

# OPERATING INSTRUCTIONS

## CT500



Please maintain these instructions and review them prior to using the unit:

### Warning:

- This unit is panel mounted type with its output terminals getting connected to the host equipment. Such equipment shall also comply with basic EMI/EMC and safety requirements like BS EN 61326-1 and BS EN 61010 respectively.
- To avoid electric shock, power supply of the unit should be kept off while wiring. Wiring should be done strictly as per the terminal layout, given in the manual.
- Use lugged terminals to meet M3.5 screws.
- The unit does not have a built-in fuse. External fuse with a rating of 275VAC/1A is recommended.

### Caution:

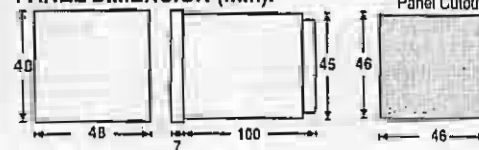
- This unit is not intended for outdoor use.
- The power connection cable must have a cross-section of atleast 1mm<sup>2</sup> and insulation capacity of atleast 1.5kV.
- The output connections must not be loaded beyond the specified values/range.
- Avoid inflow of dust and contact of conductive material with the internal circuitry of the unit.
- The unit must not operate in presence of heating sources, caustic vapors, oil, steam, vibration or impact etc.
- Use clean moist cloth soaked in water for cleaning. Care must be taken to avoid entry of water into the circuitry through the ventilation holes.

### SPECIFICATIONS

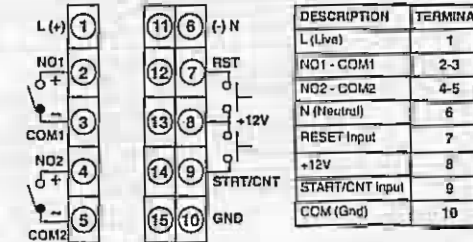
1	Supply Voltage	85 to 270VAC 50/60 Hz. 24VDC
2	Display	Dual 4 digit, 7 segment LED. Upper Display (current value): 0.5" height, red color. Lower display (selectable): 0.3" height, green color.

3	Operating modes	<b>Timer:</b> Relay 1: On delay, Interval, Cyclic On first, Cyclic Off first. Relay 2: As above + Batch. <b>Counter:</b> Relay 1: On delay, Interval, Auto reset, Time pulse repeat. Relay 2: As above + Batch.
4	Time ranges	<b>Timer:</b> 99.99 / 999.9 / 9999 sec, 99:59 min:sec, 999.9 / 9999 min, 99:59 hr:min 999.9 / 9999 hr. <b>Counter:</b> -999 to 9999 counts.
5	Resolution	0.001, 0.01, 0.1, 1.
6	Direction	Timer - Down. Counter - Up / Down.
7	Led indications	Output status, sec, min, hr.
8	Set points	Dual.
9	Start Input	Pulse start.
10	Sensor inputs	3 to 12VDC from Proximity switches, Encoders, Potential free contacts.
11	Sensor supply	12VDC, 30mA (Short circuit protected).
12	Input speed	3 Hz, 30 Hz, 5 kHz.
13	Scale factor	0.001 to 9.999 x 10 <sup>n</sup> where n = -3, -2, -1, 0, 1, 2.
14	Reset	On power interruption, Front panel reset, Terminal reset.
15	Output	2 NO
16	Relay rating	5A @ 230VAC.
17	Memory retention	10 years.
18	Accuracy	<b>Timer:</b> + 0.05% of setting or 50msec whichever is greater. <b>Counter:</b> ± 2 counts.
19	Mounting	Panel mounting.
20	Temperature	Operating: 0 - 50 ° C. Storage: -20 - 75 ° C.
21	Humidity	95% RH.
22	Housing	Flame retardant plastic.
23	Weight	175 grams (approx).

