

# PROGRAMMING GUIDE - Tiny Master Series

## 1. UNIQUE FEATURES :

- STAR (Wye)/ Delta/ Single Phase Programmable.
- PT ratio / CT ratio programmable including CT secondary
- "OLD" Register for storing Cleared Energy.
- First of its kind in INDIA 4 digits 4 Rows display with Auto scaling and Auto scrolling.
- Case construction. Finger touch proof voltage and current terminals.
- Compact size: 96x96mm, 45mm depth.
- Light weight: 300 gms. (Unpacked).
- 4kV isolation, better protection.
- Latest technology process; SMT fine pitch, pick & place re-flow soldering ensures higher reliability.
- Multilayer PCB, SMD components and no inter-connectors (PCB to PCB or Terminal Block).
- Polycarbonate casing, higher level of protection. CPRI tested.
- Higher warranty, 18 months.
- Easy mounting on panel using slide clamps.
- Wide product spectrum to suit customer requirement. True RMS measurements.
- 4 row display. Hence Total/Average & phase wise readings displayed in single page. Maximum information in single page.
- Pre-determined integrator overflow value.
- This helps to cross verify and determine power quality loading pattern etc.
- Measure 4 quadrant power and energy.
- Universal Voltage Input (80 - 550 VAC) and Current Secondary (1A or 5A)
- Clearance & creepage distance meets UL508 standard.
- Four Basic or Power or Two Energy readings in single page.
- Transducer version is also available.
- Simultaneous sampling of voltage and current signals ensures better accuracy.
- Easy installation and user programmability. User friendly and simple navigation method. Reduced operational hassles.
- Higher CT/PT ratio programmability. Current primary up to 99kA & Voltage primary up to 999kV. Provides wide range of usability.
- Larger Full scale programmability. Up to 2000 MVA.
- In RS232 option, data downloading is simpler by connecting the meter directly to the PC (limited to 1 No. on Meter).
- By using RS 485 Option more number of meters can be connected using Data Converter.
- Single Phase configuration. Meter provides greater flexibility and wider range of usability.
- User Programmable or configurable (Editable)password. Higher security protection.
- Displays calculated Neutral current. Helps to determine power quality.
- Wider range and universal auxiliary supply: 80 to 300V AC or DC. Also 48V DC optional feature.
- Input Voltage signal (Vin) can be up to 550V. Equipped to handle highly fluctuating voltage signal.
- Smart parameter grouping and powerful features.
- Separate LOAD HOURS pages for Received, Delivered\*, OLD. (\*available in meter having received / delivered option).
- Demand control (option) in smallest size with four relay output.
- Upgradation facility
  - a. Upgradeable to higher versions.
  - b. Upgradeable to additional features (RS 485, R/D, Digital input/output etc.)

