EPEVER ®

Tracer CN Series

——MPPT Solar Charge Controller

User Manual

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 CN 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. Prevent exposure to the elements and do not allow water to 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.

Information générales sur la sécurité

➢ Liseztoutes les instructions etprécautionsdans le manuelavantl'installation.

➢ IIn'y a aucune pièce utilisable pour l'utilisateur à l'intérieur du contrôleur. Ne démontez pas oun'essayez pas de réparer le contrôleur.

➢ Montez le contrôleurenintérieur. Évitezl'exposition des élémentset ne laissez pas d'eauentrerdans le contrôleur.

➢ Installez le contrôleur Tracer dansunendroitbienventilé, le dissipateur de chaleur de l'Tracerpeutdevenirtrèschaud pendant l'utilisation.

➢ Installez les fusibles / coupe-circuits commeindiqué.

➢ Déconnectez le module solaire, le chargeuret le fusible / coupe-circuit proche de la batterieavantl'installationou le réglage du contrôleur.

➢ Les connexionsd'alimentationdoiventrester à proximité pour évierunechaleur excessive du fait d'uneconnexion trop lâche.

Contents

1 General Information

1.1 Overview

Tracer-CN series adopts common negative design and advanced MPPT control algorithm, and introduces original relay design to achieve the switch of external equipment. The integration design not only replaces traditional electrical design using external relay, what is more can achieve multiple control modes and working modes, it can be widely used in household system, field monitoring and communication station etc.

Feature:

- Original relay design, achieve the switch of external equipment
- Multiple relay control mode, local, remote and cross- network
- Multiple relay working modes: manual control, light ON/OFF, light ON+timer and time control
- High tracking efficiency no less than 99.5%
- Peak conversion efficiency of 97.5%, full-load efficiency of 96%
- Accurately recognizing and tracking of multiple power points.
- Battery temperature compensation function
- Real-time energy statistics function
- RS485 port with industrial standard MODBUS open architecture
- Fully programmable function via PC software or remote meter
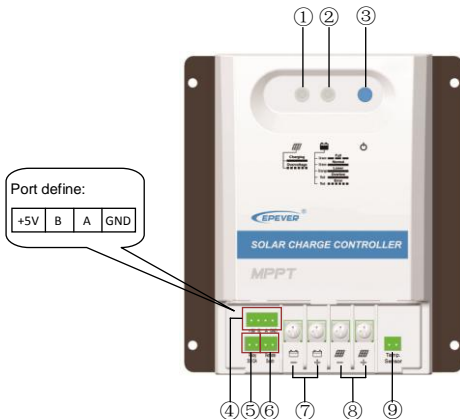- Support software upgrade.

1.2 Characteristics

Figure 1-1 Tracer-CN Series Characteristics

Item	Name	Item	Name
①	Charge LED Indicator	⑥	Remote Button Port
②	Battery LED Indicator	⑦	Battery Terminals
③	Relay Switch Button	⑧	PV Terminals
④	RS-485 Port[1] (5VDC/30mA)	⑨	RTS Port[2]
⑤	Relay Port		

Explanations:

①Monitor controller by PC, remote meter MT70 or via RS485 (RJ45 interface).

②Connect a RTS (Remote Temperature Sensor) to remotely detect battery temperature.

1.3 Optional Accessories

1) Remote Temperature Sensor (Model: RTS300R47K3.81A)

Acquisition of battery temperature for undertaking temperature compensation of control parameters, the standard length of the cable is 3m (length can be customized). The RTS300R47K3.81A connects to the port (④) on the controller.

NOTE: Unplug the RTS, the temperature of battery will be set to a fixed value 25ºC.

2) MT50 and RS-485 to RS-485 converter cable (Model: CC-RJ45-3.81-150U)

RS-485 to RS-485 converter cable is used to monitor parameters of controller using MT50. The length of cable is 1.5m. The cable connects to the port (⑨) on the controller.

