

**MODEL 714  
BI-DIRECTIONAL  
COUNTER  
DESIGN CONCEPTS INC**

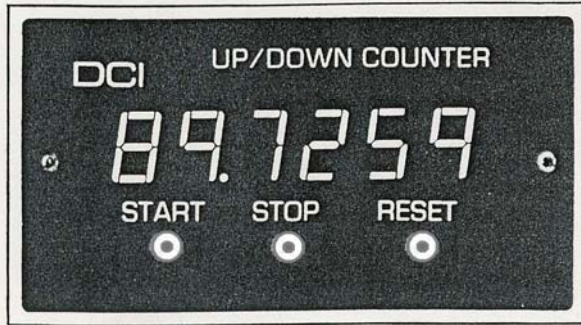
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## QUADRATURE BI-DIRECTIONAL COUNTER



MODEL 714

### FEATURES

- Through zero counting and indication
- Programmable decimal points
- Optional quadrature counting input: (X1, X2 or X4 multiplication)
- Four or six big (.56") LED digits of display
- Optional three state TTL compatible BCD outputs
- Front panel and remote control inputs for start, stop, and reset
- Remotely presettable to a positive or negative number
- CMOS circuitry for high noise immunity and low power consumption
- Schmitt trigger input circuitry for all TTL inputs
- All aluminum case with attractive black and silver bezel
- Gold plated I/O contacts
- 100Khz count rate, optional 1Mhz

Designed for industrial users the Model 714 bi-directional counter has all the features the true professional demands in a solid state counter. Schmitt trigger counting inputs, large easily read LED display, heavy duty construction, and gold plated I/O contacts. The standard unit counts from a variety of count configurations including single count source with direction select line, dual count source with one input being the up count and the other the down, and optional quadrature count input configuration available. Various signal levels and types can be counted, from as low as a 150 millivolt zero crossing sine wave up to 115 volts, and form "C" or form "A" contact closure. Optional three state BCD outputs allow paralleling of other BCD data on the same lines to simplify external wiring. Presetting is done on the BCD input/output lines. BCD outputs go to a high impedance state when preset command is received. The preset point can be a positive or negative number and unit will count up or down from the preset point. Through zero direction sensing and indication is automatic, i.e., unit counts down to zero with a positive sign and at zero switches to a negative sign and starts counting up. When counting up through zero from a negative direction the negative LED goes out when passing through zero and the unit starts counting up with positive indication.

### SPECIFICATIONS

**Accuracy:**  $\pm .1$  count @  $-20^{\circ}$  to  $+60^{\circ}$  Celsius

**Display:** 4 or 6 digits, .56" high-efficiency red LED dot for negative polarity and overrange. Decimal points programmable via solder pads behind front panel lens.

**Front Panel Controls:** Three pushbutton switches, one each for start, stop, and reset. If ordered as presettable unit the reset button becomes a preset button.

### Inputs:

**Remote start/stop/reset:** Requires closure to logic common or TTL logic zero. Input loading 1 LPTTL load. Stop signal overrides start.

**Latch:** (01 option only) Requires TTL logic zero or closure to common. BCD data is held as long as latch line is held low. Does not affect count accumulation. Input loading 1 LPTTL load.

**Store display:** Requires TTL logic one or closure to logic 5 volts. Display will be held as long as store line is held high and will update when store is allowed to go low again. Does not affect count accumulation. Input loading 1 LPTTL load.

**Parallel BCD:** For presetting, must be three state or diode isolated. Input loading 1 LPTTL load.

**Three state control:** (01 option only) Requires TTL logic zero or closure to logic common. Forces all BCD outputs to a high impedance state. Does not affect data stored in latches. Input loading 1 LPTTL load.

**Sine wave/pulse count input:** (option -08) Minimum signal 150mVRMS, DC to 10Khz. 500mVRMS, DC to 50Khz. Maximum signal 115VAC without damage to circuitry. Input impedance 100Kohm. Threshold adjustable from the front panel with a small screwdriver.

