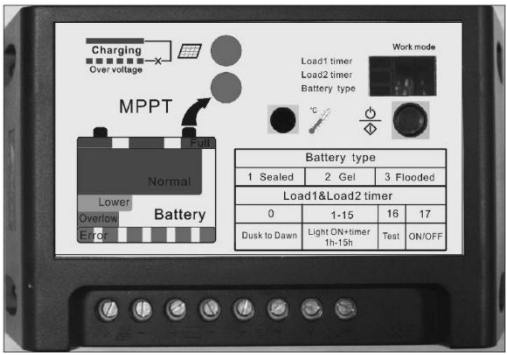
TRACER 1206/1210/1215

——Maximum Power Point Tracking Controller

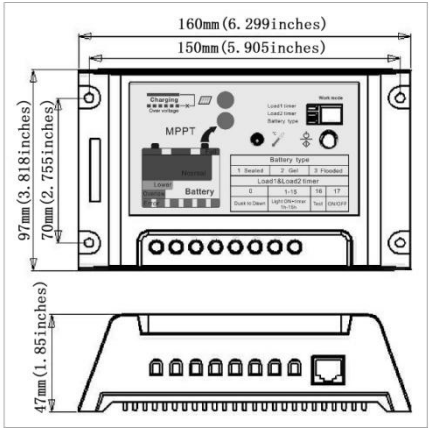
Installation and Operation Manual



Thanks very much for selecting our products！

This manual offers important information and suggestions with respect to installation, operating, and troubleshooting, etc. Please read this manual carefully before using the product and pay attention to the safety information.

TRACER Dimensions



Specification Summary

System Voltage	12V DC / 24V DC*[1]
Rated Battery Current	10A
Rated load current	10A
Max. Input Voltage*[2]	
TRACER 1206	60V DC
TRACER 1210	100V DC
TRACER 1215	150V DC
Max. PV Input Power	
12V System	120W
24V System	240W

***[1] The controller will recognize the system when powered up. If the battery voltage is lower than 18V, it will recognize the system as 12V. If the battery voltage is greater than 18V, it will recognize the system as 24V.**

***[2] The voltage of solar input should never exceed the max. input voltage to avoid the damage of the controller.**

Contents

1 Important Safety Information

Save These Instructions

This manual contains important safety, installation and operating instructions for TRACER.
The following symbols are used throughout this manual to indicate potentially dangerous conditions or mark important safety instructions，please take care when meeting these symbols.

WARNING: Indicates a potentially dangerous condition.

Use extreme caution when performing this task.

CAUTION: Indicates a critical procedure for safe and proper operation of the controller

NOTE: Indicates a procedure or function that is important for the safe and proper operation of the controller.

General Safety Information

·Read all of the instructions and cautions in the manual before beginning installation.
There are no user serviceable parts inside the TRACER. Do not disassemble or attempt to repair the controller.
Disconnect the solar module and fuse/breakers near to battery before installing or adjusting the TRACER.
Install external fuses/breakers as required.
Do not allow water to enter the controller.
Confirm that power connections are tightened to avoid excessive heating from loose connection.

2 General Information

2.1 Overview

Thank you for selecting the TRACER controller which represents advanced technology of our company. The features are listed below:

12/24V auto recognition, 10A rated charging current.
Advanced maximum power point tracking technology to optimize using the solar system.
Widely used，automatic recognize day/night.
Timer function with 1-15 hours option for street light
Two load outputs. Each load can be individually controlled, and enhance the flexibility of the system.
Sealed, Gel and Flooded battery option.
Adopting temperature compensation and correcting the charging and discharging parameters automatically, improving the battery lifetime.
Electronic protection: Over charging, over discharging, overload, short circuit, and reverse polarity of both solar module(s) and battery.
RJ45 interface with remote meter MT-2, convenient to check operating parameters of controllers.

The TRACER series controller is for off-grid solar system and control the charging and discharging of the battery. The controller features a smart tracking algorithm inside that maximizes the energy from the solar PV module(s) and charge the battery. At the same time, the low voltage disconnect function (LVD) will prevent the battery damage from battery over discharging.