2) USB to RS-485 converter cable (Model: CC-USB-RS485-150U-3.81)

USB to RS-485 converter cable is used to monitor each controller on the network using Solar Station PC software. The length of cable is 1.5m. The cable connects to the port (⑨) on the controller.

3) OTG cable (Model: OTG-12CM)

The USB to RS-485 converter cable and the OTG cable are used to view and modify the working mode and the parameters using the APP software. The USB to RS-485 converter cable connects to the port (⑨) on the controller.

1.4 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 also 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 maybe fluctuant due to the influence of the ambient circumstance and energy loss.)
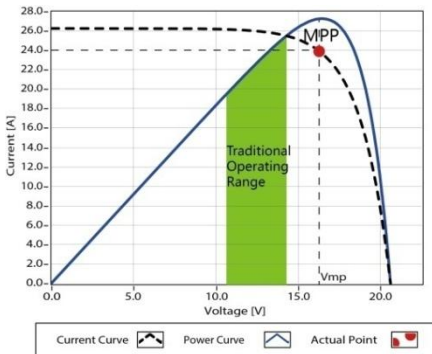

Figure 1-2 Maximum Power Point Curve

In actual application, as shading from cloud, tree and snow, the panel maybe appear Multi-MPP, but in actually there is only one real Maximum Power Point. As the below Figure 1-3 shows:
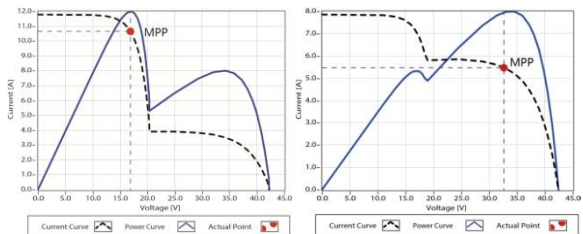
Figure 1-3 Mutil-MPP Curve

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.
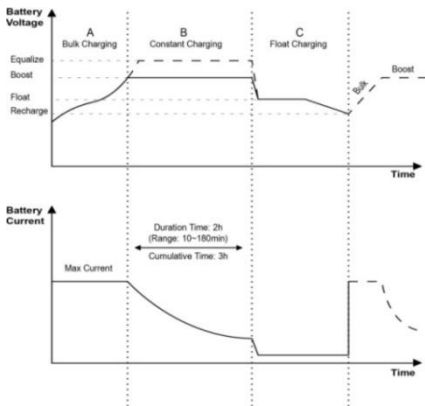

Figure 1-4Battery changing stage Curve

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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 to the level that damages 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.

AVERTISSEMENT: Risqued'explosion!
l'égalisation de batteries noyéespeutproduire des gazexplosifs, doncilestrecommandé de bienventiler le boitier de la batterie.

ATTENTION: Dégât sur l'équipement!
L'égalisationpeut augmenter la tension de la batteriejusqu'àunniveaunuisible pour les charges CC sensibles.

Vérifiez que la tension d'entréeautorisées de toutes les charges disponiblessontsupérieures à 11% à la tension du point d'installation de chargementd'égalisation.

⚠️ **ATTENTION:**Dégât sur l'équipement!
Unchargementexcessif et uneprécipitation de gazpeutendommager les plaques de la batterie et la formation de matières actives dessus. Unchargement trop fort ouuneégalisationprolongéepeut causer des dégâts. Inspectezsoigneusement les conditions spécifiques de la batterieutiliséedans le système.

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 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 setpoint. 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 Instructions

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

> **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.

Tracer2210CN; Tracer3210CN:

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	4	3	2	2	2	2	2	2

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

NOTE: The above parameter values are calculated under standard test conditions (STC (Standard Test Condition): Irradiance 1000W/m², Module Temperature 25℃, Air Mass1.5.)

➢ **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
Tracer2210CN	20A	260W/12V 520W/24V	780W/12V 1560W/24V	92V[1] 100V[2]
Tracer3210CN	30A	390W/12V 780W/24V	1170W/12V 2340W/24V	

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

2.3 Wire Size

The wiring and installation methods must conform to all national and local electrical code requirements.

