TC-4 Series Tachometers

Common Features

Digital Tachometer

- Prescale functions (Except TC-4L)
  The TC-4 series features built-in prescale functions that can convert the number of revolutions into speed, flow rate, and the amount of production per unit time.
- High accuracy
  Owing to the period measurement method, the TC-4 series offers high measurement accuracy in low speed rotation. The sampling function guarantees sufficient accuracy even in high speed rotation.
- Immediate zero display when rotation stops (TC-41)
  The display becomes zero 1 or 6 seconds after rotation stops.

TC-4 Series Tachometers Lineup

Classification	Appearance	Model Number	Digit	Input	Power Source	Power Source for Sensors	Price
Models Dedicated to Display		TC-4	4	Open collector	90 to 132 V AC 180 to 264 V AC	12 V DC, 50 mA	Open
Digital Output		TC-4B	4	Open collector	90 to 132 V AC 180 to 264 V AC	12 V DC, 50 mA	Open
Models Dedicated to Display		TC-41	4	Voltage, current and electromagnetic detector	90 to 132 V AC 180 to 264 V AC	12 V DC, 50 mA	Open
Models Dedicated to Display		TC-4L-G	4	Open collector	85 to 115 V AC	12 V DC, 30 mA	Open
Models Dedicated to Display		TC-4L-H	4	Open collector	180 to 240 V AC	12 V DC, 30 mA	Open

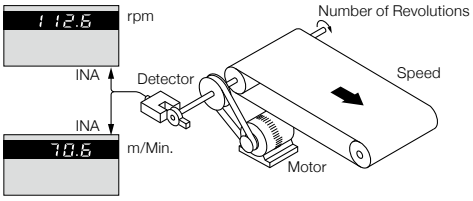
TC-4 Series Tachometers
Common Specifications

Measurement Examples

Examples of Measurement in Each Mode (8 Modes)

Number of revolutions
Mode 1

Speed
Mode 1

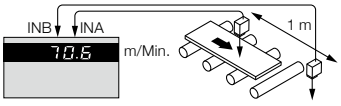


Mode 1 displays the number of revolutions.
If the signal of the rotating detector is applied, the number of revolutions (rpm) is displayed.

If the prescale is performed in mode 1, mode 1 displays the speed.
The number of revolutions x 2 πr = speed (r = radius of roller: m)

TC-4 series all support

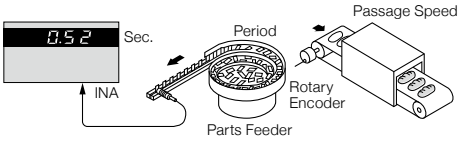
Passage speed
Mode 2



If the interval of the detector is not 1 m or if you want to make the mode to the speed-per-second display, the prescale should be used.

TC-4, 4B support

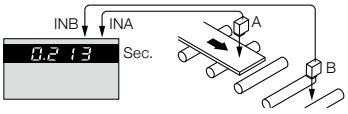
Period
Mode 3



The repetition period and passage time can be measured.
Period measurement: 10 ms to 140 s
Passage time: Unlimited

TC-4, 4B support

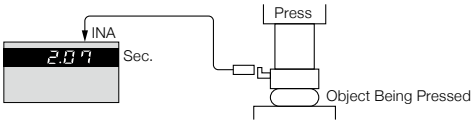
Time difference
Mode 4



The time when the operation is performed, such as the pressing time of a pressing machine, or the time when the bulb is open, is displayed.
Measurement range: 10 ms to 140 s

TC-4, 4B support

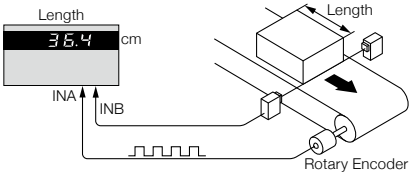
Operating time
Mode 5



The time when the operation is performed, such as the pressing time of a pressing machine, or the time when the bulb is open, is displayed.
Measurement range: 10 ms to 140 s

TC-4, 4B support

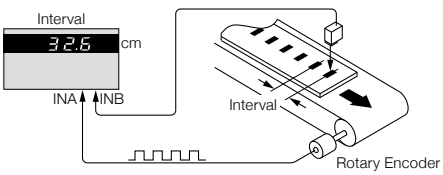
Length measurement
Mode 6



The pulse of the rotary encoder while the photoelectronic sensor for detecting objects is turned on is counted, and displayed as the length of the object after the passage of the object.
A rotary encoder of any pulse number can be used via the prescale functions.

TC-4, 4B support

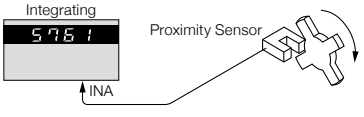
Interval
Mode 7



The pitch (interval) of the processing hole is measured and displayed.
A rotary encoder of any pulse number can be used via the prescale functions.

TC-4, 4B support

Prescale counter
Mode 8



The input pulse is counted and the accumulated value is displayed.
For the functions with preset, the device operates as a preset counter.
Using the prescale functions, a discrete value multiplied by any number can be displayed and preset.

TC-4, 4B support

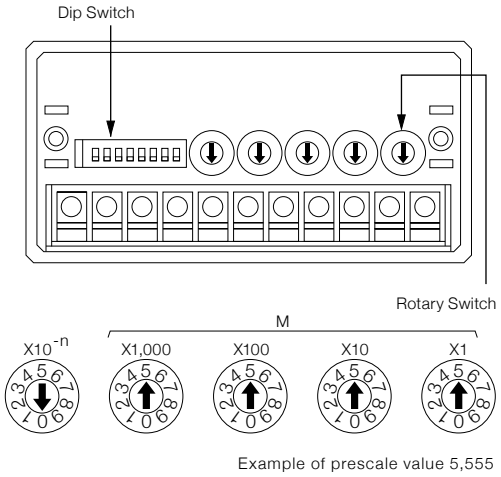
TC-4 Series Tachometers

Common Specifications

Description of Functions

Prescale Functions

In this function, the measured data is multiplied by a 4-digit numeric value set in advance, and the results of calculation are displayed or output to the display and the output terminal.
The multiplication value is set by the five miniature rotary switches on the back of case.
The numeric value that can be set is expressed in M x 10^{-n} where M represents a 4-digit integer and n represents any numeric value from 0 to 9. The maximum numeric value that can be set becomes 9,999 in the case of M = 9,999 and n = 0, and the minimum numeric value becomes 1 x 10^{-9} in the case of M = 0001 and n = 9. The TC -4L does not have this function.



Example of prescale value 5,555

Decimal Point Switching Function

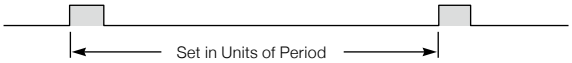
It is possible to make the decimal point light up in any position of a 4-digit numerical value on the display.
Since the correct data is always displayed according to the position of the decimal point, the placement of the decimal point is not necessary.
The decimal point lighting position can be set from the DIP switches on the back of the case.

No decimal point
1 decimal place
2 decimal place
3 decimal place

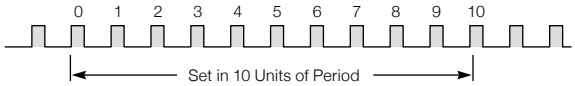
Sampling Function

(Effective only for mode 1)
The measurement principle of TC series tachometers is the period measurement method in which the time required for the measured axle to rotate one revolution is measured and the revolutions per minute are calculated based on the time.
In this method, if the axle rotates at high speed, the time required for one revolution becomes shorter, deteriorating the measurement accuracy. Therefore, in the TC series, other than the regular period measurement for every one revolution, the number of revolutions is calculated from the time required for 10 revolutions or 100 revolutions in order to prevent the deterioration of measurement accuracy in high speed rotation. This is called the "sampling function" and the number of samplings can be set from the DIP switch (miniature switch) to either 1, 10, or 100 revolutions (only 1 time for the TC-4L).

