MODEL 2992B/2992C
ELAPSED TIME
INDICATOR AND
TACHOMETER

MANUAL

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DCI
MODEL 2992B/2992C
Elapsed Time Indicator/Tachometer

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WARNINGS

In installation and use of this product, comply with the National Electrical Code, Federal, State and local codes, and any other applicable safety codes. In addition, **turn off power and take necessary precautions during installation, service and repair** to prevent personal injury, property loss and equipment damage.

If installation is to take place in a volatile, combustible or explosive atmosphere, this product must be housed in an appropriate enclosure as required for use in such atmospheres by the National Electrical Code and any local applicable standards.

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A.   GENERAL

This manual contains instructions for installation, operation and programming of the Model 2992C Elapsed Time Indicator and the Model 2992B Tachometer.

B.   PRODUCT DESCRIPTION

The compact 2992B/2992C case is rugged, die-cast metal, sealed to meet NEMA 4 standards, and fits a 2.6" x 1.3" panel cutout. Only one (1") inch of clearance behind the panel is required. Self - adhesive labels, which attach to the front panel, are provided with each unit to identify the unit of measure displayed.

C.   SPECIFICATIONS

Display:	Five - digit LCD, 0.5" high characters
Input Power:	4 to 28 VDC at 150 micro amps typical. 300 micro amps maximum.
Temperature Range:	-20 degree to +60 degree Celsius
Time Base Accuracy:	+/-.01%, +/-1 count
Environmental Integrity:	Front panel surface designed to meet NEMA 4 requirements when using the panel mounted gasket provided.
Weight:	5.5 ounces (156 g)
Signal Inputs: (Count or Run/Hold)	
High Speed:	For use with logic level voltage, TTL CMOS collector NPN transistor, or magnetic sensor having >2 volt peak into 10k load.
	Frequency Response: 5000 HZ (50% duty cycle)
	Input Voltage: Logic 1>2.0 VDC; Logic 0 <1.0 VDC; Maximum input +/- 28 VDC.
Low Speed:	For use with isolated switch/relay contact.
	Frequency Response: 25 HZ (50% duty cycle)
Input Count Logic:	Programmable choice of X1 or X2 logic, for counting the falling/rising edge of the input signal.

C. SPECIFICATIONS continued:

Reset: Front panel push button and remote reset for elapsed time modes.

Connections: Integral plug. Mating connector provided.

Operating Functions:

Elapsed Time Indicator: Registers elapsed time when signal input is held low, stops when input is removed. Programmable ranging for resolution of (2992C) hours, minutes or seconds. Decimal placement for whole units, tenths, hundredths, or thousandths (seconds range only). Front panel and remote reset.

Rate Indicator: Five digit capacity. Registers rate in RPM or virtually any other (2992B) engineering unit. Programmable sample time (gate) range of 0.001 to 9.999 seconds. Prescaler allows division of input signal by 1 to 9,999. X1 or X2 input count logic. Programmable decimal point.

SECTION 2
OPERATING PRINCIPALS AND APPLICATIONS

A. RATE (2992B)

1. THEORY: Count logic and prescaler circuits are located between the input and display counter. Counting may occur on either the falling edge (X1 logic) or both the falling and rising edge (X2 logic) of the input signal. The prescaler can be programmed to divide by up to 9999 (either one or both edges) before passing a count to the display. This provides scaling for calibration of input pulses to units displayed.

For instance, a 15.2 inch circumference drive roll is coupled to a 100 pulse-per-revolution encoder, and a reading of yards per minute is required. The circumference expressed in yards is 15.2) 36 or 0.42222 yards. Therefore, the drive roll will make 2.368 revolutions per yard (1) 0.42222). The encoder will produce 236.8 pulses per yard (2.368 x 100). The gate time should be 0.2534 seconds for calibration in yards per minute (60) 236.8). If a longer gate time is wanted for better display stability, the prescaler may be set to divide by 5, and the gate time increased by a factor of 5 (1.267 seconds).