## 2. WIRING DIAGRAM :

Fig 1 -- 4 Wire Star (Wye) - 3 Element Direct Connection

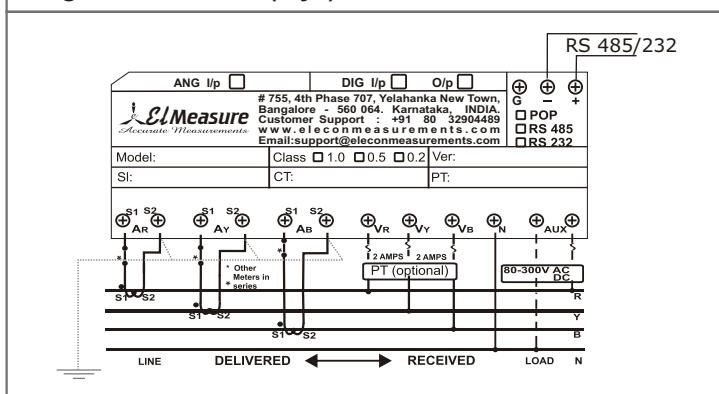
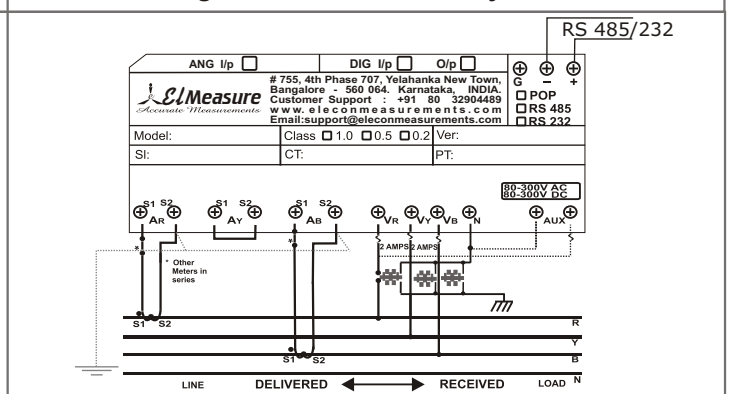


Fig 2 -- Three Wire Delta Systems



For Dual Source Meter (TM 3420 & TM 6420), Give Potential free contact from AMF panel, Use Multiplier for more number of contacts

### 3. KEY FUNCTIONS:

Key	In SET (Programming) mode	In Measurement mode
<b>RIGHT</b>	To select the value and to accept the value	No action
<b>UP</b>	To edit the value/system type up-ward in edit mode and scroll through the parameters.	To scroll up the pages to look at different parameters.
<b>DOWN</b>	To edit the value/system type down-ward in edit mode and scroll through the parameters.	To scroll down the pages to look at different parameters
<b>HOME</b>	No action.	To see the desired option (if any)
<b>FAV</b>	No action. (For Future Application)	No action. (For Future Application)

### 4. ENTERING CONFIGURATION (SETUP) MODE:

General guidance : Press right key for edit and accept, DOWN & UP key for change of settings.

To configure the setup parameters in TM series of meters through front panel keys, the following steps can be followed.

Step	Actions	Display Reads	Range/Options / comments
1	Press RIGHT & UP keys together for few seconds or till displays SETUP.	SETP (SETUP)	
2	Press DOWN key	Row 1 PwD (Password) is displayed. Row 2 0000 with first digit "0" blinking.	
3	Press UP button to increment the first digit to "1"..	PASSWORD = 1000 (default/factory set).	If any other password is already set, use UP or DOWN key to reach the right password
4	Press RIGHT key four times to accept the password.	Row 1: display ELE (element) Row 2: StAr/ dLtA/ 1Ph which was programmed earlier.	Defines the power system configuration. Options: StAr (Star), dLtA(Delta) and 1.Ph(Single phase)
5	Press RIGHT key to select required	Row 1: display ELE Row 2: Blinks StAr/dLtA/1. Ph	
6	Press UP/DOWN key to select StAr/ dELtA /1.PhASE	Row 1: display ELE Row 2: StAr/dLtA/1. Ph	(selected mode blinks)
7	Press RIGHT key to accept	Row 1: display ELE Row 2: selected mode	
8	Press DOWN key.	Row 1 : Pt.Pr (PT Primary) Row 2 : xxxx (415.0 -default/factory set)	
9	Press RIGHT key to set the PT primary value	Row 1 : Pt.Pr (PT Primary) Row 2 : First digit blinking, can be edited using UP/DOWN key.	
10	Press RIGHT key to accept the edited value for first digit.	Row 1 : Pt.Pr (PT Primary) Row 2 : Second digit blinking, can be edited using UP/DOWN key. Press RIGHT key to accept the edited value. Continue the same method till fourth digit.	Program Range for PT Primary : 100V to 999kV
11	Press RIGHT key	Row 1 : Pt. Pr (PT Primary) Row 2 : Decimal point blinking. Can be set at appropriate location using UP/DOWN key. Ascertain the correct scale (Kilo/Mega/Giga) is selected. Kilo/Mega/Giga LEDs are placed on the right hand side of the display. Press RIGHT key to accept the edited value.	Eg: To set 11.00kV Set first four digits (1100) as explained above keep pressing UP/DOWN key to place decimal point at appropriate location, while kilo LED should be "ON" (Mega LED should be OFF)
12	Press DOWN key to go to the next parameter.	Row 1 : Pt.SE (PT Secondary). Follow the procedure as described in steps 9 to 11. Row 2 : xxxx (415.0 -default/factory set)	Range : 50V to 550V If value set is above the limit, display returns to the maximum PT sec value.
13	Press DOWN key	Row 1 : Ct.Pr (CT Primary) Row 2 : xxxx (5.000 -default/factory set) Repeat steps 9 to 11 to change the settings.	Program Range for CT Secondary : 1A to 99kA
14	Press DOWN key	Row 1 : Ct.SE (CT Secondary). Repeat steps 9 to 11 . Row 2 : xxxx (5.000 -default/factory set)	Range: 1A to 6A If value set is above the limit, it returns to the maximum Ctsec value.
15	Press DOWN key	Row 1 : UA.SL (Method of VA Selection). Row 2 : Arth(Arithmetic)	Arithmetic (Arth), Vector harmonics (UEC.H). Vector (Uctr) can be selected using UP/DOWN key. Recommended Arth for Indian conditions.
16	Press DOWN key	Row 1 : bAUd (baud rate). Communication speed. Row 2 : xxxx (9600 -default/factory set)	Defines the baud rate. Option : 600,1200, 2400, 4800, 9600, 19.20k

