



User Manual for Transformer Monitoring System TMS-01

Version 1.0

NOTE

These instructions do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired or should particular problems arise which are not covered sufficiently for the purchasers purposes, the matter should be referred to our TAS PowerTek Pvt. Ltd. offices.

The contents of this instruction Manual shall not become part of or modify any prior or existing agreement or relationship. The sales contract contains the entire obligations of TAS PowerTek Pvt. Ltd. The warranty contained in the contract between the parties is the sole warranty of TAS PowerTek Pvt. Ltd. Any statements contained herein do not create new warranties or modify the existing warranty.



The reproduction, transmission or use of this document or its contents is not permitted without express written authority. Offenders will be liable for damages. All rights are reserved.

CAUTIONS:

1. High Voltage!
2. TMS-01 may only be used indoor!
- 3. This User Manual is applicable to Transformer Monitoring System TMS - 01 with Firmware Version 1.0.0 dated on 11th May , 2016.**

Because of continuous improvements carried out by TAS PowerTek in their Product's Features and Specifications, the Product as well as the Content of the User Manual is likely to get updated without any prior notice.

Therefore, please always refer to the User Manual supplied to customer along with the Product, at the time of product dispatch.

Index

❖ Index page	-- 3
❖ Features	-- 4
❖ Specifications	-- 5
❖ Mechanical dimensions	-- 6
❖ Front fascia	-- 7
❖ Back side terminals	-- 8
❖ Top side terminals	-- 9
❖ Right side terminals	-- 10
❖ Functional block diagram	-- 11
❖ External Temperature Sensor Terminals	-- 12
❖ Front fascia : LCD Screen, LED indications	-- 13
❖ Front fascia : RS232 Communication port	-- 14
❖ Front fascia : Keyboard	-- 15
❖ Display of various parameters	-- 16
❖ Sub menu for LCD display of parameters	-- 17
❖ Method of Keyboard / Display usage	-- 20
❖ Keyboard / Display operations	-- 21
❖ Edit Parameters	-- 22
General & IO	-- 23
System	-- 23
Fault	-- 24
Communication	-- 26
❖ Do's and Dont's	-- 28
❖ Commissioning Instructions	-- 30
❖ Fault finding Guidelines	-- 33
❖ Factory Default Settings	-- 35
❖ Maintenance Copy	-- 39
❖ Contact Details	-- 43

Features

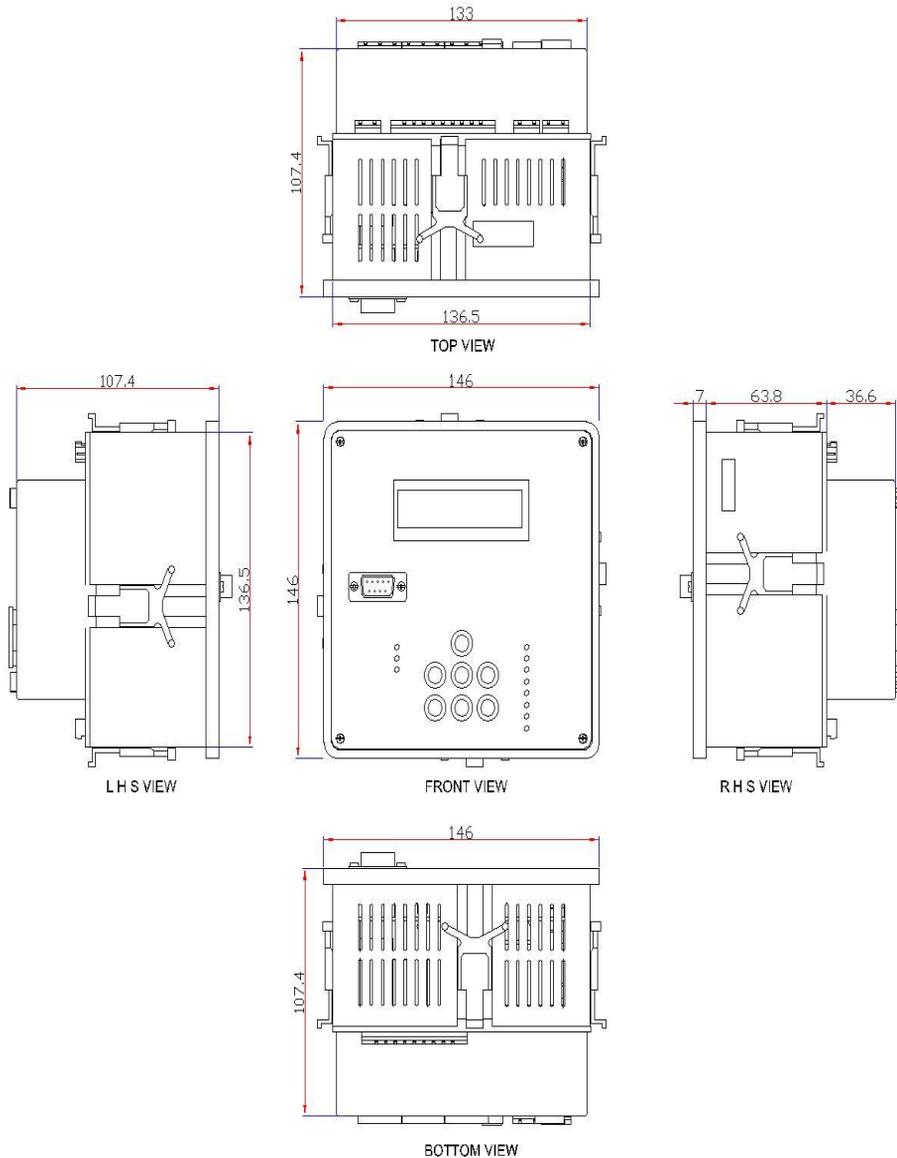
- Totally Micro-controller controlled Digital Signal processing logic for measurements, monitoring, controls and logging etc.
- Voltage & Current measurements with Class-2 accuracy.
- Load Voltage, Current THD measurement with odd harmonic coefficients up to 15th harmonic. Neutral current analysis too.
- Inbuilt GPRS facility for remote data communication. The data to be transferred is sent by Transformer Monitoring system to remote "Cloud" with the help of Internet facility SIM card. The data stored on the cloud is accessed by remote terminal where the data is to be viewed & monitored with the help user end software.
- Monitoring of Transformer Oil Level through Oil Level sensor & giving Led Indication on Low oil Level.
- Monitoring of Transformer temperature through temperature sensor/temperature switch & giving Led Indication on high temperature limit.
- Over Temperature Alarm output facility with the Relay Changeover from NO to NC .
- DIN Standard 144 x 144 mm cabinet for panel-door flush mounting.
- Serial communication through dedicated protocols.
- One RS-232 comm. port with Dedicated protocol, on front fascia.
- Logging of 4 months data in the form of *Hourly Internal Records*, *Fault Records* & *Daily Records* – recording all electrical parameter values.
- Protection & Indications provided:
 - Over/Under Voltage
 - Phase Loss
 - Overload Current
 - External Over Temperature with the help of Temperature Sensor RTD PT100 ,3 wire Input & TMS-01 Internal Over Temperature.
 - Over Temperature with the help External Temperature Switch
 - Low Oil Level
 - Load Unbalance, Phase Unbalance
 - Over/Under Frequency

Specifications:

- Feed-back Voltage: 3-Ph, 4-Wire , Nominal 240 V (+20% to -20%).
- Current input: Selectable 1A or 5A for both load.
- Measurement Accuracy: 2% (Dynamic range 10).
- Auxiliary Supply: Nominal 240V ac (+10% to -15%).
- AC Mains Supply frequency: Nominal 50 Hz, Range: 47 Hz to 53 Hz.
- RS-232 baud rate selectable up to 57.6 kbps.
- Dedicated RS-232 port on front fascia for Logged-Data.
- Connection provided for External Temperature Sensing PT-100 Probe.
- Operating Temperature: 0 to +55°C.
- Storage temperature: -5 to +60°C.
- Relative Humidity: 10 to 90% (Non-Condensing) 53 Hz.
- In-built GPRS Facility: Supports Quad-band 850/900/1800/1900 MHz for RF Communications.
- GPRS Data: GPRS Class 12
- External RTD PT 100 3 wire Temperature sensor input terminals provided on top side. Unit monitors the External temperature through the PT100 input. If temperature goes up than the set limit due to sensed temperature from the PT100 probe Over temperature fault is activated.
- Two nos. of Auxiliary Inputs .
 - i)Auxiliary Input-I : ` NC ` contact from Transformer Oil level Sensor which shall become ` NO ` on Fault Condition .
 - ii) Auxiliary Input-II : ` NC ` contact from Temperature Switch which shall become ` NO ` on Fault Condition .
- Auxiliary Output -I for Over temperature fault condition with the help of Relay contact(Contact Rating: 5A, 230Vac).On Fault condition Relay changes the status from ` NO ` to ` NC ` .

