

## Features

- Mounts easily — no brackets, screws or any other hardware needed.
- Tolerates wide variation of line voltages.
- Immune to electrically noisy environments.
- Programmable parameters and functions via front panel membrane push-button switches.
- No need to remember mathematical formulas.
- Highly accurate.
- Self-testing.

## Operational Precautions

- If the unit is used in a caustic environment, we suggest you use an NEMA 4X enclosure.
- Try to keep unit free of vibration and shock.
- When installing unit, keep power and sensor wires separate. Tie cable shield to terminal E (earth ground).
- After inserting wires, tighten terminal screws securely.

One of the most advanced on the market today, this microprocessor-based panel tachometer not only measures rotational, linear and flow rate speeds, but can also function as an elapsed time counter and ratio meter.

## Specifications

Function	Rate Measurement	Elapsed Time Counter
Display range	0.0000-9.9999	99.99 sec.
	0.000-99.999	99 min. 59 sec.
	0.00-999.99	99 hours 59 min.
	0.0-9999.9	
	0-99999	
Measuring range	10-99999rpm (at 1p/r), 0.2-30000rpm (at 60p/r)	
Update time	0.25, 0.5, 1, 2, 4, 8 and 16 sec., selectable	
Display	5-digit LED (0.56" or 14.2 mm high)	
Time base	Controlled by a 4.194304MHz crystal	
Accuracy	±0.008% ±1 digit	
Measuring system	CPU controlled	
Input no. of p/r	1-9999 (programmable)	
Input signal characteristics	Sine wave — max frequency 10kHz Square wave — max frequency 30kHz, open collector Contact closure — max frequency 20Hz	
Input signal amplitude	Sine wave (0.3-30VP-P) Square wave LO: 0-1.5V, HI: 4-30V	
Input impedance	10kΩ for magnetic pickup, rotary pulse generator and proximity switch only	
Voltage output	12VDC ±5% (50 mA max) to power sensors	
Applicable sensors	Rotary pulse generator, magnetic pickup, proximity switch, retro-reflective	
Ambient temperature	32°-113°F (0°-45°C)	
Power consumption	1W (5W when using optional modules)	
Voltage requirement*	85-265VAC (60/50Hz)	
Dimensions	3.46" L x 1.88" H x 3.78"W (88L x 48H x 96W mm), includes bezel, fits 1/8 DIN cutout	
Weight	0.55 lbs (250g)	

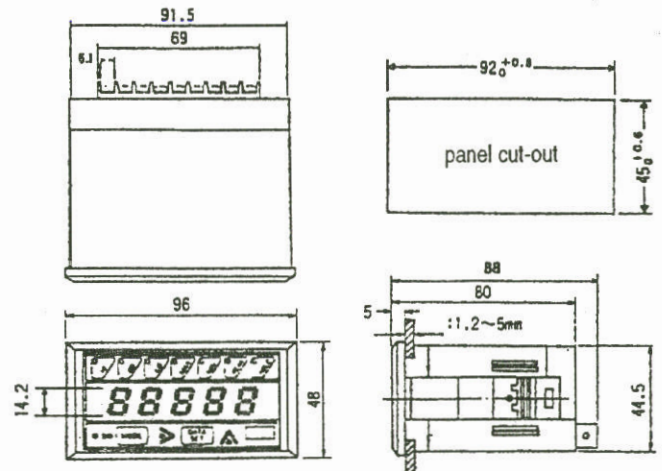
\*Available for DC applications (9-35VDC 5W)

## Installation and Dimensions

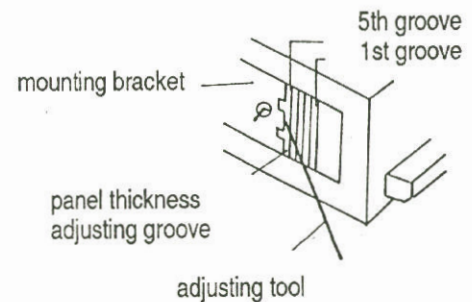
### Mounting Unit

Our 1/8 DIN case design eliminates the need for brackets and screws for installation. With the tachometer in a level position, insert it into the panel cutout. Gently push the face of the unit until the front bezel locks into place. If the tachometer case is loose, adjust the integral bracket with the enclosed tool.

