Tracer-AN series

——MPPT Solar Charge Controller

User Manual

Models：

Tracer8415AN

Tracer10415AN

Important Safety Instructions

Please reserve this manual for future review. This manual contains all instructions of safety, installation and operation for Maximum Power Point Tracking (MPPT) controller in Tracer-AN series ("the controller" is referred in this manual).

General Safety Information

- Read carefully all the instructions and warnings in the manual before installation.
- No user serviceable component inside controller. DO NOT disassemble or attempt to repair the controller.
- Mount the controller indoors. Avoid direct sunlight, high temperatures and do not install in locations where water can enter the controller.
- Install the controller in well ventilated places, the controller’s heat sink may become very hot during operation.
- Suggested to install appropriate external fuses/breakers.
- Make sure switching off all connections with PV array and the fuse/breakers close to battery before controller installation and adjustment.
- Power connections must remain tight to avoid excessive heating from a loose connection.

Contents

1 General Information

1.1 Overview

Appreciate you for choosing our MPPT solar charge controller, Tracer-AN series. Based on multiphase synchronous rectification technology (MSRT) and common negative design, with dual-core processor architecture and advanced MPPT control algorithm, the products in this series have the features of high response speed, high reliability, high industrial standards, etc.

With MPPT control algorithm, in any situation, products of this series can fast and accurately track out the best maximum power point (MPP) of PV array, in order to obtain the maximum solar energy in time, MSRT can guarantee very high conversion efficiency in any charge power, which sharply improves the energy efficiency of solar system. With Modbus communication protocol interface, it is convenient for customers to expand applications and monitor in various fields like telecommunication base station, household system, wilderness monitoring system, etc.

All-round electronic fault self-test function and enhanced electronic protection function could furthest avoid damages on system components resulting from installation errors or system failures.

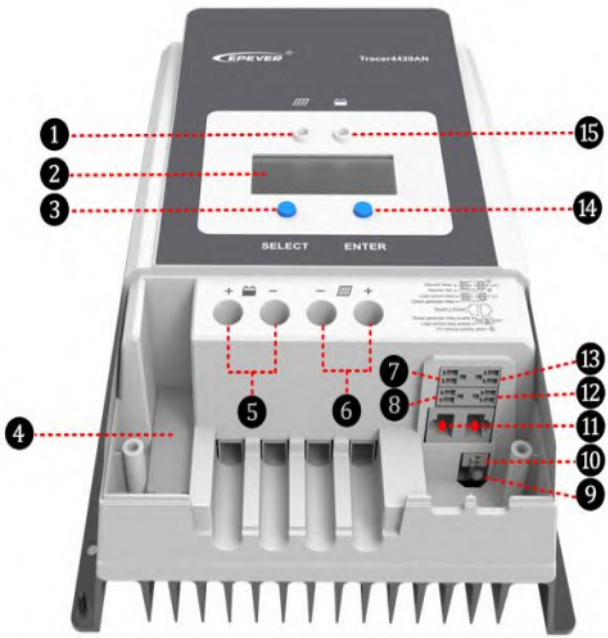
Features:

- Advanced Maximum Power Point Tracking (MPPT) technology, with efficiency no less than 99.5%.
- High quality components, perfecting system performance, with maximum conversion efficiency of 98.7% and full load efficiency of 98%.
- MSRT, realizing high conversion efficiency in the situation of low charge power.
- Ultra-fast tracking speed and guaranteed tracking efficiency.
- Accurately recognizing and tracking of multiple power points.
- Reliable automatic limit function of maximum PV input power, ensuring no overload.
- Wide MPP operating voltage range.
- High-speed and high-powered dual-core processor architecture, improving system response speed, optimizing system performance.
- Die-cast aluminum case for heat dissipating, ensuring excellent heat

dissipation characteristic.

- 12/24/36/48VDC automatically identifying system voltage or user-defined working voltage.
- Concise human-computer interactive interface, convenient multiple combination keys, dynamically displaying system operating data and working condition.
- Support 4 charging options: Sealed, Gel, Flooded and User.
- Battery temperature compensation function.
- Real-time energy statistics function.
- With RS-485 communication bus interface and Modbus communication protocol, it is available to meet various communication requirements in different situations.
- Available for PC monitoring and external display unit connecting like MT50 and so on, realizing real-time data checking and parameters setting.
- Support software upgrade.

1.2 Characteristics



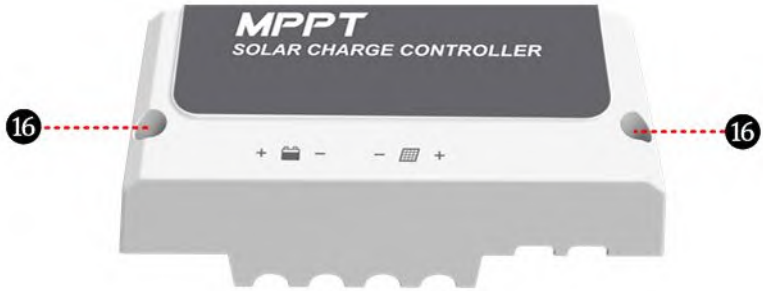


Figure 1-1 Tracer-AN Series Characteristics

Item	Name	Item	Name
1	Charging LED indicator	9	PV reverse polarity alarm indicator
2	LCD	10	Diesel generator relay enable Load control relay enable
3	SELECT button	11	RS485 port②
4	Fuse	12	Diesel generator relay
5	Battery Terminals	13	RBVS Port③
6	PV Terminals	14	ENTER button
7	RTS Port①	15	Fault LED indicator
8	Load control relay	16	Cover screw holes

①Connect for a RTS (Remote Temperature Sensor) to remotely detect battery temperature.