Mechanical dimensions:

All Dimensions given are in mm.

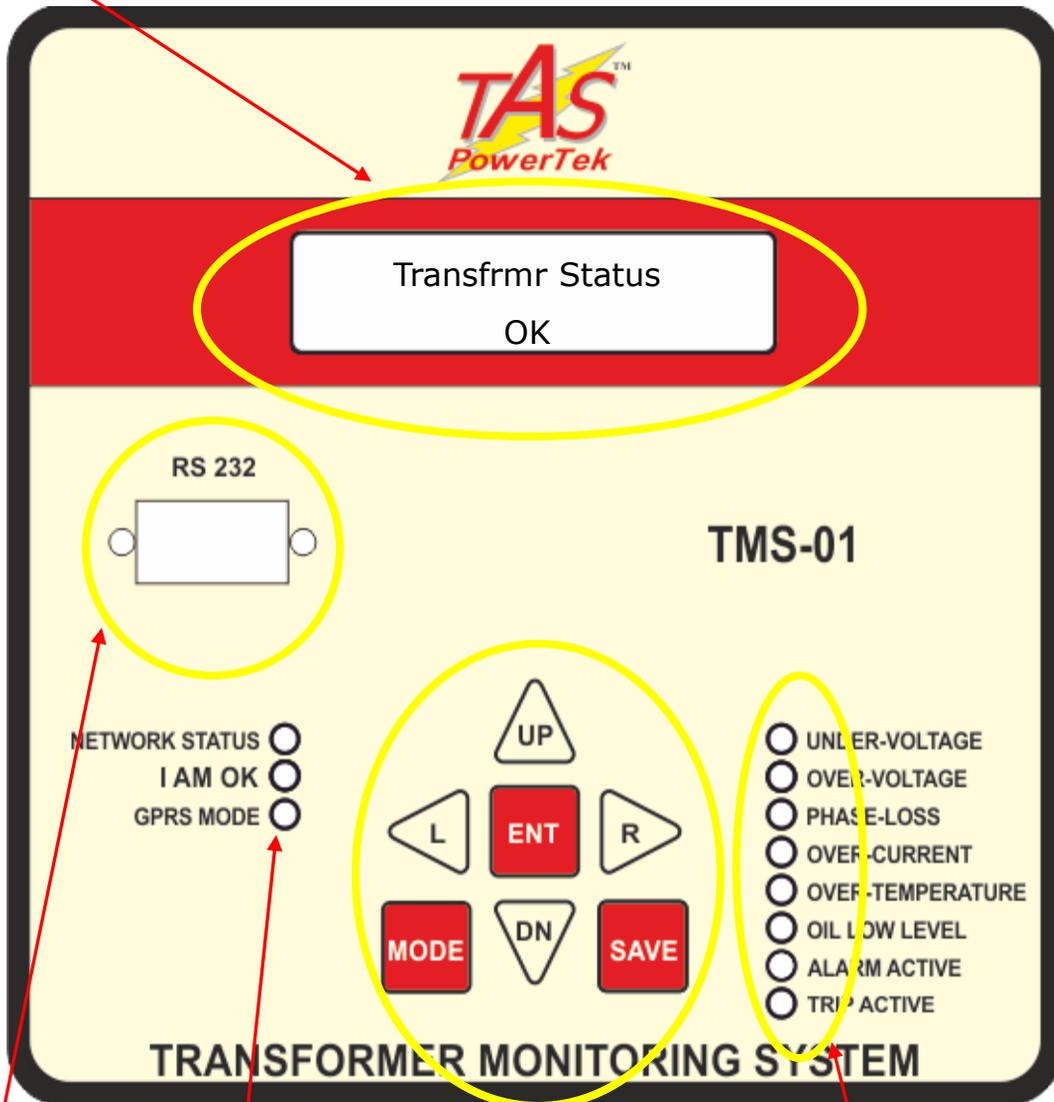


Recommended size for cut-out on panel door is 138 x 138 mm.
 Maximum weight(with clamps and terminals) = approx. 1.5 kg.

Front fascia

Keyboard, LCD display, LED indications and communication port

LCD Display



NETWORK STATUS
I AM OK
GPRS MODE

TMS-01

- UNDER-VOLTAGE
- OVER-VOLTAGE
- PHASE-LOSS
- OVER-CURRENT
- OVER-TEMPERATURE
- OIL LOW LEVEL
- ALARM ACTIVE
- TRIP ACTIVE

Transformer Monitor Status LED indications

Fault Status LED indications:

RS-232 port with dedicated protocol.

7-Keys Key-pad

Back side terminals

Measurement input voltage **240V, 3Phase, 4Wire .**

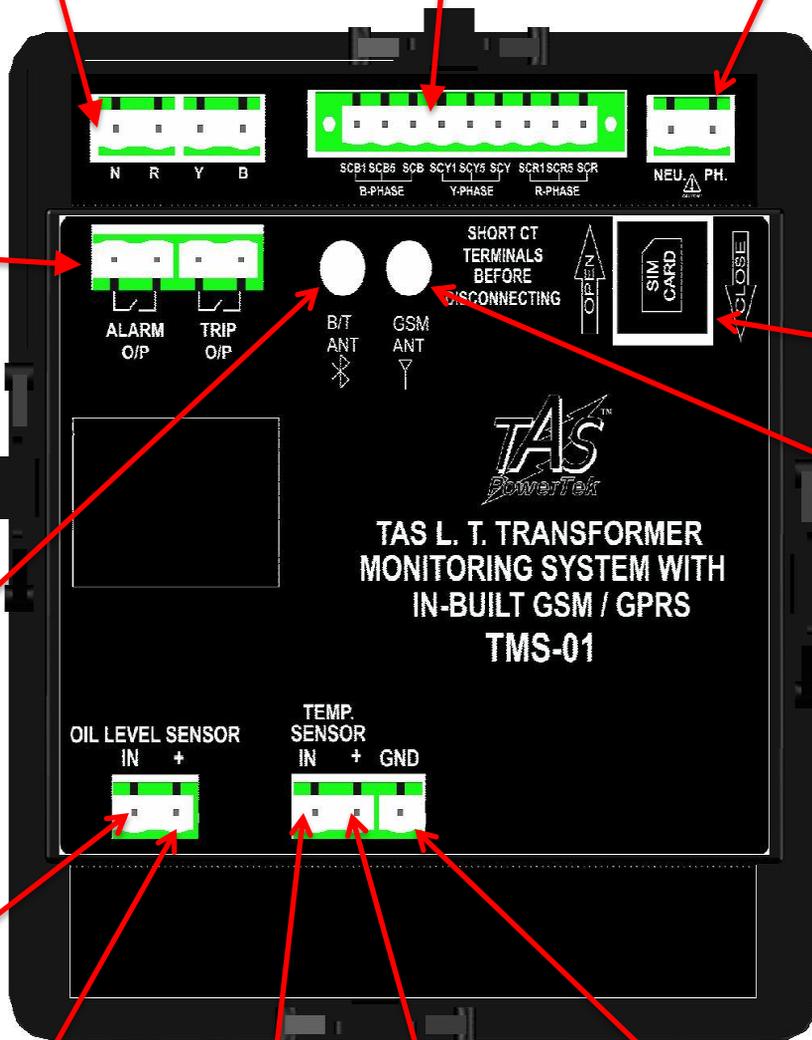
Load current CT input **Selectable 1A or 5A**
 Example: For R-phase CT, Select either SCR1 (1A) or SCR5 (5A) along with SCR (common)
 Similarly for Y-phase and B-phase.