## Dimensions in mm



### Mounting Bracket Adjustment Groove



### Thickness of Panel

1.2 - 1.6 mm  
1.8 - 2.5 mm  
2.8 - 3.6 mm  
4.0 - 4.5 mm  
5.0 mm

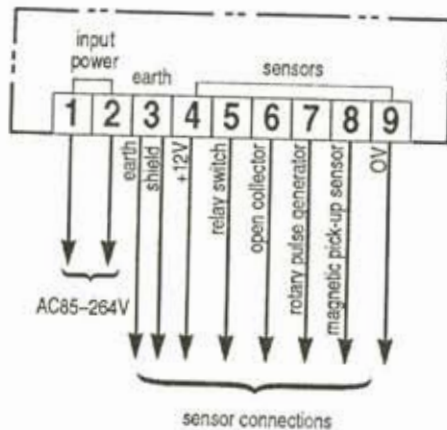
### Panel Thickness Adjusting Groove

5th groove  
4th groove  
3rd groove  
2nd groove  
1st groove

### Removing Unit

From the rear of the tachometer, alternately push the unit from the left and right. This will free it for easy removal.

## Connections



- 1&2 Line voltage input. AC voltage must be between 85 and 264 volts.
- 3 Earth ground. Connect all cable shielding to this terminal.
- 4 12VDC 50 mA max. This sensor power supply is for any sensor that requires external power.
- 5 Switch closure input. To be used with a relay or solenoid. The input frequency must be less than 20Hz.
- 6 For use with open collector sensors. Connect the sensor's signal output wire. No need for an external pull-up resistor.
- 7 Terminal to accept signals from rotary encoders or pulse generators.
- 8 Standard input terminal for magnetic pick-ups and proximity switches.
- 9 Signal ground or common.

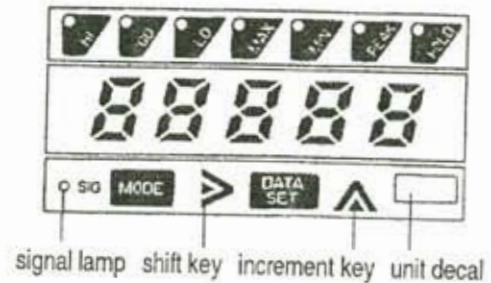
## Sensors

Shimpo offers a large selection of sensors to meet your application needs. The chart below shows the optimum sensor to use when designing your system. Please call us for more information.

Sensor	Frequency Type	Terminal Numbers	Frequency of RPM Range	Operation Temperature
RE1B-60C RE1B-600C RE1B-1000C	Rotary Pulse Generator	4, 7, 9 4, 7, 9 4, 7, 9	0-5000rpm 0-3000rpm 0-1800rpm	+14° F to +122° F +14° F to +122° F +14° F to +122° F
BI2-S12 DJ2-G SE-G	Proximity Switch Proximity Switch Proximity Gear Sensor	4, 8, 9 4, 8 4, 8, 9	0-2KHz 0-1KHz 0-8KHz	-13° F to +158° F -68° F to +140° F -4° F to +158° F
MCS-625	Retro Reflective Sensor	4, 6, 9	0-250Hz	-22° F to +120° F
3030AN MP-10 3070A*	Magnetic Pick-up	8, 9, 3 8, 9, 3 3, 8, 9		-100° F to +225° F -40° F to +221° F -100° F to +200° F
Switch Closure	Relay or Solenoid	5, 9	< 20Hz	

\*Explosion proof

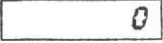
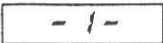
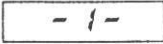
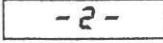
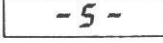
## Mode Selections



The DT-5TG has five modes of operation. Each mode uses separate parameters for you to program:

Mode	Function	Application
1	Rate measurement (frequency input)	Measures rotational linear or flow rate speeds. Factory set.
2	Elapsed time counter	Times variable processes.
3	Rate measurement	For tachogenerator
5	Self test	Diagnostically tests LED display, panel switches and input circuitry.