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SECTION 3
SETUP AND OPERATION

A. GENERAL

1. ENABLE THE RESET AND STYLUS SWITCHES: Before beginning the setup procedure, set the two jumpers on the back of the 2992B/2992C to their ENABLE positions to enable the reset switch and the stylus switch. (See Figure 3-1.)
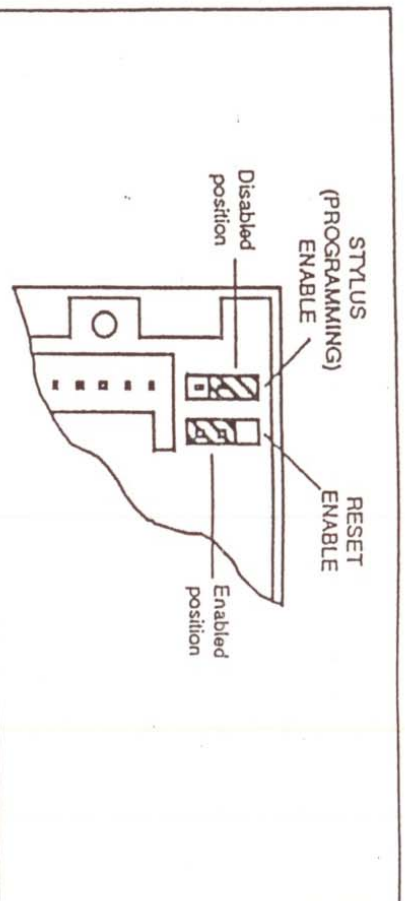

Figure 3-1. Jumper Enable/Disable Reset Positions

2. Press the reset switch with a ballpoint pen or similar instrument to place the unit in the setup mode.

B. TIMER

1. SELECT TIMING UNITS: Scroll to either hours, minutes or seconds, timing units by pressing the reset switch. Press the stylus switch to move to the resolution setup loop.

2. SELECT RESOLUTION: The resolution is either whole units, tenths of units or hundredths of units. In the case of seconds, thousandths of seconds are also available. These are indicated by the number of zeros displayed and the position of the decimal point.

  a.   Press the reset switch to scroll through possible resolutions.

3. RETURN TO RUN MODE: Press the stylus switch to set the resolution indicated by the display, and return to the run mode.

4. OPERATION: Time is accumulated whenever the signal input is held active and the reset is not applied. The reset button, if enabled, and remote reset can be used to reset the timer at any time. **NOTE:** The display is refreshed two times per second. This may give an appearance of missing counts when higher resolutions are selected.

C. **RATE (2992B)**

1. **SELECT GATE VALUE:** Five digits are lit with a decimal point, which represents a possible gate range of 0.001 to 9.999 seconds.

   a. Select digit values by scrolling the flashing digit with the reset switch.

   b. Advance to the next digit by pressing the stylus switch until all digit values have been set.

   c. After the fourth digit is set, press the stylus switch to set the value of the prescaler and count logic.

   NOTE: Gate times of less than .5 seconds may cause the display to miss some readings because the display is refreshed twice a second.

2. **SET THE PRESCALER:** The four right hand digits are the prescaler, which is the number by which the input signal will be divided before a pulse is sent to the display counter.

   a. Press the reset switch to scroll the right most digit to the desired value.

   b. Press the stylus switch to move to the next digit, then scroll to the desired value.

   c. Continue until each digit is set to the desired value, then press the stylus switch to move the left most digit.

   NOTE: Continuing to operate the reset switch will scroll a digit from 0 through 9 and then back to 0. If a desired value is over shot, continue scrolling until you reach the desired value. Once a digit is selected by the stylus switch, however, you must complete the set up cycle then start over from the run mode to change the value.

   IMPORTANT: A PRESCALER VALUE OF 0000 IS NOT VALID. THEREFORE, IF NO RESCALING IS REQUIRED, A VALUE OF 0001 SHOULD BE ENTERED.

3. **SELECT THE COUNT LOGIC:** The two dots to the left of the most significant digit selects the count logic, which indicates if counting is done on only the falling edge of the input (1) or on both the rising and falling edge of the input (2). Press the reset switch to select.

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4. **POSITION THE DECIMAL POINT:** After the count logic is set and the stylus switch is operated, the position of the decimal point is ready to be set.

1. Press the reset switch to advance the decimal point to the left up to four decimal positions, then scroll back to no decimal point.

NOTE: Positioning the decimal point does not change internal calibration.

5. **RETURN TO RUN MODE:** Once the decimal point position is set, press the stylus switch to return to the run mode. The rate annunciator will be steady.

6. **OPERATION:** The rate function displays events per unit time. The most common application is as a tachometer. However, many other rates may be displayed. The reset button and the remote reset input are inoperative in the rate mode.

7. **SECURITY:** After the set up procedure is completed, place the stylus enable jumper, located on the rear panel, in the disabled position. This will secure the mode selection from change.

SECTION 4
INSTALLATION

A. CONNECTOR ASSEMBLY

1. Insert wired terminals into the terminal housing. Be certain to orient the locking tang on the terminal as shown in Figure 4-1.