The TRACER controller charging process has been optimized for long battery life and improved system performance. The comprehensive self-diagnostics and electronic protection functions can prevent damage from installation mistakes or system faults. In addition, the TRACER controller has a RJ45 interface to allow communication with a meter for remote monitoring

Although the TRACER controller is very simple to configure and use, please take your time to read the operator's manual and become familiar with the controller. This will help you make full use of all the functions and improve your solar PV system.

The features of TRACER controller are shown in Figure 2-1

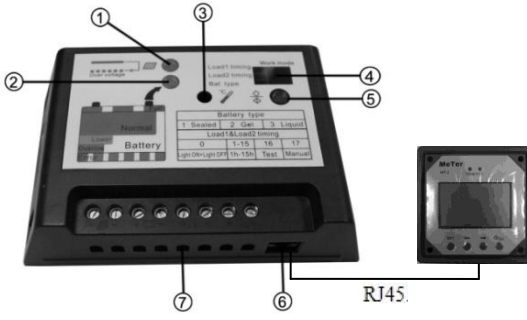


Figure 2-1 TRACER features.

1 – Charging status LED

An LED indicator that shows charging status and also indicates when a solar input fault condition exists

2 – Battery status and load fault LED

An LED indicator that shows battery status or load fault condition exists

3 –Temperature sensor

Measures ambient temperature

4 –Setting & Work mode indicators

Controller setting and work mode indicators

5 –Setting switch/ON/OFF switch

Setting two loads work mode and battery type

6 – RJ45 communication port

Communicate with remote meter MT-2

7 –Terminal block

Terminals for system: Solar, Battery, Load1, Load2 connections

2.2 Optional Accessories

Remote Meter(Model：MT-2)

The digital Remote Meter displays system operating information, error indications, and self-diagnostics read-out. Information is displayed on a backlit LCD display. The large numerical display and icons are easy to read and large buttons make navigating the meter menus easy. The meter can be flush mounted in a wall or surface mounted using the mounting frame (included). The MT-2 is supplied with 1.5m of cable and a mounting frame. The MT-2 connects to the RJ45 port on the TRACER.

3 Installation Instructions

3.1 General Installation Notes

Read through the entire installation section first before beginning installation.

·Be very careful when working with batteries. Wear eye protection. Have fresh water available to wash and clean any contact with battery acid.

·Use insulated tools and avoid placing metal objects near the batteries.

· Explosive battery gasses may be present during charging. Be certain there is sufficient ventilation to release the gasses.

·Do not install in locations where water can enter the controller.

·Loose power connections and/or corroded wires may result in resistive connections that 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.

·Only charge sealed, gel or flooded batteries.

·TRACER 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.

3.2 Mounting

NOTE: When mounting the TRACER, ensure free air through the controller heat sink fins. There should be at least 6 inches (150 mm) of clearance above and below the controller to allow for cooling. If mounted in an enclosure, ventilation is highly recommended.

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

Step 1: Choose Mounting Location

Locate the TRACER on a vertical surface protected from direct sun, high temperature, and water.

Step 2: Check for clearance

Place the TRACER in the location where it will be mounted. Verify that there is sufficient room to run wires and that there is sufficient room above and below the controller for air flow.

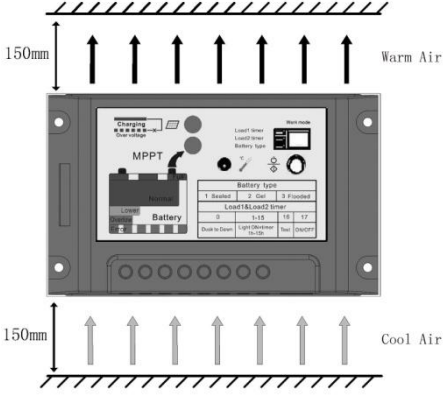


Figure 3-1 Mounting and cooling

Step 3: Mark Holes

Use a pencil or pen to mark the four (4) mounting hole locations on the mounting surface.

Step 4: Drill Holes

Remove the controller and drill 4mm holes in the marked locations.