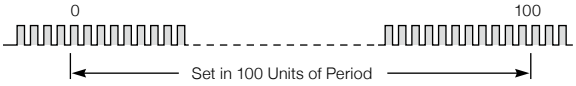
- Sampling Frequency is Set to 1.



- Sampling Frequency is Set to 10.



- Sampling Frequency is Set to 100.



Error Code Display Function

The error code is displayed when the measurement data exceeds the effective range or the prescale value is set outside the prescribed range.

Common Errors

Error Code	Error Name	Error details
E01	Overflow error	The data that should be displayed is larger than the display range.
E02	Underflow error	The digit of the data that should be displayed by prescale and decimal point setting is lower than the display range.
E03	Prescale setting error	The integer part setting of the prescale set value is zero.
E04	Over input frequency	The input frequency in the mode 1 exceeds 10 kHz.

(Note) The error indications of E01, E02, and E04 will automatically reset when the measured value enters the normal range.

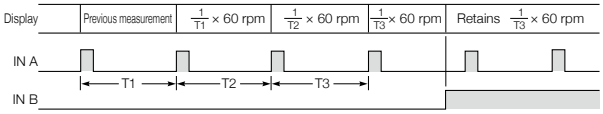
TC-4 Series Tachometers
Common Specifications

Explanation of the Run Mode

Mode 1: Measurement of the Number of Revolutions (rpm)

* Excluding the TC-41 (See individual specifications).
* The TC-4L does not have IN B.

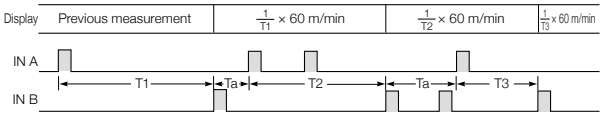
- The reciprocal (1/T) of the input period (T) of IN A is multiplied by 60 and displayed as the number of revolutions (rpm).
- IN B is prohibited from input and the internal measurement operation is prohibited when IN B is ON and the display data continues holding the previous state.



The measuring range is 10 to 9,999 rpm when the input is 1 P/R, sampling = 1, and prescale = 1. In the case above, the period (T) should be 300 ms or more, and if the period is below 300 ms, the number of revolutions is measured at the interval of one period of more. The previous measured value is displayed 6 sec after rotation stops.

Mode 2: Measurement of Passage Speed (m/minute)

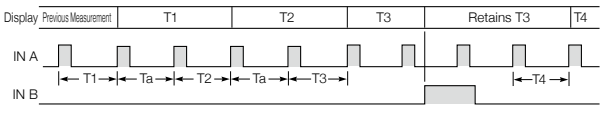
- The reciprocal of the time (T) from ON of IN A to ON of IN B is multiplied by 60 and displayed as the passage speed between point A and point B.
- When the interval of the sensor for IN A and the sensor for IN B is 1 m, the units are m/min.



The measuring range T should be between 10 ms and 6 sec. Until the start of the next measurements, downtime Ta of 30 ms is required.

Mode 3: Period (Measuring Range: 10 ms to 140 s)

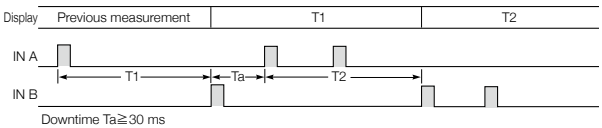
- The input period of IN A is measured and displayed as is.
  However, the period that can be measured is from 10 ms to 140 s, and measurement is performed every two periods.
- IN B is prohibited from input and the internal measurement operation is prohibited when IN B is ON and the display data continues holding the previous state.
  If IN B turns ON during measurement, the measurement operation is canceled.



Until the start of the next measurements, downtime Ta of 30 ms is required.

Mode 4: Time Difference (Measuring Range: 10 ms to 140 s)

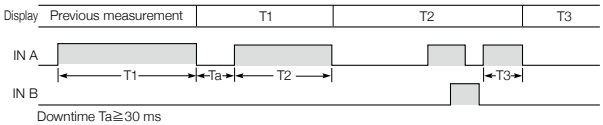
- The time (T) from ON of IN A to ON of IN B is measured and displayed as is.
  The time that can be measured is from 10 ms to 140 s.



Downtime Ta≧30 ms

Mode 5: Operating Time (Measuring Range: 10 ms to 140 s)

- The time (T) when IN A is ON is measured and displayed. The time that can be measured is from 10 ms to 140 s .
- IN B is prohibited from input and the internal measurement operation is prohibited when IN B is ON and the display data continues holding the previous state.
- If IN B turns ON during measurement, the measurement operation is canceled.

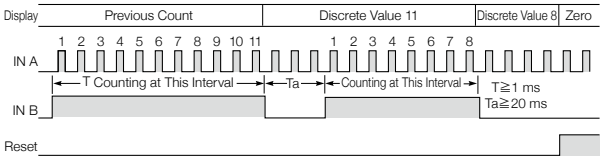


Downtime Ta≧30 ms

Mode 6 Mode 6: Length Measurement (Measurement of Length)

* IN A responsivity: 10 kHz

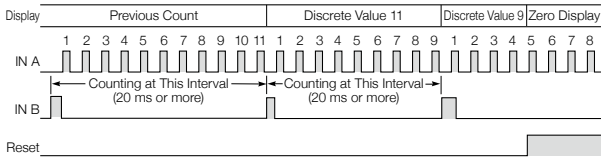
- The number of pulses that are input to IN A while IN B is ON is counted, and the number of pulses counted when IN B is OFF is displayed.
- When the reset input is ON, the indicated value returns zero.



Mode 7 Mode 7: Interval (Measurement of Interval)

* IN A responsivity: 10 kHz

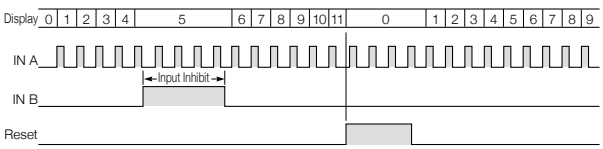
- The number of pulses that have been input in IN A since IN B turned ON is counted, and the number of impulses that have been input in IN A until IN B turns ON next is displayed.
- When the reset input is ON, the indicated value returns zero.



Mode 8 Mode 8: Prescale Counter (Integrating Display of Pulse)

* IN A responsivity: 1 kHz

- The number of pulses applied to IN A is counted and a discrete value is displayed.
- IN B is the prohibition input for IN A and ignores the input of IN A while IN B is ON.
- When the reset input is ON, the indicated value returns zero.



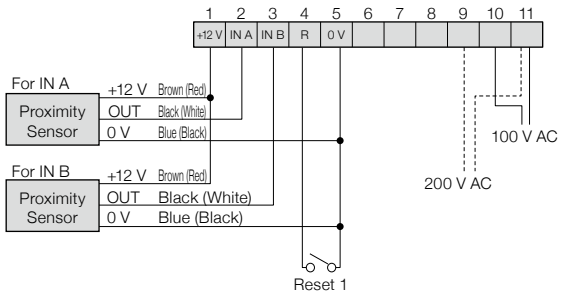
TC-4 Series Tachometers

Use Example

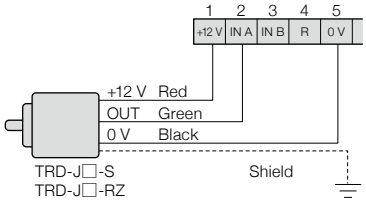
Example of Connection of the Terminal

Proximity Sensor

The type of proximity sensors that can be connected are the APS series models with an N or E and Z attached to the output symbol.
Example: APS3-16F-E



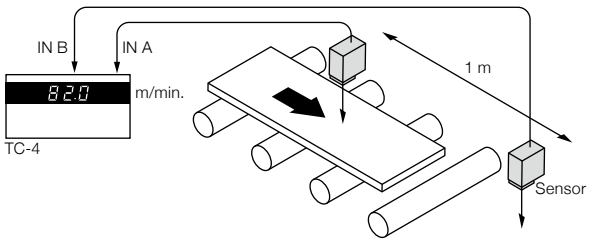
Rotary encoder



Example Applications

Example 1: Measurement of the Travel Speed Between the Two Points

As shown in the figure below, the travel speed of an object that passes below the sensors installed at the interval of 1 meter is detected and displayed as the travel speed per minute (m/minute).