②Monitor controller by PC and update controller software via RS485

③ Connect for RBVS (Remote Battery Voltage Sensor) to detect accurate battery voltage.

1.3 Maximum Power Point Tracking Technology

Due to the nonlinear characteristics of solar array, there is a maximum energy output point (Max Power Point) on its curve. Traditional controllers, with switch charging technology and PWM charging technology, can't charge the battery at the maximum power point, so can't harvest the maximum energy available from PV array, but the solar charge controller with Maximum Power Point Tracking (MPPT) Technology can lock on the point to harvest the maximum energy and deliver it to the battery.

The MPPT algorithm of our company continuously compares and adjusts the operating points to attempt to locate the maximum power point of the array. The tracking process is fully automatic and does not need user adjustment.

As the Figure 1-2, the curve is the characteristic curve of the array, the MPPT technology will boost the battery charge current through tracking the MPP. Assuming 100% conversion efficiency of the solar system, in that way, the following formula is established:

Input power (P_{PV})= Output power (P_{Bat})

↓

Input voltage (V_{Mpp}) *input current (I_{PV}) =Battery voltage (V_{Bat}) *battery current (I_{Bat})

Normally, the V_{Mpp} is always higher than V_{Bat}, Due to the principle of conservation of energy, the I_{Bat} is always higher than I_{PV}. The greater the discrepancy between V_{Mpp} &$V_{Bat,}$, the greater the discrepancy between I_{PV}& I_{Bat}. The greater the discrepancy between array and battery, the bigger reduction of the conversion efficiency of the system, thus the controller's conversion efficiency is particularly important in the PV system.

Figure 1-2 is the maximum power point curve, the shaded area is charging range of traditional solar charge controller (PWM Charging Mode), it can obviously diagnose that the MPPT mode can improve the usage of the solar energy resource. According to our test, the MPPT controller can raise 20%-30% efficiency compared to the PWM controller. (Value may be fluctuant due to the influence of the ambient circumstance and energy loss.)

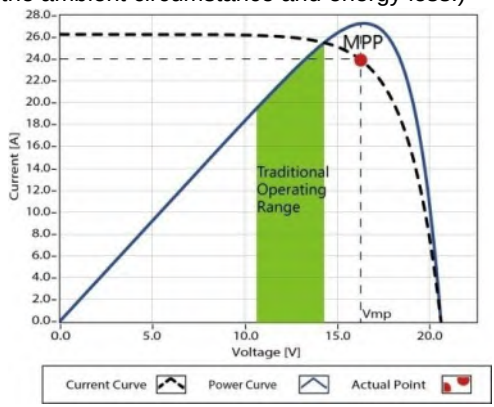


Figure 1-2 Maximum Power Point Curve

In actual application, as shading from cloud, tree and snow, the panel may

appear Multi-MPP, but in actually there is only one real Maximum Power Point. As the below Figure 1-3 shows:

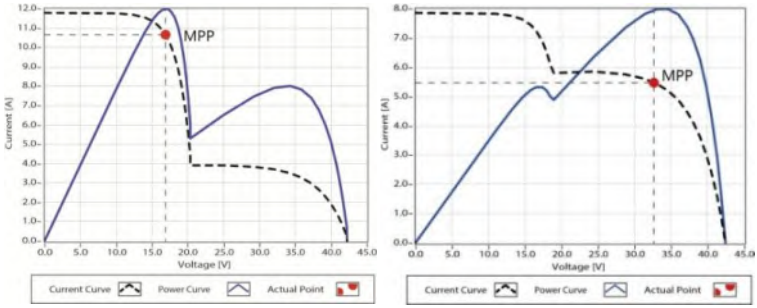


Figure 1-3 Mutil-MPP Curve

If the program works improperly after appearing Multi-MPP, the system will not work on the real max. power point, which may waste most solar energy resources and seriously affect the normal operation of the system. The typical MPPT algorithm, designed by our company, can track the real MPP quickly and accurately, improve the utilization rate of the array and avoid the waste of resources.

1.5 Battery Charging Stage

The controller has a 3 stages battery charging algorithm (Bulk Charging, Constant Charging and Float Charging) for rapid, efficient, and safe battery charging.

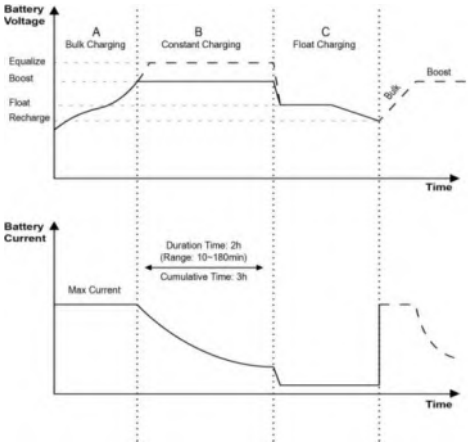


Figure 1-4 Battery changing stage

A) Bulk Charging

In this stage, the battery voltage has not yet reached constant voltage (Equalize or Boost Voltage), the controller operates in constant current mode, delivering its maximum current to the batteries (MPPT Charging).

