

MODEL 874, 884, 894
Variable Timebase
Frequency
Meter/Tachometer, Low
Frequency Tachometer

DESIGN CONCEPTS INC

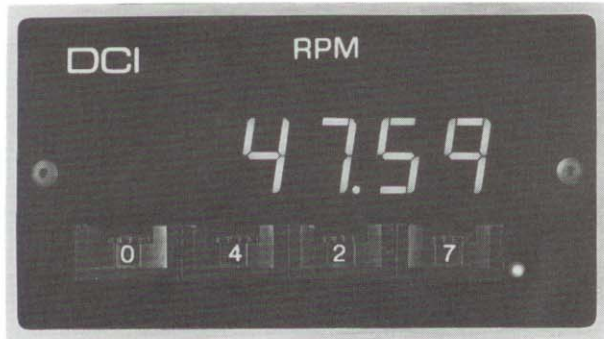
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**VARIABLE TIMEBASE
FREQUENCY METER/
TACHOMETER
LOW FREQUENCY
TACHOMETER**



MODELS 874, 884, 894

FEATURES

- Accurate and fast readout of low frequencies (below 100hz) without multipliers (894)
- Gate time easily programmed to readout in engineering units
- Readout to 100th of an RPM (894)
- Up to 1megahertz input frequency on Model 874 and 884
- Precision crystal timebase
- CMOS Schmitt Trigger input circuitry for high noise immunity
- Optional three state, TTL compatible, parallel BCD outputs
- Accepts inputs from wide range of sensors
- Heavy duty all aluminum case
- .56" high-efficiency red LED display
- Non-glare lens

No longer do you have to wait ten to sixty seconds or use expensive phase locked loops or multipliers to read the rotational speed of a shaft. The DCI Model 894 only requires one cycle of the input signal to enable it to make a calculation. The calculation is made by measuring the elapsed time of the input cycle(s) and then calculating the reciprocal of the time. This method gives an accurate reading every time even with changing input frequencies, unlike phase locked loop multipliers which lose lock on when the input frequency changes. Total time required to read out to the nearest hundredth of an RPM is the time of one input cycle plus the gate time. For instance if a shaft is rotating at a speed of 60RPM and has an output of ten pulses/revolution, it would take 1.1 seconds to complete a calculation although a readout to the nearest whole RPM could be completed in .11 seconds if faster readings are required. An internal prescaler can be programmed to divide the input frequency by any number from two to one hundred so a reading can be averaged over more than one input cycle. The gate time is programmed via the front panel switches or internal solder pads.

The Model 874 is a tachometer that counts the input frequency over a predetermined length of time to read out in engineering units such as RPM. The gate time is programmable via internal diode jumpers and selectable in ten microsecond steps up to one hundred seconds. This unit will read out any frequency from one hertz up to one megahertz.

The Model 884 is a variable gate time frequency counter with the gate time easily adjustable via front panel thumbwheel switches. Having these thumbwheel switches (or optional solder pads) on the front panel allows the user to easily set the unit up to read out in engineering units such as RPM or GPM. For instance, if a readout of 7245 is desired with an input frequency of 9000hz a gate time of 805 msec would be selected. A precision one megacycle crystal timebase ensures a high degree of accuracy and repeatability. The unit will accept inputs from a wide range of sensors and has conditioning circuitry for slow rise time signals. Three state BCD outputs with single line enable are available for systems use.

SPECIFICATIONS

Accuracy:

(894) 1.00 hz to 100.00hz, $\pm .1\%$ @ 25°C \pm gate time tempco of ± 2 PPM/°C from -20° to +60° Celsius.

(874) (884) 1 hz to 1 megahertz, ± 1 count @ 25°C \pm gate time tempco of 2 PPM/°C from -20° to +60° Celsius.

Display:

(894) 4 or 6 digits of .56" high efficiency red LED. Red LED dots for out of range and timing.

(874) (884) 4 or 6 digits of .56" high-efficiency red LED. Red LED dot to indicate unit is gating.

Front Panel Controls:

(884) (894) Four thumbwheel switches for setting gate time.

Input Count Rate:

(894) 1 hz to 100hz without input divider. The input divider will divide input count signal by any number from 2 to 10. Optional divider will divide input signal by 20 to 100 in steps of 10.

(874) (884) 1 hz to 1 megahertz (TTL input) 1 hz to 100khz (sine wave input).

Gate Time Periods:

(884) (894) 1 millisecond to 9.999 seconds in 1 millisecond steps. Selectable by front panel switches or internal solder pads.