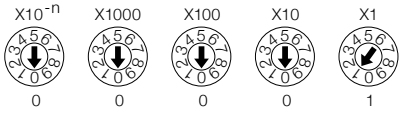
《Design 1》 Selection of a model
Display the TC-4 for the speed indication.

《Design 2》 Input sensor
Use the photoelectronic sensor for IN A and IN B.

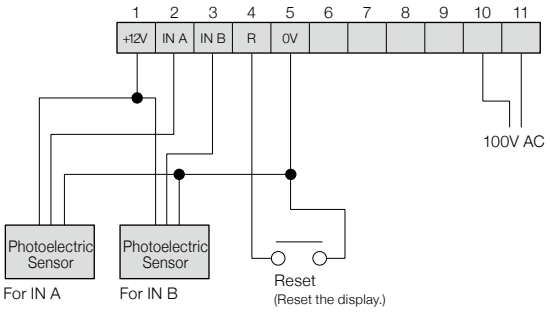
《Design 3》 Setting DIP switches
Set the 8 DIP switches on the back of the TC-4.

Switch	Purpose	Design Condition	Setting
1	Input frequency	high speed input	OFF
2	Decimal point	1 digit after decimal point (000.0)	ON
3			OFF
4	Operation mode	Mode 2	ON
5			OFF
6			OFF
7	Number of samplings	1	OFF
8			OFF

《Design 4》 Setting the prescale
Set to x 1. (The prescale is set to x 1 before shipment.)



《Design 5》 Connection



TC-4 Series Tachometers

TC-4

Features

Display-dedicated Type Tachometer

- Multifunctional high-performance model for display
- The large LED numeric indicators that emit red light display bright, easy-to-see characters with the height of 14.2 mm.
- The 8 operation modes enable measurement of the number of revolutions, speed, period, time difference, duration, length and interval, and integration.
- The TC-4 has a prescale, sampling, and decimal point switching functions.
- Display period: When the period of the input pulse is within 0.4 sec, the displayed data changes every 0.4 sec.

Electrical Specifications

Items	Specifications
Rated Voltage Range	90 to 132 V AC/180 to 264 V
Rated Frequency	50/60 Hz
Power Consumption	14 VA
Withstand Voltage	2,000 V AC 1 min (Between power supply and external terminal)
Insulation Resistance	20 MΩ or higher 500 V DC (Between power supply and external terminal)

Environmental Specifications

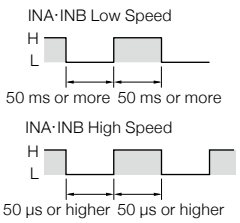
Items	Specifications
Ambient Operating Temperature	-10 to +50˚C
Storage Temperature	-25 to +70˚C (No freezing)
Use / Storage Ambient Humidity	35 to 90% RH (No condensation)
Vibration Resistance	Endurance: Displacement amplitude: 0.5 mm, frequency: 10 to 55 Hz, 3 axial directions Malfunction: Displacement amplitude: 0.35 mm, frequency: 10 to 55 Hz, 3 axial directions
Impact Resistance	Endurance: 490 m/s^2 11 ms, 3 axial directions Malfunction: 98 m/s^2 11 ms, 3 axial directions
Noise Resistance	1 kV 1 µs Between power supply terminals

Input Specifications

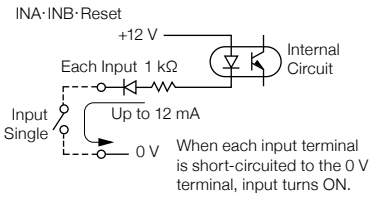
Name	Specifications			
	Responsivity	Input Resistance	Input Voltage	
			ON Voltage	OFF Voltage
Count Input	10 Hz 10 kHz Switching	1 kΩ	0 to 4 V	10 to 30 V
Reset Input*	30 ms			

* The display cannot be reset in modes 1 to 5.

Input Single Pulse Width



Configuration of the Input Circuit



Function/Performance Specifications

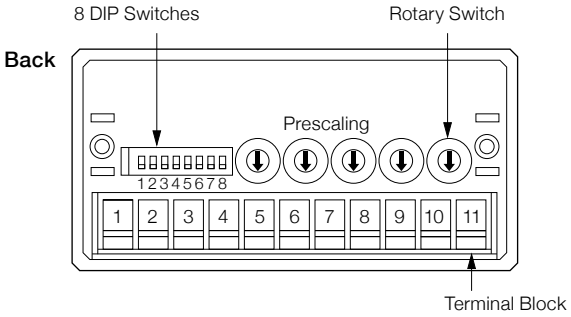
Items	Specifications
Counting System	Period measurement system
Function	Only display
Display	Red 7-segment LED, 4-digit, height of characters 14.2 mm
Basic Measurement Range	10 to 9,999 rpm, 10 ms to 140 s, 1 to 9,999 count
Measurement Accuracy	±1 degit (mode 1)/±0.1 ms (mode 2 to 5)
Measurement Item	8 mode*
Prescale Functions	M x 10^{-n} = 10^{-9} to 9,999 1 ≦ M ≦ 9,999, 0 ≦ n ≦ 9 (M and n are integers)
Sampling Function	1 time, 10 times, 100 times (Effective only for mode 1)
Connection Method	Backside screw terminal block
Power Source for Sensors	12 V DC 50 mA
Power Source Reset	Power supply shutdown time 0.5 s/Reset time 0.6 s
Dimensions (mm)	96 W x 48 H x 105 D
Weight	Approx. 450 g
Accessories	Mounting brackets, unit label
Price	Open

* 8 mode			
	Mode 1	Number of revolutions	rpm
	Mode 2	Passage speed	m/minute
	Mode 3	Period	Second
	Mode 4	Time difference	Second
	Mode 5	Operating time	Second
	Mode 6	Length measurement	
	Mode 7	Interval	
	Mode 8	Prescale counter	

TC-4
Each Part Name and Function

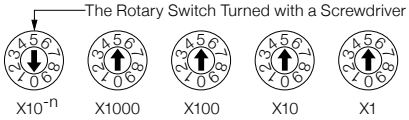
Explanation of the Back Panel

The connecting terminals and setting switches are centrally provided on the back panel of the case.



Setting the Prescale

The prescale function is used for displaying the obtained measured value multiplied by a certain constant.

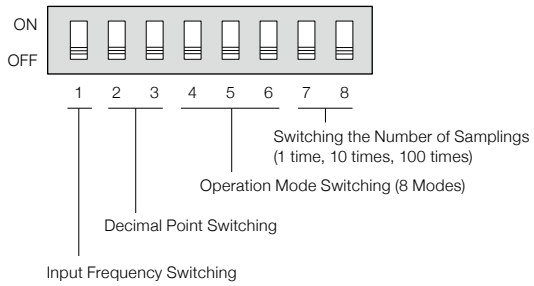


Measured Value x Prescale Value = Indicated Value

As the prescale value, any 4-digit numeric value from a minimum 1 x 10^{-9} to a maximum 9,999 x 10^{-0} = 9,999 can be set.

[Note]
- The exponent (10^{-n}) can be set in the range of 0 to 9.
- If the prescale function is not used, the prescale should be set to 1 x 10^{-0} = 1 as shown below.