## Setting Modes

-  1. Apply any voltage between 85–264 VAC to terminals 1 and 2. When power is applied, the display will show all zeros. After a half second, the display will change to **0**.
-  2. Press **mode** and **data set** keys for at least 5 seconds. A zero will flash until **1** appears on the display.
-  3. Press the **increment** key to select the mode you want. Mode sequence will depend on input module.
- 

4. Press **mode** key. You're now ready to program the parameters for the mode you have selected.

## Mode 1: Rate Measurement (Frequency Input)

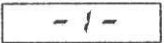

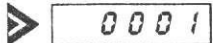

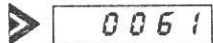
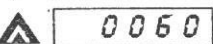
The DT-5TG can easily measure any rotational, linear or flow rate speed. Each parameter function dictates the necessary steps when preparing a system application. Parameters 2 and 3 can be measured with a hand-held digital tachometer (no need for arithmetic calculations).

Parameter	Function Setting	Factory	Range
1	Pulses per revolution	1p/r	1 – 9999
2	Sensing rpm	50,000rpm	
3	Display units	50,000rpm (rpm, fpm, ips)	
4	Decimal point	none	0-4th place
5	Minimum rpm (sensor)	10rpm	
6	Update time	1	.25, .5, 1, 2, 4, 8, 16
7	Acceleration	0	0, 1, 2

## Setting Parameters

### Parameter 1: Pulses Per Revolution from Sensor

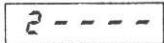
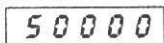

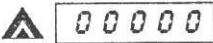
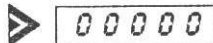
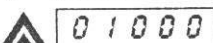
Here's how to change the parameter from 1 to 60 pulses per revolution ("p/r"):

-  1. Set unit to mode 1.
-  2. Press **mode** key.
-  3. Press **shift** key to select the desired digit.
-  4. Press **increment** key 6 times.
-  5. Press **shift** key.
-  6. Press **increment** key 9 times.

Parameter 1 is now set for 60p/r.

### Parameter 2: Sensing RPM

To change the parameter from 50,000 to 1000rpm:

-  1. Press **mode** key.
- 
-  2. Press **shift** key.
-  3. Press **increment** key five times.
-  4. Press **shift** key.
-  5. Press **increment** key.

### Parameter 3: Display Units

Program this parameter to the desired display value, corresponding to the parameter 2 setting. For example, suppose a conveyor is running at 157fpm and 1000rpm, sensing speed. This parameter would then be programmed for 157.

**3 - - - -** 1. Press mode key.

**50000**

➤ ▲ **00157** 2. Press increment and shift keys to change display.

To get a decimal point, increase the parameter 3 setting by a power of 10, depending on the number of decimal places needed. For one decimal place (in this example), program the display for **01570**. For two places, program **15700**.

### Parameter 4: Decimal Point

**4 - - - -** 1. Press mode key. (If you don't want a decimal point, skip to parameter 5.)

➤ **00157** 2. Press the shift key to select position of decimal point.

### Parameter 5: Minimum RPM (sensor)

Set this parameter to the highest value possible.

**5 - - - -** 1. Press mode key.

➤ ▲ **00010** 2. Press shift and increment keys to change display.

### Parameter 6: Update Time

**6 - - - -** 1. Press mode key.

➤ **1** 2. Press shift key to select update time.

### Parameter 7: Acceleration

This parameter is useful when rate speeds accelerate or stop rapidly. If the tachometer senses a large rate change, the update time automatically switches to .25 seconds. When the tachometer senses a constant rate, the update time is determined by parameter 6.

**7 - - - -** 1. Press mode key.

➤ **0** 2. Press shift key to set parameter:

**0** = No function

**1** = Rapid stop

**2** = Acceleration (input frequency must be  $\geq 7$  Hz)

Parameter settings are now complete. Press data set key to start measuring.

### Field Adjustment

In the rate measurement mode, parameter 3 can be adjusted without following the parameter sequence. For example, suppose the initial parameter 2 and 3 settings are 50,000rpm. But during actual measurements, the display shows 3800rpm when the sensing speed is 3500rpm. The DT-5TG can be quickly adjusted:

1. Press **mode** and **increment** keys simultaneously for 5 seconds.
2. Press **shift** and **increment** keys to make adjustment.
3. Press **data set** key — you're now ready to measure speed.