(874) 10 microseconds to 99.99999 seconds in 10 microsecond steps. Selectable by internal diode jumpers. Normally set for one second when shipped unless specified otherwise.

Inputs:

Light test: Requires TTL logic zero or closure to logic common to force all LED segments on. Input loading 1LPTTL load.

Latch: (-01 option only) Requires TTL logic zero or closure to logic common. BCD data is held as long as latch line is low. Input loading 1LPTTL 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 1LPTTL load.

Sine wave/pulse count input: (option -08) Minimum signal 150mVRMS, DC to 10Khz. 500mVRMS, DC to 100Khz. Maximum signal .115VAC without damage to circuitry. Input impedance 100Kohm. Threshold adjustable from the front panel with a small screwdriver. (option -09) Minimum signal 10mVRMS DC to 10Khz. Maximum signal 10VRMS. Input impedance 10Kohms (884 only).

TTL count input: Schmitt trigger type with no limit on rise or fall time of input pulse. Maximum count rate 1Mhz (874) (884), 100hz (894). Input loading 1LPTTL load.

Contact closure count 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 1uf capacitor is required between the N.O. input and logic common with the N.C. input tied to logic common. Can be factory installed.

BCD Outputs:

(option -01) Parallel, 8421, TTL compatible, positive true. Output is updated at end of each gate time. Fan out is 4 TTL loads and is three state with single line enable.

Input Power:

115VAC 50-400 hz 3 watts maximum
 230VAC 50-400 hz 3 watts maximum (optional)
 5VDC @ 400 mA maximum (optional)
 10-15 VDC @ 400 mA maximum (optional)
 10-30VDC @ 400 mA maximum (optional)

Operating temperature: -20° to +60° Celsius.

Case size: "A" See page 39.

OPTIONS

•01	TTL compatible, buffered, latching, three state, parallel BCD outputs with single line enable. Fan out of 4 TTL loads.	(4 digits)	\$25.00
		(6 digits)	\$35.00
•02	Add two digits to left of display to make a six digit display.		\$25.00
•03	Divide input signal by 20 to 100 in steps of 10. Specify division when ordering. (894 only)		\$25.00
•05	5VDC input power		\$ 5.00
•08	Input amplifier for sine wave/pulse input signals. Threshold is adjustable from front panel.		\$25.00
•09	Low level sine wave input. (884 only)		\$50.00
•10	(884, 894 only) Remove front panel switches used for setting gate time. Gate times are then programmed by internal solder pads.	Less	\$10.00
•12	10-15VDC input power		\$15.00
•22	230VAC input power		\$10.00
•23	Green LED display		\$50.00
•24	10-30VDC input power		\$50.00
•25	Logo and/or nomenclature change. (special artwork to be supplied by customer)	One time charge	\$55.00
		Plus per lens	\$ 5.00
•26	No logo		\$ 3.00
•27	Screw terminal I/O connector	with option 01	\$70.00
		without option 01	\$35.00
•28	Blank lens		\$ 3.00
•37	RPM legend		\$ 5.00
•41	IPM legend		\$ 5.00

MODELS:

874 Frequency meter/tachometer
 884 Variable timebase frequency meter/tachometer
 894 Low frequency tachometer



*Option -24

pin 7 of J2: +10 to +30VDC power input
pin 9 of J2: DC power return

		J1			
LSD	4	A	1	4-----	
1st digit	2	B	2	2 3rd digit	
BCD out	8	C	3	8 BCD out	
		D	4	1-----	
		E	5	4-----	
2nd digit	2	F	6	2 4th digit	
BCD out	8	H	7	8 BCD out	
		J	8	1-----	
		K	9	4-----	
5th digit	2	L	10	2 6th digit (MSD)	
BCD out	8	M	11	8 BCD out	
		N	12	1-----	
		P	13	three state control	
		R	14	common	
		S	15	5V	

- 1 high-non-zero crossing (option -08)
- 2 high-zero crossing (option -08)
- 3 signal return (option -08)
- 4 TTL signal input (option 08 use pin 1)
- 5 N.C. contact closure
- 6 N.O. signal input
- 7 115Vac power*
- 8 remote reset
- 9 115VAC power*
- 10 remote stop
- 11 reset output (internal battery option 52)
- 12 remote start (one megahertz 874 only)
- 13 unregulated (battery charge option 52)
- 14 common
- 15 5V

Note: latch and three state control are used only with option -01

Note: On units with Option 52 installed the units are shipped with the internal battery disconnected to prevent damage to battery. To reconnect a jumper must be made between 11 & 13 of J2. If power is removed for extended periods of time the battery must be disconnected.