Setting the Back Side DIP Switches



Switch 1 Input Frequency Switching

ON/Position	10 Hz for both IN A and IN B (Low speed)
OFF/Position	10 kHz for both IN A and IN B (High speed)

Switch 2·3 Decimal Point Switching

Switch	9999	999.9	99.99	9.999
2	OFF	ON	OFF	ON
3	OFF	OFF	ON	ON

Switch 4·5·6 Operation Mode Switching

Switch	Mode 1	Mode 2	Mode 3	Mode 4	Mode 5	Mode 6	Mode 7	Mode 8
4	OFF	ON	OFF	ON	OFF	ON	OFF	ON
5	OFF	OFF	ON	ON	OFF	OFF	ON	ON
6	OFF	OFF	OFF	OFF	ON	ON	ON	ON

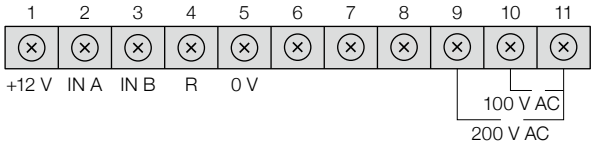
Switch 7·8 Switching the Number of Samplings

Switch	1 Time	10 Times	100 Times	
7	OFF	ON	OFF	ON
8	OFF	OFF	ON	ON

TC-4

Connection

Connecting the Terminal Block

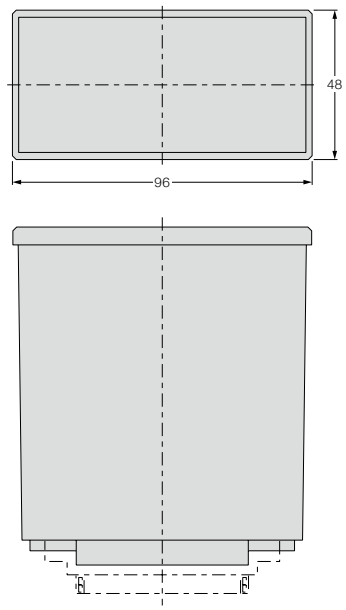


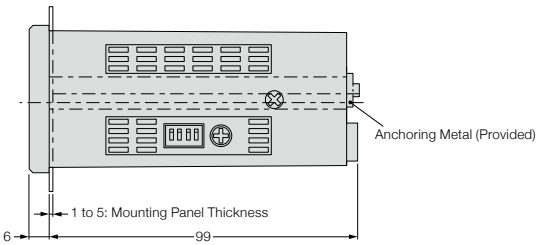
Terminal Number	Symbol	Description
1	+12 V	DC power output for supplying to the sensor
2	IN A	Input
3	IN B	Input
4	R	Reset input (Display is reset in modes 6, 7, and 8.)
5	0 V	Common of input and sensor power supply
6	Empty	(Not connected)
7	Empty	(Not connected)
8	Empty	(Not connected)
9	200 V AC	Power source input
10	100 V AC	
11	0 V AC	

Electronic Counter
Tachometer
Digital Timer
Programmable Cam
TC-V
TC-4

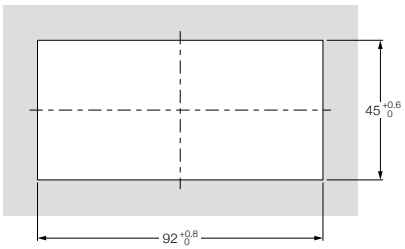
TC-4
Dimensions

Dimensions (Unit: mm)



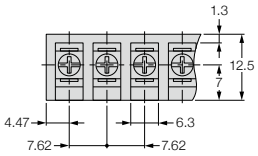


Panel-cut Dimensions for Embedded Installation



If the dust cover (provided) is used, the dimensions should be 47 x 94.

Terminal Block Detail Drawing



TC-4B

Features

Display-dedicated Type Tachometer with Digital Output

- Having the basic configuration of the TC-4, the TC-4B model features additional digital output (BCD code) functions.
- Other functions except the digital output are the same as the TC-4.
- Display period: Although the display data and BCD output are the same, the digital output is output earlier than the display data when the input period is not longer than 0.4 sec.

Electrical Specifications

Items	Specifications
Rated Voltage Range	90 to 132 V AC/180 to 264 V
Rated Frequency	50/60 Hz
Power Consumption	14 VA
Withstand Voltage	2,000 V AC 1 min (Between power supply and external terminal)
Insulation Resistance	20 MΩ or higher 500 V DC (Between power supply and external terminal)

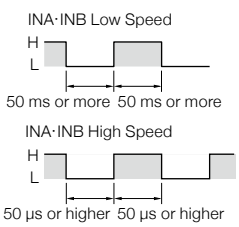
Environmental Specifications

Items	Specifications
Ambient Operating Temperature	-10 to +50˚C
Storage Temperature	-25 to +70˚C (No freezing)
Use / Storage Ambient Humidity	35 to 90%RH (No condensation)
Vibration Resistance	Endurance: Displacement amplitude: 0.5 mm, frequency: 10 to 55 Hz, 3 axial directions Malfunction: Displacement amplitude: 0.35 mm, frequency: 10 to 55 Hz, 3 axial directions
Impact Resistance	Endurance: 490 m/s^2 11 ms, 3 axial directions Malfunction: 98 m/s^2 11 ms, 3 axial directions
Noise Resistance	1kV 1μs Between power supply terminals

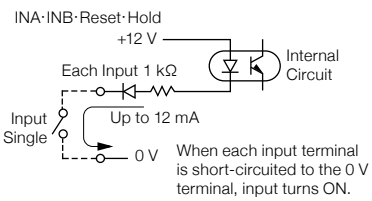
Input Specifications

Name	Specifications			
	Responsivity	Input Resistance	Input Voltage	
			ON Voltage	OFF Voltage
Count Input	10 Hz 10 kHz Switching	1 kΩ	0 to 4 V	10 to 30 V
Reset Input	30 ms			
Hold Input				

Input Single Pulse Width



Configuration of the Input Circuit



When each input terminal is short-circuited to the 0 V terminal, input turns ON.

Function/Performance Specifications

Items	Specifications
Counting System	Period measurement system
Function	Digital output (BCD output 4-digit)
Display	Red 7-segment LED, 4-digit, height of characters 14.2 mm
Basic Measurement Range	0 to 9,999 rpm, 10 ms to 140 s, 1 to 9,999 count
Measurement Accuracy	±1 degit (mode 1)/±0.1 ms (mode 2 to 5)
Measurement Item	8 mode*
Prescale Functions	M x 10^{-n} = 10^{-9} to 9,999 1 ≦ M ≦ 9,999, 0 ≦ n ≦ 9 (M and n are integers)
Sampling Function	1 time, 10 times, 100 times (Effective only for mode 1)
Connection Method	Backside screw terminal block
Power Source for Sensors	12 V DC 50 mA
Power Source Reset	Power supply shutdown time 0.5 second/ Reset time 0.5 second
Dimensions (mm)	96 W x 48 H x 110 D
Weight	Approx. 450 g
Accessories	Mounting brackets, card edge connector, unit label
Price	Open

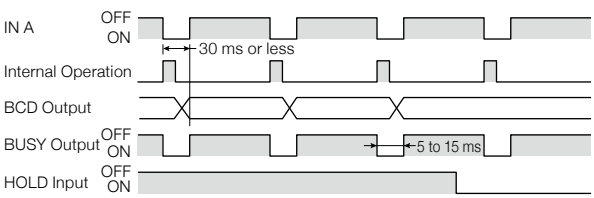
* 8 mode

Mode 1	Number of revolutions	rpm
Mode 2	Passage speed	m/minute
Mode 3	Period	Second
Mode 4	Time difference	Second
Mode 5	Operating time	Second
Mode 6	Length measurement	
Mode 7	Interval	
Mode 8	Prescale counter	

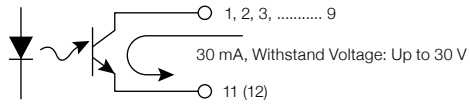
Output Specifications

Circuit Configuration	Open collector
Operation	ON for data 1
Working Voltage	24 V or lower
Working Current	30 mA or lower
Residual Voltage	2 V or lower