➢ **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 Isc of PV array. Please refer to the value of Isc in PV module specification. When the PV modules connect in series, the Isc is equal to the PV module's Isc. When the PV modules connect in parallel, the Isc is equal to the sum of PV module's Isc. The Isc 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(mm²/AWG)
Tracer2210CN	20A	6/10
Tracer3210CN	30A	10/8

NOTE: When the PV modules connect in series, the open circuit voltage of the PV array must not exceed 92V (25℃)

➢ **Battery Wire Size**

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

Model	Rated charge current	Battery wire size(mm²/AWG)
Tracer2210CN	20A	6/10
Tracer3210CN	30A	10/8

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.

2.4 Mounting

CAUTION: The controller requires at least 150mm of clearance above and below for proper air flow. Ventilation is highly recommended if mounted in an enclosure.

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

WARNING: Risk of electric shock!
Exercise caution when handling solar wiring. The solar PV array can produce open-circuit voltages in excess of 100V when in sunlight. Pay more attention to it.

ATTENTION: Le contrôleurTracer nécessite au moins un espace libre de 150mm au dessus et en dessous pour une circulation correcte de l'air. Une ventilation est hautement recommandée en cas d'installation dans un boitier.

AVERTISSEMENT: Risque d'explosion ! N'installez jamais le Tracer dans un boitier fermé avec des batteries noyées! N'installez pas dans un espace confiné où des gaz de batterie peuvent s'accumuler.

AVERTISSEMENT: Risqued'électrochoc!
Faites attention lors de la manipulation des connexionssolaires. La matrice PV solairepeutproduire des tensions supérieures à 100V, à la lumière du soleil. Soyezparticulièrementattentif à cela.

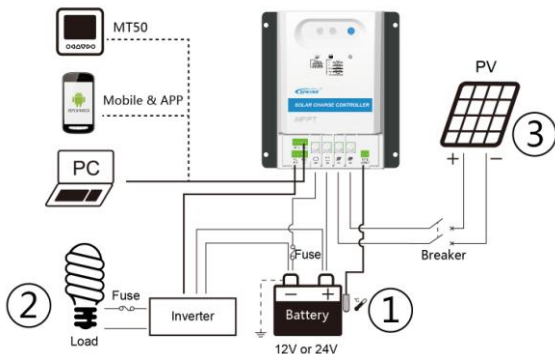Figure 2-1 Mounting

1) Connect components to the charge controller in the sequence as shown above and pay much attention to the "+" and "-". Please don't turn on the fuse during the installation. When disconnecting the system, the order will be reserved.

2) After installation, power the controller and check the battery LED indicator on. If it's not on, please refer to chapter 4. Always connect the battery first, in order to allow the controller to recognize the system voltage.

3) The battery fuse should be installed as close to battery as possible. The suggested distance is within 150mm.

4) The Tracer CN series is a negative ground controller. Any negative connection of PV or battery can be earth grounded as required.
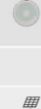
CAUTION: Unplug the RTS, the temperature of battery will be set to a fixed value 25 ºC.

CAUTION: Please connect the inverter to the battery rather than to the controller, if the inverter is necessary.

3 Operation

3.1 LED Indictor Instruction

LED Indicator	Color	Indicator	Status
	Green	On Solid	PV connection normal but low voltage(irradiance) from PV, no charging
	Green	Slowly Flashing	In charging
	Green	OFF	No PV voltage(night time) or PV connection problem
	Green	On Solid	Normal
	Green	Slowly Flashing	Full
	Green	Fast Flashing	Over voltage
	Orange	On Solid	Under voltage
	Red	On Solid	Over discharge
	Red	Flashing	Battery Overheating