Note: To change input types the following solder pad jumpers must be made on the control board internally.

TTL	none
low level input	2 to 5
contact closure	1 to 5

For form "A" contact closure input pin 5 of J2 must be grounded and a 1µf capacitor must be tied between 6 & 14 of J2 if not installed by factory.

DCI INC.

SCALE:	APPROVED BY: <i>BC</i>	DRAWN BY:
DATE: 7-11-85		REVISED:
MODEL 804 and 874 Connections		
		DRAWING NUMBER
		0800-3100

DATE	SYM	REVISION RECORD	DR	CK

		J1			
LSD	4	A	1	4-----	
1st digit	2	B	2	2 3rd digit	
BCD	8	C	3	8 BCD	
		D	4	1-----	
		E	5	4-----	
2nd digit	2	F	6	2 4th digit	
BCD	8	H	7	8 BCD	
		J	8	1-----	
		K	9	4-----MSD	
5th digit	2	L	10	2 6th digit	
BCD	8	M	11	8 BCD	
		N	12	1-----	
(Normally high, latch		P	13	three state control (normally high,	
low enables) common		R	14	common	
		S	15	5V	

		J2	
1	pwr interrupt/light test		
2	NC		
3	ext start (normally high, low enables)		
4	ext stop " " " "		
5	ext reset " " " "		
6	reset out		
7	115VAC *		
8	NC		
9	115VAC *		
10	count out		
11	out of range		
12	one megahertz (crystal unit only)		
13	unreg 5V		
14	common		
15	5V		

Note: latch and three state control are used only with option -01

*Option -24

pin 7 of J2: +10 to +30VDC power input
pin 9 of J2: DC power return

Note: Single line start stop can be accomplished by tying 4 & 14 together. Then anytime start is pulled low the counter/timer will run unless option -09 is installed.

Note: Option 06, start command starts counter/timer but display will not change until stop command. Stop will update display, reset internal counters and wait for next start command.

TOLERANCES (EXCEPT AS NOTED)			
DCI INC.			
DECIMAL		SCALE	DRAWN BY: <i>BC</i>
±			APPROVED BY: <i>BC</i>
FRACTIONAL	TITLE		
±	SERIES 800 CONNECTIONS (TIMER ONLY)		
ANGULAR	DATE	DRAWING NUMBER	
±	11-15-79	0800-3000	

DATE	REVISED	BY	CR

J1				J2			
(LSD) 1st digit	-----4	A	1	4-----	1	pulse input (non zero crossing)	
BCD	2	B	2	2	2	zero crossing input (pulse, sine wave, etc)	
	8	C	3	8	3	common	
	-----1	D	4	1-----	4	clock oscillator out	
	-----4	E	5	4-----	5	NC CC	
2nd digit	2	F	6	2	6	NO CC	
BCD	8	H	7	8	7	AC power input	
	-----1	J	8	1-----	8	light test	
	-----4	K	9	4-----	9	AC power input	
5th digit	2	L	10	2	10	CC output	
BCD	8	M	11	8	11	TTL input	
	-----1	N	12	1-----	12	low level output	
latch		P	13		13	1 megahertz timebase	
common		R	14		14	logic common	
SV		S	15	SV	15	SVDC	

Connection diagrams for different input types (connector J2)

TTL-----11 Common 14	Low level-----2 Common-----3 jumper 12 to 11	Form "A" contact closure input on 5 jumper 6 to 14 make solder pad "0" and "7" to "6" internally common 14
Form "C" contact closure	non zero crossing pulse input on 1 jumper 12 to 11 common 3	
NO-----6 NC-----5 common - 14 jumper 10 to 11		

TOLERANCES (EXCEPT AS NOTED)		DCI INC.	
DECIMAL	SCALE		
FRACTIONAL	TITLE	APPROVED BY <i>Col</i>	
ANGULAR	DATE 3-1-82	DRAWING NUMBER 0800-3001	
MODEL 894 TERMINAL DESIGNATION			

J1				J2			
(LSD) 1st digit	-----4	A	1	4-----	1	pulse input (non zero crossing)(-08 opt)	
BCD	2	B	2	2	2	zero crossing input (-08 option)	
	8	C	3	8	3	signal return (-08 option)	
	-----1	D	4	1-----	4	no connection	
	-----4	E	5	4-----	5	NC Contact Closure	
2nd digit	2	F	6	2	6	NO Contact Closure	
BCD	8	H	7	8	7	AC power input	
	-----1	J	8	1-----	8	light test	
	-----4	K	9	4-----	9	AC power input	
5th digit	2	L	10	2	10	Contact Closure output	
BCD	8	M	11	8	11	TTL input	
	-----1	N	12	1-----	12	low level output	
latch		P	13		13	1 megahertz timebase	
common		R	14		14	logic common	
SV		S	15	SV	15	SVDC	