**TTL level inputs:** Schmitt trigger with no limit on rise or fall time of input pulse. Maximum count rate 100Khz. Input loading 1 LPTTL load.

**Contact closure inputs:** Accepts form "C" closure input standard but can be modified to accept Form "A" closures by adding filter capacitors on N.O. count input to limit count rate to maximum rate expected. For instance for a count rate of 20hz a 1 $\mu$ f capacitor is required between the N.O. input and logic common with the N.C. input tied to logic common. Can be factory installed.

**Polarity preset:** Requires logic one for positive and logic zero for negative. Can only be preset when unit is programmed for preset operation and reset is activated. Input loading 1 LPTTL load.

### Outputs

**BCD:** Three state + 8421 TTL compatible. Fan out of 4 TTL loads. (Optional)

**Carry output:** Normally high goes to logic zero during count of 1,000,000 when counting up. Fan out of 1 LPTTL load.

**Borrow output:** Normally high goes to logic zero during count of 1,000,000 when counting down. Fan out of 1 LPTTL load.

**Reset output:** Normally low, goes high for overrange. Fan out of 1 LPTTL load.

**Power interrupt:** Normally a logic level one, goes to logic zero after return of power following power interruption. Fan out of 1 LPTTL load.

**Polarity output:** TTL logic one for positive and logic zero for negative. Fan out of 1 LPTTL load.

### Input Power:

115VAC, 50-400 hz	8 watts maximum
230VAC, 50-400 hz	8 watts maximum (optional)
5VDC @ 500 mA maximum	(optional)
10-15VDC @ 500 mA maximum	(optional)
10-30VDC @ 500 mA maximum	(optional)

**Operating Temperature Range:**  $-20^{\circ}$  to  $+60^{\circ}$  Celsius.

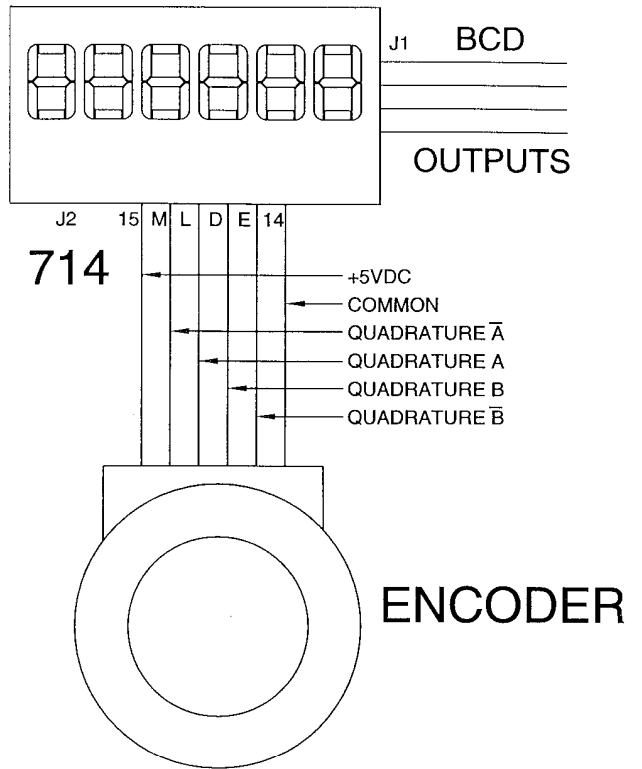
**I/O Method:** Card edge connectors with solder tabs.