Step 5: Secure Controller

Place the controller on the surface and align the mounting holes with the drilled holes in step 4. Secure the controller in place using the mounting screws.

3.3 Wiring

NOTE: A recommended connection order has been provided for maximum safety during installation.

NOTE: The TRACER is a negative ground controller. Any combination of negative connections can be earth grounded as required. Grounding is recommended.

CAUTION: Don't connect DC-to-AC inverter to the TRACER directly because the peak current of the inverter may exceed rated current of the controller when the load turns on and will initiate short circuit protection.

CAUTION: The total current draw of all system loads connected to the TRACER LOAD terminals cannot exceed the 10A load current rating. All the loads surging current cannot exceed the 35A load current rating.

CAUTION: For mobile applications, be sure to secure all wiring. 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.

Step 1: Load Wiring

The TRACER load output can connect lights, pumps, motors, and other electronic devices connection etc., TRACER will provide battery voltage to the loads. See Section 4.4 Setting Operation for more details about the load control.

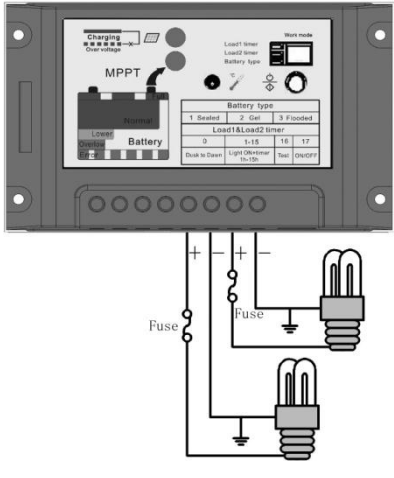


Figure 3-2 Load wiring

Connect load positive (+) and negative (-) to the TRACER load output as shown in figure 3-2.

An in-line fuse holder should be wired in series in the load positive (+) or negative (-) wire as shown. **DO NOT INSERT A FUSE AT THIS TIME.**

If wiring the load connection to a load distribution panel, each load circuit should be fused separately. The total load draw should not exceed the 10A load rating.

Step 2: Battery Wiring

WARNING: Risk of explosion or fire! Never short circuit battery positive (+) and negative (-) or cables

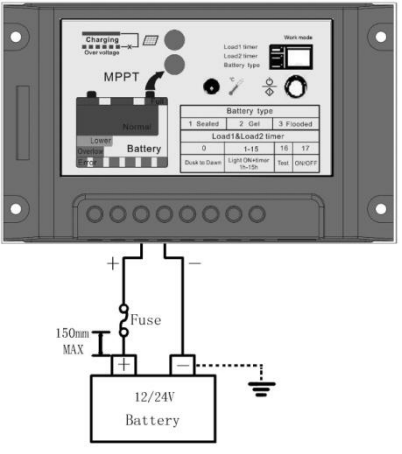


Figure 3-3 Battery wiring

Before connecting the battery, measure the battery voltage. It must be over 9 V to power the controller. For 24V, the voltage must be greater than 18V to properly detect a 24V battery. The 12/24V battery detection is automatic and the check is only performed at start-up.

Wire an in-line fuse holder no more than 150mm from the battery positive terminal. **DO NOT INSERT FUSE AT THIS TIME.**

Step 3：Solar Wiring

WARNING: Risk of electric shock! Exercise caution when handling solar wiring. The solar module(s) high voltage output can cause severe shock or injury. Cover the solar module(s) from the sun before installing solar wiring.

The TRACER CAN ACCEPT 12V, 24V nominal off-grid solar module arrays. Grid –tie solar module(s) may be used if the open circuit voltage does not exceed the maximum solar input rating. The solar module(s) nominal voltage must be equal to or greater than the nominal battery voltage.

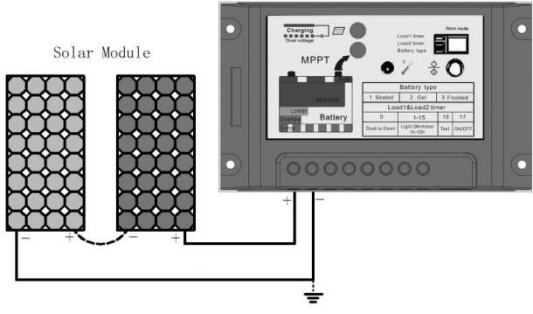


Figure3-4 Solar input wiring

Step 4: Accessories (option)

Install Remote Meter (purchased separately) if required. Refer to the instructions provided for detailed installation procedures.