3.2 Relay Working Mode

1) Manual Mode

When the relay working mode is manual mode, it can control the ON/OFF of external equipment through the **relay switch button** or remote button.
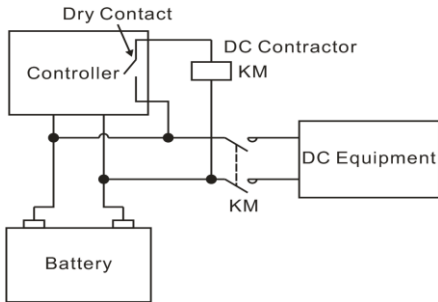
Example 1:

It shall connect controller's relay in parallel to the inverter start switch, so it can turn ON/OFF the inverter by operating the button. As shown below:
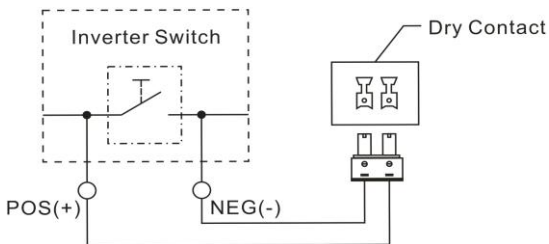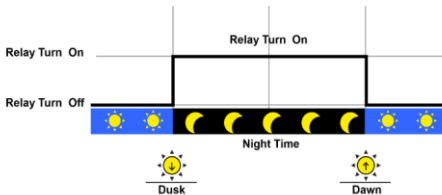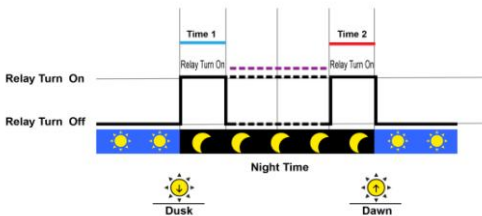
Example 2:
It can control the DC contactor coil through this relay so as to achieve the control of the DC device operation.
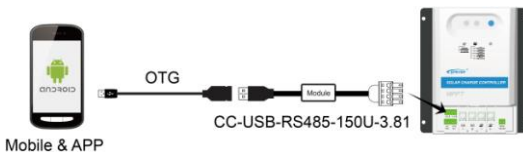

2) Light ON/OFF

3) Light ON + Timer1

4) Real-time Control
  Control the relay ON/OFF time through setting real-time clock.

3.3Parameters Setting and Monitoring

1) APP Software

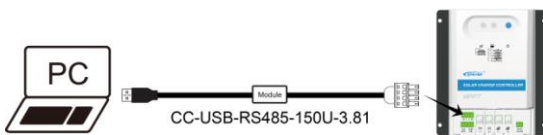

Mobile & APP   OTG   CC-USB-RS485-150U-3.81   Module

① Cables
- USB to RS-485 converter cable (Model:CC-USB-RS485-150U-3.81).
- OTG cable (Model: OTG-12CM).

②Setting Way
- APP software can be downloaded from the website of http://www.epsolarpv.com.
- Install the downloaded software.
- Connect the Mobile phone and controller using above cables.

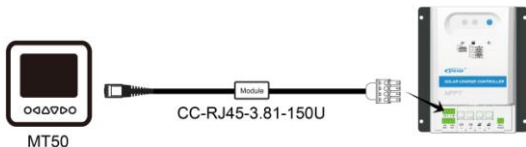**2) PC Solar Station Monitor**

PC   CC-USB-RS485-150U-3.81   Module

① Cables
- USB to RS-485 converter cable (Model:CC-USB-RS485-150U-3.81).

②Setting Way
- PC solar station monitor software can be downloaded from the website of http://www.epsolarpv.com/uploads/news/201506/1434513401716619.rar.
- Install the downloaded software.
- Connect the PC and controller using above cable.

3) MT50

MT50   CC-RJ45-3.81-150U   Module

① Cables

• RS-485 to RS-485 converter cable (Model:CC-RJ45-3.81-150U).

②Setting Way

Connect the MT50 and controller using above cable

3.4Battery Type

①Sealed(Default)   ②Gel   ③Flooded

④ User(Apply to 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.

