-Y69A/Y7PV/Y69B		
D-Y7NWW/Y7PWW/Y7BWW		2-color indication	

\* With pre-wire connector is also available in solid state auto switches.

For specifications, refer to page 10-20-66.

\* Normally closed (NC = b contact), solid state switch (D-Y7G/Y7H type) are also available. For details, refer to page 10-20-41.

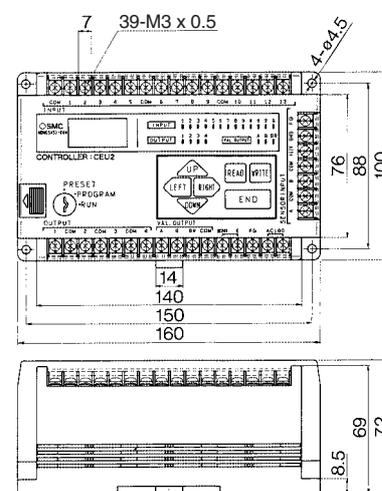
# Controller/CEU2

## Controller CEU2/Specifications

Model	CEU2	CEU2P
Type	Controller	
Mounting	Surface mounting (DIN rail or screw stop)	
Operation mode	PRESET mode, PROGRAM mode, RUN mode	
Display system	LCD (with back light)	
No. of digits	Program 1 to 16, Step 1 to 32	
Position control system	Key input (on front face)	
No. of control shaft	1 axis	
Positioning system	Key input (on front face)	
Positioning range	9999.9 mm	
Min. setting range	0.1 mm	
Memory system	Static RAM 8 K bite (Battery back up: life 5 years)	
Min. interval	5 mm or more	
Input signal	<ul style="list-style-type: none"> <li>● Start</li> <li>● Hold</li> <li>● Automatic/Manual</li> <li>● Return to origin</li> <li>● Emergency stop</li> <li>● Manual: extended, retracted (2 bit)</li> <li>● Program selection (4 bit)</li> <li>● Input origin</li> <li>● Reset</li> </ul>	
Output signal	<ul style="list-style-type: none"> <li>● Completion of positioning signal</li> <li>● Program END signal</li> <li>● Completion to figure out origin signal</li> <li>● Abnormal signal</li> </ul>	
Control output	NPN open collector (30 VDC, 50 mA)	PNP open collector (30 VDC, 50 mA)
Counting speed	20 kHz (kcps)	
Power supply	90 to 110 VAC, 50/60 Hz and 21.6 to 26.4 VDC, 0.4 A	
Operating temperature range	0 to 50°C (No freezing)	
Humidity range	25 to 85% (No condensation)	
Shock resistance	Endurance 10 to 55 Hz, Amplitude 0.75 mm, X, Y, Z for 2 hours each	
Noise resistance	Square wave noise from a noise simulator (Pulse duration 1 μs) Between 100 VAC line ±1500 V, I/O line ±600 V	
Impact resistance	Endurance 10 G; X, Y, Z directions, 3 times each	
Withstand voltage	Between case and AC line: 1500 VAC for 1 min. (3 mA or less) Between case and 12 VDC line: 500 VAC for 1 min. (3 mA or less)	
Power consumption	100 VA or less	
Insulation resistance	Between case and AC line: 500 VDC, 50 MΩ or more	
Weight	690 g	

\* Refer to operation manual of CEU2 regarding detailed positioning system.

## Dimensions



As for 3 point preset counter and multi counter, it will be common to CEP1 and CE1 series.  
For details, refer to 3 point preset counter/CEU1 on page 10-12-30, and Multi counter/CEU5 on page 10-12-27 respectively.

## Wiring with External Equipment

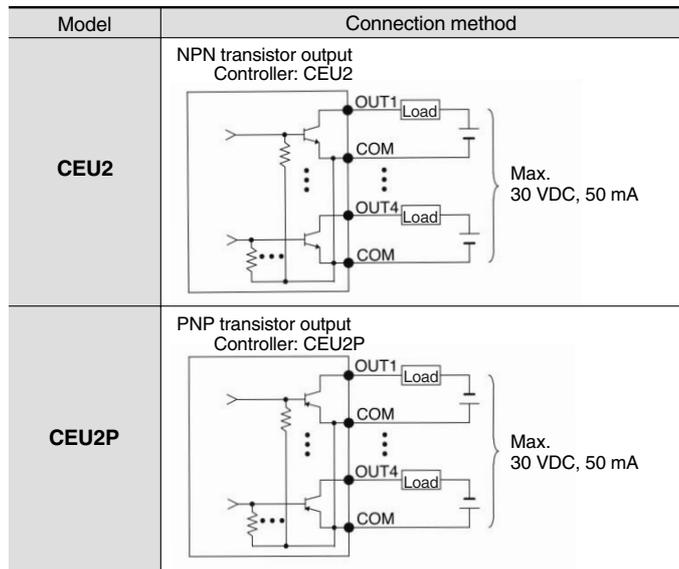
### <Wiring with controller CEU2>

#### 1. Wiring of driving power of controller

To operate the controller, use a power supply with the following specifications: 90 to 110 VAC, 50/60 Hz, and 21.6 to 26.4 VDC, 0.4 A or higher.