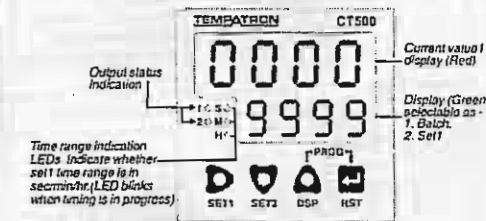
### PANEL DIMENSION (mm):



### TERMINAL CONNECTIONS



### FRONT PANEL IDENTIFICATION



KEYS	FUNCTIONS
⏏ + ⏏	Enter / Exit configuration mode
▶	1. Selects the digit to be altered. Selected digit blinks. With every press of ▶ key, next digit towards the right starts blinking. 2. Programming for Set1.
◀	1. Decrements value of blinking digit. 2. Scrolls down to previous option for configuration parameter. 3. Programming for set 2.
▲	1. Increments value of blinking digit. 2. Scrolls up to next option for configuration parameter. 3. Programming lower display options 4. Display Batch value.
⏏	1. Scrolls to next config. parameter and stores previous parameter setting. 2. Front panel RST.

### JUMPER SELECTION FOR INPUT SENSOR:-

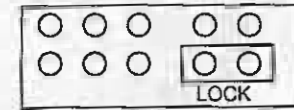
INPUT SENSOR	JUMPER SELECTION
PNP / Potential free contact	
NPN	

Note: Same Jumper selections remain valid for giving start pulse when using CT500 in Timer function.

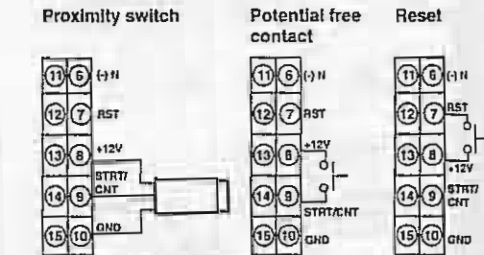
### JUMPER SELECTION TO DISABLE LOCK:-

If the lock password is forgotten / lock feature is not required, connect jumpers as in fig. below to disable lock function. These jumpers are located towards the right of the jumpers for sensor selection.

(Top view of jumpers without housing and display on the right)



### INPUT CONNECTIONS:-



Note: Color codes for proximity sensors- Brown / Red -> +12V, Black / Green -> CNT, Blue / Black -> GND

### SCALE FACTOR

Programmable scale factor facilitates display in desired engineering unit. The number of count pulses received are multiplied with the scale factor, and the result is displayed as shown:  
Display = Number of pulses received x scale factor  
Scale factor consists of two parts- mantissa & exponent. Mantissa can be set from 0.001 to 9.999 and exponent from -3 to +2. The scale factor value is arrived at as:  
Scale factor = Mantissa X 10<sup>Exponent</sup>

### CONFIGURATION SCHEME:


Note: 1. Press ⏏ to go to the next programming step and store the current programmed value in EEPROM.  
2. If no key is pressed for 2min, the unit will auto-exit from configuration.

Upper display	Lower display	Description
Press ⏏ + ⏏ keys to enter configuration		
Configuration Lock	Default : 0000.	
		The configuration cannot be changed unless a valid lock ID is entered. Press ▶ to select the digit and ▲ / ▼ to change value of the selected digit.
Press ⏏ + ⏏ keys to enter configuration		
Function		
		Function - Timer / Counter Timer: Unit functions as a timer Counter: Unit functions as a counter

Setting of Timer functions :		
Upper display	Lower display	Description
Press <b>[M]</b> key to enter programming for Time range.		
Time range <i>Default : 999.9 sec</i>		
SEC	9999	Time ranges: 99.99sec, 999.9sec, 9999sec,  99:59min:sec, 999.9min, 9999min,
▲	9999	
▲	9999	
▲	9959	
▲	9999	
▲	9999	
MIN	9999	99:59hr:min, 999.9hr, 9999hr.
▲	9959	
▲	9999	
▲	9999	
▲	9959	
▲	9999	
HR	9999	
▲	9999	
▲	9999	
▲	9999	
▲	9999	
▲	9999	
Press <b>[M]</b> key to enter programming for Relay1 operating mode.		
Relay1 operating mode.. <i>Default : ON Delay</i>		
PLY1	ON	Relay1 operating mode: ON Delay / Interval / Cyclic ON first / Cyclic OFF first.  <b>NOTE:</b> Refer waveforms for details.
▲	INt	
▲	INt	
▲	CyON	
▲	CyOF	
▲	CyOF	
Press <b>[M]</b> key to enter programming for Relay1 operating mode.		
Relay2 operating mode. <i>Default : ON Delay</i>		
PLY2	ON	Relay1 operating mode: ON Delay / Interval / Cyclic ON first / Cyclic OFF first / Batch.  <b>NOTE:</b> Refer waveforms for details.
▲	INt	
▲	INt	
▲	CyON	
▲	CyOF	
▲	btCH	