17	Press DOWN key	Row 1 : PrtY (Parity). Row 2 : EUEn/odd/no	EUEn(even)/odd(odd)/no(no parity) (Internal communication error check)
18	Press DOWN key	Row 1 : dU.Id (Device ID) Row 2 : 1.000	Defines the (ID) communications identification number. Option: 1-247
19	Press DOWN key	Row 1 : POLE(Poles) Row 2 : 4.000	Option : 1 to 28 (For rpm)
20	Press DOWN key	Row 1 : rEu.L Row 2 : no	Reverse lock (blocks energy accumulation in case the <b>CT</b> polarity reverse Option : NO/YES
21	Press DOWN key	Row 1:Pwd (Password user definable). <b>CAUTION:</b> Memorize the password. Use the same password for next time. Instrument will reject other passwords. Row 2 : -----	Range:1000 to 9999. If password is forgotten the meter has to be reset and recalibrated at Elecon factory only.
22	Press DOWN key	Row 1 : SAVE Row 2 : "Y" blinking.	If "n"(no) is selected then Meter enters into RUN mode without affecting any edited Values in the setup
23	Press RIGHT key to memorize /store the changes done.		

Once the required parameter is programmed press the down key continuously till it reaches SAVE page or press the OPTIONS key to reach SAVE page directly. If you have wrongly entered to the 'Setup', press OPTIONS key to reach run mode as described in step 34 above.

