CT1 / CS Series MANUAL

Thank you for your purchasing our product. Please read this instruction manual carefully before using to ensure the correct usage of this product. Please keep this instruction manual for future reference.

WARNING Misuse of this device may lead to injury to the user or damage to the device.

Customer Service

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Attention

- Do not use this device near machines that emit strong electromagnetic fields or objects that store static electricity.
- Do not drop or subject this device to strong impact.
- Do not use this device on rollers with high temperature or where it will be exposed to solvent, oil and water.
- Do not use or store this device where it will be exposed to direct sunlight, dust, high temperature and high humidity.
- Do not use this device where it will be exposed to vibration to avoid incorrect measuring or fault.
- Do not use organic solvents such as thinners etc. to clean this device.
- Do not attempt to disassemble or modify this device.
- Internal parts may be destroyed if a voltage outside the rated voltage is applied.
- Do not touch the conductive part of leadwires while power is being applied.

1. About CT1/CS Series

Wheels for CT1/CS series are designed to run 1-meter distance by rotating 3 times.
Resolution unit depends on the number of pulses that are generated while wheel rotates 3 times [or runs 1 meter].
During wheel's 3 rotations [or 1-meter run], 3:1 model generates and outputs 1 pulse,
3:10 model 10 pulses, 3:100 model 100 pulses, and 3:1000 model 1000 pulses.
By counting these pulse signals with a counter or PLC, length measurement can be performed.

2. Models

Models	Sensor	Unit	Speed	Weight	Operation Torque	Proper Counter
CT1-3:1	Microswitch	1m [yard]	240m [yard]/minute	700g [25oz.]	15mN.m	Electronic Counter Electromagnetic Counter
CT1-3:10		0.1m [yard]	24m [yard]/minute	710g [25oz.]		
CT1-3:1A	Photoelectronic Sensor, 1 Non-contact Output (Voltage Output)	1m [yard]	700m [yard]/minute	730g [26oz.]		Electronic Counter
CT1-3:10A		0.1m [yard]	500m [yard]/minute	730g [26oz.]		
CT1-3:100A		0.01m [yard]	250m [yard]/minute	740g [26oz.]		
CT1-3:1000A		0.001m [yard]	100m [yard]/minute	790g [28oz.]		
CT1-3:1R	Photoelectronic Sensor, 2 Non-contact Outputs (Voltage Output / 90°Quadrature Output)	1m [yard]	700m [yard]/minute	740g [26oz.]		Bidirectional Electronic Counter
CT1-3:10R		0.1m [yard]	500m [yard]/minute	740g [26oz.]		
CT1-3:100R		0.01m [yard]	250m [yard]/minute	750g [26oz.]		
CT1-3:1000R		0.001m [yard]	100m [yard]/minute	780g [28oz.]		
CT1-3:1AC	Photoelectronic Sensor, 1 Non-contact Output (Open collector Output)	1m [yard]	700m [yard]/minute	730g [26oz.]		Electronic Counter
CT1-3:10AC		0.1m [yard]	500m [yard]/minute	730g [26oz.]		
CT1-3:100AC		0.01m [yard]	250m [yard]/minute	740g [26oz.]		
CT1-3:1000AC		0.001m [yard]	100m [yard]/minute	790g [28oz.]		
CT1-3:1000ACH		0.001m [yard]	100m [yard]/minute	790g [28oz.]		
CT1-3:1RC	Photoelectronic Sensor, 2 Non-contact Outputs (Open collector Output / 90°Quadrature Output)	1m [yard]	700m [yard]/minute	740g [26oz.]		Bidirectional Electronic Counter
CT1-3:10RC		0.1m [yard]	500m [yard]/minute	740g [26oz.]		
CT1-3:100RC		0.01m [yard]	250m [yard]/minute	750g [26oz.]		
CT1-3:1000RC		0.001m [yard]	100m [yard]/minute	780g [28oz.]		
CT1-3:1000RCH		0.001m [yard]	100m [yard]/minute	780g [28oz.]		
CS-3:1	Reed Switch	1m [yard]	500m [yard]/minute	740g [26oz.]	15mN·m	Electronic / Electromagnetic Counter

