

**MODEL 2990A, 2991A
& 2992A
TOTALIZER / TIME
TACHOMETER**

MANUAL

DESIGN CONCEPTS INC

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SPECIFICATIONS

General

Power Source: Internal Lithium Battery
 Battery Life: Eight year typical life
 Temperature Range: 0° to +75 C° (+32° to +167°F)

Inputs

High Speed

Count Speed: 10 KHz, 50 μ s min. high/low pulse; for use with TTL, CMOS. Open Collector, NPN transistor or magnetic sensor

Sensitivity: Low Level Logic <1.0 VDC
 High Level Logic >2.0 VDC

Maximum Voltage: 28 VDC

Low Speed

Count Speed: 40 Hz, 12ms min. pulse; for use with isolated switch/relay contact

Sensitivity: Low Level Logic < 1.0 VDC
 High Level Logic > 2.0 VDC

Maximum Voltage: 28 VDC

Reset

Types: Front panel button and remote input through contact closure between rear terminal pins 4 and 5. (Applies only when configured for Count or Elapsed Time modes)

Min. Pulse Width: 0.5ms

Functions

Totalizer: Eight digit capacity, programmable prescaler (divide by 1 to 9999), X1 or X2 (count both Leading the trailing edge) logic; Front panel or remote reset

Elapsed Time Indicator: Eight digit capacity; registers elapsed time when signal input is held ON; Programmable resolution of hours, tenths of hours, hundredths of hours, minutes, tenths of minutes or seconds; front panel or remote reset

Hour Meter: Eight digit capacity; registers hours in whole units, tenths, or hundredths, non-resettable

*Rate Meter: Four digit capacity; time interval method with prescaler (multiply by .0001 to 9999) converts pulses to rate

Mechanical

Dimensions: 35.6 mm x 71.9 mm, x 33.3 mm deep
 Panel Cutout Size: 66.8 mm x 33.2 mm
 Panel Thickness: 2 mm to 13 mm
 Depth Behind Panel: 20.7 mm

Display

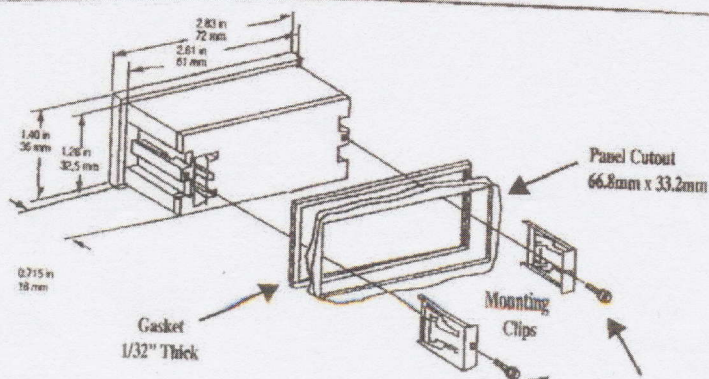
Type: Liquid Crystal Display
 Height: 0.35" (9mm) 2990A/2991A 0.5" (mm)
 Number: 8 digits (4 digits in Rate Meter mode) 2992A/2991A. 5 digit 2992A
 Decimal Point: Programmable from 0 to 4 places (0 to 3 places for Rate)

*Rate mode, Model 2991A/2992A only

PANEL MOUNTING

Install unit in panel cutout using gasket and hardware provided per drawing below.

Note: Do not overtighten screws. Tighten only until gasket begins to compress.



OVERVIEW

CONSTRUCTION



Compact Design

Rugged, diecast housing

Large LCD Display

8 digit, 0.35" (8.8mm) high
5 digit .5" 6(mm) high

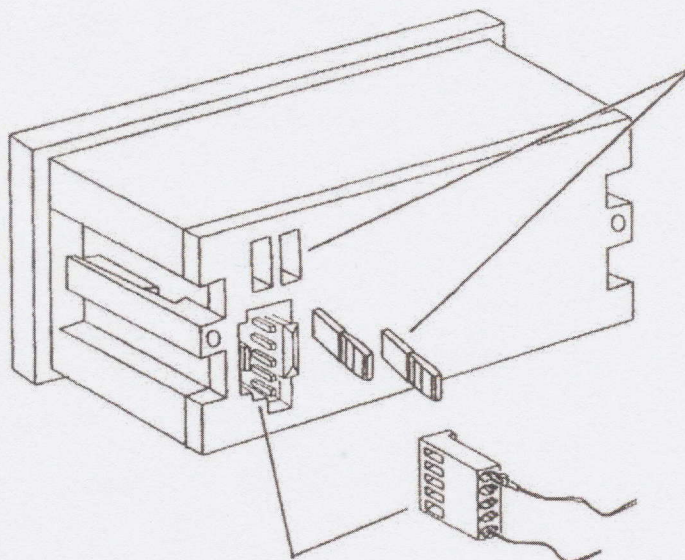
Mode Indicators

Identifies programmed function: Count (C),
Rate (R), Timer (T), Hour-Meter (H) (2992A)

