

# LUMINOUS

## HYBRID Solar Grid Feed Hybrid PCU



### HYBRID TX

Models: 3.75KVA, 5KVA

**USER MANUAL**

# LUMINOUS

Plot No. 150, Sector-44, Gurgaon-122003 (India),

Customer Care No: 1800 103 3039

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PRN-MN-263-03



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**THIS PORTION TO BE FILLED BY THE DEALER**

**PRODUCT DETAILS:**

MODEL: .....

SERIAL No. :

**ABOUT THE BATTERY**

MODEL:.....

SERIAL No. : 1..... 2.....  
3..... 4.....

**DATE OF INSTALLATION:**

Signature of Installation Personnel

**DEALER DETAILS**

(Please fill / affix. your stamp)

Name .....

Address.....

City : ..... State : .....

Contact No. /Res./Off. ....

E-mail : .....

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Dealer Signature & Date

**Important Safety Instructions**

**General Safety Instructions**

This manual contains important safety and operating instructions. Read and keep this manual for future reference. This manual will help you to not only understand the basic working of the Solar Hybrid TX but will also facilitate the ease of its maintenance and use.

- Before installing or using this device, read all instructions located in (or on) this manual.
- Read all instructions and cautionary markings before using Solar Hybrid TX.
- There are no user serviceable parts inside the unit. Do not disassemble or attempt to repair.
- The unit contains more than one live circuit (batteries and PV array). Power may be present at more than one source.

**Installation Safety Precautions**

- Mount the unit indoors. Prevent exposure to the elements and do not allow water to enter the controller.
- Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a battery or other electrical current. This will greatly reduce the chance of accidental exposure to live circuits.
- To reduce the chance of short-circuits, use insulated tools when installing or working with the unit or any DC source.
- Never smoke or allow a spark or flame in vicinity of a battery.
- When connecting batteries, always verify proper voltage and polarity.
- All the connections must be terminated properly and there should not be any loose connections.

To reduce the risk of electrical shock, disconnect all DC power source before attempting any maintenance or cleaning or working on any circuit.

**SPECIFICATIONS**

MODEL	3.75KVA	5KVA
<b>Photovoltaic</b>		
Solar Input Voltage range (Voc)	65V – 165 VDC	
Solar Input Voltage range (Vmp)	65 - 130 VDC	
Maximum PV power	3KW	4KW
Maximum I/P Current (Array)	46A	61A
Maximum MPPT Output current	60A	80A
<b>Grid Input</b>		
Input Supply Phase	Single Phase	
Grid Voltage range	180V - 270V	
Nominal Grid Current (import)	21A	29A
<b>Grid Output</b>		
Grid current (export)	12A ± 2A	16A ± 2A
<b>Battery</b>		
Nominal Battery Voltage	48 VDC	
Charging Stages	Boost, Absorption, Float	
<b>Inverter</b>		
Switching Element	MOSFET	
Control	32 Bit DSP controlled	
Nominal Output Voltage (V) & Voltage range	230V ± 2%	
Output Supply Phase	1 Phase 2 Wire	
Output Waveform	Pure Sine Wave	
Nominal Frequency	50 Hz	
Nominal Output Current	13A	17A
Output Voltage Distortion(THD)	<4%	
Overload at nominal output voltage for 10 min	110%	
Overload at nominal output voltage for 1 min	125%	
Overload at nominal output voltage for 5 sec	200%	
<b>Others</b>		
Display / Indications	LCD Display (20*4) / LED Indications	
Dimensions (WxDxH in mm)	300 x 504 x 515	350 x 635 x 589
Net Weight	50Kg approx	64Kg approx
Gross Weight	64Kg approx	96Kg approx
Cooling	Air Cooling	
Enclosure Protection	IP 21	
Galvanic Isolation	Inbuilt Isolation Transformer	
Mounting	Surface Mount	
Operating Temperature	0-45°C (32-113°F)	



**SERVICE**

In the unlikely event if you are facing a problem that has not been sorted out by troubleshooting, kindly adopt the following procedure:  
Complaints may be logged on our 24-hour service call-desk number 1800 103 3039.

**WARRANTY**

**LUMINOUS POWER TECHNOLOGIES PVT. LTD.** Provides the warranty to the purchaser of **LUMINOUS Solar Hybrid TX**, that it is free from all defects in workmanship and parts in the warranty period. Within the warranty period of 24 months from the date of purchase, the company or its authorized service center shall repair or replace components that prove to be defective if used within specifications.