BCD Output and BUSY/ HOLD Timing (Example of Mode 1)



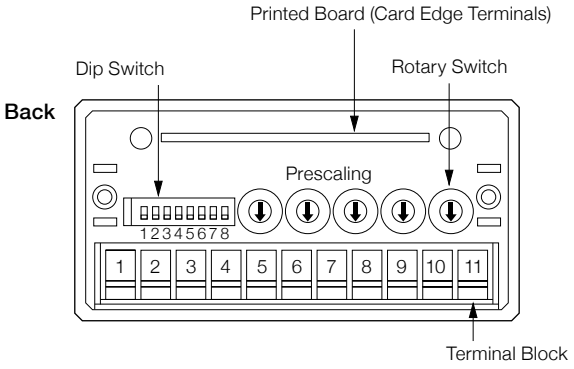
Configuration of BCD Output and BUSY Output



TC-4B
Each Part Name and Function

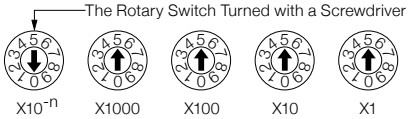
Explanation of the Back Panel

The connecting terminals and setting switches are centrally provided on the back panel of the case.



Setting the Prescale

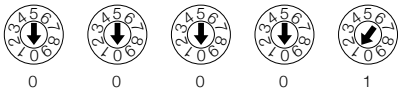
The prescale function is used for displaying the obtained measured value multiplied by a certain constant.



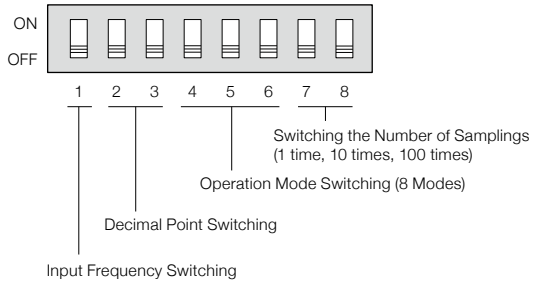
Measured Value x Prescale Value = Indicated Value

As the prescale value, any 4-digit numeric value from a minimum 1 x 10^{-9} to a maximum 9,999 x 10^{0} = 9,999 can be set.

[Note]
- The exponent (10^{-n}) can be set in the range of 0 to 9.
- If the prescale function is not used, the prescale should be set to 1 x 10^{-0} = 1 as shown below.



Setting the Back Side DIP Switches



Switch 1 Input Frequency Switching

ON/Position	10 Hz for both IN A and IN B (Low speed)
OFF/Position	10 kHz for both IN A and IN B (High speed)

Switch 2·3 Decimal Point Switching

Switch	9999	999.9	99.99	9.999
2	OFF	ON	OFF	ON
3	OFF	OFF	ON	ON

Switch 4·5·6 Operation Mode Switching

Switch	Mode 1	Mode 2	Mode 3	Mode 4	Mode 5	Mode 6	Mode 7	Mode 8
4	OFF	ON	OFF	ON	OFF	ON	OFF	ON
5	OFF	OFF	ON	ON	OFF	OFF	ON	ON
6	OFF	OFF	OFF	OFF	ON	ON	ON	ON

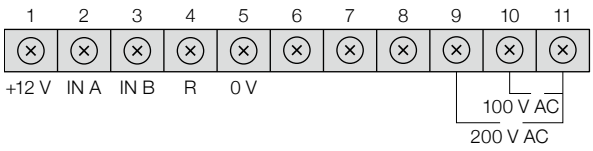
Switch 7·8 Switching the Number of Samplings

Switch	1 Time	10 Times	100 Times	
7	OFF	ON	OFF	ON
8	OFF	OFF	ON	ON

TC-4B

Connection

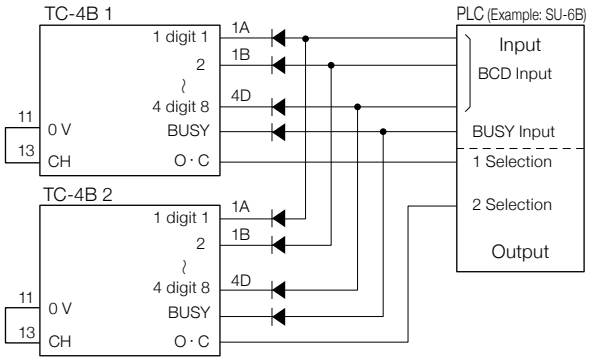
Connecting the Terminal Block



Terminal Number	Symbol	Description
1	+12 V	DC power output for supplying to the sensor
2	IN A	Input
3	IN B	Input
4	R	Reset input (Display is reset in modes 6, 7, and 8.)
5	0 V	Common of input and sensor power supply
6	Empty	(Not connected)
7	Empty	(Not connected)
8	Empty	(Not connected)
9	200 V AC	Power source input
10	100 V AC	
11	0 V AC	

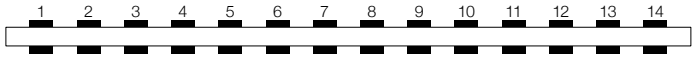
Example of BCD Output Connection

If No.11 (input common) of the card edge terminal is connected to No.13 (CH), the input common is separated from the output common.
When taking in BCD data from two or more TC-4B units for the PLC (programmable controller), the TC-4B units can have a common BCD output and BUSY output, and, therefore, the PLC can configure 17 input points. In this case, however, all BCD outputs and BUSY outputs require a diode.



Connection of a Card Edge Terminal

The TC-4B outputs 4-digit decimal numbers by BCD signal to the card edge terminal (connector is provided).



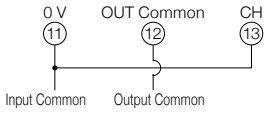
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Symbol of the Terminal Nameplate	B	1A	1B	2A	2B	3A	3B	4A	4B	BUSY	HOLD	0 V	O·C	CH	
	A	1C	1D	2C	2D	3C	3D	4C	4D	BUSY	HOLD	0 V	O·C	CH	

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Meaning of the Signal	Upper B	1	2	1	2	1	2	1	2	BUSY	HOLD	0 V	O·C	CH	Empty
	Bottom A	4	8	4	8	4	8	4	8	BUSY	HOLD	0 V	O·C	CH	Empty
	Digit and Others	1 digit		2 digit		3 digit		4 digit		Output	Input	Common	OUT Common	O·C Switching	

Note: Card edge terminal No. 11 and terminal No. 5 of the terminal block are internally connected.

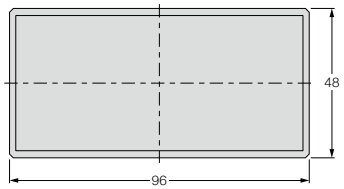
Switching the OUT Common

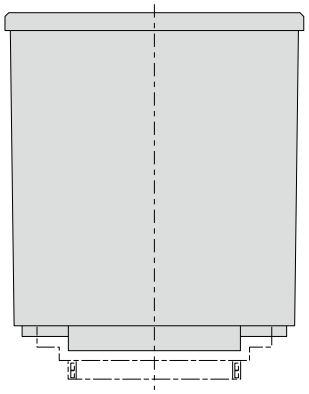
Terminal No. 11 and terminal No.12 are internally connected. If the No.13 CH and terminal No.11 are short-circuited, terminal No.11 is separated to the input common and terminal No.12 is separated to the output common respectively.