B) Constant Charging

When the battery voltage reaches the constant voltage setpoint, the controller will start to operate in constant charging mode, this process is no longer MPPT charging, and in the meantime the charging current will drop gradually, the process is not the MPPT charging. The Constant Charging has 2 stages, equalize and boost. These two stages are not carried out constantly in a full charge process to avoid too much gas precipitation or overheating of battery.

- **Boost Charging**

The Boost stage maintain 2 hours in default, user can adjust the constant time and preset value of boost voltage according to demand.
The stage is used to prevent heating and excessive battery gassing.

- **Equalize Charging**

WARNING: Explosive Risk!
Equalizing flooded battery would produce explosive gases, so well ventilation of battery box is recommended.

CAUTION: Equipment damage!
Equalization may increase battery voltage high enough so as to damage sensitive DC loads. Verify that all load allowable input voltages are 11% greater than the equalizing charging set point voltage.

CAUTION: Equipment damage!
Over-charging and excessive gas precipitation may damage the battery plates and activate material shedding on them. Too high an equalizing charge or for too long may cause damage. Please carefully review the specific requirements of the battery used in the system.

Some types of batteries benefit from equalizing charge on a regular basis, which is able to stir electrolyte, balance battery voltage and accomplish chemical reaction. Equalizing charge increases battery voltage, higher than the standard complement voltage, which gasifies the battery electrolyte.
The controller will equalize the battery on the 28th each month. The constant equalization period is 0~180 minutes. If the equalization isn't accomplished in one-time, the equalization recharge time will be accumulated until the set time is finished. Equalize charge and boost charge are not carried out constantly in a full charge process to avoid too much gas precipitation or overheating of

battery.

NOTE: 1) Due to the influence of ambient circumstance or load working, the battery voltage can't be steady in constant voltage, controller will accumulate and calculate the time of constant voltage working. When the accumulated time reach to 3 hours, the charging mode will turn to Float Charging.
2) If the controller time is not adjusted, the controller will equalize charge battery once every month following the inner time.

C) Float Charging

After the Constant voltage stage, the controller will reduce charging current to Float Voltage set point. This stage will have no more chemical reactions and all the charge current transforms into heat and gas at this time. Then the controller reduces the voltage to the floating stage, charging with a smaller voltage and current. It will reduce the temperature of the battery and prevent the gassing and charging the battery slightly at the same time. The purpose of Float stage is to offset the power consumption caused by self consumption and small loads in the whole system, while maintaining full battery storage capacity.

In Float charging stage, loads are able to obtain almost all power from solar panel. If loads exceed the power, the controller will no longer be able to maintain battery voltage in Float charging stage. If the battery voltage remains below the Recharge Voltage, the system will leave Float charging stage and return to Bulk charging stage.

2 Installation

2.1 General Installation Notes

- Before installation, please read through the entire installation instructions to get familiar with the installation steps.
- Be very careful when installing the batteries, especially flooded lead-acid battery. Please wear eye protection, and have fresh water available to wash and clean any contact with battery acid.
- Keep the battery away from any metal objects, which may cause short circuit of the battery.
- Explosive battery gases may come out from the battery during charging, so make sure ventilation condition is good.
- Gel, Sealed or Flooded batteries are recommended, other kinds please refer to the battery manufacturer.
- Ventilation is highly recommended if mounted in an enclosure. Never install the controller in a sealed enclosure with flooded batteries! Battery fumes from vented batteries will corrode and destroy the controller circuits.
- Loose power connections and corroded wires may result in high heat that can melt wire insulation, burn surrounding materials, or even cause fire. Ensure tight connections and use cable clamps to secure cables and prevent them from swaying in mobile applications.
- Battery connection may be wired to one battery or a bank of batteries. The following instructions refer to a singular battery, but it is implied that the battery connection can be made to either one battery or a group of batteries in a battery bank.
- Multiple same models of controllers can be installed in parallel on the same battery bank to achieve higher charging current. Each controller must have its own solar module(s).
- Select the system cables according to 5A/mm^2 or less current density in accordance with Article 690 of the National Electrical Code, NFPA 70.

2.2 PV Array Requirements

(1)Serial connection (string) of PV modules

As the core component of PV system, Controller could be suitable for various types of PV modules and maximize converting solar energy into electrical energy. According to the open circuit voltage (V_{oc}) and the maximum power

point voltage (V_{mpp}) of the MPPT controller, the series number of different types PV modules can be calculated. The below table is for reference only.

Tracer8415AN：

System voltage	36cell Voc＜23V		48cell Voc＜31V		54cell Voc＜34V		60cell Voc＜38V	
	MAX.	Best	MAX.	Best	MAX.	Best	MAX.	Best
12V	4	2	2	1	2	1	2	1
24V	6	3	4	2	4	2	3	2
48V	6	5	4	3	4	3	3	3

System voltage	72cell Voc＜46V		96cell Voc＜62V		Thin-Film Module Voc＞80V
	MAX.	Best	MAX.	Best	
12V	2	1	1	1	1
24V	3	2	2	1	1
48V	3	2	2	2	1

NOTE: The above parameter values are calculated under standard test conditions (STC (Standard Test Condition)：Irradiance 1000W/m^2，Module Temperature 25℃，Air Mass1.5.)