Auxiliary input voltage **240 Vac (nominal)**

Auxiliary outputs – 2 Nos. Potential-free, N.O. Contacts, Contact Rating: 5A, 230Vac

Bluetooth Antenna Connection

SIM Card Socket for SIM Insertion
 GSM Antenna connection



Auxiliary input **Normally Closed contact Input From OIL Level Sensor**

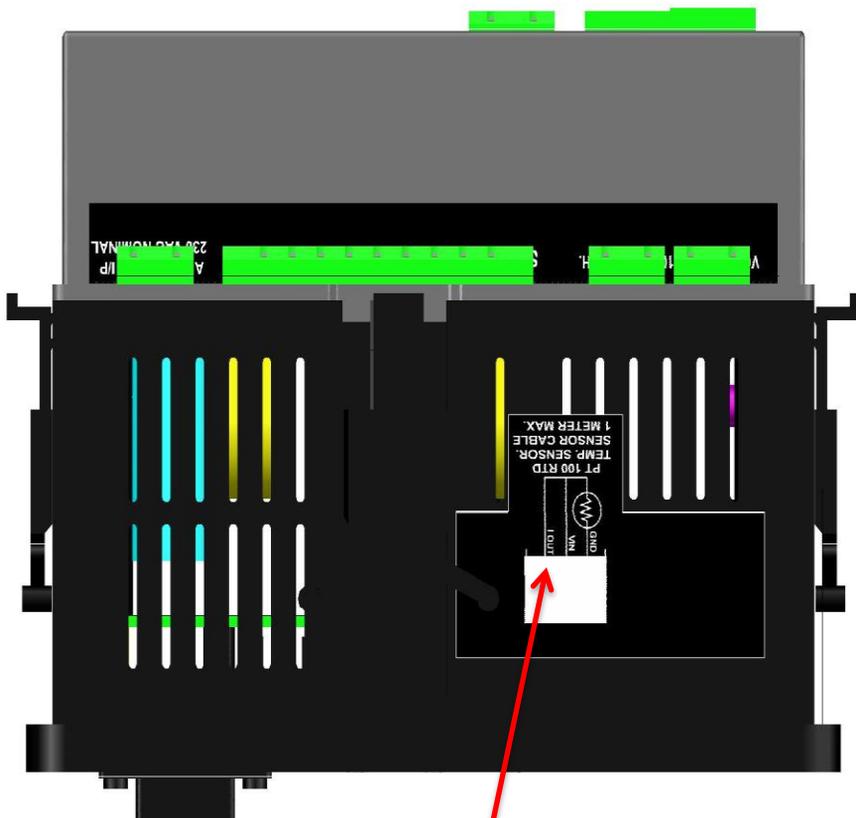
Auxiliary Input **+ve 12 Vdc Supply For OIL Level Sensor**

Auxiliary input **Normally Closed contact Input From Temperature Switch Sensor**

Auxiliary Input **+ve 12 Vdc Supply to one terminal of Normally closed contact of Temperature Switch Sensor**

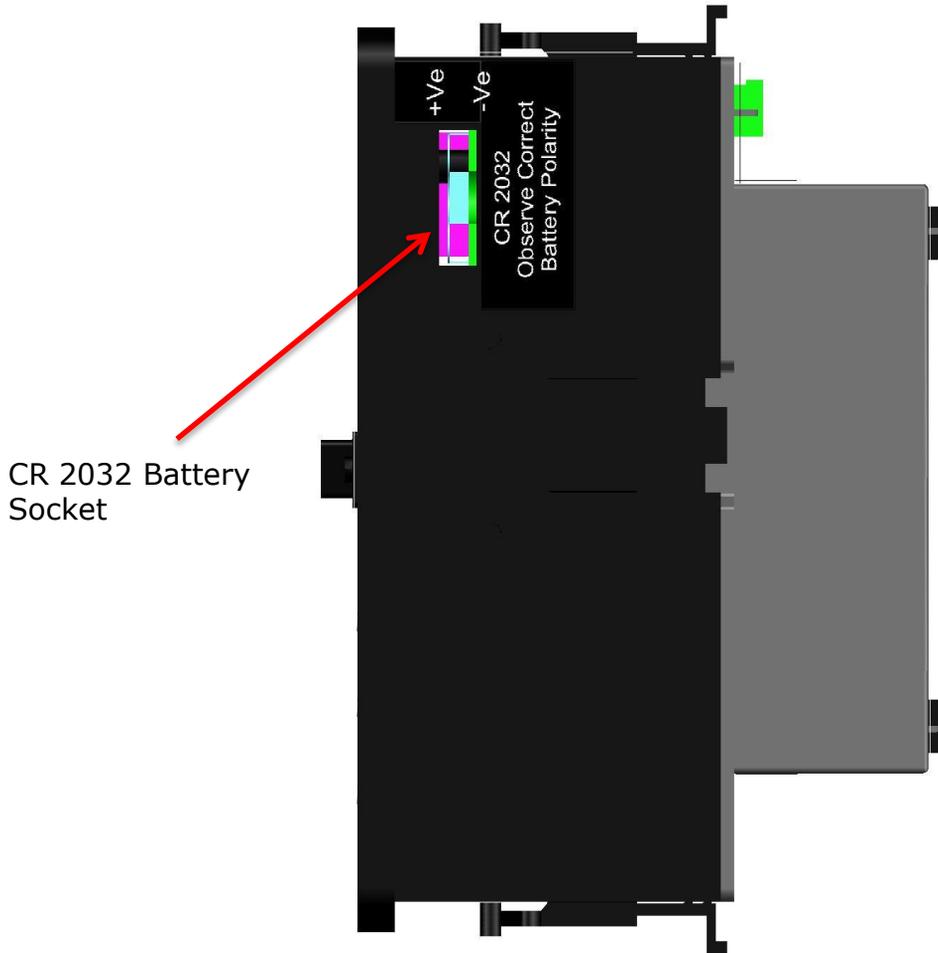
Auxiliary input Ground Terminal **(- ve) 12 Vdc Supply For OIL Level Sensor**

Top side terminals

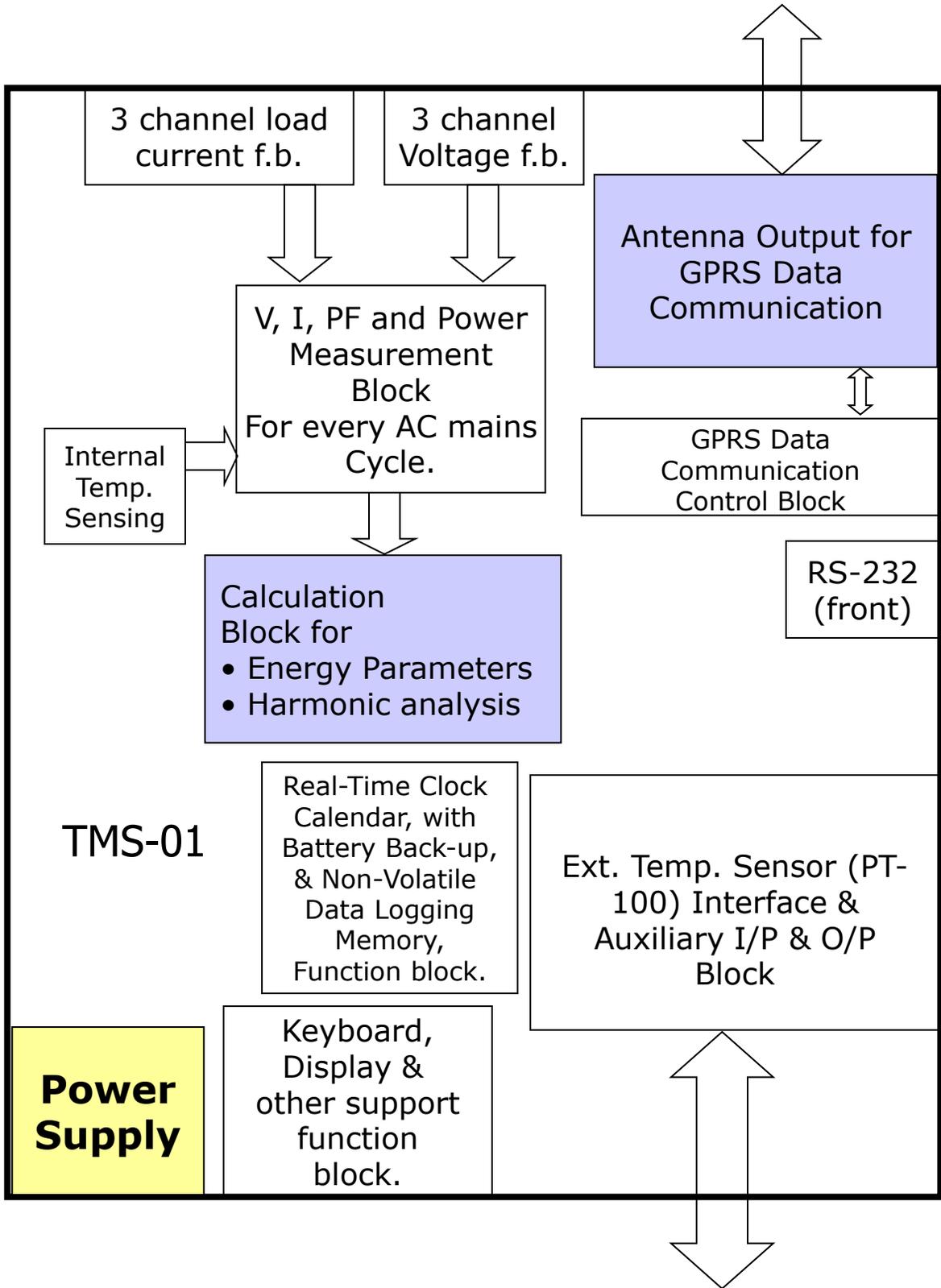


Temperature Sensor RTD
PT100 3 Wire Input

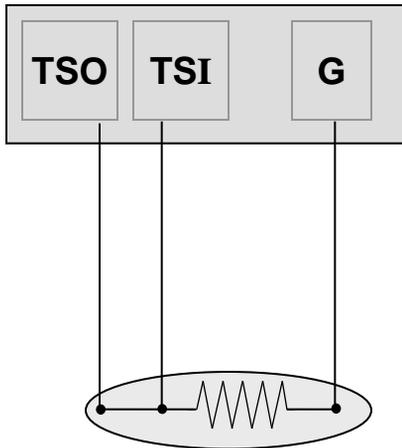
Right side terminals



Functional Block Diagram



External Temperature Sensor Terminals



External RTD Temperature sensor input terminals provided on top side.
Use only the RTD Sensor, PT100.
The RTD is not provided with Controller.
It is user installed.
It is used for monitoring the Temperature inside the panel.