**Case size:** "A" See page 39.

**OPTIONS**

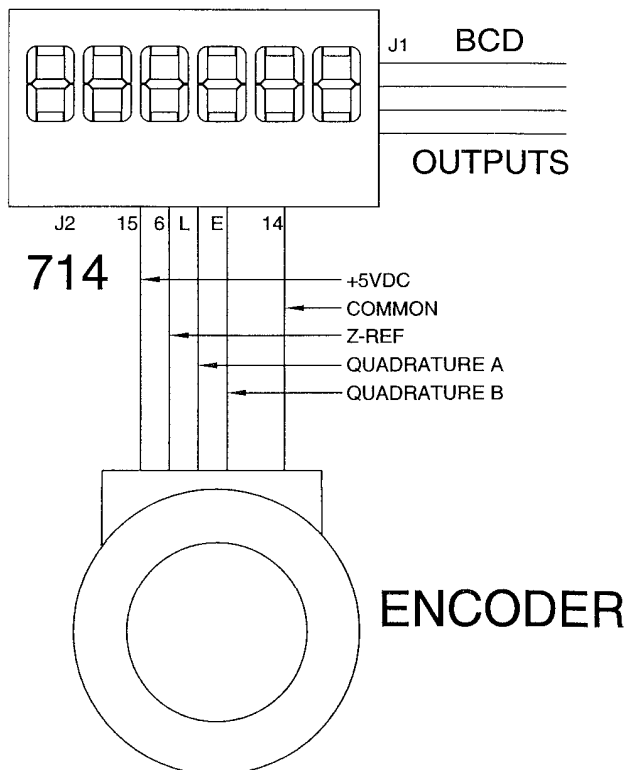
- 01 Three state + 8421 TTL compatible (4 digits) buffered, latchable BCD outputs. (6 digits) Will drive up to 4 TTL loads.
- 02 Add two digits to left of display to make a six digit display
- 03 Quadrature input counting logic.
- 04 Presetable operation. Unit is configured such that when reset is activated display will go to number input on BCD lines. All BCD inputs must be programmed for unit to preset properly.
- 05 5VDC input power
- 07 Z Reference input. Compatible with BEI encoders.
- 08 Input amplifiers for sine wave/pulse input signals. Threshold is front panel adjustable
- 10 Remove front panel switches
- 12 10-15VDC input power
- 18 Reset switch only
- 22 230VAC input power
- 23 Green LED display
- 25 Logo and/or nomenclature change (Special artwork to be supplied by customer) One time charge  
Plus per lens
- 26 No logo
- 27 Screw terminal I/O connector
- 28 Blank lens
- 36 "COUNTER" legend
- 37 "Up/Down Counter" legend
- 38 "Degrees" legend
- 50 Sunlight readable .6" LED display.

TYPICAL CONNECTIONS OF A QUADRATURE ENCODER WITH COMPLEMENTARY TTL OUTPUTS TO THE MODEL 714



THE MODEL 714-03 WILL COUNT IN QUADRATURE UP AND DOWN AND DISPLAY A NEGATIVE SIGN WHEN THE COUNT GOES THROUGH ZERO. EXCITATION VOLTAGE OF 5VDC AT 150 mA IS ALSO PROVIDED TO POWER THE ENCODER.

TYPICAL CONNECTIONS OF A QUADRATURE ENCODER WITH QUADRATURE AND Z-REF TTL OUTPUTS TO THE MODEL 714



CONNECTOR TERMINAL DESIGNATION

J1		J2	
LSD	1 A pin 1	Reset Output A	pin 1 Remote Start
1st Digit	2 B	Polarity	B
BCD I/O	3 C	N/C	C
	4 C	Contact Closure A	2 Remote Stop
	8 D	Contact Closure B	3 Remote Reset
2nd Digit	1 E	Contact Closure C	4 N/C
BCD I/O	2 F	Contact Closure D	5 Power Interrupt
	4 H	Pol. Preset	6 Down Control (Z input Opt. 7)
	8 J	N/C	7 115VAC 60Hz Power
5th Digit	1 K	N/C	8 Up Control
BCD I/O	2 L	Contact Closure E	9 115VAC 60Hz Power
	4 M	Contact Closure F	10 Common
	8 N	Contact Closure G	11 Common
Preset	P	Contact Closure H	12 Overrange output
*Three State	R	Program A	13 N/C
Store Display	S	Program B	14 Common
			15 +5V