(2) PV array maximum power

This MPPT controller has a limiting function of charging current, the charging current will be limited within rated range, therefore, the controller will charge the battery with the rated charging power even if the input power at the PV exceeds.

The actual operation power of the PV array conforms to the conditions below:

1） PV array actual power ≤ controller rated charge power, the controller charge battery at actual maximum power point.

2） PV array actual power > controller rated charge power, the controller charge battery at rated power.

If the PV array higher than rated power, the charging time at rated power to battery will be longer, more energy to battery yields.

WARNING: Controller will be damaged when the PV array straight polarity and the actual operation power of the PV array is three times greater than the rated charge power!

WARNING: Controller will be damaged when the PV array reverse polarity and the actual operation power of the PV array is 1.5 times greater than the rated charge power!

When the PV array straight polarity, the actual operation of the PV array must NOT exceed three times of rated charge power； When the PV array reverse polarity, the actual operation must NOT exceed 1.5 times. For real application please refer to the table below:

Model	Rated Charge Current	Rated Charge Power	Max. PV Array Power	Max. PV open circuit voltage
Tracer8415AN	80A	1050W/12V 2100W/24V 3150W/36V 4200W/48V	3150W/12V 6300W/24V 9450W/36V 12600W/48V	150V① 138V②
Tracer10415AN	100A	1325W/12V 2650W/24V 4000W/36V 5300W/48V	3975W/12V 7950W/24V 12000W/36V 15900W/48V	

①At minimum operating environment temperature
②At 25℃ environment temperature

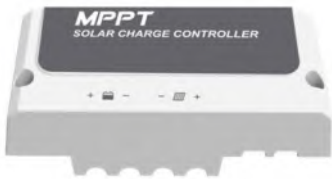
2.3 Mounting

CAUTION: When mounting the controller, ensure at least 150mm of clearance above and below the controller for proper air flow. If mounted in an enclosure, ensure good ventilation condition of the box.

WARNING: Risk of explosion!
Never install the controller with flooded batteries in a sealed enclosure! Do not install the battery in a confined area where battery gas can accumulate.

2.4 Wiring

※Please remove the terminal protective cover before wiring.



CAUTION: The following connection order is recommended for optimal safety.

CAUTION: Do not entangle all wiring together. Communication cable and power wires should be as far as possible to avoid interfering communication signal transmission.

CAUTION: The controller is a negative ground controller. Any negative connection of solar or battery can be earth grounded as required.

CAUTION: For mobile applications, be very certain that all wirings are connected securely. Use cable clamps to prevent cables from swaying when the vehicle is in motion. Unsecured cables create loose and resistive connections which may lead to excessive heating and/or fire.

① Remote Temperature Sensor Connection

CAUTION: The controller will perform temperature compensation for charging parameters according to the device temperature.

CAUTION: Equipment Damage! Never place the temperature sensor inside a battery. Both the RTS and the battery will be damaged.

The included remote temperature sensor is recommended for effective temperature compensated charging. Connect the RTS to the7th port on the controller (Check Figure 1-1). The cable standard length is 3 meters and could be customized. There is no polarity, so either wire (+ or -) can be connected to either screw terminal. No damage will result if connect the RTSto the remote battery voltage sense port, but the connection will not be recognized.

② Remote Battery Voltage Sensor Connection

CAUTION: When connecting Remote Battery Voltage Sensor, please pay attention to '+' and '-' (Check Figure 1-1).

CAUTION: Be careful when installation. Please never plug the voltage sensor wires into to the RTS terminals (7th Port). This will cause an alarm or damage the controller.

The voltage at the battery terminals on the controller may differ slightly from the real battery voltage due to connection and cable resistance. The remote battery voltage sensor will enable the controller to detect the battery voltage more exactly and avoid voltage deviation. The battery voltage sensor connection is not required to operate the controller, but it is recommended for the best performance.

The voltage sensor wires should be cut into the required length. The wire size can range from 0.25 to 1.0 mm^2 (24 to 16 AWG). Maximum length is 3m. Connect the remote battery voltage sensor wires to the 13th port on the controller (Check Figure 1-1). A twin-cord cable is recommended but not required.

Please be careful to spot the '+' and '-' when connecting. No damage will result if the polarity is reversed, but the controller can't read a reversed sensor voltage. Plugging the voltage sensor wires into to the RTS terminals (7th Port) will cause an alarm or damage the controller.

③ Power Wires Connection

- **PV Wire Size**

Since PV array output can vary due to the PV module size, connection method or sunlight angle, the minimum wire size can be calculated by the I_{SC} of PV array. Please refer to the value of I_{SC} in PV module specification. When the PV modules connect in series, the I_{SC} is equal to the PV module's I_{SC}. When the PV modules connect in parallel, the I_{SC} is equal to the sum of PV module's I_{SC}. The I_{SC} of PV array must not exceed the maximum PV input current, please refer to the table as below:

Model	Max. PV input current	Max. PV wire size
Tracer8415AN	80A	25mm^2/4AWG
Tracer10415AN	100A	35mm^2/2AWG

NOTE: When the PV modules connect in series, the open circuit voltage of the PV array must not exceed 138V under the 25℃ condition.