4 Protections, Troubleshooting and Maintenance

4.1 Protection
• 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, 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, 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 55 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.

4.2 Troubleshooting

Faults	Possible reasons	Troubleshooting
Charging LED indicator 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, LED indicator off	1)Battery voltage is lower than 9V 2)PV voltage is less than battery voltage	1) Please check the voltage of battery. At least 9V voltage to activate the controller 2)Check the PV input voltage which should be higher than battery's
Battery LED indicator green fast blink	Battery over voltage	Check if the battery voltage is too high, and disconnect the solar module
Battery LED indicator red slowly flashing	Battery overheating	The controller will automatically turn the system off. But while the temperature decline to be below 55℃，the controller will resume.

4.3 Maintenance

The following inspections and maintenance tasks are recommended at least two times per year for best 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 LCD is consistent with required. Pay attention to any troubleshooting or error indication .Take corrective action if necessary.

• 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 Technical Specifications

Electrical Parameters

Item Model	Tracer2210CN	Tracer3210CN
Nominal system voltage	12/24VDC Auto	
Battery input voltage range	9V～32V	
Rated charge current	20A	30A
Max. PV input power	260W/12V,520W/24V	390W/12V,780W/24V
Max. PV open circuit voltage	92V（at 25℃ environment temperature） 100V(at minimum operating environment temperature)	
MPP Voltage range	(Battery voltage+2V)～72V	
Relay control range	30VDC/1A	
Communication	RS485(5VDC/30mA)	
Battery Type	Sealed(Default)/Gel/Flooded/User	
Self-consumption	20mA/12V; 23mA/24V	
Temperature compensate coefficient	-3mV/℃/2V	
Working environment temperature	-35℃～+55℃	
Enclosure	IP20	
Humidity	≤95% (N.C.)	
Grounding	Common negative	
Dimension	173×150×79.9mm	173×163×86mm
Mounting dimension	Φ5mm	
Mounting hole size	141×141mm	141×154mm
Terminal	8AWG/10mm^2	6AWG/16mm^2
Power Terminals	1.21kg	1.46kg

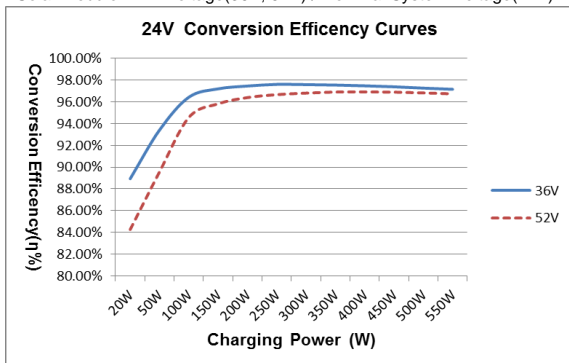# Annex I Conversion Efficiency Curves

Illumination Intensity: 1000W/m^2 Temp: 25°C

Model: Tracer2210CN

1.   Solar Module MPP Voltage(17V, 30V, 36V) / Nominal System Voltage(12V)
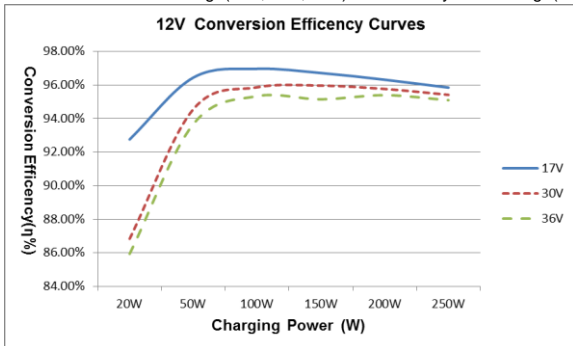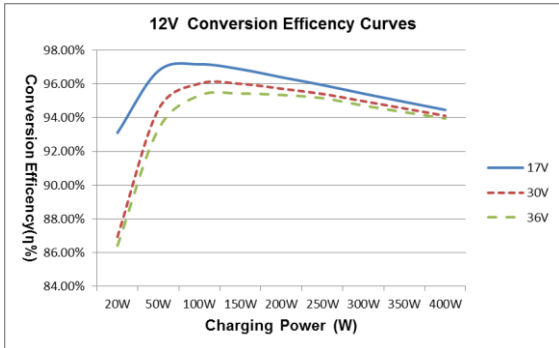