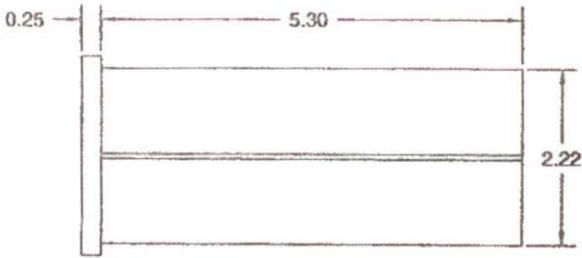
Connection diagrams for different input types (connector J2)

TTL-----11 Common 14	Low level-----2 Common-----3 Jumper 12 to 11	
Form "C" contact closure	non zero crossing pulse input on 1 jumper 12 to 11 common 14	
NO-----6 NC-----5 common - 14 jumper 10 to 11		

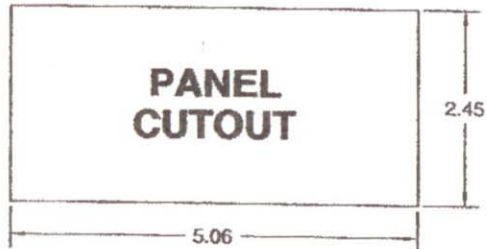
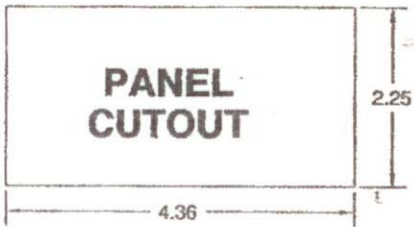
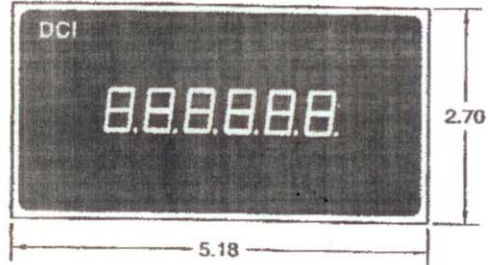
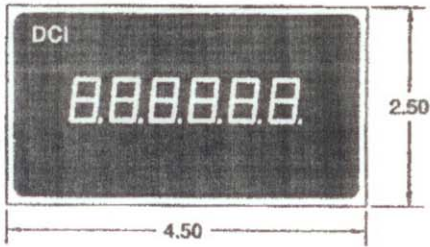
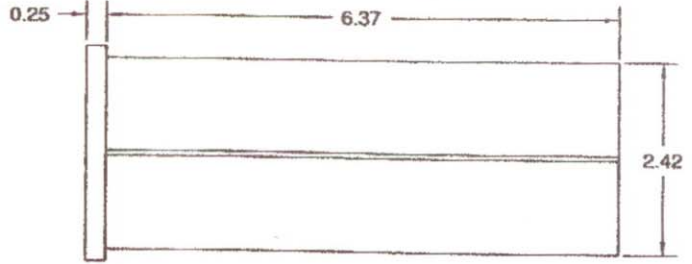
DCI INC.		
SCALE:	APPROVED BY:	DRAWN BY
DATE: 8-1-83	<i>[Signature]</i>	REVISED
MODEL 884 TERMINAL DESIGNATION		
		DRAWING NUMBER 0884-1300

