Series CEU

Series CEP1

Scale Cylinder & Counter

Series CE

CEP1/CEU5
Resolution: 0.01mm (accuracy ±0.02mm)
External output function: RS-232C BCD
Multipoint output: 5 points (20 points with bank switching)
31 points (binary output)

High Precision Scale Cylinder/ Series CEP1
Multi Counter/Series CEU5
Upgraded Scale Cylinder/Series CE1

Achieve rationalizati

A scale cylinder wit

Measurement is possible throughout the full stroke range.

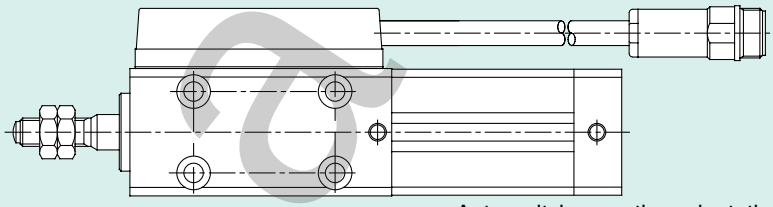
The home position can be anywhere within the cylinder stroke.

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

New

High Precision Scale Cylinder (CEP1)

- Resolution: 0.01mm (accuracy± 0.02mm)
- Special scraper now standard (IP-67)
- 2 kinds of seal material available (order made)
- Power supply voltage 12 to 24VDC

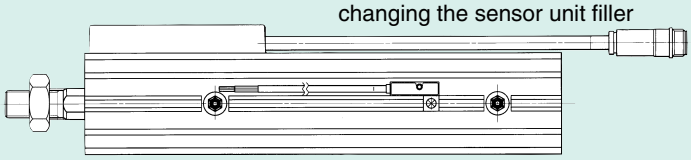


- Auto switch mounting orientation can be freely selected (3 mounting surfaces)

Upgraded

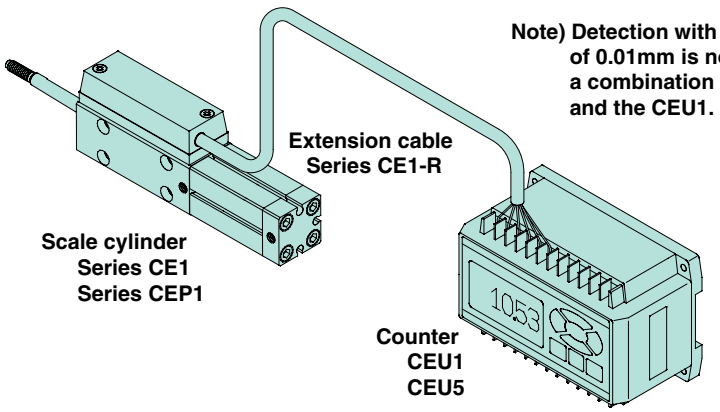
Scale Cylinder (CE1)

- Resolution: 0.1mm (accuracy± 0.2mm)
- Water resistance improved by changing the sensor unit filler



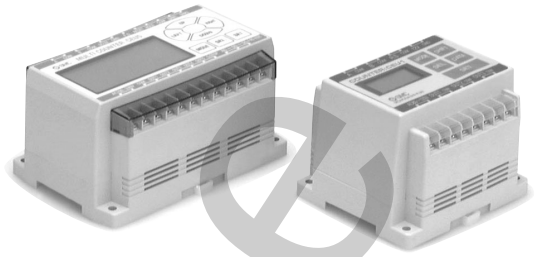
- Power supply voltage 12 to 24VDC
- Abundant stroke variations
- Improved noise resistance

System Configuration



Note) Detection with discrimination of 0.01mm is not possible with a combination of Series CEP1 and the CEU1.

on of production lines
th position feedback



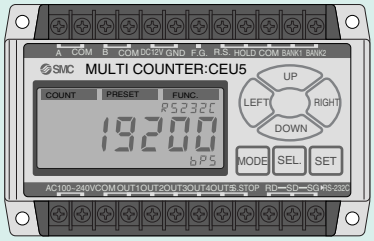
Tolerances of preset values can be set. (CEU1, CEU5)

Tolerances can be set for preset values.
CEU1: ± set tolerance
CEU5: + set tolerance, – set tolerance (separate settings)

Simple operation

New

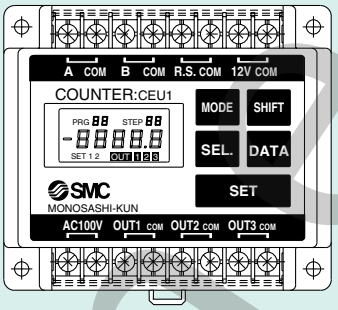
Multi Counter (CEU5)



- Output terminal: 5 points
- Number of output settings: 20 points (bank switching) 31 points (binary output)
- Communication function with RS-232C
- With BCD output (optional)
- Maximum counting speed 100kHz
- Prescale function
- With multiplication switching (1, 2, 4 multiplication)
- DIN rail mountable
- 6 digit counter display

Includes all functions of the CEU1.