If the display shows **EE-00**, the ratio between parameters 2 and 3 is too large. Press **data set** key and readjust these parameters according to the parameter setting procedure outlined earlier.

## Mode 2: Elapsed Time Mode

This mode monitors the time of a continuously variable process. Say, for example, a baker wants to know the amount of time needed to bake cookies. By using a stopwatch, he could measure the amount of time it takes at a known speed of the conveyor. Or, the baker could calculate this time by using the distance formula  $d=vt$ . By knowing the calculation time (parameter 4) and rpm of the sensing gear (parameter 2), the baker can continuously monitor the time as the process varies.

Parameter	Function Setting	Factory	Range
1	Sensing gear - pulses/revolution	1	1 - 9999
2	Sensing gear - rpm	200	
3	Time units	(=.)	(-.)=sec/sec (=.)=min/sec or hr/min
4	Calculation time	02=.00	
5	Update time	1	.25, .5, 1, 2, 4, 8, 16

### Parameter 1: Sensing Gear — Pulses per Revolution

This example shows how to change the parameter from 1 to 60 pulses per revolution:

1. Set unit to mode 2.
2. Press mode key.
- 
- 
3. Press shift key 4 times.
4. Press increment key 6 times.
5. Press shift key.
6. Press increment key 9 times.

### Parameter 2: Sensing Gear — RPM

Here's how to change the parameter from 200 to 100rpm:

1. Press mode key.
- 
- 
2. Press shift key 3 times.
3. Press increment key 9 times.

### Parameter 3: Time Units

1. Press mode key.
2. Press shift key to select units.



Unit symbols:

- =. hour/minute or minute/second
- . second/second

### Parameter 4: Calculation Time

1. Press mode key.
- 
2. Press shift and increment keys to program time calculated.

If the display shows  $--.E9$ , an entry error has been made. Reprogram the unit using the shift and increment keys.

### Parameter 5: Update Time

1. Press mode key.
2. Press shift key to select update times.

The parameter settings are now complete. Press data set key to start the elapsed time counter.

## Mode 5: Self Test

This mode lets you check the LED display, membrane switches and input circuitry.

1. Press mode and data set keys for five seconds.
2. Press increment key and select mode 5.
3. Press mode key to test display segments and decimal points.
4. Some display functions switches can also be checked. Press these keys to test:
 

0.0.0.0.0.	MAX
1.1.1.1.1.	MIN
9.9.9.9.9.	PEAK
	HOLD
5. Press mode key. The display will show 1000 and the signal LED will flash.
6. Press data set key. The display will go back to the previous mode of operation.

## Display Switches and Functions

The DT-5TG has seven display functions located above the display. All functions have an LED indicator and all but GO have a membrane switch. Here is a brief description of each function:

- HI** If the display is equal to or greater than the HI limit setting, the LED will light. To program, press HI and mode keys for one second. Use the increment and shift keys to set limit.
- GO** If the display is between the HI and LO settings, the LED will light.
- LO** If the display is equal to or less than the low limit setting, the LED will light. To program, press LO and mode keys for one second. Use increment and shift keys to set limit.
- MAX** The display will hold the average maximum measurement. To program, press MAX and mode keys until LED lights.
- MIN** The display will hold the average minimum measurement. To program, press mode and PEAK keys until LED lights.
- PEAK** The display will hold the absolute peak measurement. To program, press mode and PEAK keys until LED lights.
- HOLD** This function will hold the display indefinitely as long as the unit is powered. To program, press mode and HOLD keys until LED lights.

Note:

- The HI, GO and LO functions are nonvolatile and may be reset by programming to zero.
- The MAX, MIN, PEAK and HOLD functions must be used separately. These functions may be reset by pressing the data set key or by interrupting power.

## Error Codes

Display	Type of Error	What to Do
EE-00	Parameter setting	Press data set key. Enter parameter according to setting range.
EE-01	Hi/Lo setting	Press data set key. Enter the upper and lower limits.
EE-02	Internal setting	Press data set key. Interrupt power at terminals 1 and 2.
EE-03	Memory recall	Press data set key. In sequence, press HI, hold, increment and mode keys.