3. Specifications

Models	Output	Power source	Current consumption	Output voltage	Maximum load current	Residual voltage	Output impedance
CT1-3:1	1 Output (Contact)	- Microswitch Contact output, Capacity : AC250V • 5A , DC125V 0.5A (Load)					
CT1-3:10							
CT1-3:1A	1 Non-contact Output (Voltage Output)	DC5-24V ±10%	35mA	H : Power-supply voltage-1V min. L : 0.8V max.	100mA	-	3.9KΩ
CT1-3:10A							
CT1-3:100A							
CT1-3:1000A		DC5-12V ±10%	40mA	H : Power-supply voltage-1V min. L : 0.5V max.	20mA	-	2KΩ
CT1-3:1R	2 Non-contact Outputs (Voltage Output / 90°Quadrature Output)	DC5-24V ±10%	70mA	H : Power-supply voltage-1V min. L : 0.8V max.	100mA	-	3.9KΩ
CT1-3:10R							
CT1-3:100R							
CT1-3:1000R		DC5-12V ±10%	40mA	H : Power-supply voltage-1V min. L : 0.5V max.	20mA	-	2KΩ
CT1-3:1AC	1 Non-contact Output (Open collector Output)	DC5-24V ±10%	35mA	-	100mA	0.8V max.	-
CT1-3:10AC							
CT1-3:100AC							
CT1-3:1000AC		DC5-12V ±10%	40mA	-	20mA	0.5V max.	-
CT1-3:1000ACH		DC24V ±10%					
CT1-3:1RC	2 Non-contact Outputs (Open collector Output / 90°Quadrature Output)	DC5-24V ±10%	70mA	-	100mA	0.8V max.	-
CT1-3:10RC							
CT1-3:100RC							
CT1-3:1000RC		DC5-12V ±10%	40mA	-	20mA	0.5V max.	-
CT1-3:1000RCH		DC24V ±10%					
CS-3:1	1 Output (Contact)	-	Reed Switch Contact output, Capacity : 300VAC 0.7A 70VA, 350VDC 0.5A 50W (Load)				

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Specifications (CT1)

Ambient temp. : Operating	-10 - +50°C [14 - 122°F] (Should not be Frozen)	Ambient Humid. : Operating	35 - 85% (Non-Condensing)		
Installation environment	Over-voltage category II, Pollution degree 2, Indoor use (IEC61010-1)	Altitude	2000m max.	Compliance	CE, RoHS

Specifications (CS)

Ambient temp. : Operating	-5 - +40°C [23 - 104°F] (Should not be Frozen)	Ambient Humid. : Operating	85% max. (Non-Condensing)

4. Hi Level Voltage at Input Device in conjunction with CT1 of Voltage Output Model

Input voltage [or High Level] is determined by the following factors: power source voltage of CT1; output impedance of CT1; and input impedance of input device.
Such input voltage can be calculated as a simplified value by the formula below:

V: Power Source Voltage of CT1 [as specified above]
R1: Output Impedance of CT1 [as specified above]
R2: Input Impedance of Input Device.

$$V_{out} = V \times \frac{R2}{R1 + R2}$$

5. Accessories

Model : CT1	Measuring wheel for meter x 2	2 pieces of measuring wheel for meter are equipped as standard accessories. Instead of those, 2 pieces of measuring wheel for yard are available. Please order type of measuring wheel. "-YP" should be added to the model number. (Ex.) CT1-3:10A-YP
Model : CT1-A	Measuring wheel for meter x 2, 3P connector x 1	
Model : CT1-R	Measuring wheel for meter x 2, 4P connector x 1	
Model : CS	Measuring wheel for meter x 2	

Measuring wheel for meter : Diameter 106.1mm (Circumference 1/3 meter), Surface material is Thermoplastic Rubber.
Measuring wheel for yard : Diameter 97.0mm (Circumference 1/3 yard), Surface material is Thermoplastic Rubber.