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

Series CEP1

Bore size (mm)	Standard stroke (mm)			
	25	50	75	100
12 equiv.	●	●	●	●
20 equiv.	●	●	●	●

CEU1

Power supply voltage \ Output transistor system	NPN	PNP
100VAC	●	●
24VDC	●	●

CEU5

Power supply voltage \ Count data output / Output transistor system	RS-232C+BCD		RS-232C	
	NPN	PNP	NPN	PNP
100 to 240VAC	●	●	●	●
24VDC	●	●	●	●

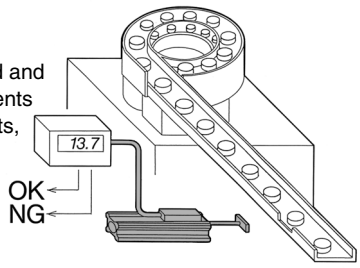
Extension cable

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

Applications

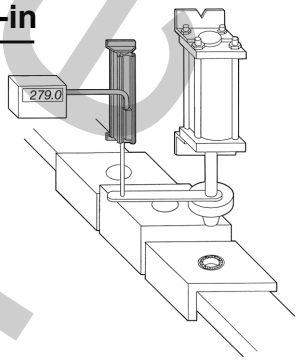
Parts inspection

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



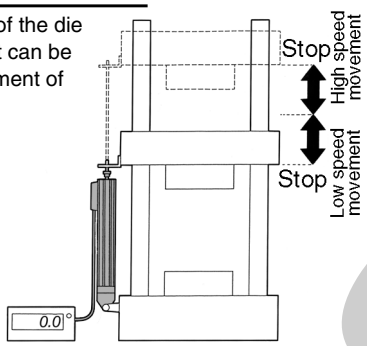
Confirmation of press-in

Can confirm the press-in 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.



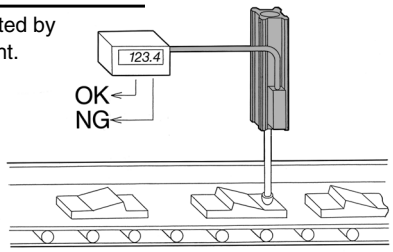
Detection of die assembly's deceleration point

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



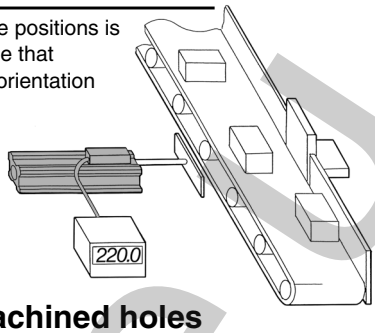
Discrimination of direction

Direction can be discriminated by measuring work piece height.



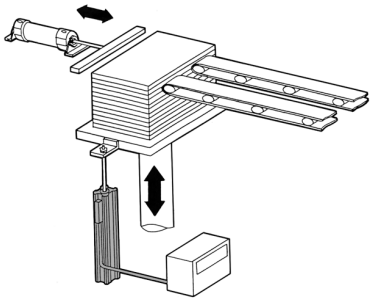
Length/breadth discrimination

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



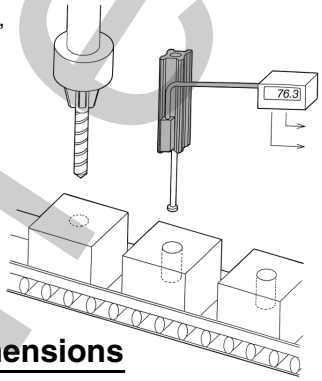
Detection of lifter position

Can continuously monitor a lifter's stroke.