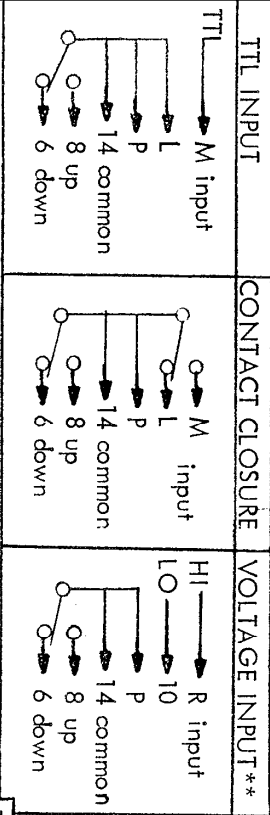
\* Buffered Option -01 Only      \*\* Voltage Input Option -08 Only

DATE	SYM	REVISION RECORD	DR.	CK.

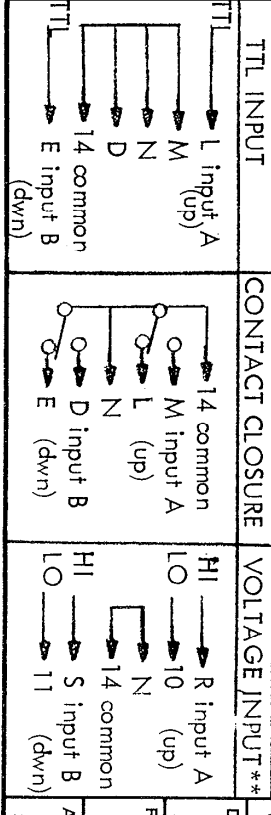
Option -24  
 pin 7 of J2: +10 to +30VDC power input  
 pin 9 of J2: DC power return  
 Decimal points are programable by removing the front panel lens and solder bridging the desired "D" number to the main buss line.  
 The "D" numbers are located on the display board just below the decimal point LED you wish to light. For example D1=999999., D2=99999.9 etc.

Note: Quadrature count inputs are hooked up as shown in dual count source block.

SINGLE COUNT SOURCE



DUAL COUNT SOURCE



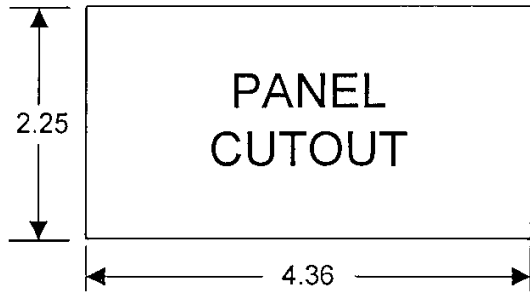
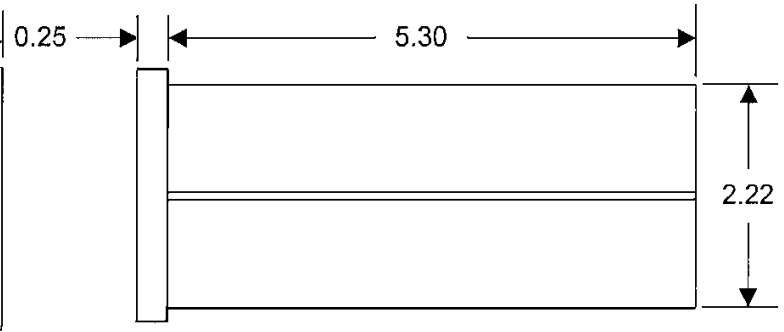
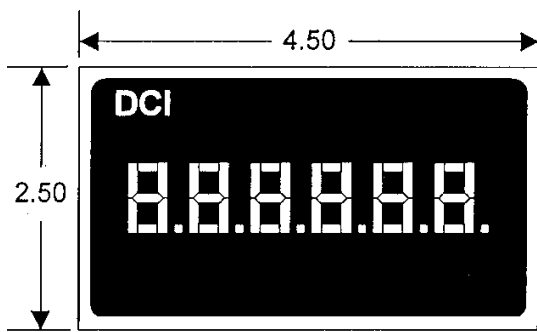
BCD I/O lines are dual function BCD output lines and/or BCD preset input lines. Lines have BCD output data present until preset line is tied to logic common. The display will then preset to the BCD data presented on the BCD lines. To input BCD data for presetting data must come from diode isolated BCD switches using the common to enable switches during preset only or by using logic gates with three-state control to keep outputs at a high impedance state until presetting.