3-Wire PT100 RTD Temperature Sensor, user installed.

Front fascia – LCD screen, LED indications

Transfrmr Status
OK

This Default screen indicates that the Transformer Status is Okay & there is no Low Oil level & Over temperature Fault.

Transfrmr Status
Low Oil Level

This screen indicates that the Transformer Status is not okay & there is Low Oil level in the Transformer.

Transfrmr Status
Over Temp

This screen indicates that the Transformer Status is not okay & there is Over Temperature Fault in the transformer.

LED Indications :

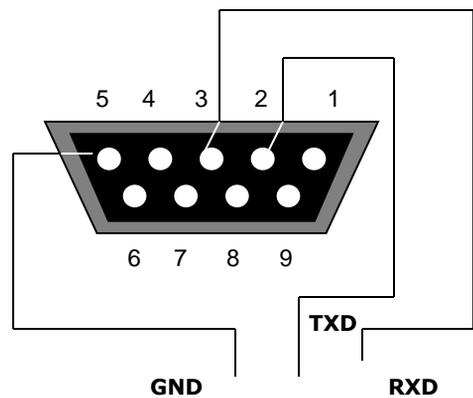
Sr. NO.	LED	Description
1.	Under Voltage	This LED glows when the voltage in any one phase drops down below the set limit .
2.	Over Voltage	This LED glows when the voltage in any one phase goes above the set limit .
3.	Phase Loss	This LED glows when the voltage in any one phase drops down to nearly Zero Volts . i.e. Phase is absent.
4.	Over Current	This LED glows when the current in any one phase goes above the set limit .
5.	Over Temperature	This LED glows when the Temperature from the external PT100 input goes above the set limit . This LED also glows if the Auxiliary Input from Temperature sensor switch which is ` NC ` becomes open upon fault condition.
6.	Oil Low Level	This LED glows when the oil level drops below the limit level.
7.	Alarm Active	This LED glows when the Auxiliary Alarm output Relay Contact becomes ` Closed ` during the Over temperature fault .
8.	Trip Active	This LED glows when the Auxiliary Trip output Relay Contact becomes ` Closed ` during any fault setting for Trip active.

Front fascia: RS-232 communication port

Front side RS-232 communication port connection

This port is used for downloading of data logged in the controller memory. The protocol used is RS-232. Following gives the pin configuration:

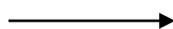
Pin	PC side	Connect	TMS -01
1	NC		
2	RXD	—————	TXD
3	TXD	—————	RXD
4			
5	GND	—————	GND
6			
7			
8			
9	NC		



RS-232, 9-pin D type
Male Connector on TMS-
01 Side

Front fascia – Keyboard

Keyboard with soft touch keys are provided on the front fascia of the controller. The various keys are:



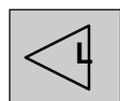
UP key. Used to scroll up the menu screen; increment values when entering numbers. Also used for changing the status of banks.



DOWN key. Used to scroll down the menu screen; decrement values when entering numbers. Also use to change status of bank.



RIGHT key. Used to shift the cursor to right; Also used to increase the contrast of LCD in default display screen mode.



LEFT key. Used to shift the cursor to left; Also used to decrease the contrast of LCD in default display screen mode.



ENTER key. Used for entering a submenu or for setting up values.



MODE key. Used for selecting modes of operation and editing of parameters

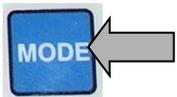
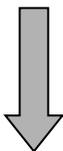
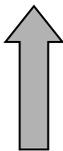
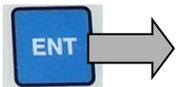


MEMORY key. Used to save all changes made in Edit Parameters menu.

Display of various parameters:

Values of various parameters can be viewed by using UP / DN keys & then pressing ENT key. To exit a sub-menu press MODE Key.

Transfrmr Status OK	This is default display screen giving information on Transformer status.
Display Overall Values	Overall values gives the average values of system parameters – V, I, kW, kVAR, kVA, Ic, C-kVAR. Load side PF, kVAR, kVA & frequency.
Display Per-Phase RMS	Per Phase RMS values of voltage, current, neutral current & capacitor current.
Display Power	Displays per phase values of PF, kW, kVA, kVAR and Capacitive kVAR.
Display Energy	Displays overall energy parameters like KWH, Inductive & Capacitive kVARh, kVAh and C-kVARh.
Display Harmonics	Displays per phase THD for V, I, Neutral current & Capacitor as well as odd harmonics up-to 15 th .
Display Aux-Function	Displays the internal (cabinet) & external temperature.
Time: 17:38:00 Date: 25/09/13	Displays current time & date that is set on internal Real Time Clock.
GPRS Signal Strength : 21	Displays the Network Signal Strength
TAS TMS-01 Ver. 1.0.0	Displays the version of software.



Sub-menu for LCD Display of parameters

Overall Values	Per Phase RMS	Power	Energy
Average Voltage 240.1 V (L-N)	R- Phase Voltage 00240.1 V (L-N)	R- Phase PF 1.000 IND	KWH 000000000.0
Average Current 1000.5A	Y-Phase Voltage 00240.1 V (L-N)	Y- Phase PF 1.000 IND	IND KVARH 000000000.0
Active Power 110000.1 KW	B-Phase Voltage 00240.1 V (L-N)	B- Phase PF 1.000 IND	CAP KVARH 000000000.0
Reactive Power 000010.0 KVA	R- Phase Current 1000.0 A	R- Phase KW 000250.0	KVAH 000000000.0
Apparent Power 000442.0 KVA	Y- Phase Current 1000.0 A	Y- Phase KW 000250.0	
Frequency 50.0 Hz	B- Phase Current 1000.0 A	B- Phase KW 000250.0	
	Neutral Current 0001.0 A	R Phase KVAR 000005.7	
		Y Phase KVAR 000005.7	
		B Phase KVAR 000005.7	
		R Phase KVA 000256.0	
		Y Phase KVA 000256.0	
		B Phase KVA 000256.0	

continued..

Sub-menu for LCD Display of parameters .

Harmonics	Aux Function
Vr- THD- F 000.0%	INT- Temperature 45 Deg C
Vy- THD- F 000.0%	EXT- Temperature 45 Deg C
Vb- THD- F 000.0%	
Ir- THD- F 000.0%	
Iy- THD- F 000.0%	
Ib- THD- F 000.0%	
In- THD- F 000.0%	

continued..

continued..

Harmonic data of various current & voltage parameters can be viewed by pressing ENT on the respective parameter screen of the Harmonics menu. Following are the sub-menus giving the harmonic data of voltage, current & capacitor current for each phase.