LOCKING TANG DETAIL

SUGGESTED WIRE COLOR USAGE

COMMON	BLACK
INPUT	WHITE
RESET	BLUE
5-28 VDC	GREEN

H.S. INPUT
L.S. INPUT
RESET
5-28 VDC
COMMON

Note orientation of alignment tabs.

Black Wire

Press on Locking Tang through slot to release wire and terminal.

Locking Tang
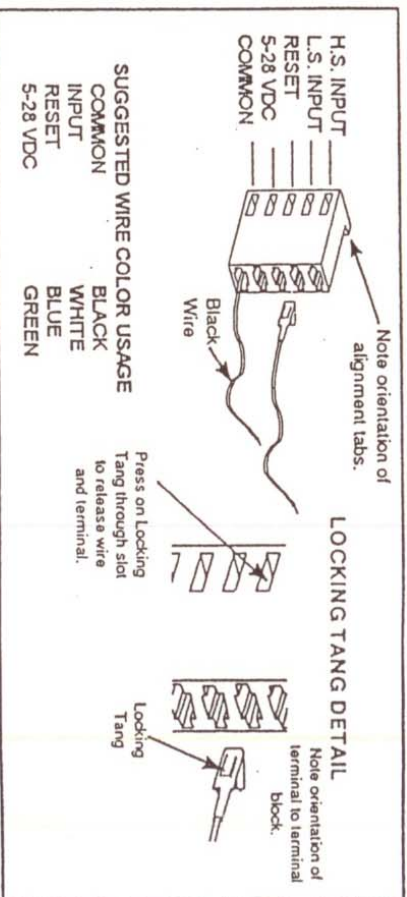
Note orientation of terminal to terminal block.

Figure 4-1. Locking Tang Orientation and Wire Usage

2. To remove a terminal from the terminal block, insert a small screw driver into the slot on the side of the terminal housing and gently press on the locking tang while pulling gently on the wire. A variety of connections arrangements are possible using the supplied connector and wires. The black common wire is installed in the terminal housing at the factory and will always be used in this position. **DO NOT INSTALL WIRES FOR FUNCTIONS THAT ARE NOT USED.** Install connector per Figure 4-2.

BLACK WIRE (COMMON)

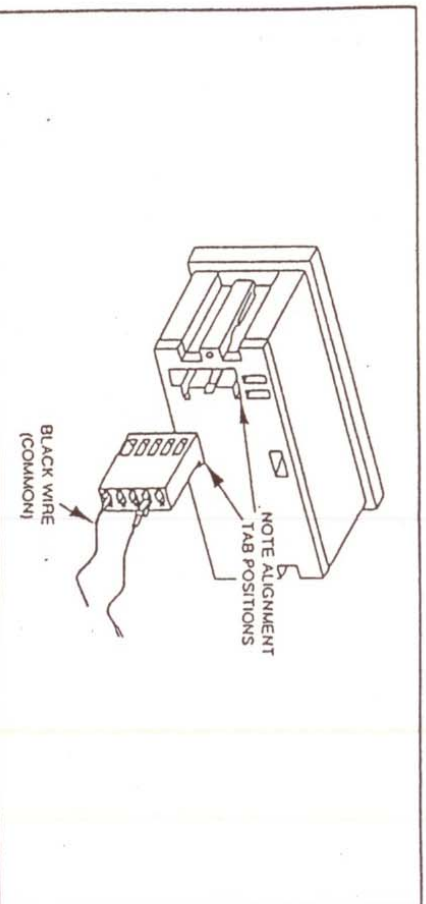NOTE ALIGNMENT TAB POSITIONS

Figure 4-2. Connector Installation

B. WIRING PRACTICE

Proper electrical wiring reduces the probability of electrical interference. The following precautions should be observed:

1. Do not run input signal or reset lines in the same conduit as power or control lines from relays, motor starters, etc.

2. Use two-conductor shielded wire for long runs of signal and/or reset inputs. The shield should be connected at the instrument end to Common.

3. Mount the 2992B/2992C as far away as possible from motor starters, SCR circuits, large relays, etc.

4. When connecting terminals, solder tin the ends of all stranded wires.

5. Do not allow the instrument to support the weight of cables, harnesses, etc. All interconnection wiring must be supported elsewhere.