Step 5: Confirm Wiring

Double-check the wiring in step1 through 4. Confirm correct polarity at each connection. Verify that all eight power terminals are tightened.

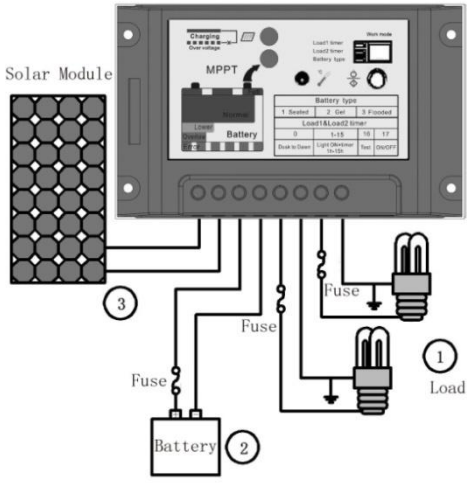


Figure3-5 System Wiring Review

Step 6: Install Fuses

Install a more than15 Amp DC-rated fuse in each fuse holder in the following order:

1. Load circuit
2. Battery circuit

Step 7: Confirm Power-up

When battery power is applied and the TRACER powers up, the battery led indicator will be green.

If the TRACER does not power up or battery status LEDs error exists, refer to Section 5 Troubleshooting

4 Operation

4.1 MPPT Technology

The TRACER utilizes Maximum Power Point Tracking technology to extract maximum power from the solar module (s). The tracking algorithm is fully automatic and does not require user adjustment, TRACER technology will track the array *maximum power point voltage* (Vmp) as it varies with weather conditions, ensuring that maximum power is harvested from the array through the course of the day.

·Current Boost

In many cases, TRACER MPPT technology will "boost" the solar charge current. For example, a system may have 8 Amps of solar current flowing into the TRACER and 10 Amps of charge current flowing out to the battery. The TRACER does not create current! Rest assured that the power into the TRACER is the same as the power out of the TRACER. Since power is the product of voltage and current (Volts×Amps), the following is true*****:

(1) Power Into the TRACER=Power Out of the TRACER

(2) Volts In×Amps In=Volts Out×Amps Out

***** Assuming 100% efficiency. Actually, the losses in wiring and conversion exist.

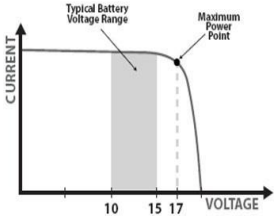
If the solar module's Vmp is greater than the battery voltage, it follows that the battery current must be proportionally greater than the solar input current so that input and output power are balanced. The greater the difference between the maximum power voltage and battery voltage, the greater the current boost. Current boost can be substantial in systems where the solar array is of a higher nominal voltage than the battery.

·An Advantage Over Traditional Controllers

Traditional controllers connect the solar module directly to the battery when recharging. This requires that the solar module operate in a voltage range that is below the module's Vmp. In a 12V system for example, the battery voltage may range from 11-15Vdc but the module's Vmp is typically around 16 or 17V.

Figure 4-1 shows a typical current VS. voltage output curve for a nominal 12V off-grid module.

Current VS. Voltage in 12V system



Output power in 12V system

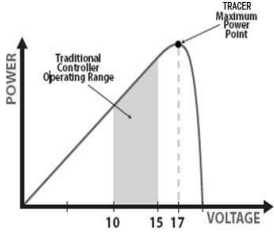


Figure 4-1 Nominal 12V Solar Module I-V curve and output power graph

The array Vmp is the voltage where the product of current and voltage (Amps×Volts) is greatest, which falls on the "knee" of the solar module I-V curve as shown in Figure4-1. Because Traditional controllers do not operate at the Vmp of the solar modules(s), energy is wasted that could otherwise be used to charge the battery and power system loads. The greater the difference between battery voltage and the Vmp of the module, the more energy is wasted.