The company reserves the right to decide as to whether the repair work should be carried out in the company's service center or at site or at any other place.

**Note :** The warranty is only valid if it is duly signed by the authorized dealer.

**Warranty does not cover:**

- If instructions provided in the manual by the manufacturer is not followed.
- If any part has been subjected to misuse, neglect or accidental damage.
- Any tampering of serial number/Mfd. Code and if original seal is found broken or tempered.
- If the unit is found to have been affected by careless use, use on an incorrect voltage, lightning, act of God and exposure to abnormal conditions or household pests.
- If service is carried out by any unauthorized person or agency.

**LUMINOUS POWER TECHNOLOGIES PVT. LTD.** Reserves the right to make changes in design and specifications without notice and without any obligation to install such changes on units previously supplied.

**Liability Exclusion:**

The manufacturer will not be liable for any damages, caused by use other than as intended or as mentioned in this manual or if recommendations of the manufacturer are neglected. The manufacturer shall not be liable if there has been service or repair carried out by any unauthorized person, wrong use & installation or bad system design.

**IMPORTANT:**

In an event the unit requiring servicing at our authorized service center the following procedure should be adopted:

- The unit must be securely packed and dispatched on Freight - prepaid basis duly insured.
- One of our Service/Sales Executive should be informed of the Goods Receipt No. and date of dispatch along with the name of the carrier.
- The above procedure should only be adopted on the advice of one of our Service / Sales Executive or Dealer.
- We reserve the right to charge the consignee for any damage incurred during transit.

**Dear Customer,**

Welcome to the ever increasing family of satisfied LUMINOUS users. Thanks for joining LUMINOUS in this fight for freedom from Fossil fuels. Fossil fuels are getting exhausted; commercial electricity is getting costlier day by day. So, solar energy is the best alternative as it is never ending and abundant. Here LUMINOUS is introducing Solar Hybrid TX with MPPT technology. It is an integrated system consisting of solar charge controller, inverter and Grid charger. This product is designed to give you trouble-free operations and efficient performance with minimal care and maintenance at your end.

**INTRODUCTION****Features**

- Maximum utilization of solar energy.
- Grid quality sine wave output.
- Hybrid design (Solar & Grid charging & Grid feeding).
- In-built MPPT charge controller.
- Solar priority / Grid priority logic / Grid feed mode .
- Microcontroller driven intelligent design.
- Equipped with in-built electronic / thermal protections.
- High efficiency and high reliability.
- User-friendly 20\*4 (character\*line) LCD for displaying operating data and faults.
- LEDs for system status and four buttons / switches for system parameters.
- Zero grid feed feature.
- TDR available (only in 5KVA).

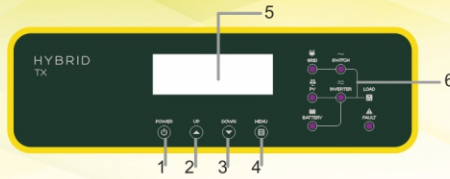
**Functionality**

The Solar Hybrid TX is Solar Grid feed Hybrid PCU. Normally, it works on solar (when available), during this it charges the battery and drives load. If battery is charged & solar power is in excess of load power, the remaining power is fed in the grid, which can be monitored by net metering device. When solar is not available the system transfers to grid and it charges the battery and drives load. In the event of power failure and solar is not available, the inverter transfers the load to the battery. The load is automatically transferred back to the mains or solar when it restores.



SYSTEM OVERVIEW

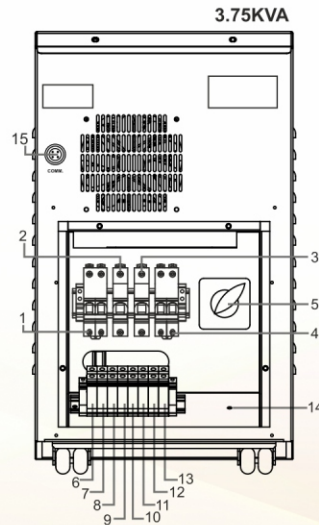
FRONT PANEL



- 1) **Power switch**  
Switch for On and Off the inverter. It also works as EXIT switch.
- 2) **UP scroll switch**  
Switch for increasing the value.
- 3) **Down scroll switch**  
Switch for decreasing the value.
- 4) **Menu switch**  
Switch for enter the user settable Menu. It also works as ENTER switch.
- 5) **LCD Display**  
Displays various parameters on the screen
- 6) **LED Indications**
  - (a) GRID LED (Green) – When Grid is available (senses Grid availability)
  - (b) SWITCH LED (Yellow) – When Grid is selected
  - (c) PV LED (Green) – When Solar is available
  - (d) INVERTER LED (Green) – When Inverter is ON, Grid feeding (blinking)
  - (e) BATTERY LED (Green) – Battery discharging (LED steady),  
Battery charging (Blinking)
  - (f) FAULT LED (Red) – When any Fault arises