- **Battery Wire Size**

The battery wire size must conform to the rated current, the reference size as below:

Model	Rated charge current	Battery wire size
Tracer8415AN	80A	25mm^2/4AWG
Tracer10415AN	100A	35mm^2/2AWG

NOTE: The wire size is only for reference. If there is a long distance between the PV array and the controller or between the controller and the battery, larger wires can be used to reduce the voltage drop and improve performance.

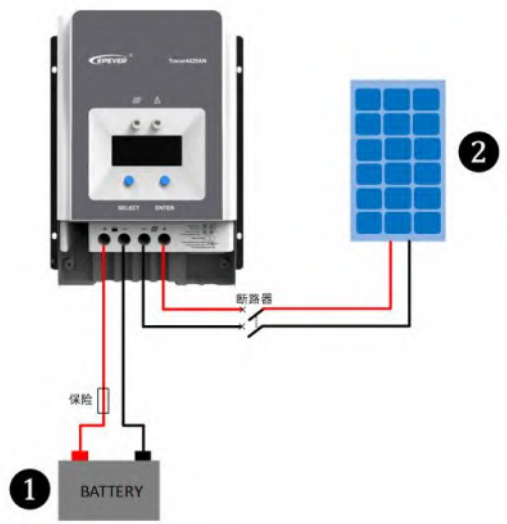


Figure 2-1 Stand-alone Wiring Diagram

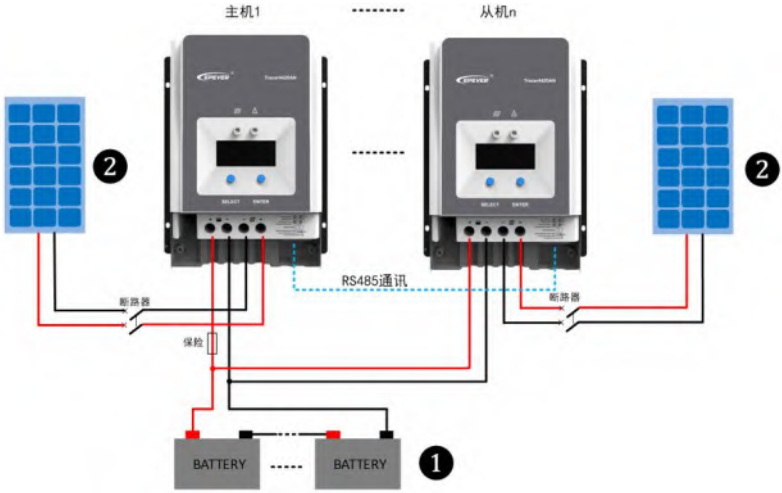


Figure 2-2 Multi-machine Wiring Diagram

- **Battery Connection**

Connecting a fuse in series through battery positive (+) in the circuit and the battery circuit fuse must be 1.25 to 2 times to the rated current. Keep OFF before connection. Connect battery positive (+) and negative (-) to battery terminals on the controller in the figure 1-1. Please pay much attention to '+' and '-'.

- **Solar Module(s) Connection**

Connecting a breaker in series in the solar circuit is recommended, and the breaker must be 1.25 to 2 times of the rated current. Keep OFF before connection. Connect solar positive (+) and negative (-) to solar terminals on the controller in the figure 1-1. Please pay much attention to '+' and '-'. Solar array short circuit protection and the reversed polarity connection will trigger automatically.

WARNING: Risk of electric shock!
Use fuses or breakers in solar and battery circuits is recommended, and make them keep OFF state before connection.

WARNING: Risk of electric shock!
Exercise caution when handling solar wiring. The solar PV array can produce open-circuit voltages in excess of 150 V when in sunlight. Pay more attention to it.

WARNING: Risk of explosion or fire!

Never short circuit battery positive (+) and negative (-) or cables. Pay more attention to it

2.5 Power Up

CAUTION: The controller is only powered by battery, so it will not work when connected only to solar input.

- Before switching on, recheck the step of ①～④and make sure all wirings correct, especially ④connected with battery and PV array.
- Turn on the battery Fuse firstly. Observe if battery indicator light and startup interface work fine or not (Refer to section 4). Always connect the battery firstly, in order to allow the controller to recognize the system voltage.
- After battery works fine with power on, switch on the breaker of PV array. With enough sunlight, the charging LED will blink and the controller will begin charging.
- If the battery LED error exists or LCD interface alarms, refer to section 5 for troubleshooting. When disconnecting the system, the order will be reserved.