TRACER MPPT technology will always operate at the Vmp resulting in less wasted energy compared to traditional controllers.

·Conditions That Limits the Effectiveness of MPPT

The Vmp of a solar module decreases as the temperature of the module increases. In very hot weather, the Vmp may be close or even less than battery voltage. In this situation, there will be very little or no MPPT gain compared to traditional controllers. However, systems with modules of higher nominal voltage than the battery bank will always have an array Vmp greater than battery voltage. Additionally, the savings in wiring due to reduced solar current make MPPT worthwhile even in hot climates.

4.2 Battery Charging Information

Four Charging Stage

The TRACER has a 4-stage battery charging algorithm for rapid, efficient, and safe battery charging.

Figure 4-2 shows the sequence of the stages.

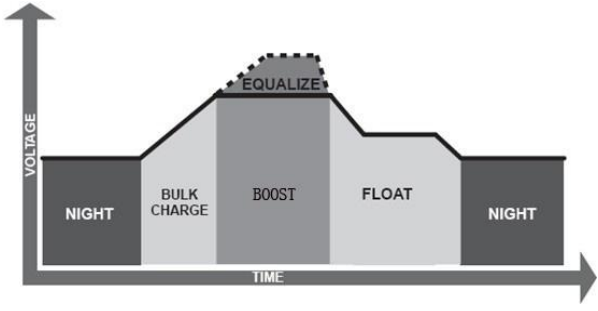


Figure 4-2 TRACER MPPT charging algorithm

Bulk Charge

In this stage, the battery voltage has not yet reached boost voltage and 100% of available solar power is used to recharge the battery.

Boost Charge

When the battery has recharged to the Boost voltage setpoint, constant-voltage regulation is used to prevent heating and excessive battery gassing. The Boost stage remains 120 minutes and then goes to Float Charge

Float Charge

After the Boost voltage stage, TEACER will reduce the battery voltage to Float voltage setpoint. When the battery is fully recharged, there will be no more chemical reactions and all the charge current transmits into heat and gas at this time. Then the TRACER reduces the voltage to the floating stage, charging with a smaller voltage and current. It will reduce the temperature of battery and prevent the gassing, also 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 stage, loads can continue to draw power from the battery. In the event that the system load(s) exceed the solar charge current, the controller will no longer be able to maintain the battery at the Float setpoint. Should the battery voltage remains below the Boost setpoint, the controller will exit Float stage and return to Bulk charging.

Equalize

WARNING: Risk of explosion!

Equalizing flooded battery can produce explosive gases, so well ventilation of battery box is necessary

NOTE: Equipment damage!

Equalization may increase battery voltage to the level damaging to sensitive DC loads. Ensure that all load allowable input voltages are greater than the equalizing charging set point voltage.

NOTE: 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.

Certain types of batteries benefit from periodic equalizing charge, which can stir the electrolyte, balance battery voltage and complete chemical reaction. Equalizing charge increases the battery voltage, higher than the standard complement voltage, which gasifies the battery electrolyte.

If it detects that the battery is being over discharged, the solar controller will automatically turn the battery to equalization charging stage, and the equalization charging will be 120mins. Equalizing charge and boost charge are not carried out constantly in a full charge process to avoid too much gas precipitation or overheating of battery.

4.3 LED Indications

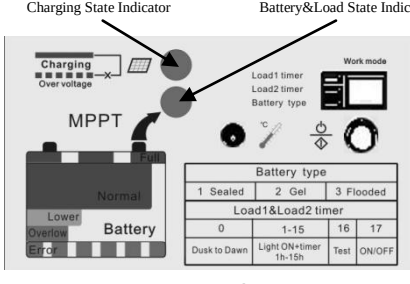


Figure 4-3 LED Indicator

Charging State Indicator

The green LED indicator will light whenever sunlight is available for battery charging, the green charging LED will stay on in normal charging. The charging LED indicator flashes when system over voltage. Please refer to Chapter 5 for troubleshooting.