TOLERANCES (EXCEPT AS NOTED)		DRAWN BY	
DECIMAL	±	SCALE	APPROVED BY
FRACTIONAL	±	TITLE	
ANGULAR	±	DATE	
		DRAWING NUMBER	

SERIES 700 TERMINAL DESIGNATION

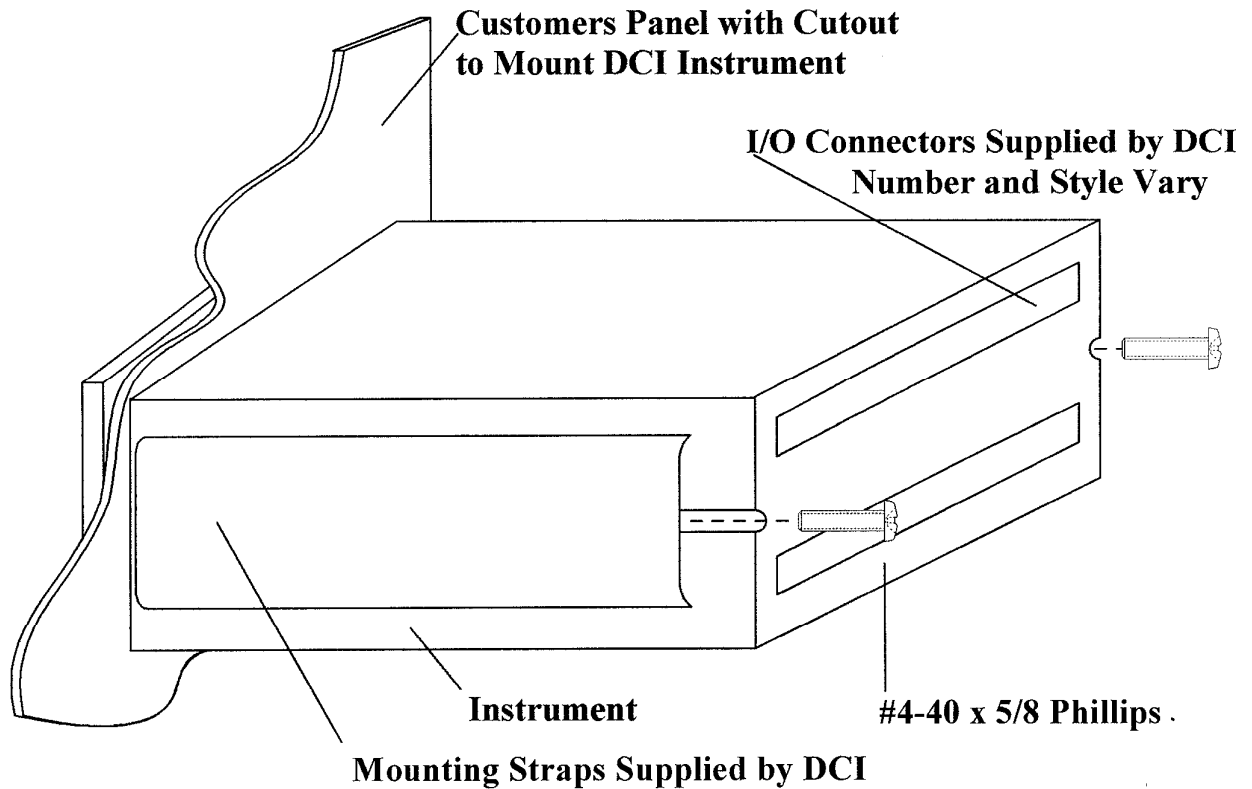
DATE 1-13-81

DRAWING NUMBER 0700-3000



**CASE SIZE A**

# MOUNTING



**Note: Ground Case per FIGURE 1.0, page 16**

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