3 Operation

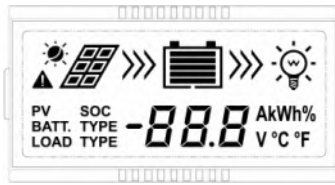
3.1 Indicator

Indicator	Color	Status	Instruction
Charging LED indicator	Green	On Solid	PV connection normal but low voltage(irradiance) from PV, no charging
	Green	OFF	No PV voltage(night time) or PV connection problem
	Green	Slowly Flashing	In charging
	Green	Fast Flashing	PV Over voltage
Fault LED indicator	Red	OFF	Normal
	Red	Flashing	Over discharged Battery Overheating
All indicator is fast flashing			System voltage error
All indicator is slowly flashing			Controller Overheating

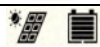
3.2 Button Function

Button	Function
SELECT button	• Browse interface • Setting parameter
ENTER button	• Load ON/OFF • Clear error • Enter into Set Mode • Save data

3.3 LCD Display



➢ Status Description

Item	Icon	Status
PV array		Day
		Night
		No charging
		Charging

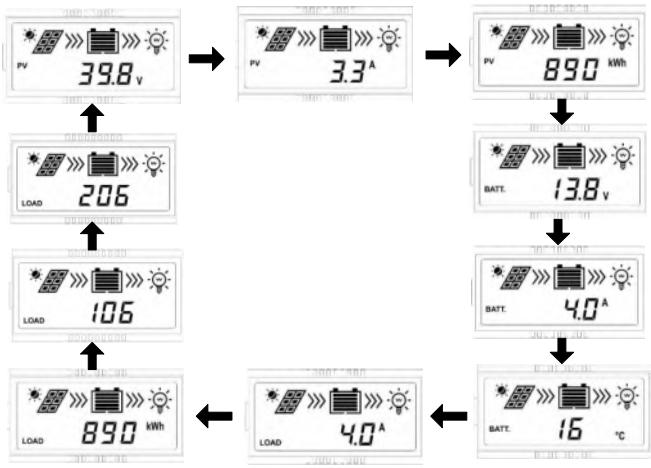
	PV	PV Voltage, Current, Power
Battery		Battery capacity, In Charging
	BATT.	Battery Voltage, Current, Temperature
	BATT. TYPE	Battery Type

➢ Fault Indication

Status	Icon	Description
Battery over discharged	⚠	Battery level shows empty, battery frame blink, fault icon blink
Battery over voltage	⚠	Battery level shows full, battery frame blink, fault icon blink
Battery over temperature	⚠	Battery level shows current value, battery frame blink, fault icon blink

① When load current reaches1.02-1.05 times 1.05-1.25 times, 1.25-1.35 times and 1.35-1.5 times more than nominal value, controller will automatically turn off loads in 50s, 30s,10s and 2s respectively.

➢ Browse interface



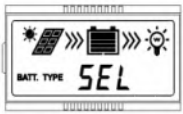
NOTE: When no operation, the interface will be automatic cycle, but the follow two interfaces not be display.

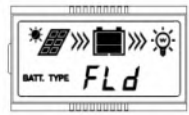
3.4 Battery Type

➢ Operating Steps

Under Battery Voltage interface, long press ENTER button enter into the interface of Battery type setting. After choosing the battery type by pressing SELECT button, waiting for 5 seconds or pressing ENTER button again to modify successfully.

➢ Battery Type





①Sealed (Default) ②Gel ③Flooded

④ User(Apply to “MT50” and “PC software “Solar Station Monitor”）

Battery Voltage Parameters (parameters is in 12V system at 25℃, please use double value in 24V.)

Battery charging setting	Sealed	Gel	Flooded	User
Over Voltage Disconnect Voltage	16.0V	16.0V	16.0V	9~17V
Charging Limit Voltage	15.0V	15.0V	15.0V	9~17V
Over Voltage Reconnect Voltage	15.0V	15.0V	15.0V	9~17V
Equalize Charging Voltage	14.6V	——	14.8V	9~17V
Boost Charging Voltage	14.4V	14.2V	14.6V	9~17V
Float Charging Voltage	13.8V	13.8V	13.8V	9~17V
Boost Reconnect Charging Voltage	13.2V	13.2V	13.2V	9~17V
Low Voltage Reconnect Voltage	12.6V	12.6V	12.6V	9~17V
Under Voltage Warning Reconnect Voltage	12.2V	12.2V	12.2V	9~17V
Under Volt. Warning Volt.	12.0V	12.0V	12.0V	9~17V
Low Volt. Disconnect Volt.	11.1V	11.1V	11.1V	9~17V
Discharging Limit Voltage	10.6V	10.6V	10.6V	9~17V
Equalize Duration (min.)	120	——	120	0~180
Boost Duration (min.)	120	120	120	10~180

NOTE:

1) When the battery type is sealed, gel, flooded, the adjusting range of equalize duration is 0 to180min and boost duration is 10 to180min.

2) The following rules must be observed when modifying the parameters value in user battery type (factory default value is the same as sealed type):

a. Over Voltage Disconnect Voltage > Charging Limit Voltage ≥ Equalize Charging Voltage ≥ Boost Charging Voltage ≥ Float Charging Voltage > Boost Reconnect Charging Voltage.

b. Over Voltage Disconnect Voltage > Over Voltage Reconnect Voltage

c. Low Voltage Reconnect Voltage > Low Voltage Disconnect Voltage ≥ Discharging Limit Voltage.

d. Under Voltage Warning Reconnect Voltage > Under Voltage Warning Voltage ≥

Discharging Limit Voltage.

e. Boost Reconnect Charging voltage > Low Voltage Disconnect Voltage.

CAUTION: Please refer to user guide or contact with the sales for the detail of setting operation.