Color	Indication	Operating State
Green	On Solid	Charging
Green	Fast Flashing	Over-voltage

Table4-1 Charging State LED definitions

Battery&Load State Indicator

GREEN ON when battery voltage in normal range
GREEN FLASHING SLOWLY when battery full
YELLOW ON when battery under voltage
RED ON when battery over discharged
RED FLASHING SLOWLY when over load (the load amp is 1.25times of rated current for 60 seconds, the load amp is 1.5times of rated current for 5 seconds)
RED FLASHING FAST when short circuit (load amp is more than four times of rated current)
Please refer to Chapter 5 for troubleshooting.

Color	Indication	Operating State
Green	On solid	Normal (battery)
Green	Slow Flashing	Full (battery)
Yellow	On solid	Under voltage(battery)
Red	On solid	Over discharged(battery)
Red	Slow flashing	Over load
Red	Fast flashing	Short circuit

Table 4-2 Battery & Load status LED definition

4.4 Setting Operation

. Load Control Settings

1. Dusk to Dawn (Light ON+Light OFF)

When solar module voltage goes below the point of NTTV (Night Time Threshold Voltage) at sunset, the solar controller will recognize the starting voltage and turn on the load after 10 minutes delay; When solar module voltage goes above point of DTTV (Day Time Threshold Voltage), the solar controller will recognize the starting voltage and turn off the load after 10 minutes delay.

2. Light ON + Timer (1-15h hours on)

When solar module voltage goes below the point of NTTV (Night Time Threshold Voltage) at sunset; the solar controller will recognize the starting voltage and turn on the load after 10 minutes delay for several hours which users set on the timer. The timer setting operation is referred to as “Load Work Mode Setting”.

3. Test mode

It is used to test the system and the same as Dusk to Dawn. But there is no 10 minutes delay when controller recognizes the starting voltage. When below the starting voltage, the controller will turn on the load, if higher, it will turn off load. The test mode makes it easy to check the system installation.

4. ON/OFF mode

This mode is to turn on/off the load by Setting Switch

. Load Work Mode Setting

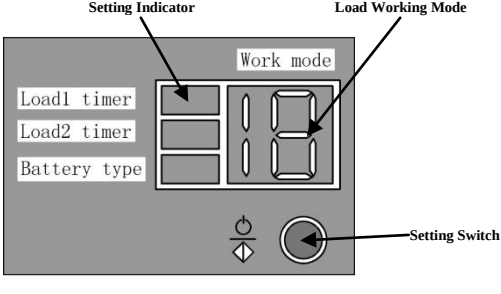


Figure 4-4 Instruction figure on setting

Press the Setting Switch, and the led will switch between load 1 timer, load 2 timer and battery type.

Press the Setting Switch for 5 seconds when the led is on load 1 timer setting. The led will be flashing. Continue to press the setting switch and the number will repeat from 0 to 17, and stop pressing when the desired number appears according to the following setting table.

Setting work mode of load 2 is the same as load 1 when the led is on load 2 timer setting.

Work Mode of Load	LED Digital No.
Dusk to Dawn, Load will be on all night	0
Load will be on for 1 hour after ten minutes delay since sunset	1
Load will be on for 2 hours after ten minutes delay since sunset	2
Load will be on for 3 hours after ten minutes delay since sunset	3
Load will be on for 4 hours after ten minutes delay since sunset	4
Load will be on for 5 hours after ten minutes delay since sunset	5
Load will be on for 6 hours after ten minutes delay since sunset	6
Load will be on for 7 hours after ten minutes delay since sunset	7
Load will be on for 8 hours after ten minutes delay since sunset	8
Load will be on for 9 hours after ten minutes delay since sunset	9
Load will be on for 10 hours after ten minutes delay since sunset	10
Load will be on for 11 hours after ten minutes delay since sunset	11
Load will be on for 12 hours after ten minutes delay since sunset	12
Load will be on for 13hours after ten minutes delay since sunset	13
Load will be on for 14 hours after ten minutes delay since sunset	14
Load will be on for 15 hours after ten minutes delay since sunset	15
Test mode	16
ON/OFF mode	17

Table 4-3 Load Work Mode

Note: There will be 10 minutes delay for the load to turn on after sunset and to turn off before sunrise. Because the controller requires 10 minutes of delay before it starts to work. These constraints avoid false transitions due to lightning or dark storm clouds.