Upper display	Lower display	Description
Press <b>[M]</b> key to enter programming for Front panel batch reset		
Front panel batch reset. <i>Default : Yes</i>		
FPbP	YES	Front panel batch reset : Yes / No. Yes: Batch value can be reset from front panel. No: Batch value cannot be reset from front panel.
▲	NO	
Press <b>[M]</b> key to enter programming for Batch reset		
Batch reset <i>Default : No</i> <b>NOTE:</b> Prompted only if Front panel batch reset is No.		
btPSE	YES	Batch reset : Yes and No. Yes: Batch value is reset immediately. No: Batch value is not reset.
▲	NO	
Press <b>[M]</b> key to enter programming for Front panel reset		
Front panel reset. <i>Default : Yes</i>		
FPP	YES	Front panel reset : Yes / No. Yes: Unit can be reset from the front panel. No: Unit cannot be reset from the front panel.
▲	NO	
Press <b>[M]</b> key to enter programming for Power on reset		
Power on reset. <i>Default : No</i>		
POP	NO	Power on reset ranges: Yes / No. Yes: Unit is reset on power interruption. No: Unit is not reset on power interruption.
▲	YES	
Press <b>[M]</b> key to enter programming for Reset all.		
Reset all parameters to default <i>Default : No</i>		
dFLE	NO	Reset all parameters to default : Yes / No Yes: All parameters are set to factory set values All set points are set to 0.
▲	YES	

### PROGRAMMING - TIMER

 Temporary display: Lower display shows parameter name for 1sec and then its value.

Enter programming as per the given procedure.

**To program set points:** Press **[D]** to select the digit. The selected digit blinks. Press **[▲]** / **[▼]** key to change its value. Press **[M]** key to go to the next parameter (if applicable). If the edited parameter is the last parameter, the unit will quit programming.

To select lower display options: Press **[▲]** / **[▼]** key to select particular option and then press **[M]** key to quit programming. To select reset option: Press **[▲]** / **[▼]** key to select particular option and then press **[M]** key for 1.5 sec to quit programming.

#### 1. Programming for Set point1:

Press Key	Lower Display
	Applicable when Relay1 in On delay / Interval mode.
	Set point 1 SEEt1 1234
<b>[D]</b> for 1.5 sec to Enter Set1 programming. (Auto program out after 2min)	Applicable when Relay1 in Cyclic mode.
	Start time ON time OFF time 1-SEt1 1-00 1-0F 1234 1234 1234
<i>Default : 10sec.</i>	Exit Set point1 programming

Note: \* sign indicates that the digit blinks.

#### 2. Programming for Set point2:

Press Key	Lower Display
	Applicable when Relay2 in On delay / Interval mode.
	Set point 2 SEEt2 1234
<b>[▼]</b> for 1.5 sec to Enter Set2 programming. (Auto program out after 2min)	Applicable when Set2 in Cyclic mode.
	Start time ON time OFF time 2-SEt2 2-00 2-0F 1234 1234 1234
<i>Default : 9sec.</i>	Exit Set point2 programming
	Applicable when Set2 in Batch mode.
	Set point 2 SEEt2 1234

Note: \* sign indicates that the digit blinks.

#### 3. Programming for Lower display options:

Press Key	Lower Display
<b>[▲]</b> for 1.5 sec to Enter programming for Lower display options. (Auto program out after 2min).	Batch Set point 1 btCH SEEt1 Exit programming Exit programming


Note: \* sign indicates that the display blinks.

#### 4. Programming for Reset.

Press Key	Lower Display
<b>[M]</b> for 1.5 sec to Enter / Exit programming for reset.	Reset Batch reset PSE btPSE

Note: \* sign indicates that the display blinks.