### 5. The List of parameters can be configured and the range :

Sl.No	Parameter	Default setup	Range	Options
1	Connection mode(ELE)	<b>Star</b>	StAr(Star)/dLtA (Delta)/1.Ph(1-phase)	
2	PT Primary (Pt.Pr)	<b>415.0</b>	100V- 999kV	
3	PT Secondary (Pt.SE)	<b>415.0</b>	50V 550V	
4	CT Primary (Ct.Pr)	<b>5.000</b>	1A 99kA	
5	CT.Secondary (Ct.SE)	<b>5.000</b>	1A 6A	
6	VA selection (UA.SL)	<b>Arth (Arithmetic)</b>	Arth (Arithmetic) / UCtr (Vector)/ UEc.H (vector harmonics)	<b>Meter with Demand Measurement or Control option only</b>
7	Year (YEAr)	<b>2005</b>	2000 to 2040	
8	Date (dAtE)	<b>01. 01</b>	(MM:DD format) Jan 01 to Dec 31	
9	Time (tIME)	<b>00. 00</b>	(HH:MM format) 00:00 to 23:99	
10	Demand Type (d.tYP)	<b>SLId</b>	Slid(sliding) / bLOC (block / fixed )	
11	Demand Parameter (d.PAR)	<b>UA(VA)</b>	W (Watts)/ VA / A.AVg (Amps Avg)	<b>Meter with Demand control option only</b>
12	Demand Period (d.Prd)	<b>15.00</b>	5 to 30 Minutes	
13	Demand Control Type (d.con)	<b>Forc.dn</b>	Forc (Forecast) or StEP (step)	
14	Forecast interval (FC.In) or Step1 (StP1) level	<b>7.000</b>	20% to 50% of Demand Period	
15	Hi Limit 1(Hi.L1) / Step2 (StP2) level	<b>1800</b>	5% of Fullscale - Fullscale	
16	Hi Limit2 (Hi.L2) / Step3 (StP3) level	<b>1700</b>	50% to 99% of Hi Limit1	<b>Meter with Digital Output option Only</b>
17	Low Limit (Lo.Lt) / Step4 (StP4) level	<b>1300</b>	50% to 95% of Hi limit2	
18	Digital 1 Parameter (d1.Pr)	<b>Disable (dSbL)</b>	VLL or A or FrEq or W or VA or PF	
19	Digital 1 Threshold Limit (d1.Hi)	<b>1000</b>	0.001 to 9999 * 10 <sup>9</sup>	
20	Digital 2 Parameter (d2.Pr)	<b>Disable (dSbL)</b>	VLL or A or FrEq or W or VA or PF	
21	Digital 2 Threshold Limit(d2.Hi)	<b>1000</b>	VLL or A or FrEq or W or VA or PF	<b>Meter with Analog Input option Only</b>
22	Digital 3 Parameter (d3.Pr)	<b>Disable (dSbL)</b>	VLL or A or FrEq or W or VA or PF	
23	Digital 3 Threshold Limit (d3.Hi)	<b>1000</b>	0.001 to 9999 * 10 <sup>9</sup>	
24	Digital 4 Parameter (d4.Pr)	<b>Disable (dSbL)</b>	VLL or A or FrEq or W or VA or PF	
25	Digital 4 Threshold Limit (d4.Hi)	<b>1000</b>	0.001 to 9999 * 10 <sup>9</sup>	
26	Analog input 1 (A1.Pr)	<b>4 to 20mA</b>	4 to 20mA / 0 to 20mA / 0 to1V	<b>Meter with Analog Input option Only</b>
27	Analog input 1 (A1.Pr)	<b>4 to 20mA</b>	4 to 20mA / 0 to 20mA / 0 to1V	
28	Analog Input 1 full scale (A1.FS)	<b>1200</b>	0.001 to 9999 * 10 <sup>9</sup>	
29	Analog input 2 (A2.Pr)	<b>4 to 20mA</b>	4 to 20mA / 0 to 20mA / 0 to1V	
30	Analog Input 2 full scale (A2.FS)	<b>1200</b>	0.001 to 9999 * 10 <sup>9</sup>	

31	Device Id (dV.Id)	<b>1.000</b>	1.000 to 247.0
32	No of Poles (POLE)	<b>4.000</b>	1.000 to 28.00
33	Reverse lock(rEu.L)	<b>No</b>	Yes/no
34	Password (Pwd)	<b>1000</b>	1000 to 9999