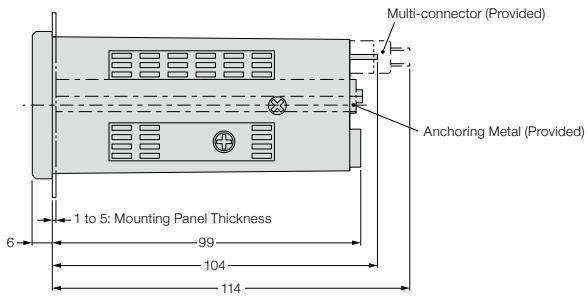


TC-4B
Dimensions

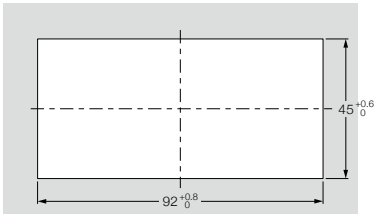
Dimensions (Unit: mm)



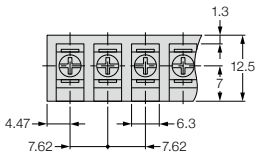




Panel-cut Dimensions for Embedded Installation



Terminal Block Detail Drawing



TC-41

Features (Discontinued Products)

Display-dedicated Type Tachometer with Multifunctional Input

- Models dedicated to displaying the number of revolutions feature an input circuit that can support all kinds of devices.
- The TC-41 quickly displays zero when rotation stops (1 or 6 sec after rotation stops).
  To display the measured value for 1 sec as an average, the TC-41 can minimize the instability of the display caused by the rotating irregularity of the measured machine.
- The TC-41 features prescale, sampling, and decimal point switching functions.

Electrical Specifications

Items	Specifications
Rated Voltage Range	90 to 132 V AC/180 to 264 V
Rated Frequency	50/60 Hz
Power Consumption	14 VA
Withstand Voltage	2,000 V AC 1 min (Between power supply and external terminal)
Insulation Resistance	20 MΩ or higher 500 V DC (Between power supply and external terminal)

Environmental Specifications

Items	Specifications
Ambient Operating Temperature	-10 to +50˚C
Storage Temperature	-25 to +70˚C (No freezing)
Use / Storage Ambient Humidity	35 to 90%RH (No condensation)
Vibration Resistance	Endurance: Displacement amplitude: 0.5 mm, frequency: 10 to 55 Hz, 3 axial directions Malfunction: Displacement amplitude: 0.35 mm, frequency: 10 to 55 Hz, 3 axial directions
Impact Resistance	Endurance: 490 m/s^2 11 ms, 3 axial directions Malfunction: 98 m/s^2 11 ms, 3 axial directions
Noise Resistance	1 kV 1 µs Between power supply terminals

Function/Performance Specifications

Items	Specifications
Counting System	Period measurement system
Function	Only display, Multifunctional input
Display	Red 7-segment LED, 4-digit, height of characters 14.2 mm
Basic Measurement Range	10 to 9,999 rpm/60 to 9,999 rpm Switching
Measurement Accuracy	±1 degit
Measurement Item	Number of revolutions (rpm) (Only for mode 1)
Prescale Functions	M x 10^{-n} = 10^{-9} to 9,999 1 ≦ M ≦ 9,999, 0 ≦ n ≦ 9 (M and n are integers)
Sampling Function	1 time, 10 times, 100 times (Effective only for mode 1)
Connection Method	Backside screw terminal block
Power Source for Sensors	12 V DC 50 mA
Power Source Reset	Power supply shutdown time 0.5 s/Reset time 0.5 s
Dimensions (mm)	96 W x 48H x 105 D
Weight	Approx. 450 g
Accessories	Mounting brackets, unit label
Price	Open

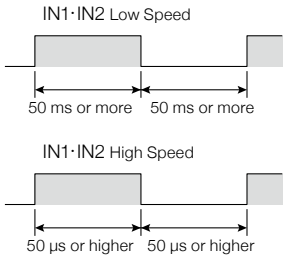
* Since the mean value for 1 sec is displayed, if the measured value has changed, the intermediate value is displayed.

Input Specifications

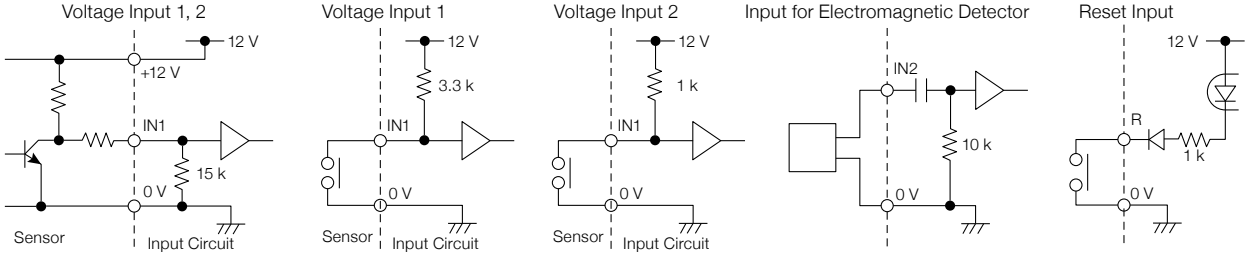
Name	Specifications			
	Responsivity	Input Resistance	Input Voltage	
			ON Voltage	OFF Voltage
Voltage Input 1 (12 to 24 V)	10 Hz 10 kHz Switching	15 kΩ	0 to 4 V	6 to 30 V
Voltage Input 2 (5 V)		15 kΩ	0 to 1.5 V	2.5 to 30 V
Current Input 1		3.5 kΩ*1	0 to 4 V	6 to 30 V
Current Input 2		1 kΩ*1	0 to 4 V	6 to 30 V
Input for Electromagnetic Detector	10 Hz*2 10 kHz Switching	10 kΩ	10 Hz : 0.3 Vp-p or more 100 Hz : 0.3 Vp-p or more 1 kHz : 2 Vp-p or more 10 kHz : 20 Vp-p or more	
Reset Input (Open Collector)	30 ms	1 kΩ*1	0 to 4 V	10 to 30 V

*1 Pull-up to 12 V inside
*2 If the input frequency is 10 Hz or more, set the backside DIP switch 1 in the OFF position (10 kHz).
IN1 and IN2 cannot be simultaneously used.

Input Single Pulse Width



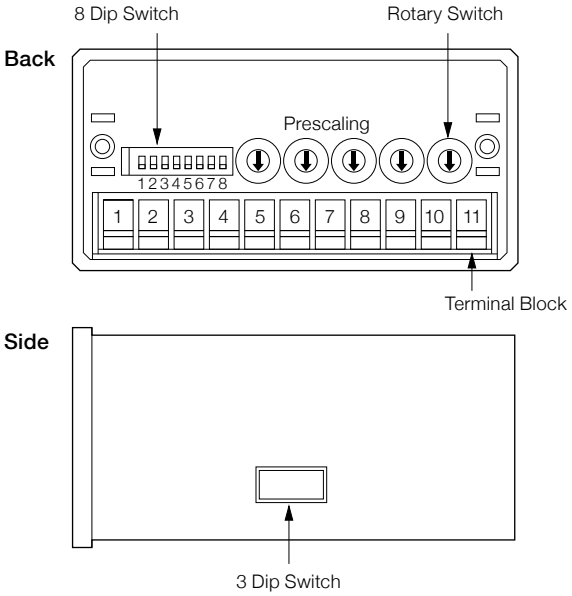
Configuration of the Input Circuit



TC-41
Each Part Name and Function

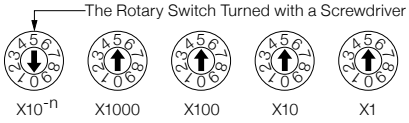
Explanation of the Back / Side Panel

The connecting terminals and setting switches are installed on the back and side of the case.



Setting the Prescale

The prescale function is used for displaying the obtained measured value multiplied by a certain constant.

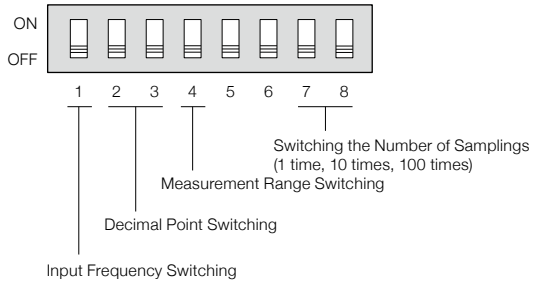


Measured value x Prescale value = Indicated value

As the prescale value, any 4-digit numeric value from a minimum 1 x 10^{-9} to a maximum 9,999 x 10^{-0} = 9,999 can be set.