#### Read Function

 Temporary display: Lower display shows parameter name for 1sec and then its value

#### 1. Reading of set1 parameters

Press Key	Lower Display
	Applicable when Set1 in On delay / Interval mode.
	Set point 1 SEEt1 1234
<b>[D]</b> momentarily each time to read Set1 value. Auto exit from Read function if key is not pressed within 3 sec.	Applicable when Set1 in Cyclic mode.
	Start time ON time OFF time 1-SEt1 1-00 1-0F 1234 1234 1234

#### 3. Reading of set2 parameters

Press Key	Lower Display
	Applicable when Set2 in On delay / Interval mode.
	Set point 2 SEEt2 1234
<b>[D]</b> momentarily to each time to read Set 2 value. Auto exit from Read function if key is not pressed within 3 sec.	Applicable when Set2 in Cyclic mode.
	Start time ON time OFF time 2-SEt2 2-00 2-0F 1234 1234 1234
	Applicable when Set2 in Batch mode.
	Set point 2 SEEt2 1234

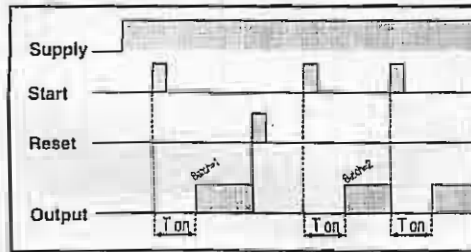
### 3. Reading Batch.

Press Key	Lower Display
▲ momentarily to read batch value. Auto exit from Read function if key is not pressed within 3 sec.	

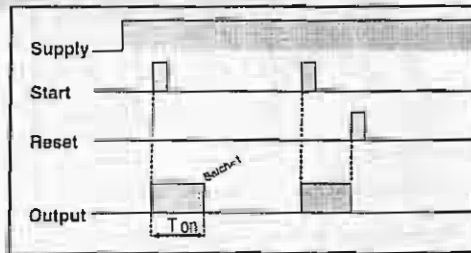
Note: When viewing 6 digit batch value, lower display LSD dp blinks and batch value is displayed for 3 sec. If lower display is selected as batch, and batch value exceeds 4 digits, the lower display LSD dp is on continuously indicating that the batch value has exceeded 4 digits.

### TIMER MODE

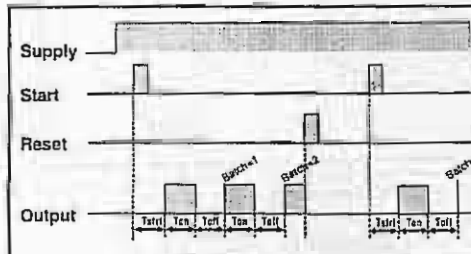
#### 1. On delay



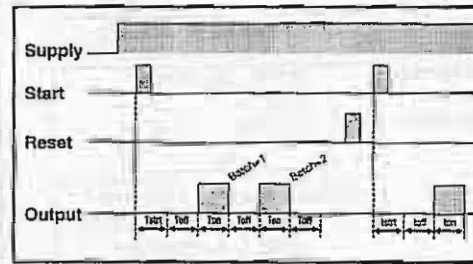
#### 2. Interval



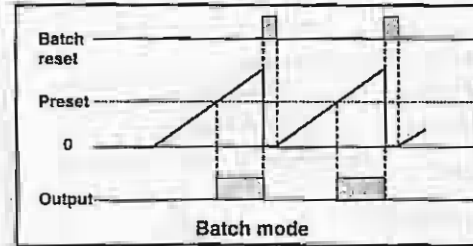
#### 3. Cyclic ON - First



### 4. Cyclic OFF - First



### 5. Batch mode



### Setting of Counter functions :

Upper display	Lower display	Description
Press  key to enter programming for Scale factor mantissa		
Scale factor mantissa	Default : 1.000	
Press  key to enter programming for Scale factor Exponent		
Scale factor Exponent	Default : 0	
		Scale factor Exponent: 0 / 1 / 2 / -3 / -2 / -1.