BACK PANEL

- 1) **BATT. MCB (Battery MCB)**
- 2) **MAINS MCB**
- 3) **O/P MCB (Output MCB)**
- 4) **SOLAR MCB**
- 5) **MANUAL BY PASS SWITCH\***
- 6) **BATT. (+VE)**  
Terminal block to connect battery positive wire
- 7) **LINE IN**  
Terminal block to connect Input Mains phase wire
- 8) **LINE OUT**  
Terminal block to connect Output phase wire
- 9) **INPUT NEUTRAL**  
Terminal block to connect input mains neutral wire
- 10) **OUTPUT NEUTRAL**  
Terminal block to connect output neutral wire
- 11) **BATT. (-VE)**  
Terminal block to connect battery negative wire
- 12) **SOLAR (-VE)**  
Terminal block to connect solar negative wire
- 13) **SOLAR (+VE)**  
Terminal block to connect solar positive wire
- 14) **EARTHING**
- 15) **CONNECT (Comm IOT Device)**  
This is for IOT device connection. (GSM / WiFi)



RECOMMENDED WIRE SIZE

TERMINAL	Battery	Solar	Line	Output	Earth Wire for Lightning Arrester	Earth Wire for Structure	Earth Wire for Hybrid
3.75KVA	16mm <sup>2</sup>	10mm <sup>2</sup>	4mm <sup>2</sup>	4mm <sup>2</sup>	10mm <sup>2</sup>	6mm <sup>2</sup>	4mm <sup>2</sup>
5KVA	25mm <sup>2</sup>	16mm <sup>2</sup>	6mm <sup>2</sup>	4mm <sup>2</sup>	10mm <sup>2</sup>	6mm <sup>2</sup>	6mm <sup>2</sup>

INSPECTION & MAINTENANCE

Timely (quarterly) inspection and maintenance is necessary for better performance of the system. Turn off the system before any maintenance.

Some of the important measures are:

- Check all the connections are properly connected and there is no loose wire.
- The unit is mounted in clean and dry place.
- The unit is aligned accurately and there is proper air circulation.
- Check for any loose parts and tighten them.
- Check battery voltage and water level.
- Check and clean cooling fans (to be done by company engineer).
- Check for corrosion on terminals and other surfaces (to be done by company engineer).
- Clean solar panels regularly for maximum power utilization.
- For any other damage or repair, contact a trained LUMINOUS engineer.

LCD display and LED indicator lights can be cleaned with a damp cloth if they are too dirty to be read.

How to shut down / open the unit

Shutdown the system:

- i) Switch off output MCB
- ii) Switch off Grid MCB
- iii) Switch off Array MCB
- iv) Switch off Battery MCB

Open the system:

Do not try to open the unit yourself, always contact company engineer to open the unit.

TROUBLESHOOTING

This section provides you with troubleshooting tips to identify and solve most of the common problems with the unit:

**Problem 1: Controller Off, No LED indication**

Check battery voltage with multimeter and it should be within the range of 35~58(±5)Vdc. If the battery voltage is within the range, then check the battery circuit breakers.

**Problem 2: LEDs and Front display is off**

Check FRC cable connector is connected.

**Problem 3: Battery is not charging**

Check the circuit breakers and wiring connections of the battery bank and array. Check array voltage and current.

\*Default position of Manual By Pass Switch is at Position – 1 (Normal)



**OPERATION**

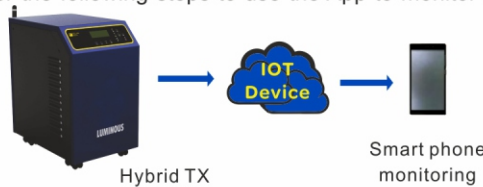
- 1) After complete installation, switch On the Battery MCB (system & display starts and wait for 20 seconds).
- 2) Set date / time and other required parameters settings (to be operated by company engineer only).