Long-Life Internal Battery

Lithium cell provides continuous "ON"
operation. Nonvolatile data and program
memory

Rear Panel Features

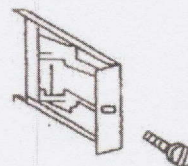


Connector

Connector can be pre-wired.
Locks securely in place

Reset and Program Enable

Pin jumpers allow access or inhibit to
reset and programming functions

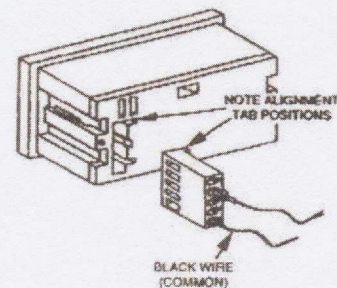
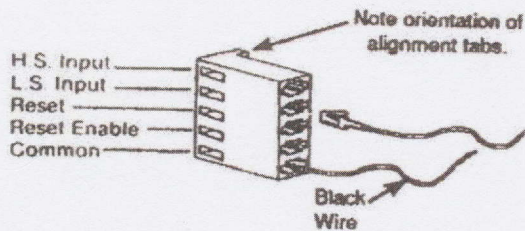


Panel Mounting Clips

SETUP

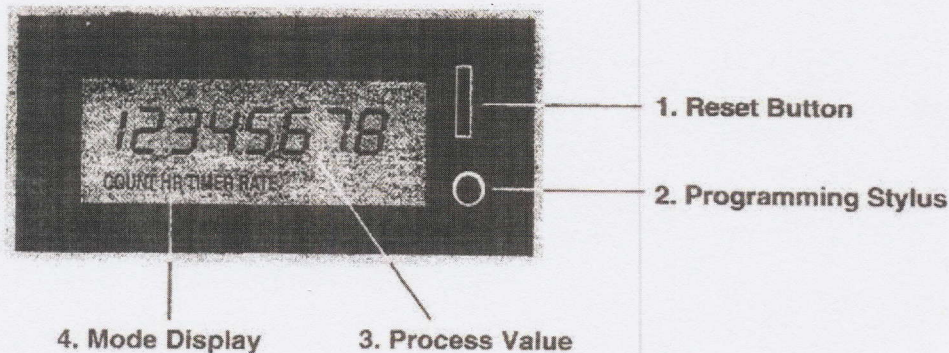
WIRING

The unit uses a detachable terminal strip to make wiring more convenient. Included are the terminal strip and 4 colored wires with locking tangs attached. The black common wire is installed in the terminal strip at the factory, and should always be used in that position. Wires can be removed from the terminal strip by inserting a small screw driver into the slot on the side of the strip and gently pressing on the locking tang while pulling gently on the wire.



Note: Do not install wires for functions that are not used.

OPERATION



1. Reset Switch: Used to reset the present value in Count or Timer mode. The Reset function will only be activated if the Reset Enable jumper is set to the ON position, or if the rear terminal Reset Enable input (pins 4 and 5) is connected. In Set-up mode, this button is used to set parameter values by incrementing the highlighted number or scrolling through the possible choices.

2. Programming Stylus: Used in Set-up mode to advance from one parameter to the next and to move between digits in a numerical value.

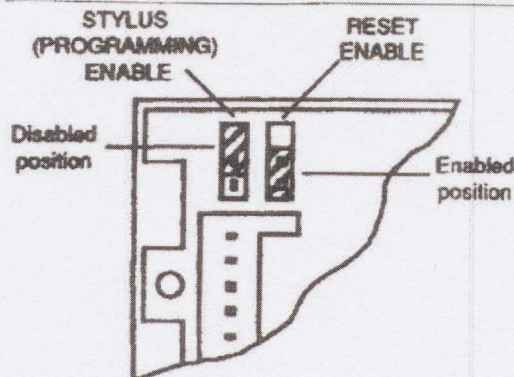
3. Present Value: Displays the current Count, *Rate or Time value in operating mode. In Set-up mode displays the parameter value.