Upper display	Lower display	Description
Press  key to enter programming for Resolution		
Resolution	Default : 1	
		Resolution : 1 / 0.1 / 0.01 / 0.001.
Press  key to enter programming for Maximum input speed.		
Maximum Input Speed	Default : 30Hz	
		Speed : 3Hz / 30Hz / 5KHz.
Press  key to enter programming for Direction		
Counting Direction	Default : Up	
		Direction: Up and Down Up: Counting starts from 0 and proceeds towards set point. Down: Counting starts from set point and proceeds down to 0.
Press  key to enter programming for Relay 1 mode		
Relay 1 operating mode	Default : ON Delay	
		Relay1 operating mode: ON delay / Interval. Refer waveforms for details.
Press  key to enter programming for Relay2 operating mode		
Relay 2 operating mode	Default : ON Delay	
		Relay2 mode ranges: ON delay / Interval / Batch.

Upper display	Lower display	Description
Press  key to enter programming for Run mode		
Run mode	Default : Over run	
		Run mode ranges: Overrun / Non overrun. Overrun: Counter continues counting above the set point. Non Overrun: Counter does not count any pulses received after reaching the set point.
Press  key to enter programming for Operating mode		
Operating mode	Default : Delay	
		Operating mode ranges: Delay / Auto reset / Time pulse repeat. Refer waveform for details
Press  key to enter programming for Front panel batch reset		
Front panel batch reset.	Default : Yes	
		Front panel batch reset : Yes / No. Yes: Batch value can be reset from front panel. No: Batch value cannot be reset from front panel
Press  key to enter programming for Batch reset		
Batch reset	Default : No	
NOTE: Prompted only if Front panel batch reset is No.		
		Batch reset : Yes and No. Yes: Batch value is reset immediately. No: Batch value not is reset
Press  key to enter programming for Front panel reset		
Front panel reset.	Default : Yes	
		Front panel reset : Yes / No. Yes: Unit can be reset from the front panel. No: Unit cannot be reset from the front panel

Press <b>☐</b> key to enter programming for Power on reset.	
Power on reset.	Default: No
	Power on reset ranges: Yes / No. Yes: unit is reset at power ON. No: Unit is not reset at power ON.
Press <b>☐</b> key to enter programming for Reset all.	
Reset all parameters to default	Default: No
	Reset all parameters to default: Yes and No Yes: All parameters are set to factory set values. All set points are set to 0.

### PROGRAMMING - COUNTER

→ Temporary display: Lower display shows parameter name for 1sec and then its value

Enter programming as per the given procedure.  
To program set points: Press **▶** to select the digit. The selected digit blinks. Press **▲/▼** key to change its value. Press **☐** key to go to the next parameter (if applicable). If the edited parameter is the last parameter, the unit will quit programming.  
To select lower display options: Press **▲/▼** key to select particular option and then press **☐** key to quit programming.

To select reset option: Press **▲/▼** key to select particular option and then press **☐** key for 1.5 sec to quit programming.

#### 1. Programming for Set point 1:

Press Key	Lower Display
	Applicable when Set1 in On delay / Interval mode.
<b>▶</b> for 1.5 sec to Enter / Exit online programming for Set1. (Auto program out after 2min)	Set point 1 
	Applicable when Set1 in On delay / Interval mode + Autoreset mode.
	Set point 1 Autoreset time 
	Autoreset time range: 0 to 999.9 sec.
	Applicable when Set1 in On delay / Interval mode + Time Pulse Repeat.
	Set point 1 Time pulse repeat 
	TPR time range: 0 to 999.9 sec.

Note: \* sign indicates that the digit blinks.

#### 2. Programming for Set point 2 :

Note: Set2 should always be less than Set1, except when Set 2 is in Batch mode.

Press Key	Lower Display
	Applicable when Set2 in On delay / Interval mode.
<b>▶</b> for 1.5 sec to Enter / Exit online programming for Set2. (Auto program out after 2min)	Set point 2 
	Applicable when Set2 in Batch mode.
	Set point 2 

Note: \* sign indicates that the digit blinks.

#### 3. Programming for Lower display options.

Press Key	Lower Display
<b>▲</b> for 1.5 sec to Enter programming for lower display. (Auto program out after 2min)	Batch Set point 1 

Note: \* sign indicates that the digit blinks.

