Timing Comparator

What is a "Timing Comparator"? - It's a brand new concept in sensing.
The TMC Timing Comparator is a signal processing unit that senses not only the On and Off transitions but also memorizes the timing of the incoming signals. These On and Off signals are indicators of the shape of the target that the TMC uses to determine if the correct part is present.

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TMC series 159

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Timing Comparator

TMC series

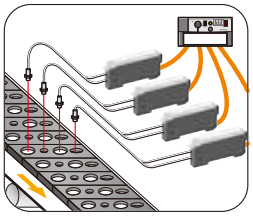
·TMC-N11 NPN type ·TMC-P11 PNP type

- ***TMC "Timing Comparator" a new concept in product sorting applications.***
- ***Any sensor (Digital output, Analog output) is applicable for use with the TMC module.***
- ***Monitor the signals from 1 analog output device or 4 digital output devices.***

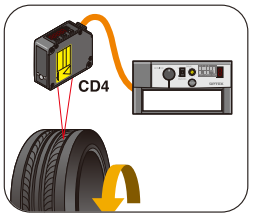
The timing of the output signals can be used to determine the shape of the object.

The "CVS-M1 remote monitor" can be used to monitor the settings of the TMC.

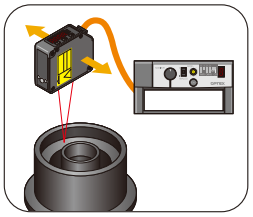
Applications



To identify the pattern of holes in a rubber piece.



Depth of tread



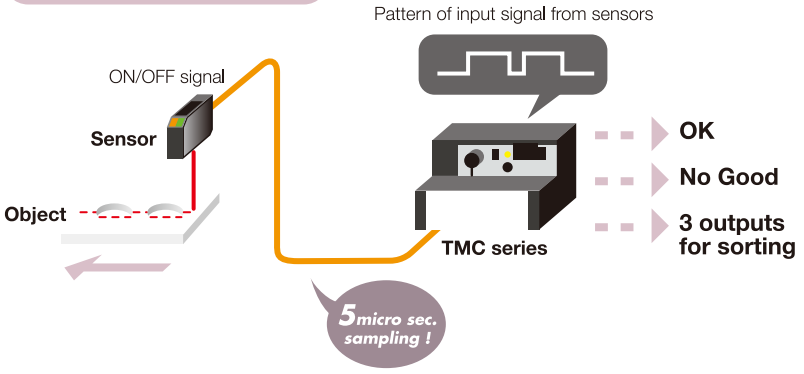
Shape of cast part

Features

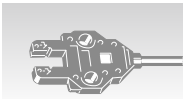
A brand new concept in sensing.

The TMC Series "Timing Comparator" is a Signal Processing Unit that senses not only the ON / OFF signal from a sensor but also memorizes the "timing" of the incoming signals. It can monitor the signals from up to 4 devices. These ON / OFF signals are indicators of the shape. The TMC uses this to identify the shape of the object. This is quite a new way of sorting / identifying. Any sensor that outputs an ON / OFF signal is applicable for use with the TMC Series Timing Comparator. It is possible to not only detect the presence of an object, but to also detect the orientation, shape, etc.

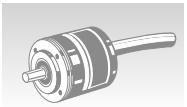
International Patent



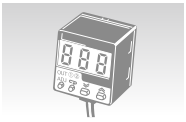
The TMC works with any type of sensor with an ON / OFF output.



Photomicro sensor



Encoder



Pressure sensor

Inductive / Capacitive sensor

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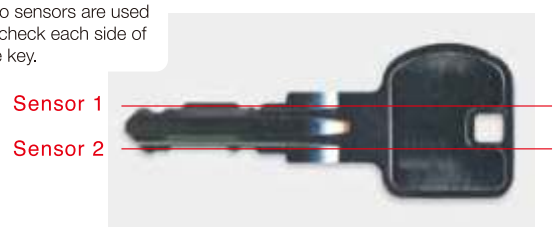
"Timing" is stored and compared like this

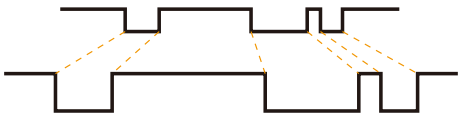
The TMC Timing Comparator memorizes the timing pattern of the incoming signals (sensor outputs). It is possible to monitor a maximum of 4 sensors. Once the pattern of the object has been stored by teaching, the TMC will compare the preset pattern with the incoming signals. The photo at the below shows an example where a key is being checked for the correct orientation. Two sensors are used.