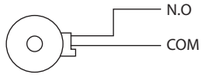
Measuring wheels are subject to slip due to wear after prolonged usage. They may cause measurement errors if not replaced on time. Please periodically check the wheels for signs of deterioration.

6. Connection

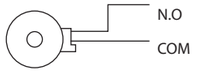
Cable does not come with either CT1-A or CT1-R model.
Procure the cable that is appropriate for your installation environment, and the cable should be based on the specifications below:
For CT1-A models, 3-Pin cable equivalent to AWG16.
For CT1-R models, 4-Pin cable equivalent to AWG20-22.

<How to wire up cable to 3P/4P Female Connector>
1. Remove 2 pcs of screw ① to detach the fastener.
2. Remove the smaller screw ② and pull out the cover.
3. Put cable through the cover first, and then joint the pins inside connector and wire leads of cable together by soldering.
4. Through reverse procedure, attach the cover and the fastener to the connector, and put screw to tighten up the connector.

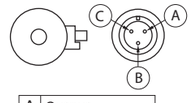
• Model : CT1 (Micro Switch output)



• Model : CS (Reed Switch output)

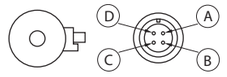


• Model : CT1-A (Photoelectronic sensor 1 output) 3P connector

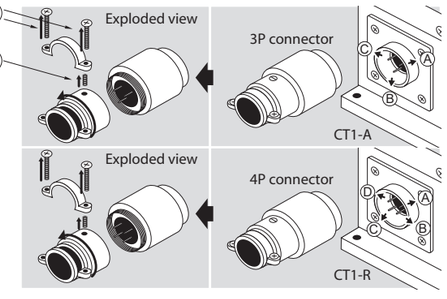


A	Output
B	GND
C	DC Power Source

• Model : CT1-R (Photoelectronic sensor 2 outputs) 4P connector

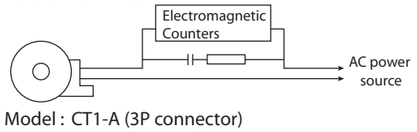


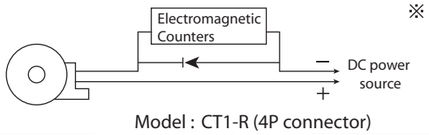
A	DC Power Source
B	Output A
C	GND
D	Output B



7. Connection to counters

Model : CT1 · CS





※ It is recommendable to use such components as diode, CR etc., for the protection of contact in the case of connection with such inductive load as electromagnetic counter.

Model : CT1-A (3P connector)

Terminal numbers in generator's connector		Terminal numbers in counter MD	G48 E48	E60	E10
A	Output	4	1	1	1
B	GND	3	4	4	4
C	DC power source	2	3	3	3

Model : CT1-R (4P connector)

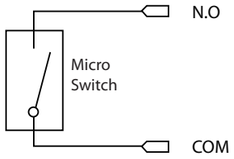
Terminal numbers in generator's connector		Terminal numbers in counter MDR	G48 E48	E60	E10
A	DC power source	3	3	3	3
B	Output A	4	1	1	1
C	GND	6	4	4	4
D	Output B	5	2	2	2

* DC Source is not provided in G48-306, E48-102 and E48-112. Please prepare DC power supply for CT1 separately.
* CT1 models with Voltage Output (excluding CT1-3:1000A/R) cannot be used in parallel connection. Please use CT1 models with Open Collector Output.