#### 4. Programming for Reset.

Press Key	Lower Display
	Applicable in AR / TPR mode
<b>☐</b> for 1.5 sec to Enter / Exit online programming for reset.	Reset Batch reset 

Note: \* sign indicates that the display blinks.

#### Read Function

→ Temporary display: Lower display shows parameter name for 1sec and then its value

#### 1. Reading of set1 parameters

Press Key	Lower Display
<b>▶</b> momentarily each time to read Set1 value.	Applicable when Set1 in On delay / Interval mode.
	Set point 1 

Press Key	Lower Display
	Applicable when Set1 in On delay / Interval mode + Autoreset mode.
	Set point 1 Autoreset time 
	Applicable when Set1 in On delay / Interval mode + Time Pulse Repeat.
	Set point 1 Time pulse repeat 

#### 2. Reading of set2 parameters

Press Key	Lower Display
<b>▶</b> momentarily each time to read Set 2 value. Auto exit from Read function if key is not pressed within 3 sec.	Applicable when Set2 in On delay / Interval mode.
	Set point 2 

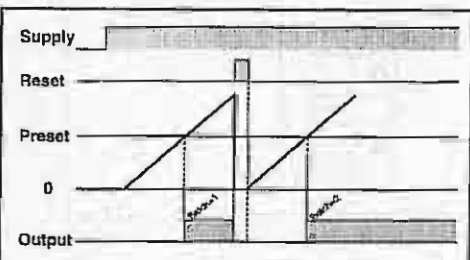
#### 3. Reading Batch.

Press Key	Lower Display
<b>▲</b> Momentarily each time read Set 2 value. Auto exit from Read function if key is not pressed within 3 sec.	Batch 
	4 digit Batch 6 digit Batch 
	6 digit batch can be read with 2MSDs on upper display.

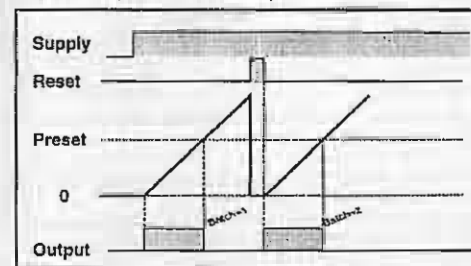
Note: When viewing 6 digit batch value, lower display LSD dp blinks and batch value is displayed for 3 sec. If lower display is selected as batch, and batch value exceeds 4 digits, the lower display LSD dp is on continuously indicating that the batch value has exceeded 4 digits.

### COUNTER MODE

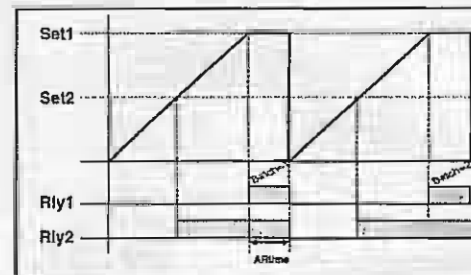
#### 1. ON Delay ( Overrun mode )



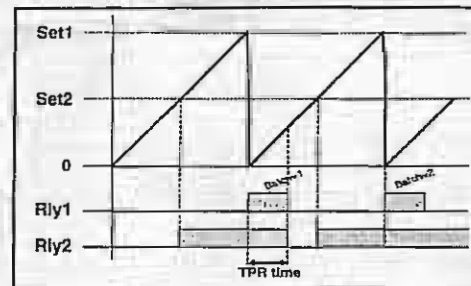
#### 2. Interval ( Overrun mode )



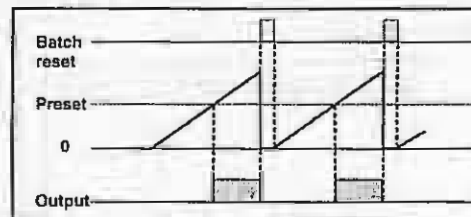
#### 3. Auto Reset ( Non Overrun mode )



#### 4. Time Pulse Reset ( Non Overrun mode )



#### 5. Batch mode



(Specifications subject to change as development is a continuous process)

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