Voltage (V) Harmonics

Vr- Harmonics 03 rd : 00.0 %	Vy- Harmonics 03 rd : 00.0 %	Vb- Harmonics 03 rd : 00.0 %
Vr- Harmonics 05 th : 00.0%	Vy- Harmonics 05 th : 00.0%	Vb- Harmonics 05 th : 00.0%
Vr- Harmonics 07 th : 00.0 %	Vy- Harmonics 07 th : 00.0 %	Vb- Harmonics 07 th : 00.0 %
Vr- Harmonics 09 th : 00.0%	Vy- Harmonics 09 th : 00.0%	Vb- Harmonics 09 th : 00.0%
Vr- Harmonics 11 th : 00.0 %	Vy- Harmonics 11 th : 00.0 %	Vb- Harmonics 11 th : 00.0 %
Vr- Harmonics 13 th : 00.0 %	Vy- Harmonics 13 th : 00.0 %	Vb- Harmonics 13 th : 00.0 %
Vr- Harmonics 15 th : 00.0 %	Vy- Harmonics 15 th : 00.0 %	Vb- Harmonics 15 th : 00.0 %

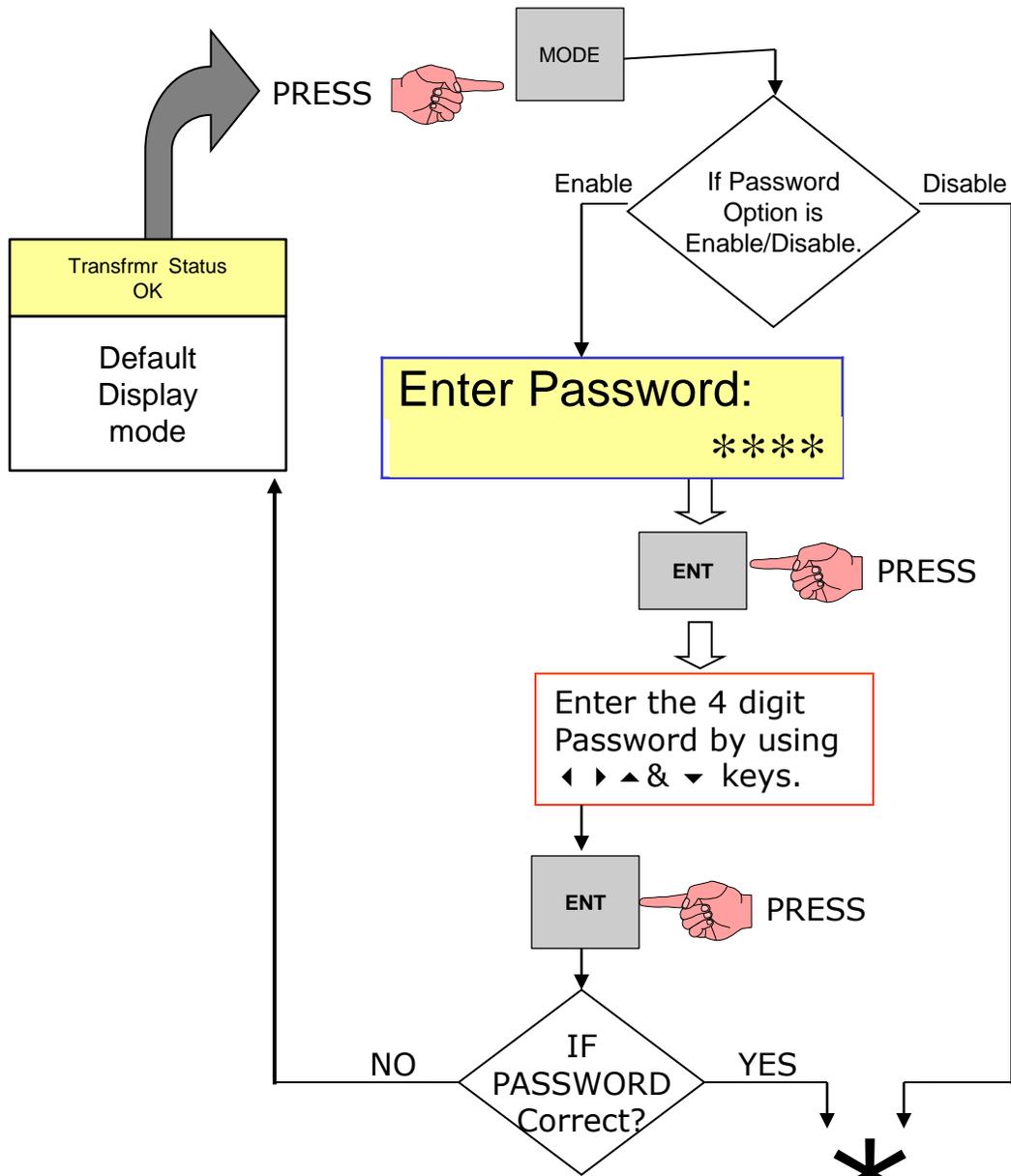
Load Current (I) Harmonics

Ir- Harmonics 03 rd : 00.0 %	Iy- Harmonics 03 rd : 00.0 %	Ib- Harmonics 03 rd : 00.0 %	In- Harmonics 03 rd : 00.0 %
Ir- Harmonics 05 th : 00.0%	Iy- Harmonics 05 th : 00.0%	Ib- Harmonics 05 th : 00.0%	In- Harmonics 05 th : 00.0%
Ir- Harmonics 07 th : 00.0 %	Iy- Harmonics 07 th : 00.0 %	Ib- Harmonics 07 th : 00.0 %	In- Harmonics 07 th : 00.0 %
Ir- Harmonics 09 th : 00.0%	Iy- Harmonics 09 th : 00.0%	Ib- Harmonics 09 th : 00.0%	In- Harmonics 09 th : 00.0%
Ir- Harmonics 11 th : 00.0 %	Iy- Harmonics 11 th : 00.0 %	Ib- Harmonics 11 th : 00.0 %	In- Harmonics 11 th : 00.0 %
Ir- Harmonics 13 th : 00.0 %	Iy- Harmonics 13 th : 00.0 %	Ib- Harmonics 13 th : 00.0 %	In- Harmonics 13 th : 00.0 %
Ir- Harmonics 15 th : 00.0 %	Iy- Harmonics 15 th : 00.0 %	Ib- Harmonics 15 th : 00.0 %	In- Harmonics 15 th : 00.0 %

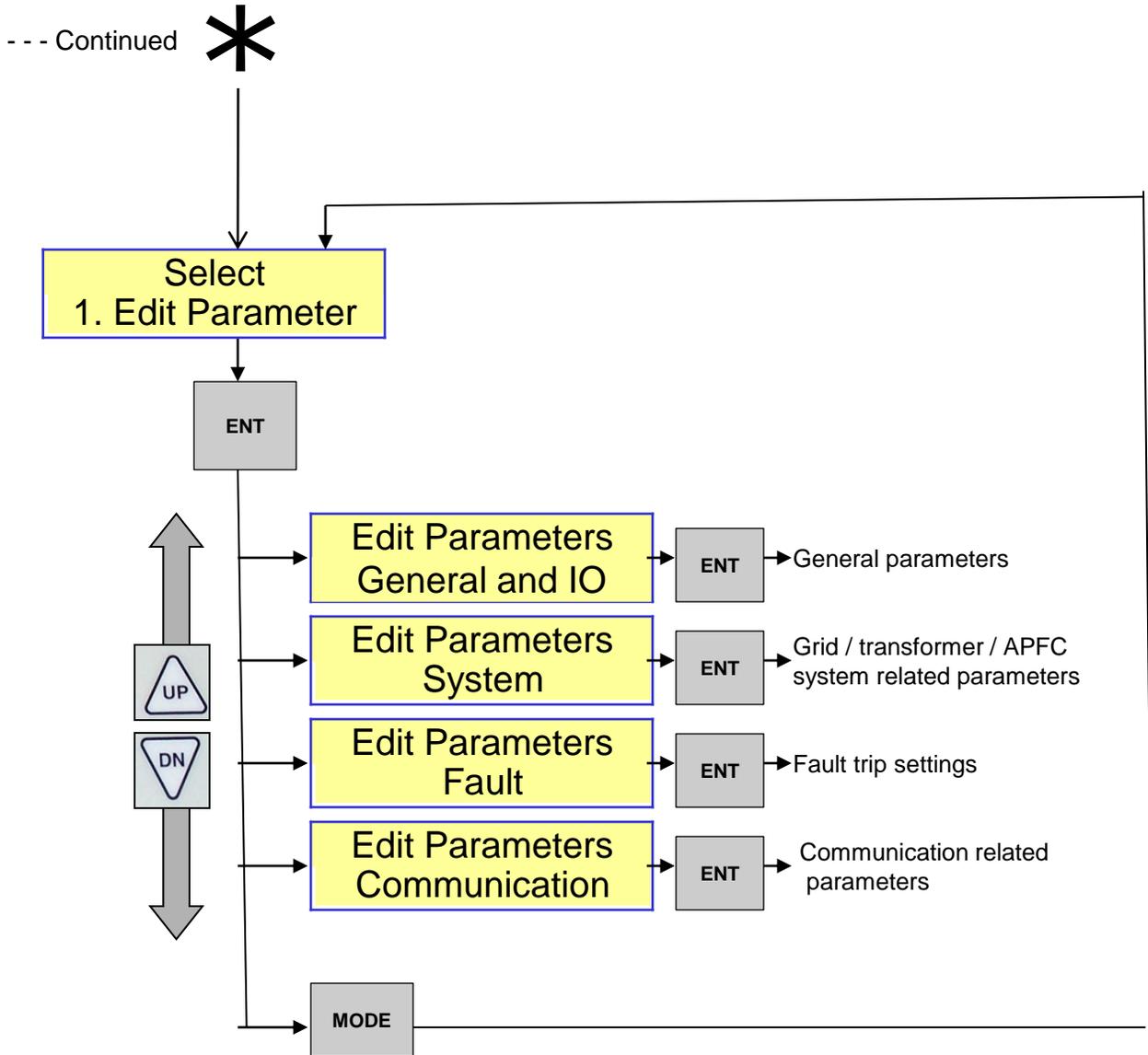
Continued

Method for keyboard / display usage

Flowchart for entering into Edit Parameter mode:



Continued on next page



Keyboard / Display operations

Mode Selection

There is one mode for data entry (Edit Parameters). Press the Mode key. Enter password (if enabled) by using ◀ ▶ ▲ ▼ keys. Press ENTER.