4 Protections, Troubleshooting & Maintenance

4.1 Protections

• PV Over Current

The controller will limit charge power in rated charge power. An over-sized PV array will not operate at maximum power point.

• PV Short Circuit

When PV short circuit occurs, the controller will stop charging. Clear it to resume normal operation.

• PV Reverse Polarity

Fully protection against PV reverse polarity, no damage to the controller will result. Correct the miswire to resume normal operation.

WARNING: Controller will be damaged when the PV array reverse polarity and the actual operation power of the PV array is 1.5 times greater than the rated charge power!

• Battery Reverse Polarity

Fully protection against battery reverse polarity, no damage to the controller will result. Correct the miswire to resume normal operation.

• Battery Over voltage

When battery voltage reaches to the voltage set point of Over Voltage Disconnect Voltage, the controller will stop charging the battery to protect the battery overcharge to break down.

• Battery Over discharge

When battery voltage reaches to the voltage set point of Low Voltage Disconnect Voltage, the controller will stop discharging the battery to protect the battery over discharged to break down.

• Battery Overheating

The controller detects the battery temperature through the external temperature sensor. If the battery temperature exceeds 65ºC, the controller will automatically start the overheating protection to stop working and recover below 50 ºC.

• Damaged Remote Temperature Sensor

If the temperature sensor is short-circuited or damaged, the controller will be charging or discharging at the default temperature 25℃ to prevent the battery

damaged from overcharging or over discharged.

• Controller Overheating

If the temperature of the controller heat sinks exceeds 85℃, the controller will automatically start the overheating protection and recover below 75℃.

• High Voltage Transients

PV is protected against small high voltage surge. In lightning prone areas, additional external suppression is recommended.

CAUTION: Faults will be cleared every day, so the faults which aren't caused by hardware can be solved intelligently.

4.2 Troubleshooting

Faults	Possible reasons	Troubleshooting
The LED&LCD is off during daytime when sunshine falls on PV modules properly	PV array disconnection	Confirm that PV and battery wire connections are correct and tight
Wire connection is correct, LCD not display	Battery voltage is lower than 9V	Please check the voltage of battery. At least 9V voltage to activate the controller
Fault LED indicator flashing  Interface blink	Battery voltage higher than over voltage disconnect voltage(OVD)	Check if the battery voltage is too high, and disconnect the solar module
Fault LED indicator flashing  Interface blink	Battery under voltage	Load output is normal, charging LED indicator will return to green automatically when fully charged
Charging and fault LED indicator flashing  Interface blink	Battery over temperature	The controller will cut off the output automatically, LED indicator will return to green automatically when fully charged

4.3 Maintenance

The following inspections and maintenance tasks are recommended at least two times per year for best controller performance.

- Make sure controller firmly installed in a clean and dry ambient.
- Make sure no block on air-flow around the controller. Clear up any dirt and fragments on radiator.

- Check all the naked wires to make sure insulation is not damaged for serious solarization, frictional wear, dryness, insects or rats etc. Repair or replace some wires if necessary.
- Tighten all the terminals. Inspect for loose, broken, or burnt wire connections.
- Check and confirm that LED or LCD is consistent with required. Pay attention to any troubleshooting or error indication .Take necessary corrective action.
- Confirm that all the system components are ground connected tightly and correctly.
- Confirm that all the terminals have no corrosion, insulation damaged, high temperature or burnt/discolored sign, tighten terminal screws to the suggested torque.
- Check for dirt, nesting insects and corrosion. If so, clear up in time.
- Check and confirm that lightning arrester is in good condition. Replace a new one in time to avoid damaging of the controller and even other equipments.

WARNING：Risk of electric shock!
Make sure that all the power is turned off before above operations, and then follow the corresponding inspections and operations.

5 Specifications

Electrical Parameters

Item	Tracer8415AN	Tracer10415AN
Nominal System Voltage	12/24/36/48VDC Auto	
Battery Input Voltage Range	8V～68V	
Rated charge current	80A	100A
Max. PV open circuit voltage	150V (At minimum operating environment temperature) 138V (At 25℃ environment temperature)	
MPP Voltage Range	(Battery voltage+2V)～108V①	
Maximum Input Power	1050W/12V; 2100W/24V; 3150W/36V; 4200W/48V	1325W/12V; 2650W/24V; 4000W/36V; 5300W/48V
Self Consumption	1.4W～2.6W	
Grounding	Common Negative	

① Max. PV open circuit voltage must never exceed 138V under 25℃ conditions.