#### 3. Output circuit

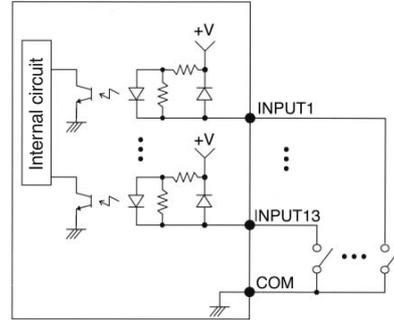
There are two outputs, the NPN open collector and the PNP open collector. The maximum rating is 30 VDC, 50 mA. Operating the controller by exceeding this voltage and amperage could damage the electric circuit. Therefore, the equipment to be connected must be below this rating.



\* However, on the valve output side, the COM of the input circuit and the COM of the output circuit are electrically insulated from each other.

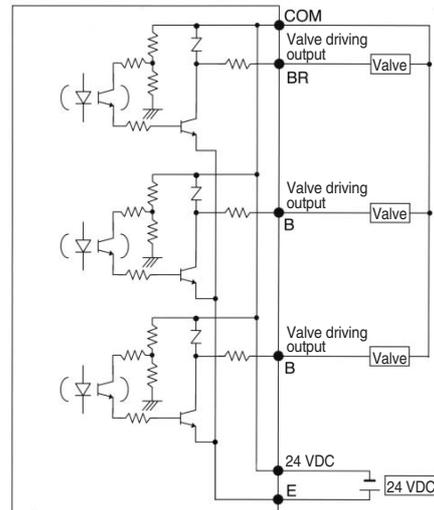
#### 2. Input circuit

The voltage and the amperage capacity of the switch or the PLC to be connected are 24 VDC, 10 mA or higher.



#### 4. Valve output circuit

The maximum rating is 24 VDC, 80 mA. Operating the controller by exceeding this voltage and amperage could damage the electric circuit. Therefore, the equipment to be connected must be below this rating.



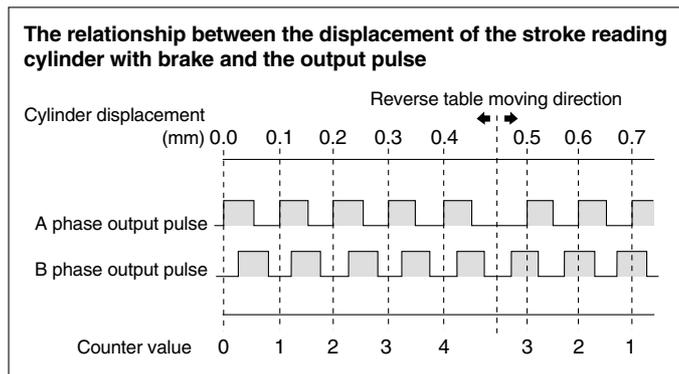
## Electrical Wiring

### <Output system of positioning detection sensor>

The position detection sensor of the stroke reading cylinder outputs an A/B phase difference (open collector output) as shown in the diagram below.

The relation between the moving distance and the output signal of the stroke reading cylinder with brake is as follows: Every 0.1 mm of movement of the stroke reading cylinder with brake outputs 1 pulse signal to both output terminals A and B.

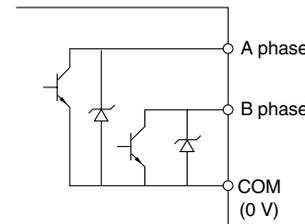
The maximum response speed of the sensor for the stroke reading cylinder with brake is at a maximum cylinder speed of 1500 mm/s (15 kcps).



### <Input, Output>

The connection of the input/output signals of the position detection sensor of the stroke reading cylinder is effected through the connector that extends from the cylinder. The output circuit and the connection of the connectors are described in the diagram below.

#### Output circuit of stroke reading cylinder with brake



#### Signal

Contact signal	Wire color	Signal name
A	White	A phase
B	Yellow	B phase
C	Brown	COM (0 V)
D	Blue	COM (0 V)
E	Red	+12 V
F	Black	0 V
G	—	Shield

#### Connector pin arrangement