Two sensors are used to check each side of the key.



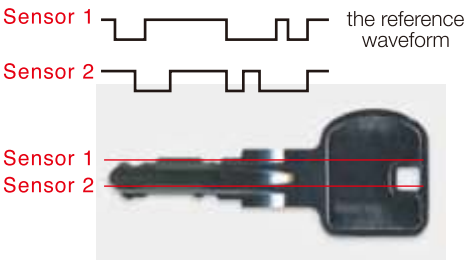
Line speed doesn't matter.

This is an example of the signal from Line 1 above.
This pattern is stored to be used for comparision.

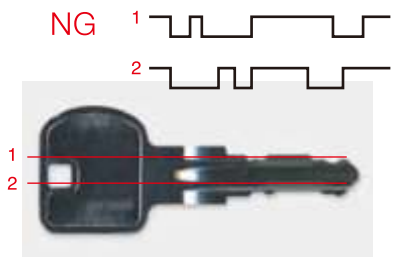


The pattern (timing) is expanded like this at a slower speed, the TMC can automatically adjust for this. There is no difference in the "ratio" of the ON and OFF timing.

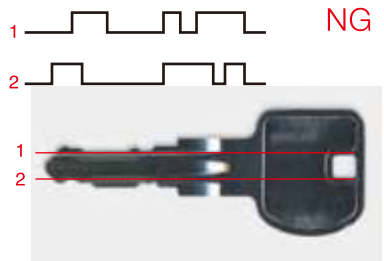
Sampled pattern for Teach-in



Opposite direction



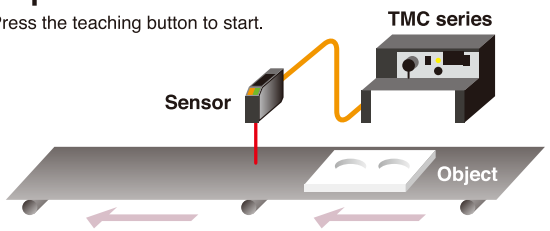
Reverse



Easy setup just 3 steps!

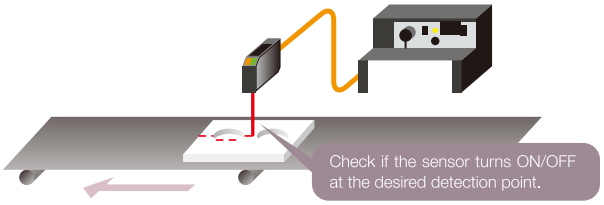
Step 1

Press the teaching button to start.



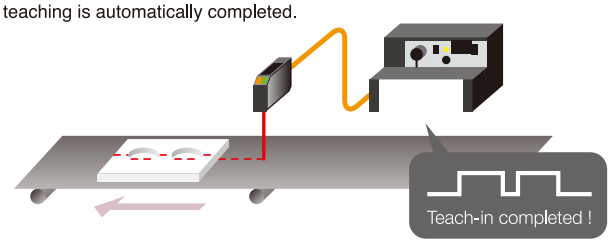
Step 2

Scan the object
(maintain a constant speed if possible)



Step 3

Then, after time-out period that is preset, teaching is automatically completed.



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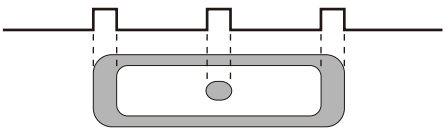
STANDARD MODE : Detection of incorrect objects.

The outside shape is OK, but the position, the number or the size of the inner pins is incorrect. In the past you may have been using an expensive vision system for this type of workpiece. These can be complicated to setup and use.

The TMC Timing Comparator offers a simple and easy solution in a totally new concept. It features simple setup and easy processing at a much lower cost than vision systems.

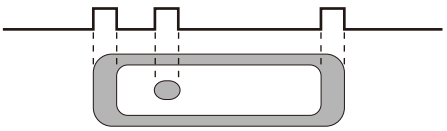
Stored waveform

OK



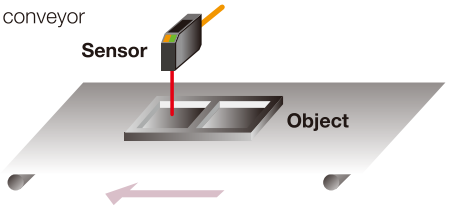
Incorrect position of hole.