Environmental Parameters

Environmental	Tracer8415AN	Tracer10415AN
LCD temperature range	-20℃ ~ +70℃	
Ambient temperature range*	-25℃ ~ +55℃	
Storage temperature range	-30℃ ~ +85℃	
Humidity range	≤95%, N.C.	
Enclosure	IP20	
Altitude	< 5000 m (Derate to operate according to IEC60146 at a height exceeding 1000 m)	

*** Please operate controller at permitted ambient temperature. If over permissible range, please derate capacity in service.**

Mechanical Parameters

Mechanical	Tracer8415AN	Tracer10415AN
L x W x H	394 x 240 x 134mm	394 x242 x143mm
Mounting Hole	Φ8	
Terminal	2AWG(35mm^2)	
Net Weight	6.8kg	7.5kg

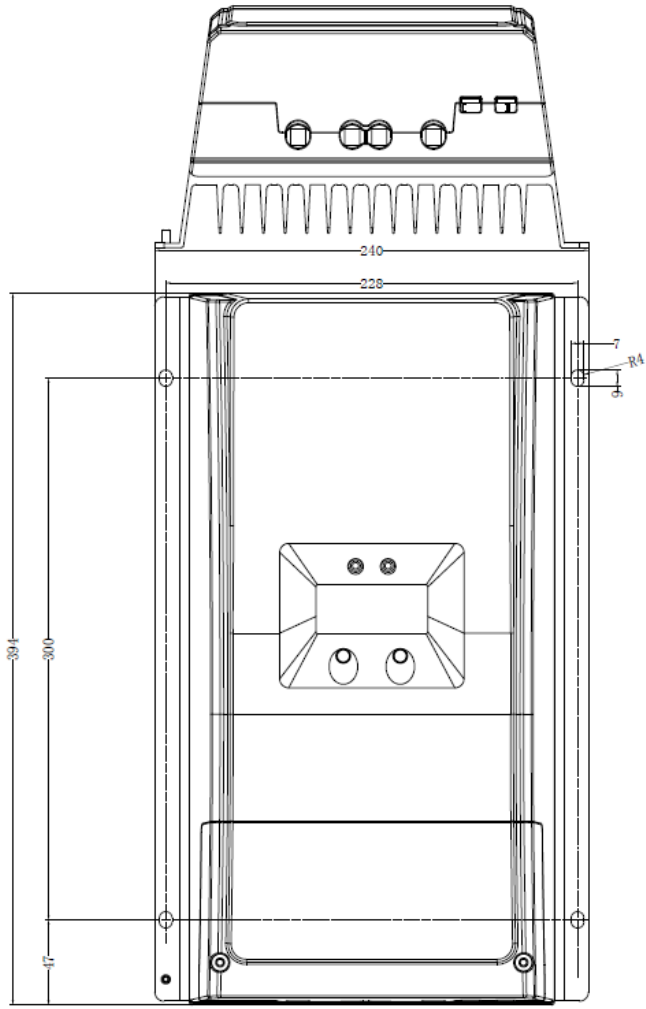
6 Disclaimer

This warranty does not apply under the following conditions:

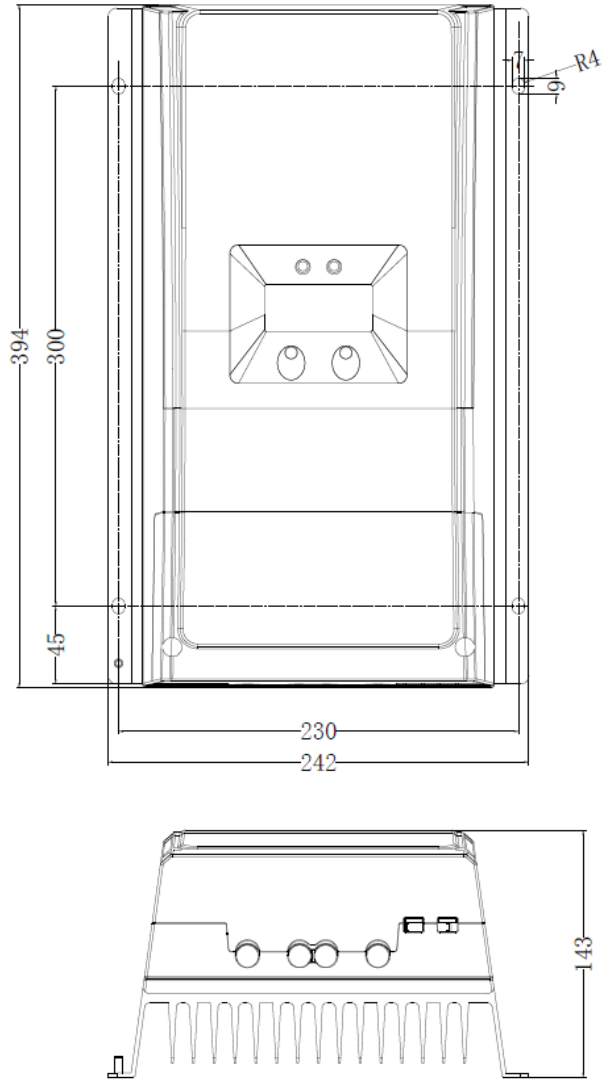
- Damage from improper use or use in an unsuitable environment.
- PV or load current, voltage or power exceeding the rated value of controller.
- The controller is working temperature exceed the limit working environment temperature.
- User disassembly or attempted repair the controller without permission.
- The controller is damaged due to natural elements such as lighting.
- The controller is damaged during transportation and shipment.

Annex I Dimensions

Tracer8415AN Dimensions（Unit：mm）



Tracer10415AN Dimensions（Unit：mm）



Any changes without prior notice! **Version number：V1.0**

BEIJING EPSOLAR TECHNOLOGY CO., LTD.

Tel: +86-10-82894112 / 82894962

Fax: +86-10-82894882

E-mail：info@epsolarpv.com

Website: http://www.epsolarpv.com/

http://www.epever.com/