•EDIT PARAMETERS

Then press ENTER to enter the Edit Parameter mode.

Edit Parameters:

This mode is used to carry out system settings. In this mode various system settings can be carried out. To do the same, use the ▲ ▼ keys and select the type of parameters to be edited. The types of parameters that can be edited are:

- General & IO** : For general settings.
- System** : For mains/generator system settings.
- Fault** : Fault settings.
- Communication** : Communication parameters.

After selecting the type, press ENTER to enter the sub-menu of that specific type.

The details of these sub-menus for every type is given further.

You can edit all these sub-menu settings by using the ENTER, ▲, ▼, ◀, and ▶ keys

To come out of the sub-menu press MODE key once.

To store the edited parameters permanently, press SAVE when you are either in the Edit Parameters or any sub-menu area.

To come out of Edit Parameters without saving the changes press MODE key again.

Note: In the Edit Parameters area, if no keys are pressed for more than a minute, the default display screen comes on and the changes done till that time are discarded.

Fault

Over vol fault Indicate : 1
Over voltage Limit (%) :110
Over voltage Resume (%) :105
Under Vol fault Indicate : 1
Under voltage Limit (%) :070
Under voltage Resume (%) :085
Over load fault Indicate : 1
Over load Limit (%) :130
Over load Resume (%) :125
Under load kW fault Disable : 0
Under Ld. Limit (%) :020
Under Ld. Resume (%) :025

For most of the types of faults defined here, the options available are as hereunder:

0=Disable

1=Indicate (Display a Fault Message & or store in Flash)

For all the faults, normally two limits are defined. One is Detection Limit and another Resume Limit. Detection Limit if exceeded by the parameter would mean the action as defined by parameter in type of fault (as given here-above). Resume Limit defines the parameter value below which the fault is deactivated.

- Over Voltage: As name suggests, its for Over-Voltage conditions.
- Under Voltage: For Under-Voltage conditions.
- Over Load: Detects the supply system is over-loaded. i.e. the load current is greater than the set limit.
- Under Load fault: It is activated when the active power KW in any of the phases falls below the set limit.

continued..

...continued.

Load UN bal Flt Disable : 0
Load UN bal Limit (%) : 020
Phase Unbal Flt Disable : 0
Phase Unbal limit (%) : 020
Select Unbalance Method : 3
Temperature Flt Disable : 0
Temperature L. Limit : 55
Temperature U. Limit : 65
Ext. Temp Flt Disable : 0
Ext. Temp Flt L. Limit : 030
Ext. Temp Flt U. Limit : 050
Harmonic Ovrload Disable : 0
V-Thd Threshold Limit(%) :05
I-Thd Threshold Limit(%) :025
Harmonic Lmt Ext Loading (%) :20
Low Range Multiplying Factor for VTHD : 3.0
Low Range Multiplying Factor for ITHD : 4.0
NV RAM Bat. Fault Enable : 1
Under Freq Fault Disable :0
Over Freq Fault Disable :0

- Load Unbalance fault: Limits defined here are in % of maximum of the three phase source current compared with the minimum of three phase source current.
- Phase Unbalance fault: Limits defined here are in % of maximum of the three phase voltage compared with the minimum of three phase voltage.
- Select Unbalance Method : There are three different methods to calculate Unbalance . One of either of the three methods can be selected for the purpose of unbalance fault.
- Internal Temperature Fault: TMS-01 Unit monitors the temperature inside the cabinet. Upper limit is for activating the fault and lower limit is for normal operation (resume).
- External Temperature Fault: Unit monitors the External temperature through the PT100 input. This temperature can go up due to sensed temperature from the PT100 probe . Upper limit is for activating the fault and lower limit is for normal operation (resume).
- Harmonic Overload Fault: Harmonic overload fault when enabled can sense the THD value of the Voltage & Current and in case of THD exceeding the limit the controller shall switch Off the Capacitor bank steps. As the quantity of harmonics levels are normally higher at lower loads , Facility of Multiplying factor setting & limit setting for Lower Load is provided. Below the set lower load , the Vthd & Ithd Fault limits shall be multiplied by the set multiplied factor for the purpose of Vthd & Ithd fault detection.
- NV-Ram Battery Fault: For internal NV-RAM & RTC, a small battery is provided inside TMS - 01. Health of battery is checked on regular basis. If it is found unhealthy, & if this parameter is enabled, it will stop data logging & give indication (as it may otherwise write error data).
- Under Freq Fault: This fault occurs when the frequency goes below 3 hz than the rated frequency.
- Over Freq Fault: This fault occurs when the frequency goes above 3 hz than the rated frequency.

Communication



UINT ID : 0000
BAUD RATE 9600 : 1
TIME 14:58:40
DATE 01/05/16
INITIALIZE RTC No : 0
CLEAR NVRAM No : 0
Select LOG Time 05 MIN : 0
OvrWrt INTER LOG YES : 1
OvrWrt EVENT LOG YES : 1
COM2 Function GPRS : 1
BAUD RATE – COM2 9600 : 1

Unit ID: Value: 0000 to 9999. Default value 0001. Defines the 4 digit unit ID used for serial communication on RS-232 Dedicated protocol.

- Baud Rate: selectable.
0 – 4800bps, 1 – 9600bps, 2 – 19200bps, 3 – 38400bps, 4 – 57600bps.
- Time: Defines time setting in HH:MM:SS, 24 Hours Format.
- Date: Defines the date setting, in DD/MM/YY Format.

• Initialize RTC: 0 – No, 1 – Yes.
Defining Yes initializes RTC (real time clock/calender) to the above specified values. (This is after pressing SAVE command).

• Clear NVRAM: 0 – No, 1 – Yes.
Defining Yes clears NVRAM (in real time clock) in TMS-01. This will also clear Energy counters, this is generally used to clear NVRAM Checksum fault (This is after pressing SAVE command).

• Select LOG Time : 0 – 5 MIN , 1 – 10 MIN , 2 – 15 MIN , 3 – 30 MIN , 4 – 60 MIN , 5 – 120 MIN can be selected. It defines logging of data at 5/10/15/30/60 /120 MIN interval period. Default value is 05 min.

• OvrWrt INTER LOG: User can enable this option to allow the interval logged data to be overwrite after log data memory is full. If the option is disable data logging will get stopped after memory is full.

• OvrWrt EVENT LOG: User can enable this option to allow the Event logged data to be overwrite after log data memory is full. If the option is disable data logging will get stop after memory is full.

• COM2 FUNCTION: The internal port COM 2 is configured for GPRS function .

• BAUD RATE – COM2 : Selectable.
0- 4800bps, 1- 9600bps baud rate for COM2 Function. For TMS-01 unit , the baud rate is fixed internally & auto selectable

Communication

----- Continued

Server Web Addr : rcomnet
Server IP Addr : 115.124.124.97
GPRS Port : 5002

- Server Web Addr : For GPRS Communication Service provider server web address i.e. APN (Access Point Name) is to entered here . Eg. For Reliance SIM card with Internet facility , Server web address i.e. APN is " rcomnet ".
- Server IP Addr : For GPRS Communication host server IP address is to entered here .i.e. The IP address of Cloud server where the data from TMS-01 shall be stored.
- GPRS Port : For GPRS Communication host server port number is to entered here .i.e. The port no. of Cloud server where the data from TMS-01 shall be stored.