[Note]
- The exponent (10^{-n}) can be set in the range of 0 to 9.
- If the prescale function is not used, the prescale should be set to 1 x 10^{-0} = 1 as shown below.
  The default settings are all zero.

Setting the Back Side DIP Switches



* 5 and 6 are not in use.

Switch 1 Input frequency switching

ON	10 Hz for both IN A and IN B (Low speed)
OFF	10 kHz for both IN A and IN B (High speed)

Switch 2·3 Decimal point switching

Switch	9999	999.9	99.99	9.999
2	OFF	ON	OFF	ON
3	OFF	OFF	ON	ON

Switch 4 Measurement range switching

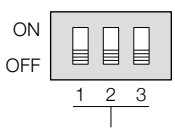
ON	60 to 9,999 rpm*	0 is displayed 1 sec after the rotation stops.
OFF	10 to 9,999 rpm*	0 is displayed 6 sec after the rotation stops.

* 1 revolution 1 pulse and prescale = 1

Switch 7·8 Switching the number of samplings

Switch	1 Time	10 Times	100 Times	
7	OFF	ON	OFF	ON
8	OFF	OFF	ON	ON

Setting the Side DIP Switches

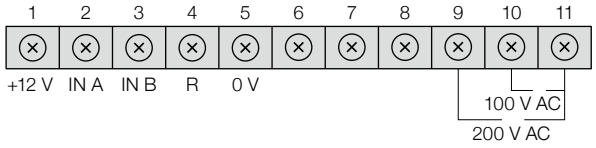


Switch	Voltage input 1 (12 to 24 V)	Voltage input 2 (5 V)	Current input 1	Current input 2
1	OFF	ON	OFF	OFF
2	OFF	OFF	ON	OFF
3	OFF	OFF	OFF	ON

TC-41

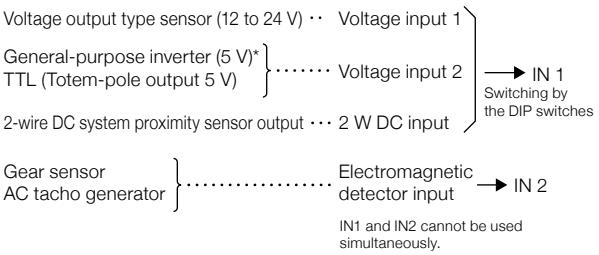
Connection

Connecting the Terminal Block



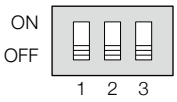
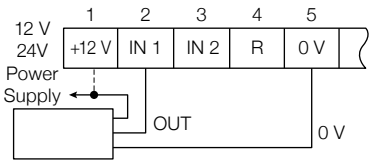
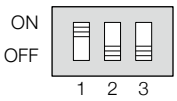
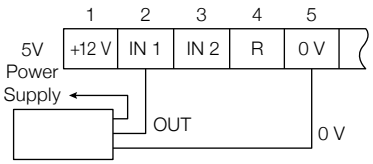
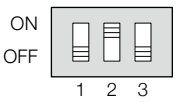
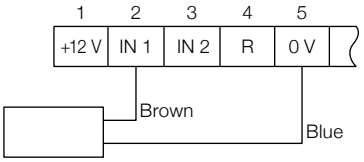
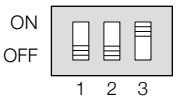
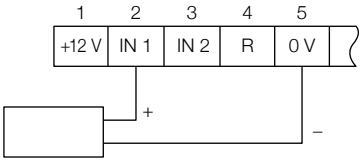
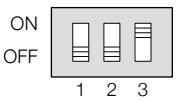
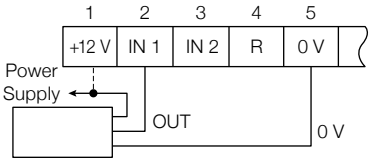
Terminal Number	Symbol	Description
1	+12 V	DC power output for supplying to the sensor
2	IN 1	Input
3	IN 2	Input
4	R	Reset input
5	0 V	Common of input and sensor power supply
6	Empty	(Not connected)
7	Empty	(Not connected)
8	Empty	(Not connected)
9	200 V AC	Power source input
10	100 V AC	
11	0 V AC	

Supported Detectors (Example)



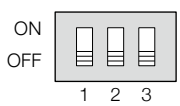
* When making a digital rotation display of an inverter motor, connect the signal for frequency meter (tachometer) of the inverter to the TC-41. However, if this is an analog signal (voltage, current), it cannot be connected to the TC-41.
Moreover, if a pulse signal is output, set the TC-41 so that the output circuit and signal level match with each other.

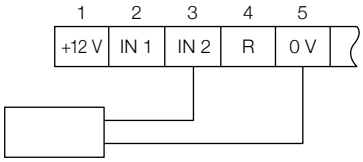
Connection Examples

Supported Sensor	Input Mode	Setting the DIP Switch (Side)	Connection diagram
Voltage Output Type Sensor (12 to 24 V) Voltage output type proximity sensor <Example> APS-80A-2T APS-30-2T	Voltage input 1		
Voltage Output Type Sensor (5 V) (General-purpose inverter) TTL of totem-pole output, etc.	Voltage input 2		
Namur Output Type Proximity Sensor	Current input 1		
Current Output Type Sensor Open collector output 2-wire DC system proximity sensor, etc. <Example> APS3-12GMC-Z APS5-12GK-Z	Current input 2		
NPN Open Collector Output Type Sensor Connectable either by Namur input or current input. <Example> APS5-12GK-E/APS3-16F-E TRD-J□-S/RZ	Namur input or current input		

[Note] - When a power supply for sensor (+12 V) is used, ensure that the consumption current of the sensor is not more than 50 mA. The sensors shown in the <Example> above are all connectible.
- When the input for electromagnetic detector (IN2) is used, set all DIP switches on the side in the OFF position.

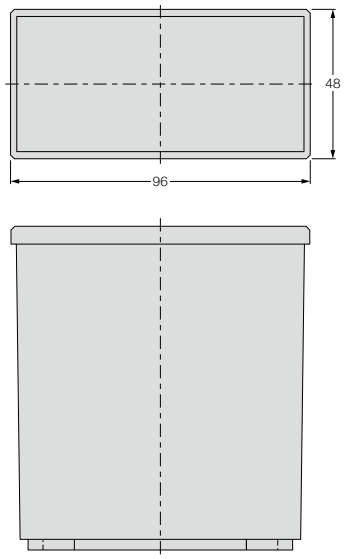
<Example> Gear sensor
AC tacho generator, etc.

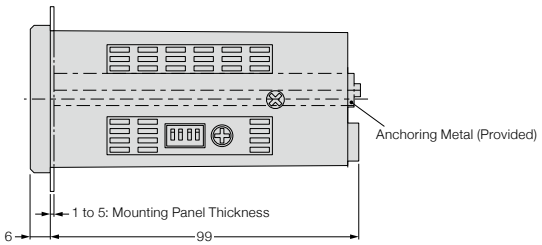




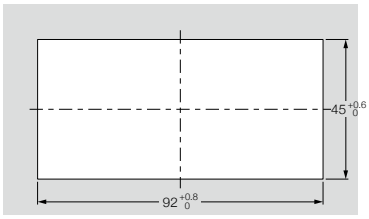
TC-41
Dimensions

Dimensions (Unit: mm)

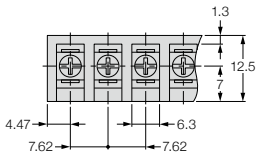




Panel-cut Dimensions for Embedded Installation



Terminal Block Detail Drawing



TC-4L-G/H

Features

Display-dedicated Type Tachometer (Economy Model)

- The miniature economy type is for displaying the number of revolutions. To widen the measurement range, the input pulse can be switched between the two stages - 1 pulse per revolution and 10 pulses per revolution.