If either of the two loads is TEST MODE. The two loads will be TEST MODE simultaneously.

If either of the two loads is ON/OFF MODE. The two loads will be ON/OFF simultaneously. But there is an exception, as long as one of the loads is TEST MODE, the TEST MODE will prevail.

Battery Type Setting

Press Setting Switch and hold on 5 seconds when the led is on battery type setting mode. The led will be flashing. Continue to press and the number will repeat from 1 to 3, and stop pressing until the desired number appears according to the following setting table:

Battery Type	LED digital indicator
Sealed battery	1
Gel battery	2
Flooded battery	3

Table 4-4 Battery Type Setting

5 Protections, Troubleshooting and Maintenance

5.1 Protections

Solar Overload

TRACER will limit battery current to the 10A maximum rating. An over-sized solar array will not operate at peak power. The solar array should be less than the TRACER nominal max. input power rating for optimal performance.

Load Overload

If the load current exceeds the maximum load current rating, the TRACER will disconnect the load. The greater the overload, the faster the load will be disconnected. A small overload could take a few minutes to disconnect. The TRACER will attempt to reconnect the load twice. Each attempt will be approximately 10 seconds apart. After this, the load will remain disconnected until power is removed and reapplied.

Solar Short Circuit

Solar input power wires are short-circuited. Charging automatically resumes when the short is cleared.

Load Short Circuit

Fully protected against load wiring short-circuit. After two automatic load reconnect attempts (10 seconds between each attempt), the fault must be cleared by removing and reapply power.

High Voltage Input

If the solar input open circuit voltage (Voc) exceeds the maximum input voltage of TRACER (TRACER 1206/60VDC; TRACER 1210/100VDC; TRACER 1215/150VDC), the array will remain disconnected until the Voc falls safely below the maximum rating.

PV Reverse Polarity

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

Battery Reverse Polarity

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

Damaged Internal Temperature Sensor

If the temperature sensor 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.

High-Voltage Transients

Solar, battery, and load power connections are protected against high voltage transients. In lightning prone areas, additional external suppression is recommended.

5.2 Troubleshooting

Troubleshooting according to the following instructions:

Faults	Possible reasons	Troubleshooting
Charging LED indicator is off during daytime and sunshine falls on PV modules properly.	PV array disconnection	Check that PV and battery wire connections are correct and tight.
Green charging LED indicator is fast flashing	Battery voltage higher than over voltage disconnection voltage(OVD)	Check if battery voltage Over high. Disconnect the solar module
Battery and load LED indicators are Yellow color	Battery under voltage	Load output is not affected, charging LED indicator will return to green automatically when fully charged.
Battery and load LED indicators stay on RED color, and loads are not working.	Battery over discharged	The controller will cut off the output automatically, LED indicator will return to green automatically when fully charged.
Battery and load LED indicators are RED slowly flashing.	Load power exceeds rated power	Remove some loads, then press the power switch, the controller will return to work after 3 seconds,.
Battery and load LED indicators are RED fast flashing	Load power exceeds 4 times of rated power or load short circuit.	Check load connections and cut off the trouble loads, press the switch button once, output will be recovered after 3 second. There is one time reconnect attempt after 10 seconds when first time short circuit. If short circuit occurs twice continuously, only press the switch button can recover output.

Table 5-1 Troubleshooting

Note：If no LED indications

With a multi-meter, measure the battery voltage at the battery terminal, it can only be powered when the battery voltage is over 9V.

Note：If no charging LED indication when the connection is normal

Measure the PV input voltage at the PV terminals, input voltage must be greater than battery voltage before charging begins.

5.3 Maintenance

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

- Check that the controller is securely mounted in a clean and dry environment.
- Check that the air flow and ventilation around the controller is not blocked. Clear all dirt or fragments on the heat sink.
- Check all the naked wires to make sure insulation is not damaged for serious solarization, frictional wear, dryness, insects or rats etc. Maintain or replace the wires if necessary.
- Tighten all the terminals. Inspect for loose, broken, or burnt wire connections.
- Check and confirm that LED or Digital Display indication 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.
- Inspect for dirt, insects and corrosion, and clear up.