**Note:** Check Normal bypass switch should be at position-1 (Normal).

- 3) Now press power switch for 5 seconds, inverter will start working and Inverter LED (Green) will glow.
- 4) Switch On Output MCB and check output voltage at output terminal block.
- 5) Apply load gradually till prescribed limit (On inverter).
- 6) Now Switch ON Mains MCB and apply Mains Input (rated voltage 230V).
- 7) Grid LED glows.

**IOT Device Installation (Optional)**

Solar Hybrid TX can be monitored through WiFi or Cellular connectivity. Please refer the following steps to use the App to monitor the device.



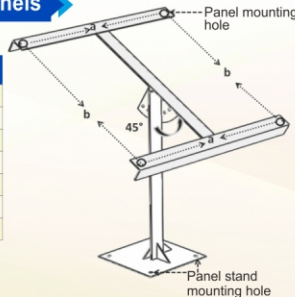
For Android device download and install "Luminous ConnectX" app from Play store.  
For iOS device download and install "Connect By Luminous" app from App store.



\*Luminous connect dongle to be purchased separately.

**Recommended panel mounting structure for solar panels**

For a & b dimensions refer to the manual of solar panel.



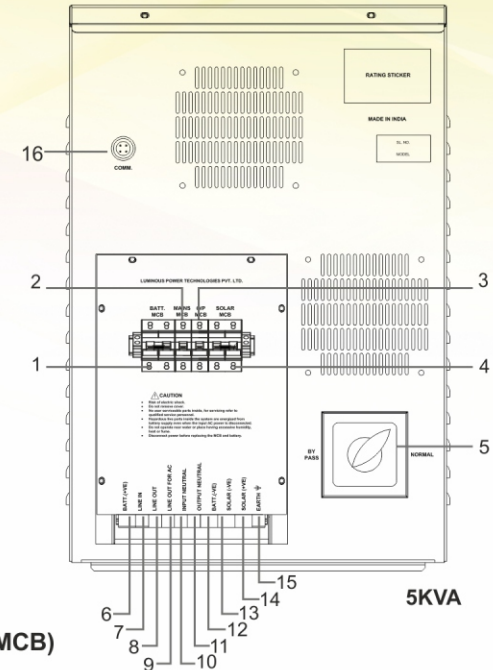
**Always Keep in mind for best performance and safety**

Solar panel direction	True south
Panel angle of tilt	As per geographic location
Panel wire length	Max. 8 meter
Panel installation area	Outdoor. Without any shadow
Panel maintenance	Regular dusting / washing
Battery installation area	Well ventilated. Away from flame
Wiring and connections	Periodically check & maintain

**Recommended combination of Solar Panels**

Models	330 Panel Wattage		445 Panel Wattage	
	No. of Panels in Series	No. of Panels in Parallel	No. of Panels in Series	No. of Panels in Parallel
3.75KVA	3	3	3	2
5KVA	3	4	3	3

**BACK PANEL**



- 1) **BATT. MCB (Battery MCB)**
- 2) **MAINS MCB**
- 3) **O/P MCB (Output MCB)**
- 4) **SOLAR MCB**
- 5) **MANUAL BY PASS SWITCH\***
- 6) **BATT. (+VE)**  
Terminal block to connect battery positive wire
- 7) **LINE IN**  
Terminal block to connect Input Mains phase wire
- 8) **LINE OUT**  
Terminal block to connect Output phase wire
- 9) **LINE OUT FOR AC (TDR)\*\***  
Terminal block to connect air conditioner or heavy load.
- 10) **INPUT NEUTRAL**  
Terminal block to connect input mains neutral wire
- 11) **OUTPUT NEUTRAL**  
Terminal block to connect output neutral wire
- 12) **BATT. (-VE)**  
Terminal block to connect battery negative wire
- 13) **SOLAR (-VE)**  
Terminal block to connect solar negative wire
- 14) **SOLAR (+VE)**  
Terminal block to connect solar positive wire
- 15) **EARTHING**  
Terminal block for earth connection.
- 16) **CONNECT (Comm IOT Device)**  
This is for IOT device connection. (GSM / WiFi)

\*Default position of Manual By Pass Switch is at Position – 1 (Normal)

\*\* TDR available only in 5KVA.



**DISPLAY OVERVIEW**

The Solar Hybrid TX operation is fully automatic. There are few operator tasks to perform for manual operation. So, the operator should be familiar with the certain operations.

• **Front Panel:** The front panel cum display is designed to facilitate better interface of man and machine.