TC-4L-G: For 100 V AC (85 to 115 V AC 50/60 Hz)
TC-4L-H: For 200 V AC (180 to 240 V AC 50/60 Hz)

Electrical Specifications

Items	Specifications
Rated Voltage Range	TC-4L-G: 85 to 115 V AC TC-4L-H: 180 to 240 V AC
Rated Frequency	50/60 Hz
Power Consumption	6 VA
Withstand Voltage	2,000 V AC 1 min (Between power supply and external terminal)
Insulation Resistance	20 MΩ or higher 500 V DC (Between power supply and external terminal)

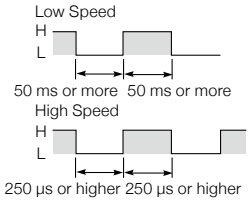
Environmental Specifications

Items	Specifications
Ambient Operating Temperature	-10 to +50˚C
Storage Temperature	-25 to +70˚C (No freezing)
Use / Storage Ambient Humidity	35 to 90% RH (No condensation)
Vibration Resistance	Endurance: Displacement amplitude: 0.5 mm, frequency: 10 to 55 Hz, 3 axial directions Malfunction: Displacement amplitude: 0.35 mm, frequency: 10 to 55 Hz, 3 axial directions
Impact Resistance	Endurance: 490 m/s^2 11 ms, 3 axial directions Malfunction: 98 m/s^2 11 ms, 3 axial directions
Noise Resistance	1 kV 1μs Between power supply terminals

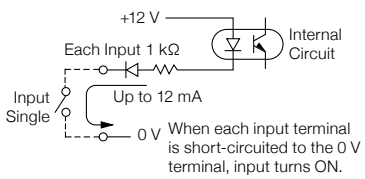
Input Specifications

Name	Specifications			
	Responsivity	Input Resistance	Input Voltage	
			ON Voltage	OFF Voltage
Count input	10 Hz 2 kHz Switching	1 kΩ	0 to 4 V	10 to 30 V

Input Single Pulse Width



Configuration of the Input Circuit



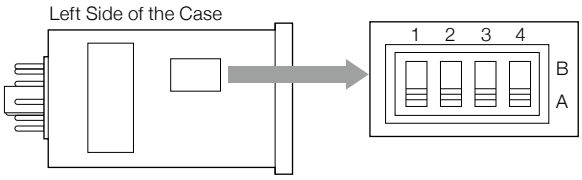
Function/Performance Specifications

Items	Specifications
Counting System	Period measurement system
Function	Only display
Display Period	Every 0.4 sec when the input pulse period is within 0.4 sec. Input period + 0.4 sec when the input pulse period exceeds 0.4 sec. The previous measured value is displayed for 6 sec after rotation stops.
Display	Red 7-segment LED, 4-digit, height of characters 8 mm
Basic Measurement Range*1	10 to 9,999 rpm
Measurement Accuracy	±1 degit
Measurement Item	Number of revolutions (rpm) (Only for mode 1)
Prescale Functions	1 pulse / rotation, 10 pulse / rotation switching*2
Sampling Function	Once
Connection Method	Dedicated stand B or stand F socket (Sold separately)
Power Source for Sensors	12 V DC 30 mA
Power Source Reset	Power supply shutdown time 0.5 s/Reset time 0.5 s
Dimensions (mm)	48 W x 48 H x 95 D
Weight	Approx. 200 g
Accessories	Mounting brackets, unit label
Price	Open

*1 When the prescale = 1
*2 To widen the measurement range, the input pulse can be switched by 2 stages between 1 revolution 1 pulse and 1 revolution 10 pulses.

	Input pulse	Switch 4 A Side	Switch 4 B Side
Measurement Range	1 pulse / rotation	10 to 9,999 rpm	Display at one-tenth value
	10 pulse / rotation	Display at 10 times value	1 to 9,999 rpm

Setting the Changing Switches



Switch	Function	Position A	Position B
1	Counting speed	2 kHz	10 Hz
2	Decimal point	Lighting position changes according to combination. (See below.)	
3	Decimal point		
4	Pulses / rotation	1 pulses / rotation	10 pulses / rotation

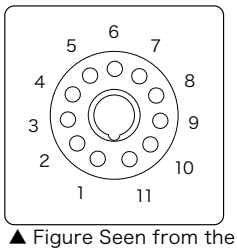
Setting the Lighting Position of the Decimal Point

Switch	9999	999.9	99.99	9.999
2	A	B	A	B
3	A	A	B	B

TC-4L-G/H
Connection/Dimensions

Terminal Connections

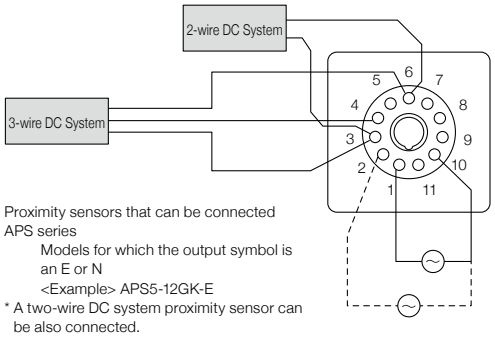
Terminal	Function	Terminal	Function
3	0 V	9	Not connected
4	+12 V (For supplying to sensor)	10	200 V AC / 100 V AC * Different models for 100/200 V
5	Not connected	11	
6	Input	—	
7	Not connected	1	* No connection for terminal No. 11
8		2	



▲ Figure Seen from the Back

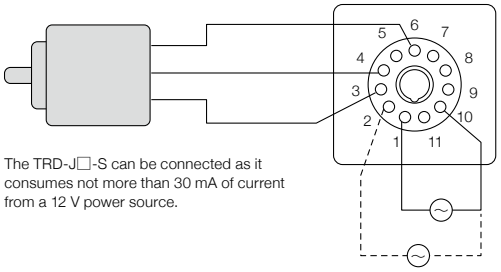
Example of Connection

Proximity Sensor



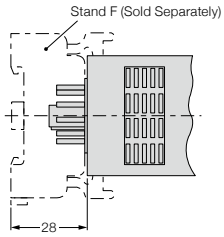
Proximity sensors that can be connected
APS series
Models for which the output symbol is an E or N
<Example> APS5-12GK-E
* A two-wire DC system proximity sensor can be also connected.

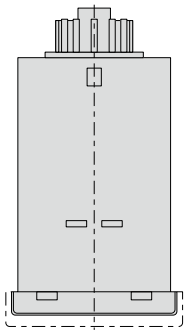
Rotary Encoder



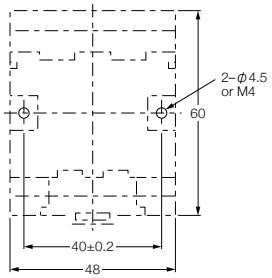
The TRD-J□-S can be connected as it consumes not more than 30 mA of current from a 12 V power source.

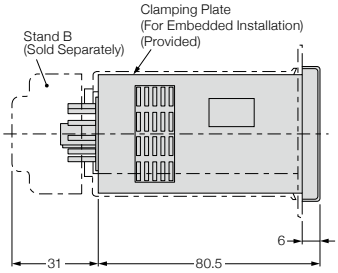
Dimensions (Unit: mm)

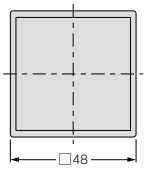




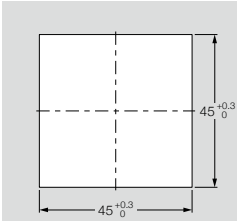
Stand F (For stationary installation)
Panel-cut Dimensions for Embedded Installation







Panel-cut Dimensions for Embedded Installation



Socket for Embedded Installation:
KB-04 (Sold Separately: Open Price)