DIMENSIONS

CASE SIZE A



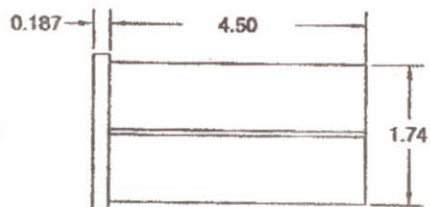
CASE SIZE B



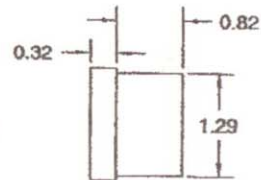
CASE SIZE D



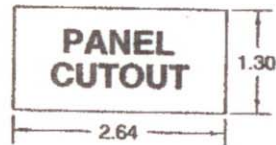
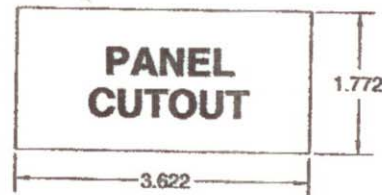
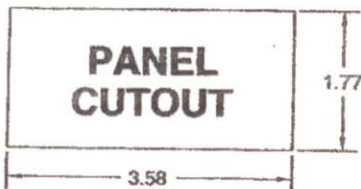
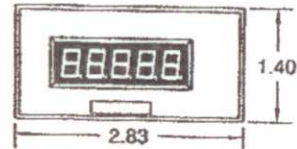
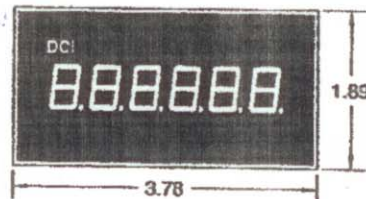
CASE SIZE C



CASE SIZE E

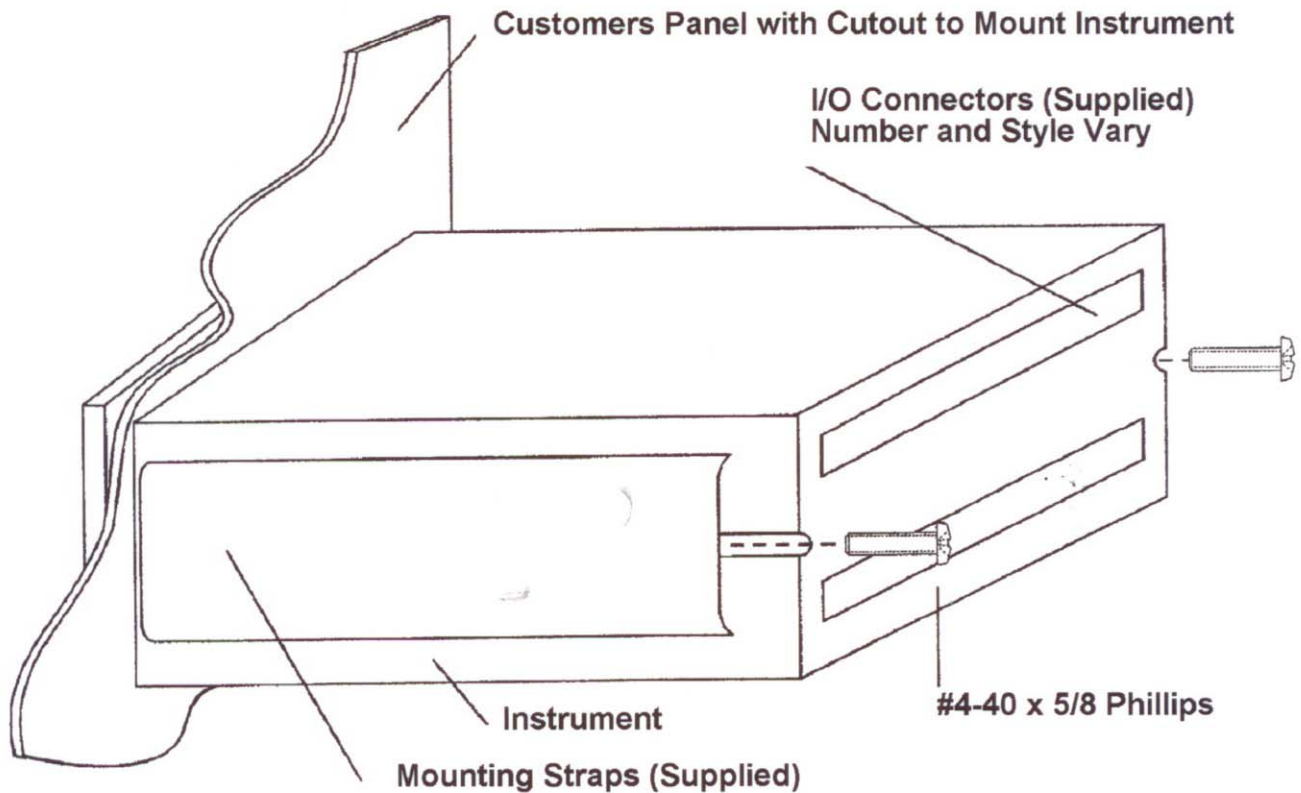


CASE DEPTH SERIES 2000: 5.1"
 SERIES 2600: 4.0"
 SERIES 9000: 4.0"



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

MOUNTING



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