4. Operating Mode Display: Based on how the unit is programmed, one of the 4 above displays will be illuminated to indicate the chosen mode of operation. A flashing display indicates that the controller is in Set-up mode.

*Rate mode, Model
2991A/2992A only

SET-UP OVERVIEW

Located on the back of the unit are two jumpers which are used to enable operation of the front panel reset button and programming stylus. Before beginning the set-up procedure it is necessary to set these two jumpers to the ON position. After set-up is complete, the jumpers may be moved to the OFF position to prevent unauthorized changes or accidental reset of the count or elapsed time value.



Operating Mode Selection

Depressing the recessed stylus will activate the Operation Mode selection menu. All four mode indicators will be illuminated with the presently chosen one flashing. Use the Reset key to scroll between the mode. Once the desired mode is flashing, it can be entered for set-up by depressing the stylus key.

COUNT HR TIMER RATE

COUNT MODE

In Count Mode, the unit operates as an eight digit decimal totalizer. Leading zeros are suppressed. The reset button, if enabled, and the remote reset input can reset the count to zero at any time. Counting will not resume until the reset is released.

COUNT 0001

Prescale Value

The four digits on the right-hand side of the display represents the value by which the input signal will be divided before a pulse is sent to the display counter. For example if 20 pulses represented one display unit, a value of 20 would be entered for this parameter. The value can be set by depressing the reset key to increment the currently flashing number, starting with the right most digit. The stylus key is used to scroll to the next digit to the right on the display. Default value is 0001.

Note: A prescale value of 0000 is not valid. If no prescaling is required, leave this parameter at the default value of 0001.

COUNT 1 0001

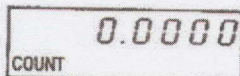
Count Logic

Depress the stylus key until the digit on the far left of the display begins to flash. The digit selects the count logic, which indicates whether counting is done on only the falling edge (1) of the input or both the rising and falling edge of the input (2). Use the reset key to toggle between the two values. Default is 1.

SETUP

Decimal Point Position

After the count logic has been set, depressing the stylus key will bring up the decimal point position display. The position can be changed by depressing the reset key. Each successive press of the key will move the decimal position one place to left, up to a maximum of four places. Default is zero places.

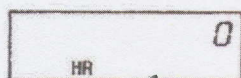


After the decimal position has been set, depressing the stylus will cause the unit to return to Operating mode.

Note: In count mode this parameter serves as a cosmetic decimal point that will not effect the calibrated resolution. For example, if the display showed 123 with the Decimal Point Position set to 0, changing the position to 1 will cause the display to show 12.3.

In Hour Meter mode, the unit accumulates time whenever the input is held active. Front panel and Remote Reset functions are inoperative. The Present Value can only be reset by entering Set-up mode.

HR METER MODE



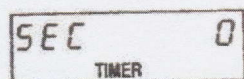
Display Resolution

The accumulated time can be displayed in whole hours, tenths of hours or hundredths of an hour. Depressing the reset switch will scroll the display between these three choices. Default is whole hours.

After the display resolution has been set, depressing the stylus key will cause the unit to return to Operating mode.

In Timer mode, the unit accumulates time whenever the input is held active. The reset, if enabled, the remote reset can be used to reset the timer at any time.

TIMER MODE



Display Resolution

The accumulated time can be displayed in one of the following resolutions: seconds, minutes, tenths of minutes, hours, tenths of an hour, hundredths of an hour. Depressing the reset key will scroll the display between these six choices. Default is seconds.

After the display resolution has been set, depressing the stylus key will cause the unit to return to Operating mode.

In Rate Mode (Rate mode, Model 2991A/2992A only), the unit displays events per time. It can be used as a tachometer or to display other rates; production flow, etc.

RATE MODE



Prescale Value

The four digits on the right hand side of the display represents the value by which the input signal will be multiplied before a pulse is sent to the display counter. This value can be set in a range from 0.001 to 9.999. Depressing the reset key will move the decimal position to the right. After the position has been set, depressing the stylus key will enable the value to be set. Use the reset key to increment the currently flashing number starting with the right-most digit. The stylus key is used to scroll to the next digit to the right on the display. Default value is 1.000.

Note: A prescale value of 0000 is not valid. If no prescaling is required, leave this parameter at the default value of 1.000.