## 6. LED Indications:

LED status	Meaning	LED status	Meaning
KILO' ON	Kilo	COM' ON	Communication ON
'MEGA' ON	Mega	RCVD' ON	Received energy readings
KILO' & 'MEGA' ON	Giga	'DLVD' ON	Delivered energy readings
KILO' & 'MEGA' OFF	Direct reading	'RCVD' & 'DLVD' ON	NET(total) energy readings
ON	Lag/Minus	'Old' ON	Respective old energies
OFF	Lead/Plus		

## 7. Clearing the Integrator and Maximum Demand:

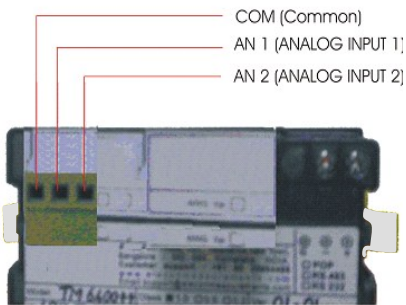
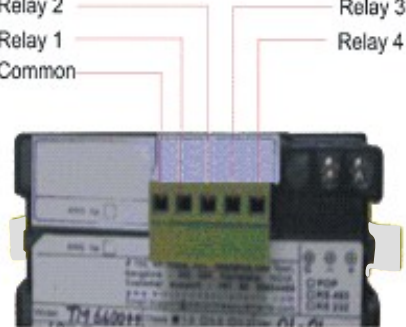
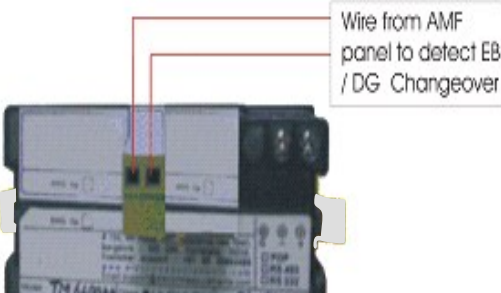
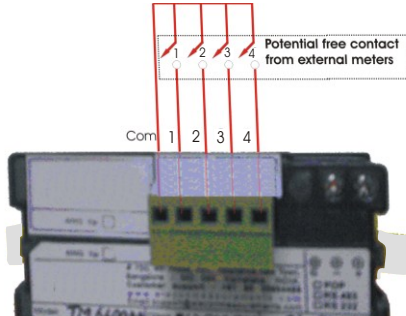
To Clear energy parameters of the Tiny Master from the front panel, Press UP and DOWN Keys together and 'CLr'(Clear) is displayed .Enter the Password (default password is 1000). It will display "CLr.I" (Clear Integrator). Press UP / DOWN Key for selecting **CLr.I** (Clear Integrator) or **Md** (Maximum clear Demand). Once the parameter to be cleared is selected, it will prompt to YES or No(default n ). Press UP and DOWN key to change Yes/No and press the RIGHT key to do the operation. User can return to display mode at any time by again pressing HOME key.

## 8. Enabling and disabling of Auto scrolling :

**Enabling auto scrolling:** Press UP key continuously for 5 seconds or until display shows **EnbL Auto** for upward scrolling. Press Down key continuously for 5 seconds or until display shows **EnbL Auto** for downward scrolling.

**Disabling auto scrolling:** Press any key (RIGHT/UP/DOWN), display show **dSbL Auto** and returns to normal mode.

## 9. Wiring Diagram for Optional Features:

Analog Input	Digital Output
 <p>COM (Common) AN 1 (ANALOG INPUT 1) AN 2 (ANALOG INPUT 2)</p>	 <p>Relay 2 Relay 1 Common Relay 3 Relay 4</p>
Dual source TM3420/6420	Digital Input
 <p>Wire from AMF panel to detect EB / DG Changeover</p>	 <p>Com 1 2 3 4 Potential free contact from external meters</p>

Connections to the terminals located at the rear side of the unit are to be made by using preferably 12 to 14 SWG (2.6mm<sup>2</sup> to 2.0mm<sup>2</sup>) industrial grade wire. Relay Rating No contact SPST. 250VAC / 30VAC @2Amps resistive.