NG

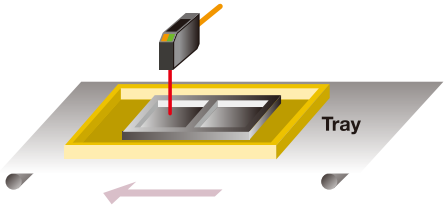


For teach-in and sensing, the object must move but not necessarily at a constant speed.

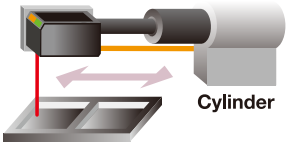
(1) Inspection on conveyor



(2) Inspection when the index table is moving



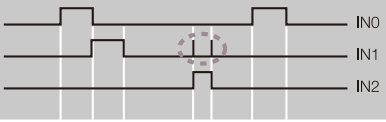
(3) Inspection by moving the sensor



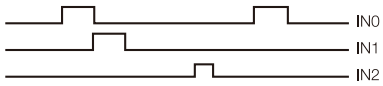
ANALOG MODE : Pushbutton Teach is fast and simple, for Analog mode too.

Use the analog output of the CD3 or CD4 Displacement sensors to sort products. For example, sorting tires by measuring the depth of tread.

By comparing the stored patterns against the CD3 or CD4 Displacement sensor output it is possible to identify the product.

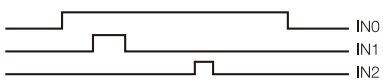


Teaching waveform



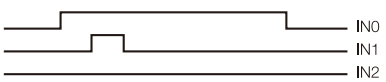
Sample waveform (good)

OK



Process depth is insufficient (incorrect)

NG



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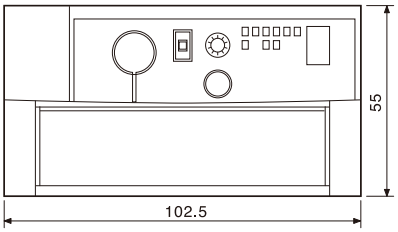
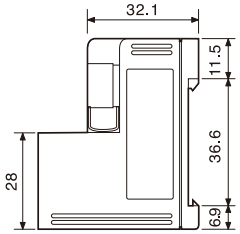
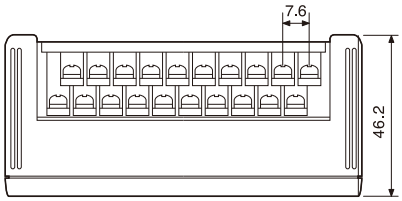
Dimensions



Front



Side



bottom

(Unit : mm)

Specifications

Model	TMC-N11	TMC-P11
Supply voltage	12 - 24V DC ±10%	
Power consumption	Max. 80 mA / 24 V DC	
Input signal	NPN	PNP
Output signal	NPN Open collector	PNPOpen collector
Sensor input	1 to 4	
Teaching / clear input	1 Teaching input and 1 Clear input	
Bank selection	3 (7 types with binary format)	
Input response time	5 µs - 25.6 ms	
Output response time	Max. 5 µs	
OK / NG output	1 OK output and 1 NG output	
Sorting output	3 (7 types with binary format)Used together with Bank selection input	
Maximum open / close capacity	Max. 100 mA	
Output leakage current	Max. 100 µA	
Output residual voltage	Max. 0.8 V	Max. 1.8 V
Analog resolution	10 bit (1 bit = 6.45 mV / 25.8 µA)	
Accuracy	± 0.2 % of F.S. (F.S. = 6.6 V / 26.4 mA)	
Linearity	± 0.2 % of F.S.	
Input ON voltage	Min. 7.8 V	
Input OFF current	Max. 1.0 mA	
Input current (typical)	7.1 mA / 24 V DC	
Input impedance, Input voltage range	3.3kΩ, 0 - Supply voltage (AIN excluded)200kΩ, 0 - 6.5 V (AIN voltage input)250Ω, 0 - 26 mA (AIN current input)	
Temp drift	± 80 ppm/°C	
Operating temp	0 - 55°C	
Operating humidity	35 - 85 %/RH	
Storage temp	–20 - 70°C	
Storage humidity	25 - 95 %/RH	
Vibration resistance	10 - 55 Hz Amplitude 1.5 mm	
Shock resistance	5 G (10 times)	
Housing material	ABS	
Weight	Approx. 130 g	