Do's and Dont's for Transformer Monitoring System

❖ DO's:

- 1] Always do tighten screws of terminals with 1 N-meter torque calibrated screw driver.
- 2] Always do check the CT shorting terminals are provided externally, so that in case of CT connections are to be opened, these external terminals should be kept short.
- 3] Always use tubular pin type lugs with 1.5 sq-mm Cu-breaded wires for all the control terminals. If 5 Amp CTs are selected then only use 2.5 sq-mm Cu-breaded wires.
- 4] Ensure Auxiliary Input Operating Power Supply to the unit is given from separate reliable supply source. (NOT FROM VOLTAGE FEEDBACK PTs).
- 5] Please always find the correct specifications of the unit for measurement input voltage range, measurement input current range, auxiliary input power supply range, potential free normally open relay contact voltage and current ratings etc., before applying power as well as input signals to the unit.
- 6] Only trained personnel should do the parameter editing and final commissioning.
- 7] Do set password after complete commissioning.
- 8] Do install the TMS-01 in an environmentally protected environment for ambient temperature, relative humidity, conductive dust, electromagnetic interference, mechanical shocks and vibrations, chemical and corrosive gases.
- 9] Press Front panel keys gently to avoid damage to the Keys.
- 10] Use correct RS-232 serial communication interface cable for downloading logged data from the TMS-01 in to a PC or a Hand-Held-Unit (HHU).
- 11] Always use **unique** Unit ID for EACH TMS-01 used in a project, to avoid conflicting of logged data during post-processing on a PC.

❖ DONT's :

- 1] Do not try to open the TMS-01 unit or damage warranty seal.
- 2] Don't clean the external of unit with brush or pressurized air.
Only use a vacuum cleaner to suck the dust away from the TMS-01 unit.
- 3] Don't open the LIVE CT Terminals from the Unit without externally shorting them. Otherwise, it can extensively damage the Unit due to flash-over / fire.
- 4] Don't drop or mis-handle the TMS-01 unit . Handle Unit with care.
- 5] Don't use the TMS-01 unit in extreme chemicals-prone / conductive dust-prone environment.
- 6] Do **not** install the TMS-01 unit in an environmentally un-protected environment such as wide ambient temperature variations, high relative humidity, saline atmosphere, chances of water condensation, conductive dust, electromagnetic interference, mechanical shocks and vibrations, chemical and corrosive gases.
- 7] Do not allow direct Sunrays falling on the LCD Display of the Unit
- 8] Do not throw the discharged or used 3.0 Volt coin type Lithium Battery into fire.
- 9] Do not press Front panel keypad heavily, to cause damage to the keys.
- 10] Do not apply excessive voltage and current inputs beyond the Unit's specifications, else irreparable damage will take place.

Commissioning Instructions:

1. Power Supply Wiring Check:

Ensure that the power supply cables are connected properly from the feeder I/C or the transformer bushings. The connection has to be after the Load Feed back CT looking from the Transformer side.

2. Load Feed Back CT connection:

Ensure that the load feed back CT connections are done properly. Confirm that correct phase CT is connected with the correct phase input terminals.

CT connections to be done carefully so as to ensure that the wire does not get open and there is no loose connection.

Loose connection or open CT secondary can result in very high voltages getting developed in the circuit which can damage the CT and also produce high levels of noise in the system.

3. Temperature Sensor & Oil level Sensor connection :

i) Ensure the Three wire RTD PT-100 sensor terminal connected as per the indicated label at the top side of TMS-01 unit.

ii) Ensure the Temperature Switch Sensor connected to rear side auxiliary input for temperature sensor as per the indicated in the label.

+Ve Terminal to be connected to one terminal of Temperature Switch NC contact .

IN Terminal to be connected to other remaining terminal of Temperature Switch NC contact.

iii) Ensure the Oil Level Sensor connected to rear side auxiliary input for Oil Level sensor as per the indicated in the label.

+Ve Terminal to be connected to +ve power supply terminal of Oil Level Sensor.

GND Terminal to be connected to GND (-ve) power supply terminal of Oil Level Sensor.

IN Terminal to be connected to NC contact of Oil Level Sensor.

Commissioning Instructions:

- - - - Continued

4. Power ON Check :

- i) Ensure proper Power ON , Check for correct voltage & Current per phase parameters .
- ii) Ensure External RTD PT 100 3 wire Temperature sensor connected to unit . Increase the temperature of PT100 sensor through suitable means . Check for Over temperature & Alarm active LED becoming ON & alarm output relay becoming ` NC ` when the temperature exceeds the set limit .
- iii) Check for the following
 - a) Auxiliary Input-I : ` NC ` contact from Oil level Sensor which shall become ` NO ` after the Oil level drops below the oil level sensor . TMS-01 shall indicate Oil Low Level LED ON.
 - b) Auxiliary Input-II : ` NC ` contact from Temperature Switch which shall become ` NO ` when the temperature exceeds the set limit . Over temperature & Alarm active LED shall be ON & alarm output relay shall become ` NC ` .

Commissioning Instructions:

- - - - Continued

5. Verification of GPRS Communication :

- Power down the controller & insert the SIM card with Internet Facility into the rear side SIM card socket .
- Power Up the controller & Check for Network Status LED on the front fascia of the APFC controller . It should be in blinking state.
- After the power on discharge time completion. Check for GPRS mode LED on the front fascia of the APFC controller . It should be in ON state.

The satisfaction of above LED state indicate the healthy condition for GPRS Communication.

- Now enter into the Edit Parameter mode & in the Communication Menu fill in the following details on the respective display pages.

i)Server Web Addr :

Note : Server Web Address i.e ` APN `(Access Point Name) is to be obtained from internet service provider.

ii)Server IP Addr :

Note : Server IP Address is the IP address of Host or Cloud server where the data from TMS-01 shall be transferred & stored.

iii)GPRS Port :

Note : GPRS Port is the port no. of Host or Cloud server where the data from TMS-01 shall be stored.

After entering the above details press the save key .

- Now Check for data communication from TMS-01 to Host Server as per the set LOG Time.

Fault finding guidelines

Fault Type	Probable Reason	Action to Take
Unit Does not turn ON.	<ul style="list-style-type: none"> • Input auxiliary supply not coming. 	<ul style="list-style-type: none"> • Check the input supply to restore
“BF” flashing indication. <i>OR</i> “NV RAM Checksum error” display. <i>OR</i> Corruption of date & time.	<p>In all these three conditions, the battery needs to be checked.</p> <ul style="list-style-type: none"> • Internal Li-Ion 3 Vdc battery used for RTCC and NV RAM must be drained down. 	<ul style="list-style-type: none"> • Replace this battery in consultancy with TAS trained personnel.
Serial Communication is not working.	<ul style="list-style-type: none"> • Baud rate selection is not proper. • Unit ID is not set properly. • Serial communication cable connections are not proper. 	<ul style="list-style-type: none"> • Select proper baud rate. • Set the unit ID correctly. • Check the serial cable continuity as per the connections given earlier in this manual.
Data logging is not taking place.	<ul style="list-style-type: none"> • If Battery Health monitoring is enabled and battery is weak. Possibility of battery unhealthy message being displayed. • Improper settings in PC software and/or PC 	<ul style="list-style-type: none"> • Change the battery by help of EPCOS's authorized person. • Ensure proper settings in date/time format of PC, and settings in the PC S/W are correct .
GPRS Communication is not working.	<ul style="list-style-type: none"> • SIM card Data connectivity is improper. • Antenna connectivity improper. • Server Web Address (APN) is improper. • Host Server IP Address improper. • Host Server GPRS port no. improper. 	<ul style="list-style-type: none"> • Ensure Data connectivity & validity of the SIM Card. • Ensure proper Antenna connectivity & positioning of Antenna for good signal strength. • Set the Server Web Address (APN) correctly. • Set the Host Server IP Address correctly. • Set the Host Server GPRS port no. correctly.

continued..

Fault finding guidelines ... continued

Fault Type	Probable Reason	Action to Take
Oil Level fault not indicated even after Low Oil Level	i)Improper connections to Oil Level sensor. ii)Oil level sensor faulty.	i)Check connections as per indicated in labels. ii)Replace the Oil Level sensor.
Over Temperature fault is not indicated even after over temperature.	i)Improper connections to PT 100 sensor / Temperature switch. ii)External Temperature fault disabled in system menu & edit parameter mode. iii)PT100 sensor/ Temperature switch faulty.	i)Check connections as per indicated in labels. ii)Ensure External Temperature fault enabled in system menu & edit parameter mode. iii)Replace the PT100 sensor/ Temperature switch.