8. Output circuit

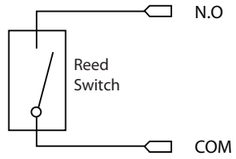
Model : CT1

CT1-3:1 / CT-3:10



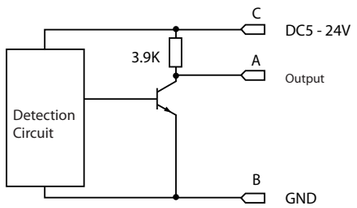
Model : CS

CS-3:1

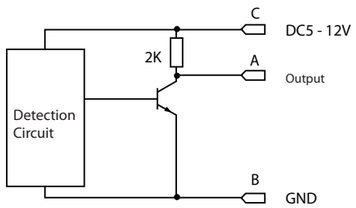


Model : CT1-A

CT1-3:1A / CT1-3:10A / CT1-3:100A

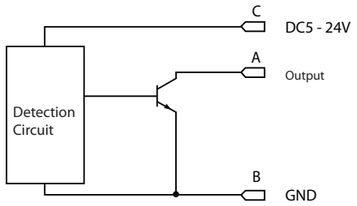


CT1-3:1000A

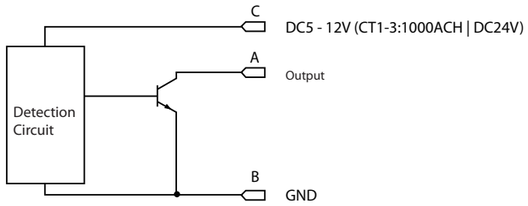


Model : CT1-AC

CT1-3:1AC / CT1-3:10AC / CT1-3:100AC

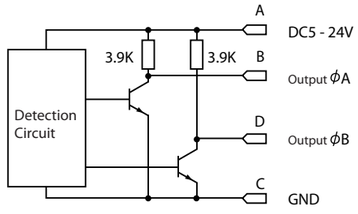


CT1-3:1000AC / CT1-3:1000ACH

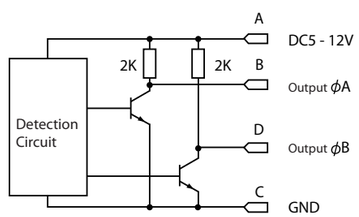


Model : CT1-R

CT1-3:1R / CT1-3:10R / CT1-3:100R

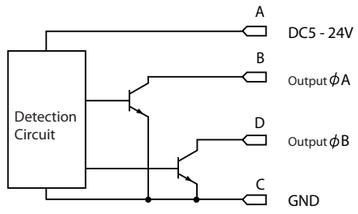


CT1-3:1000R

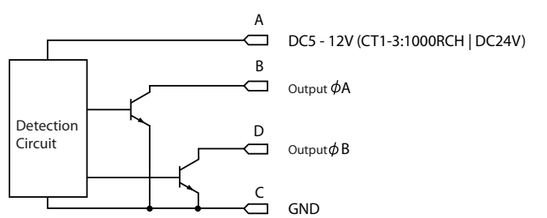


Model : CT1-RC

CT1-3:1RC / CT1-3:10RC / CT1-3:100RC



CT1-3:1000RC / CT1-3:1000RCH



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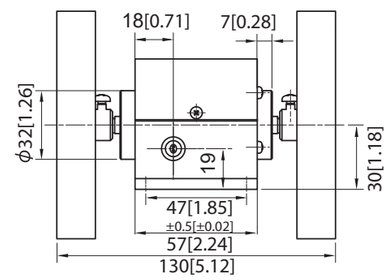
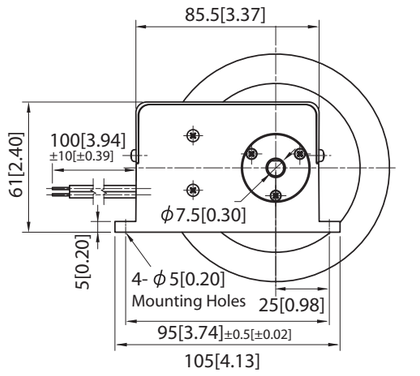
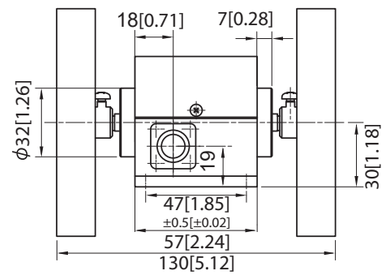
9. Dimensions : mm [inch]