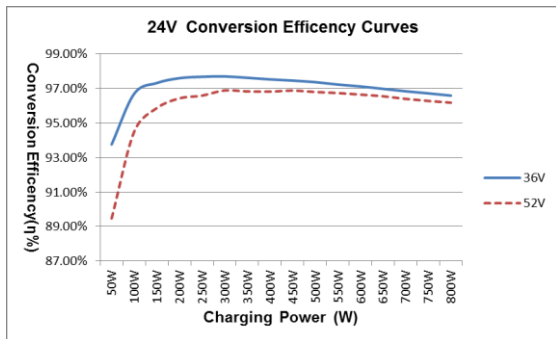2.   Solar Module MPP Voltage(36V, 52V) / Nominal System Voltage(24V)

Model: Tracer3210CN

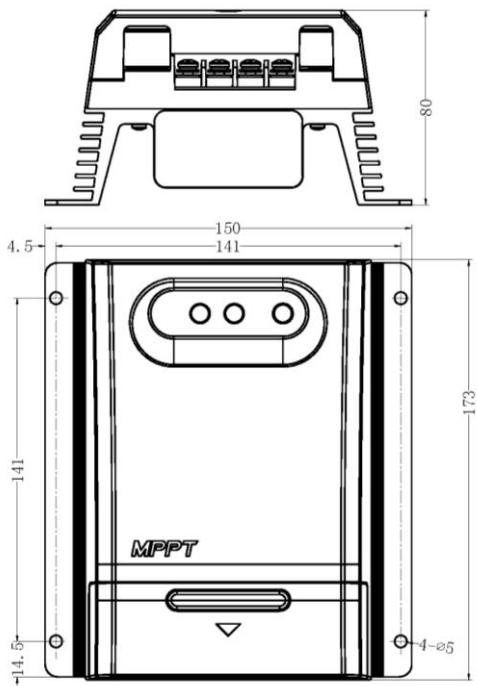Solar Module MPP Voltage(17V, 30V, 36V) / Nominal System Voltage(12V)

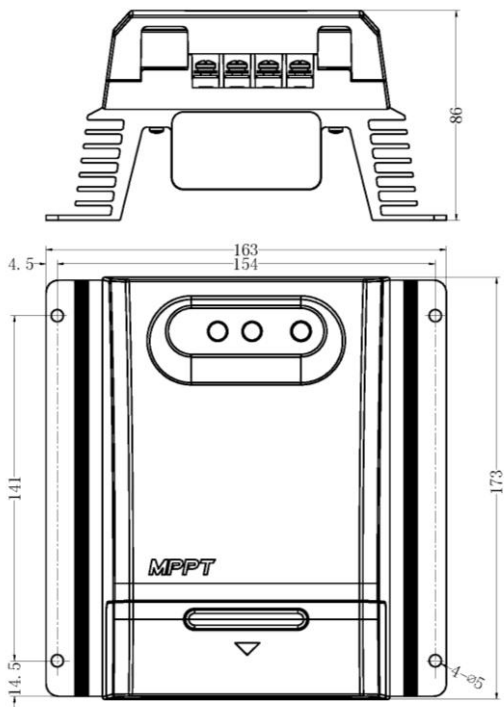1.   Solar Module MPP Voltage(36V, 52V) / Nominal System Voltage(24V)

Annex II Dimensions

Tracer2210CNDimensions in Millimeters

Tracer3210CN Dimensions in Millimeters

Any changes without prior notice!   Version number: V1.2

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