Rate Prescale Example:

This unit determines rate based on input frequency, thus if the Prescale Value is left at 1.000, the value displayed would be number of pulses per seconds. Based on this, the basic formula for the Prescale Value is:

$$\frac{1}{\text{Pulses per Display Unit}} \times \frac{\# \text{ of seconds}}{1} = \text{Prescale Value}$$

Revolutions per minute (RPM) can be displayed using a 360 PPR encoder as the input by setting the Prescale Value according to the formula below:

$$\frac{1}{360} \times \frac{60}{1} = .167$$

Gallons per hour can be displayed using a 20 pulse per gallon flow meter as the input by setting the Prescale Value according to the formula below:

$$\frac{1}{20} \times \frac{3600}{1} = 180.0$$

Decimal Point Position

After the left-most digit on the Prescale Value has been set, depressing the stylus will bring up the Decimal Point Position Display. This parameter applies to the rate display and is not related to the decimal point position for the Prescaler. The position can be changed by depressing the reset key. Each successive press will move the decimal position one place to the left up to a maximum of three places. Default is zero places.

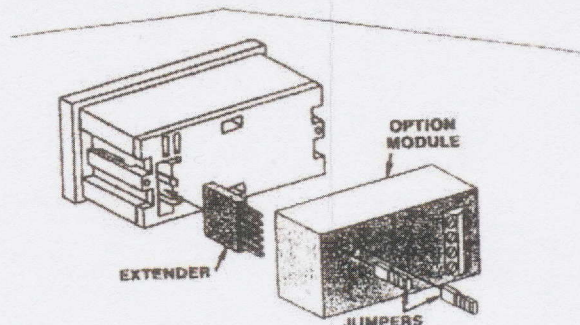
Note: In Rate mode, this parameter serves as a function decimal point that will effect the displayed resolution. For Example, If the displayed value was 123 with the Decimal Point Position set at 0, changing the decimal point position to 1 would cause the display to read 123.X, with X representing tenth of a unit resolution.

Three option modules are available to snap-mount to the rear of the 2990A/2991A/2992A: a screw terminal adaptor; an AC/DC input module and a Triac Input module.

OPTION MODULES

Option Module Installation

1. Remove the two jumpers from the back of the instrument that enable the reset and stylus keys. Place these jumpers in their corresponding positions on the back of the option module.
2. Place the six-position pin extender into the connector on the bottom of the option module.
3. Position the option module so that the pin extender lines up with the connector on the back of the instrument. Press together until the option module snaps into position flush to the back of the instrument.

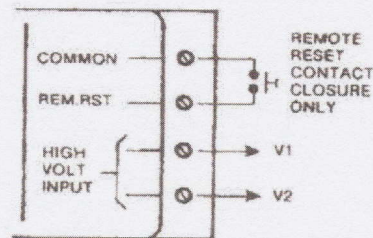


Option Module Wiring and Installation

The Screw Terminal Adaptor (Part #328992-010) provides the convenience of screw terminal connection of input signal and remote reset. Wire signal and reset input according to the wire diagram on Page 4.

The AC/DC Input Module (Part #328992-020) allows use of a high voltage input signal of 24 to 270 volts AC or DC. Impulse frequency response is 0 to 10 Hz. It is optically isolated for maximum immunity to electrical transients and interference. Refer to the diagram below for wiring information.

The Triac Input Module (Part #328992-030) allows use of a 115 VAC, 50/60 Hz switching devices as input signal source. Impulse frequency response is 0 to 10 Hz. The module is optically isolated. Refer to the diagram below for wiring information.



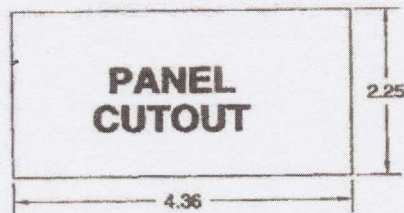
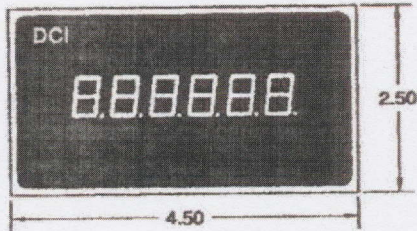
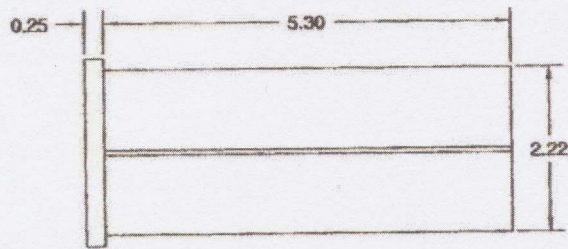
WARRANTY

The following warranty is in lieu of all other warranties, expressed, implied or statutory, including but not limited to any implied warranty of merchantability or fitness for a particular purpose.