The Solar Hybrid TX has the following features to display and operation functions:

- 1) LCD display – 20\*4 LCD display for displaying system parameters and features.
- 2) Push Button – 4 push buttons / Tact switches are there for operations and navigating the screen pages.
- 3) LED Lights – LEDs are for indicating the system faults and system operations.

**Figure: Front Display Panel**



**Note:** Enter correct date and time before the operation starts, else controller will take default values.

**Viewing Status/Display:** The Solar Hybrid TX has 20 character and 4 line LCD display for displaying system information and operation. The display parameters navigate automatically.

1) Following parameters are displayed on the LCD screen with cycle of 5 seconds.

- Battery Voltage, Battery Charging current
- Panel Voltage, Panel Current, Panel Power
- Grid Voltage, Grid Current, Grid Frequency
- Output Voltage, Output Current
- Day Solar KWH, Solar KWH
- Time, Date
- TOC (Time of Charge), TOD (Time of Discharge)

**Note:** These parameters are displayed all the time irrespective of any fault arises.

2) Following parameters are displayed on the top row of LCD screen with cycle of 2 seconds.

- Load on Inverter / Load Off
- Switch On / Switch Off
- Grid Off / Grid Available
- Battery Charging On / Battery Charging Off
- Load On Grid
- Grid Feed Mode On / Grid Feed Mode Off
- Battery Type
- Priority
- Grid Under Volt Cut / Grid Over Volt Cut
- Solar On / Solar Off
- GFM Type

**Note:** These parameters disappear when any fault arises.

3) Following faults are displayed on the top row of LCD screen continuously when any fault arises.

- Solar Overload
- Low Battery / Low Battery Trip
- Overload Trip / Short Circuit Trip
- Wrong Wiring
- High Battery Voltage
- High Temperature
- Overload
- Mains Overload / Mains Overload Trip
- Array Over Voltage

**LED Indications:**

LEDs are for indicating the system operation and fault indication.

Listed below table is representing the status:

LED Indication	LED	Indicating Functions	Status
Grid	Green	Grid Available(Grid senses)	Permanent ON
Switch	Yellow	Grid is Selected	Permanent ON
PV	Green	Solar Available	Permanent ON
Inverter	Green	Inverter ON	Permanent ON
Inverter	Green	Grid Feeding	Blink
Battery	Green	Battery Discharging	Permanent ON
		Battery Charging	Blink
Fault	Red	Fault happened	Blink

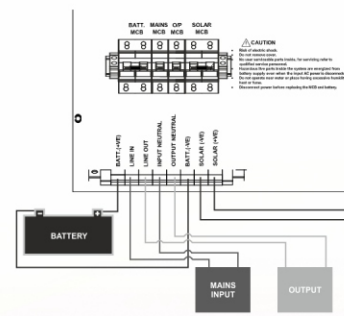
**INSTALLATION & OPERATION**

**INSTALLATION**

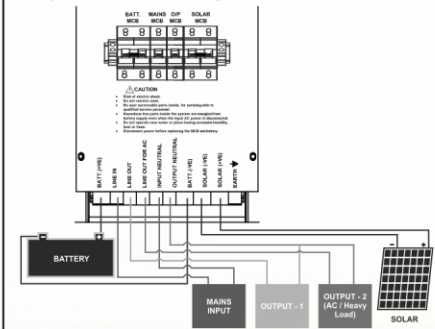
For the integrity of the installation, please review all the safety and precautions mentioned in this manual before installation process. Observe all the warnings and labels on the equipment. Do not try to install the system yourself. Only a trained LUMINOUS engineer is authorized to install the inverter. If the system is found tempered by any unauthorized person, the warranty would expire immediately.

**Connection diagram of Solar Hybrid TX.**

A) Connection diagram of 3.75KVA



B) Connection diagram of 5KVA



**1) Guidelines for Unpacking**

- Unpack the system and check for any physical damages during transit.
- Check manual inside the packing box
- In case of any damage or any problem, inform the concerned engineer.

**2) Place for Installation**

- Place unit on smooth surface in clean, dry and well-ventilated area

**3) Installation**

- Check all the MCBs are in OFF position.
- Now make battery, Mains, Output and PV connections to their respective terminal blocks. (Use proper wire grade / size for connections)
- Make ensure **solar input voltage range (Voc)** must be in range of 65 - 165Vdc.
- Check voltage and polarity at the terminal block. If correct, then proceed further.