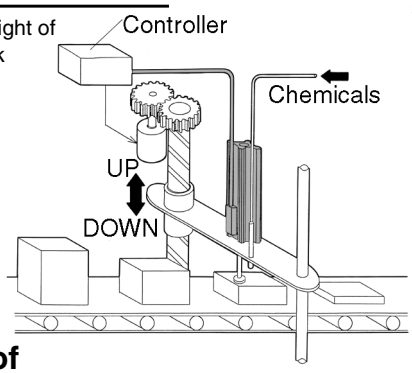
Inspection of machined holes

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



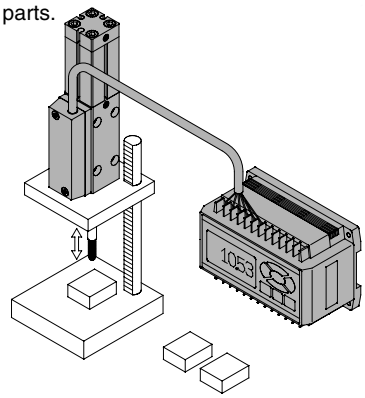
Nozzle height adjustment

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



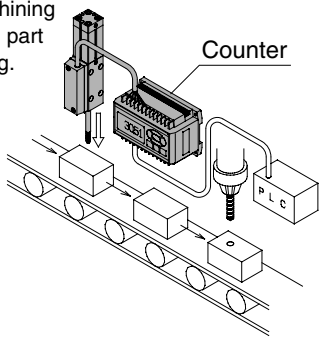
Measurement of dimensions

Can measure dimensions of parts.



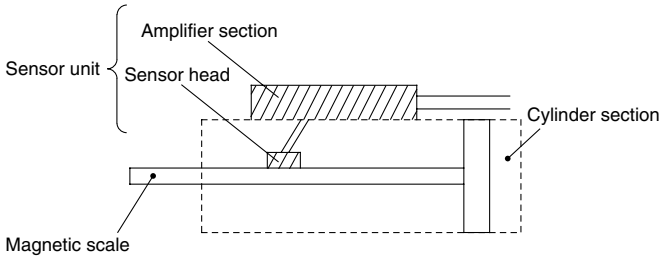
Measurement of machining dimensions

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

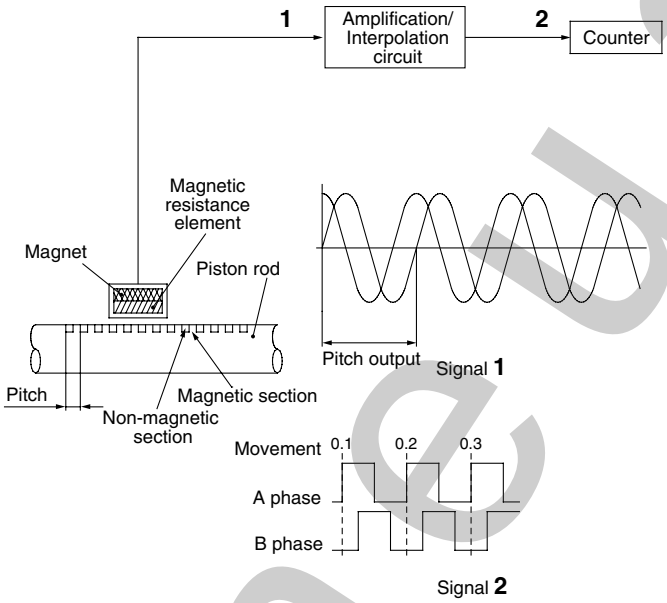


Measurement Principles

The amount of rod movement in the scale 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 attached to the cylinder case. The sensor head and amplifier section together are referred to as the sensor unit.



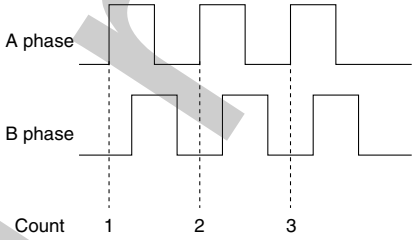
The scale cylinder is equipped with the capability of outputing the piston stroke movement as a pulse signal. The measurement principle is as shown in the drawing below.



(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.
(5) In the case of the high precision scale cylinder, the sin, cos 2-phase signal obtained in (2) is amplified and divided into 1/20 parts. As a result, a 90° phase difference pulse signal of 0.04mm/pulse (Signal 2) is output.
(6) By multiplying this pulse signal by 4 with the counter, it is possible to detect the piston position with a resolution of 0.01mm.

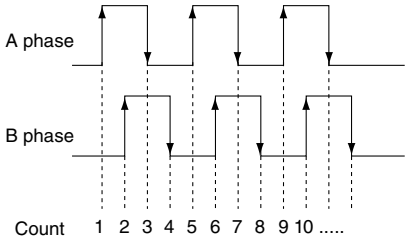
A/B phase difference output (90° phase difference output)

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.



4 times multiplication function

This function increases resolution 4 times by counting 4 for each cycle of pulses, instead of counting 1 for each cycle as is normally the case. In principle, this function counts each time there is a rise or fall in either of the A or B phase pulses.



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 scale 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 scale 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.