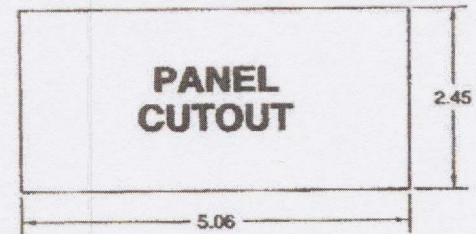
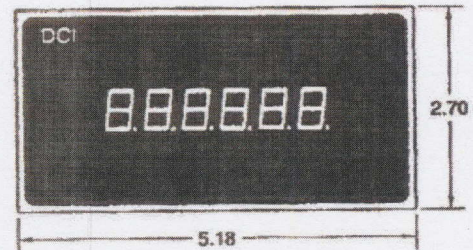
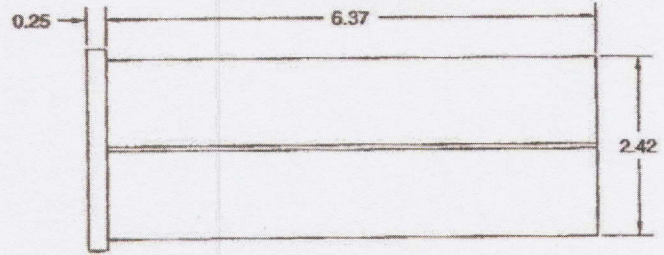
All new products sold by DCI, Inc. are warranted against defects in materials and workmanship for one (1) year from the date of the original shipment. During the warranty period, DCI, Inc. will repair or at its option, replace without charge any DCI, Inc. product provided it is defective during the subsequent factory examination. The warranty for products repaired after expiration of the new product warranty, as stated above, is limited to the repaired portion and is valid for ninety (90) days from the date of its reshipment. These warranties do not apply if the product has been damaged by accident, misuse, or modification in the absence of authorization from DCI, Inc. DCI will not be responsible or liable for contingent, incidental, secondary or consequential costs or damages.

DIMENSIONS

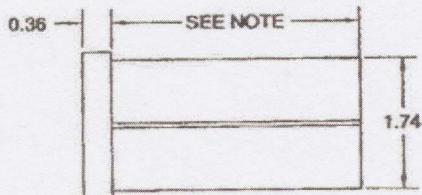
CASE SIZE A



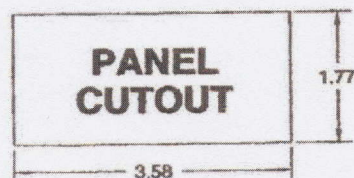
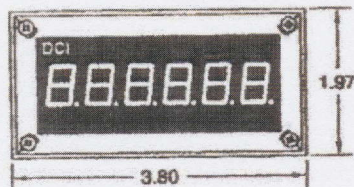
CASE SIZE B



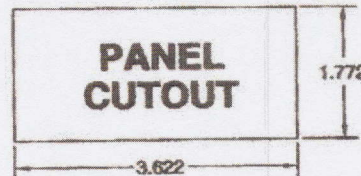
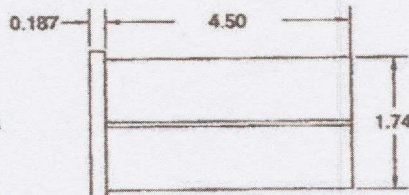
CASE SIZE D



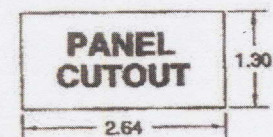
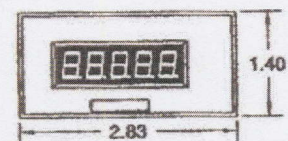
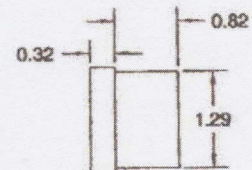
CASE DEPTH SERIES 2000: 5.1"
SERIES 2600: 4.0"
SERIES 9000: 4.0"



CASE SIZE C



CASE SIZE E



ALL DIMENSIONS IN INCHES
PLEASE ADD .5 INCHES TO DEPTH FOR REAR CONNECTORS