C. INPUTS

The input signal for all applications may be supplied either through the Low Speed (LS) or High Speed (HS) input, depending on the type and speed of the signal source.
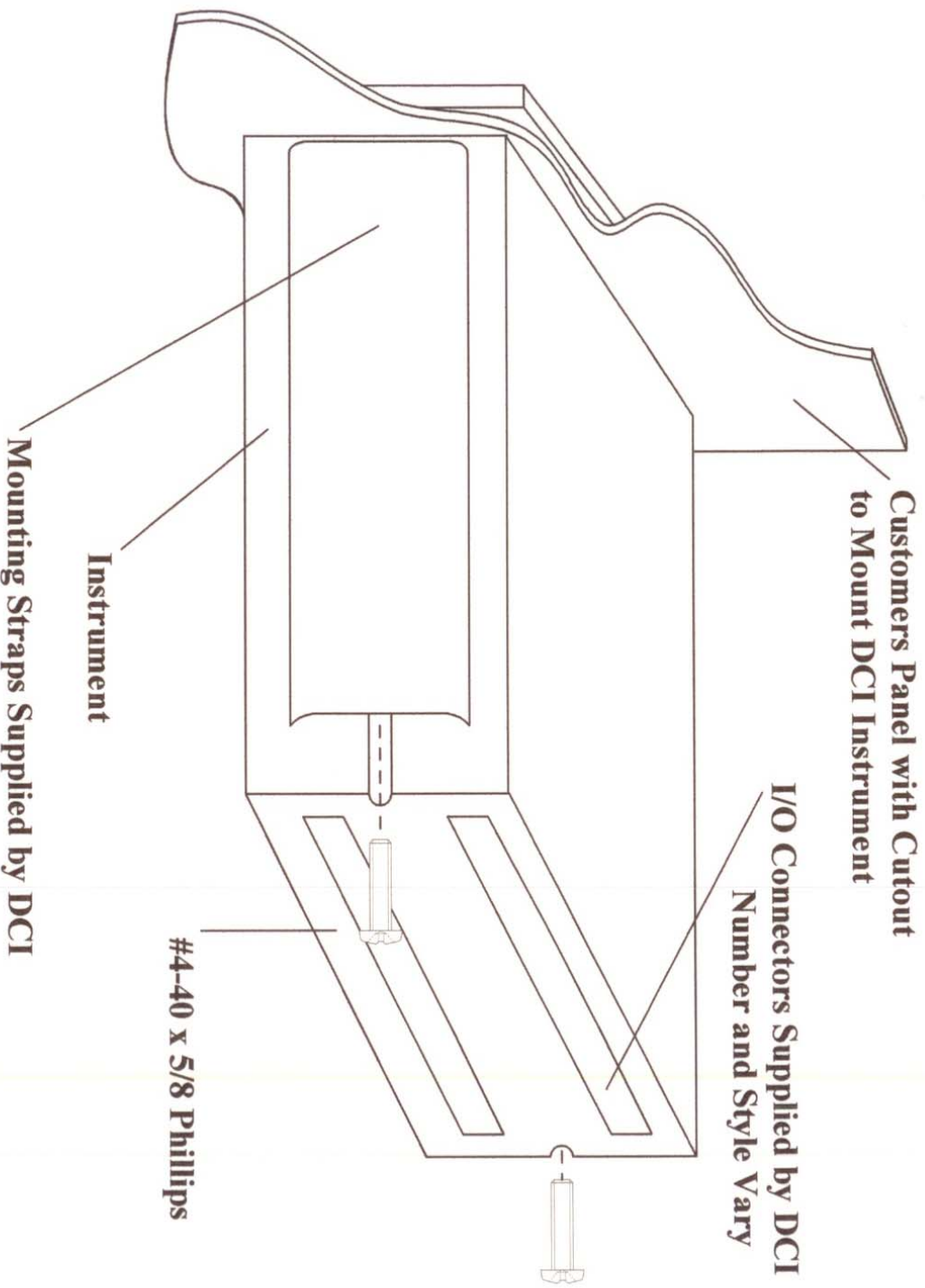
The low speed input should be used for contact or open collector type inputs, when protection against false inputs due to contact bounce and noise is required, and input rates are below 25 HZ. It is recommended that the input wire to the high speed input not be installed in the connector to avoid possible noise pickup.

For logic type inputs at rates up to 5000 counts per second, use the high speed input. The input can be TTL, CMOS, or other logic type signals up to 28 volts. Open collector type inputs will not work properly at these higher rates unless a pull up resistor is added at the logic output. An external pull up of 4.7k is recommended for most high speed applications.

D. RESET FUNCTIONS (2992C ONLY)

Enable the front reset by positioning the reset jumper per Figure 3-1. Reset is initiated by momentary contact of the reset input to common, or by pressing the front panel reset switch.

MOUNTING

Customers Panel with Cutout
to Mount DCI Instrument

I/O Connectors Supplied by DCI
Number and Style Vary

#4-40 x 5/8 Phillips

Instrument

Mounting Straps Supplied by DCI

Note: Ground Case per FIGURE 1.0, page 16

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