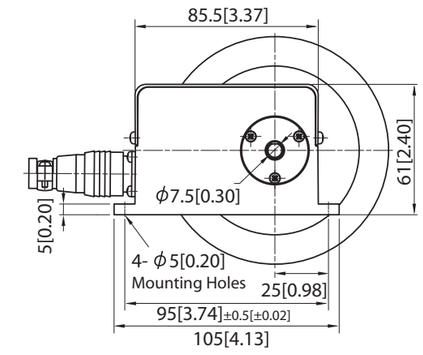
Model : CT1



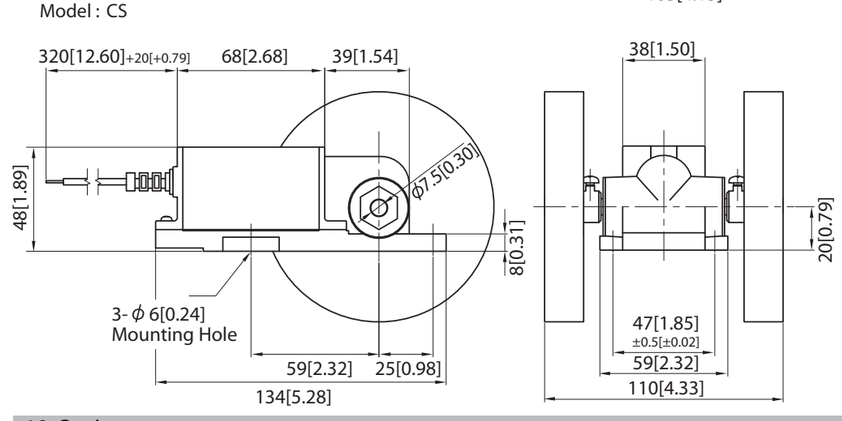


Model : CT1-A / CT1-R





Model : CS



Installation note

- Make sure that measuring wheels are fixed to the shaft of the device with the screws provided to avoid slippage.
- Make sure that both measuring wheels are parallel to each other and perpendicular to the surface of measuring object or roller.
- Be careful to the surrounding environment if the measuring object is easy to be stretched by tension, temperature and humidity.
- Please avoid using this device at places with vibrations that may cause not only imprecise measurement, but also malfunction of the device.
- There may be differences between measured value on the counter and actual length of the material. If this happens, kindly check if the measuring wheels slip or if the roller is synced with the measuring object.
- ON and OFF ratio of output of standard device is 1:1. For example, 0.5m-ON and 0.5m-OFF are for the measuring unit of a meter.
- There may be some differences between measured value on the counter and actual length of the material. The differences may be made when ON/OFF of output signal happens shortly before or after the measuring "start position" or measuring "stop position". It is recommended that you consider the resolution of the device based on the required accuracy.

Wheel

- Measuring wheels are subject to slip due to wear after prolonged usage. They may cause measurement errors if not replaced on time. Please periodically check the wheels for signs of deterioration.

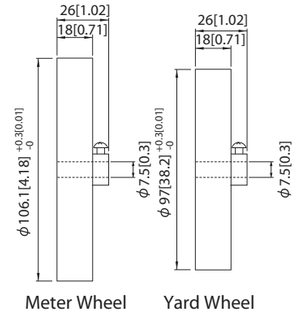
10. Option

2 pieces of measuring wheel for meter are equipped as standard accessories.
Instead of those, 2 pieces of measuring wheel for yard are available.
Please order type of measuring wheel.

Meter Rubber Wheel of High Precision
Circumference adjusted
Comes with Certificate of Inspection
*With extra charges, additional documents can be issued, such as Traceability System Diagram, and Certificate of Calibration Tool.

Meter Urethane Wheel
MRM110
Diameter of measuring part: 106.1 mm
(1/3 m in circumference)
Outer circumference finished with urethane resin coating
Abrasion resistance

Yard Wheel
MRM097
Diameter of measuring part: 97.0mm
(1/3 yard in circumference)
Surface material is Thermoplastic Rubber



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*Subject to change without prior notice.