Warning：Risk of electric shock! ! !

Make sure all the power is turned off before above operations, and then follow the corresponding inspections and operations.

6 Warranty

The TRACER-MPPT charge controller is warranted to be free from defects for a period of TWO (2) years from the date of shipment to the original end user. Epsolar will, at its option, repair or replace any such defective products.

• Claim procedure:

Before requesting warranty service, check the Operator's Manual to be certain that there is a problem with the controller. Return the defective product to Epsolar or the authorized Epsolar distributor with shipping charges prepaid if problem cannot be solved. Provide proof of date and place of purchase. To obtain rapid service under this warranty, the returned products must include the model, serial number and detailed reason for the failure, the module type, array size, type of batteries and system loads. This information is critical to a rapid disposition of your warranty claim.

•This warranty does not apply under the following conditions:

1. Damage by accident, negligence, abuse or improper use.
2. PV or load currents exceeding the ratings of product.
3. Unauthorized product modification or attempted repair
4. Damaged occurring during shipment
5. Damage results from acts of nature such as lightning, weather extremes.

No EPSOLAR is authorized to make any modification or extension to this warranty.

7 Technical Specifications

• Electrical

Description	Parameter
Nominal system voltage	12VDC or 24VDC
Rated battery current	10A
Battery voltage range	9-36V
Max. solar input voltage	TRACER 1206 60VDC TRACER 1210 100VDC TRACER 1215 150VDC
Max. PV input power	12V/ 120W 24V /240W
Self-consumption	≤16mA
RJ45 connection	8pin
Load surge protect	35A

Table 7-1 Electrical Parameters

• Battery Setpoints（Tem.：25℃）

Charging Parameter			
Battery charging setting	Gel	Sealed	Flooded
High Volt Disconnect	16V; x2/24V	16V; x2/24V	16V; x2/24V
Charging limits voltage	15.5V; x2/24V	15.5V; x2/24V	15.5V; x2/24V
Equalization voltage	——	14.6V; x2/24V	14.8V; x2/24V
Boost voltage	14.2V; x2/24V	14.4V; x2/24V	14.6V; x2/24V
Float voltage	13.8V; x2/24V	13.8V; x2/24V	13.8V; x2/24V
Boost return voltage	13.2V; x2/24V	13.2V; x2/24V	13.2V; x2/24V
Low voltage reconnect	12.6V; x2/24V	12.6V; x2/24V	12.6V; x2/24V
Under voltage recover	12.2V; x2/24V	12.2V; x2/24V	12.2V; x2/24V
Under voltage warning	12V; x2/24V	12V; x2/24V	12V; x2/24V
Low voltage disconnect	11.1V; x2/24V	11.1V; x2/24V	11.1V; x2/24V
Discharging limits voltage	10.8V; x2/24V	10.8V; x2/24V	10.8V; x2/24V
Equalize duration	——	2hours	2hours
Boost duration	2hours	2hours	2hours

Table 7-2 Battery Charging Setting

• Threshold Voltage

Description	Parameter
NTTV (Night Time Threshold Voltage)	5V; x2/24V
DTTV (Day Time Threshold Voltage)	6V; x2/24V

Table7-3 Threshold Voltage Parameters

• Battery Charging

Description	Parameter
Temp compensation coefficient	-5mV/℃/cell（25℃ ref）

Table7-4Battery Charging Parameters

• Environmental

Environmental	Parameter
Ambient temperature range	-35 ℃to +55℃
Storage temperature	-35℃ to +80℃
Humidity	10%-90%(NC)
Enclosure	IP30（Indoor）

Table 7-5Environmental Parameters

• Mechanical

Mechanical	Parameter
Dimension	160(6.299)x97(3.818)x47(1.85)/mm(inches)
Mounting holes	150(5.905)x70(2.755)/mm(inches)
Weight	0.45kg

Table 7-6Mechanical Parameters