❖ Factory Default Settings

PARAMETER	MIN	MAX	INCREMENT /DECREMENT STEP SIZE	FACTORY DEFAULT
GENERAL I/O				
1] Password (Enable: 1/ Disable: 0)	0	1	1	1
2] Change Password	0000	9999	1	0001
3] Load Default (Yes: 1/ No: 1)	0	1	1	0
4] THD to display (F-THD: 1/R-THD: 0)	0	1	1	1
5] Reset Energy Counter (Yes: 1/ No: 0)	0	1	1	0
6] TEMP SWITCH (Enable: 1/ Disable: 0)	0	1	1	Permanently enabled
7] Oil Level SWITCH (Enable: 1/ Disable: 0)	0	1	1	Permanently enabled
SYSTEM				
1] Measurement voltage (not editable)	-	-	-	240
2] EXT-PT ratio	0000.1	0600.1	1	0100.0:1
3] Current CT primary (Mains)	1	1199	1	1000
4] Current CT primary (Generator)	1	999	1	0500
5] Mains Generator (Mains :0 , Generator :1)	0	1	1	0
6] EXT. Temp. Meas (Enable: 1/ Disable: 0)	0	1	1	0

PARAMETER	MIN	MAX	INCREMENT /DECREMENT STEP SIZE	FACTORY DEFAULT
FAULT				
1] Over Voltage Fault Disable: 0 Indicate: 1	0	1	1	1
2] Over Voltage Limit (%)	Resume	150	1	110
3] Over Voltage Resume (%)	100	Limit	1	105
4] Under Voltage Fault Disable: 0 Indicate: 1	0	1	1	1
5] Under Voltage Limit (%)	0	Resume	1	070
6] Under Voltage Resume (%)	Limit	100	1	085
7] Over Load Fault Disable: 0 Indicate: 1	0	1	1	1
8] Over Load Limit (%)	Resume	150	1	130
9] Over Load Resume (%)	100	Limit	1	125
10] Under Load KW Fault Disable: 0 Indicate: 1	0	1	1	1
11] Under Load Limit (%)	0	Resume	1	020
12] Under Load Resume (%)	Limit	100	1	025
13] Load Unbalance Fault Disable: 0 Indicate: 1	0	1	1	0
14] Load Unbalance Limit (%)	10	100	1	020
15] Load Unbalance Fault Disable: 0 Indicate: 1	0	1	1	0
16] Load Unbalance Limit (%)	10	100	1	020
17] Select Unbalance Method : 1/2/3	1	3	1	3

18] Temperature Fault Disable: 0 Indicate: 1	0	1	1	0
19] Temperature lower Limit	0	Upper Limit	1	55
20] Temperature Upper Limit	Lower Limit	100	1	65
21] External Temperature fault Disable: 0 Indicate: 1	0	1	1	0
22] External Temperature Fault Lower Limit	10	Upper Limit	1	030
23] External Temperature Fault Upper Limit	Lower Limit	250	1	050
24] Harmonic Overload Fast Off Disable: 0 Indicate: 1	0	1	1	4
25] V-Thd Threshold Limit (%)	1	20	1	5
26] I-Thd Threshold Limit (%)	3	150	1	25
27] Harmonic Limit Extension Loading (%)	2	50	1	20
28] Low Rng Multiplying Factor For VTHD	2	5	1	3.0
29] Low Rng Multiplying Factor For ITHD	2	5	1	4.0
30] NV RAM Battery Fault (Enable: 1/ Disable: 0)	0	1	1	1
31] Under Frequency Fault (Enable: 1/ Disable: 0)	0	1	1	0
32] Over Frequency Fault (Enable: 1/ Disable: 0)	0	1	1	0

PARAMETER	MIN	MAX	STEP SIZE	FACTORY DEFAULT
COMMUNICATION				
1] Unit ID	0000	9999	1	0001
2] Baud Rate- COM1: 4800: 0 9600: 1 19200: 2 38400: 3 57600: 4	0	4	1	1
3] Time (HH/MM/SS) 24Hrs clock format	-	-	-	Current Time
4] Date (DD/MM/YY)	-	-	-	Current Date
5] Initialize RTC (Yes: 1/No: 0)	0	1	1	0
6] Clear NVRAM (Yes: 1/ No: 0)	0	1	1	0
7] Select LOG Time 05 MIN : 0 10 MIN : 1 15 MIN : 2 30 MIN : 3 60 MIN : 4 120 MIN : 5	0	5	1	0
8] Ovr Wrt INTER LOG (Yes/No)	No	Yes	-	No
9] Ovr Wrt EVENT LOG (Yes/No)	No	Yes	-	Yes
7] COM 2 Function: GPRS: 1	0	1	1	1
8] Baud Rate- COM2 4800: 0 9600: 1	0	1	1	1 (Baud Rate is automatically selected internally)
9] Server Web Addr	Defines Service provider Server Web Addr. i.e. APN (Access Point Name)			
10] Server IP Addr	Defines Host Server I.P Addr. Where the data from APFC controller is to be stored..			
11] GPRS Port	Defines Host Server GPRS Port No. Where the data from APFC controller is to be stored..			

Maintenance Copy : Please fill-in the below after successful commissioning.

PARAMETER	As on date	As on date	As on date
GENERAL I/O			
1] Password (Enable: 1/ Disable: 0)			
2] Change Password			
3] Load Default (Yes: 1/ No: 1)			
4] THD to display (F-THD: 1/R-THD: 0)			
5] Reset Energy Counter (Yes: 1/ No: 0)			
6] TEMP SWITCH (Enable: 1/ Disable: 0)			
7] Oil Level SWITCH (Enable: 1/ Disable: 0)			

PARAMETER	As on date	As on date	As on date
SYSTEM			
1] Measurement voltage (not editable)			
2] EXT-PT ratio			
3] Current CT primary (Mains)			
4] Current CT primary (Generator)			
5] Mains Generator (Mains :0 , Generator :1)			
6] EXT. Temp. Meas (Enable: 1/ Disable: 0)			

PARAMETER	As on date	As on date	As on date
Faults			
1] Over Voltage Fault Disable: 0 Indicate: 1			
2] Over Voltage Limit (%)			
3] Over Voltage Resume (%)			
4] Under Voltage Fault Disable: 0 Indicate: 1			
5] Under Voltage Limit (%)			
6] Under Voltage Resume (%)			
7] Over Load Fault Disable: 0 Indicate: 1			
8] Over Load Limit (%)			
9] Over Load Resume (%)			
10] Under Load KW Fault Disable: 0 Indicate: 1			
11] Under Load Limit (%)			
12] Under Load Resume (%)			
13] Load Unbalance Fault Disable: 0 Indicate: 1			
14] Load Unbalance Limit (%)			
15] Load Unbalance Fault Disable: 0 Indicate: 1			
16] Load Unbalance Limit (%)			
17) Select Unbalance Method : 1/2/3			

PARAMETER	As on date	As on date	As on date
18] Temperature Fault Disable: 0 Indicate: 1			
19] Temperature lower Limit			
20] Temperature Upper Limit			
21] External Temperature fault Disable: 0 Indicate: 1			
22] External Temperature Fault Lower Limit			
23] External Temperature Fault Upper Limit			
24] Harmonic Overload Fast Off Disable: 0 Indicate: 1			
25] V-Thd Threshold Limit (%)			
26] I-Thd Threshold Limit (%)			
27] Harmonic Limit Extension Loading (%)			
28] Low Rng Multiplying Factor For VTHD			
29] Low Rng Multiplying Factor For ITHD			
30] NV RAM Battery Fault (Enable: 1/ Disable: 0)			
31] Under Frequency Fault (Enable: 1/ Disable: 0)			
32] Over Frequency Fault (Enable: 1/ Disable: 0)			

PARAMETER	As on date	As on date	As on date
Communication			
1] Unit ID			
2] Baud Rate- COM1: 4800: 0 9600: 1 19200: 2 38400: 3 57600: 4			
3] Time (HH/MM/SS) 24Hrs clock format			
4] Date (DD/MM/YY)			
5] Initialize RTC (Yes: 1/No: 0)			
6] Clear NVRAM (Yes: 1/ No: 0)			
7] Select LOG Time 05 MIN : 0 10 MIN : 1 15 MIN : 2 30 MIN : 3 60 MIN : 4 120 MIN : 5			
8] Ovr Wrt INTER LOG (Yes/No)			
9] Ovr Wrt EVENT LOG (Yes/No)			
7] COM 2 Function: GPRS: 1			
8] Baud Rate- COM2 4800: 0 9600: 1			
9] Server Web Addr			
10] Server IP Addr			
11] GPRS Port			



Contact us:

The Sales & Marketing / The Customer Support & Service Dept.,

TAS PowerTek Pvt. Ltd.

W-61, C/o. Pawar Industries, Opp. "Machine House",

MIDC Industrial Area, Ambad

Nasik – 422 010 (via Mumbai)

Maharashtra State, India

Land-Line Phones: +0091-253-6694956 (Sales & Marketing)

+0091-253-6694955 (Customer Support & Service)

Fax: +0091-253-6694 955

Working Hours: 9:30 AM to 6:30 PM Weekly Off: Saturdays

E-mail: sales@taspowertek.com

Web: www.taspowertek.com

This Product is completely Designed, Developed, Manufactured, Assembled, Tested and Calibrated in India by,

TAS PowerTek Pvt. Ltd., Nasik – 422 010, India.

