MPPT Solar Charge Controller

User Manual

Models:

XTRA1206N/XTRA2206N

XTRA1210N/XTRA2210N

XTRA3210N/XTRA4210N

XTRA3215N/XTRA4215N

XTRA3415N/XTRA4415N

EN

Important Safety Instructions

Please keep this manual for future review.

This manual contains all safety, installation, and operation instructions for the XTRA N series Maximum Power Point Tracking (MPPT) controller ("controller" as referred to in this manual).

General Safety Information

- Read all the instructions and warnings carefully in the manual before installation.
- No user-serviceable components exist inside the controller. DO NOT disassemble or attempt to repair the controller.
- Mount the controller indoors. Avoid exposure to the components and do not allow water to enter the controller.
- Install the controller in a well-ventilated place. The controller's heat sink may become very hot during operation.
- Suggest installing appropriate external fast-acting fuses/breakers.
- Disconnect all PV array connections and the battery fast-acting fuse/breakers before controller installation and adjustment.
- Power connections must remain tight to avoid excessive heating from a loose connection.

 **WARNING**	Do not install the controller in humid, salt spray, corrosion, greasy, flammable, explosive, dust accumulative, or other severe environments.

CONTENTS

1 General Information

1.1 Overview

XTRA N series controller, which can carry different display units (XDB1/XDS1/XDS2), adopts the advanced MPPT control algorithm. It can minimize the maximum power point (MPP) loss rate and time and quickly track the MPP to obtain the maximum energy under any conditions. It can also increase the solar system's energy utilization ratio

Limiting the charging power & current and reducing charging power functions ensure the system is stable with over PV modules in a high-temperature environment. IP33 Ingress protection and isolated RS485 design improve the controller's reliability and meet the different application requirements.

XTRA N series controller owns a three-stage charging mode, which can effectively prolong the battery's lifespan and significantly improve the system performance. Comprehensive electronic protection of overcharge, over-discharge, PV & battery reverse polarity, etc., ensures the solar system is more reliable and durable. This controller can be widely used for RV, household systems, field monitoring, and many other applications.

Features：

- CE certification(LVD EN/IEC62109,EMC EN61000-6-1/3)
- 100% charging and discharging in the working environment temperature range
- Optional LCD units (XDB1/XDS1/XDS2)
- High quality and low failure rate components of ST or IR to ensure the service life
- Advanced MPPT technology & ultra-fast tracking speed guarantee the tracking efficiency of up to 99.5%
- Maximum DC/DC transfer efficiency is as high as 98.5%*; full load efficiency is up to 97.2%*
- Advanced MPPT control algorithm to minimize the MPP lost rate and lost time
- Accurate recognizing and tracking of multi-peaks maximum power point
- Wide MPP operating voltage range

- Support the lead-acid and lithium batteries; voltage parameters can be set on the controller◆
- Programmable temperature compensation
- Limit charging power & current over the rated value
- Real-time energy statistics function
- Power reduction automatically over-temperature value
- Multiple load work modes
- Comprehensive electronic protection
- Isolated RS485 with 5V/200mA protected output for no power devices, with Modbus protocol
- Support monitoring and setting the parameters via the APP or PC software
- IP33▲ Ingress protection

★ XTRA4415N@48V system

◆ For the BCV, FCV, LVD, and LVR, users can modify them on the local controller when the battery type is "USE."

▲3-protection against solid objects: protected against solid objects over 2.5mm.
3-protected against sprays to 60°from the vertical.

1.2 Characteristics

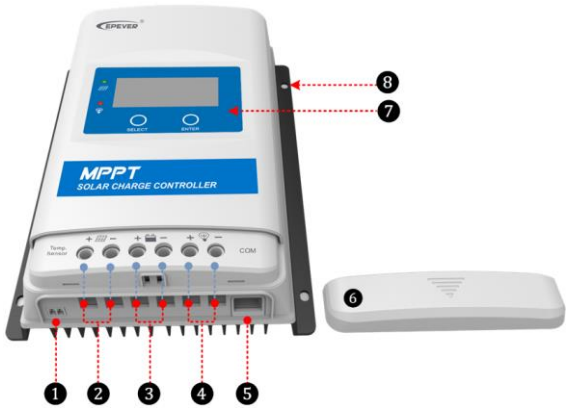


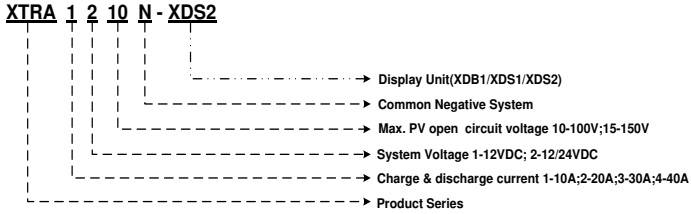
Figure 1 Product Characteristics

❶	RTS★port	❺	RS485 communication port
❷	PV Terminals	❻	Terminal protection cover

❸	Battery Terminals	❼	Display units
❹	Load Terminals	❽	Mounting Hole Φ5mm

★ If the temperature sensor is short-circuited or damaged, the controller will charge or discharge according to the setting voltage at 25 ºC (no temperature compensation).

1.3 Naming Rules



1.4 Product Classification

Classify	Model	Picture	Display
Basics	XTRA****N-XDB1		**LED Indicators:** PV & battery working status **Button:** ✦ In manual work mode, it switches ON/OFF the load by pressing the button. ✦ Clear the error information.
Standard	XTRA****N-XDS1		**LED Indicators:** PV & load working status **Buttons:** View or set the parameters or clear the error information. **LCD:** *PV display:* voltage/current /generated energy *Battery display:* voltage/current/temperature Load display: current/consumed energy/load working mode

Advanced	XTRA****N-XDS2		**LED Indicators:** PV & battery & load working status **Buttons:** View or set the parameters or clear the error information. **LCD:** *PV display:* voltage/current /generated energy/**power** *Battery display:* voltage/current/ temperature/**capacity** Load display**:** **voltage**/current/**power** /consumed energy/load working mode

2 Installation

2.1 Attentions

- Please read the instructions to familiarize yourself with the installation steps before installation.
- Be very careful when installing the batteries, especially flooded lead-acid batteries. 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 a short circuit of the battery.
- Explosive battery gases may come out from the battery during charging, so make sure the ventilation condition is good.
- 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 produce high heat that can melt wire insulation, burn surrounding materials, or even cause a fire. Ensure tight connections, use cable clamps to secure cables, and prevent them from swaying in mobile applications.
- The controller can work with lead-acid and lithium batteries within its control scope.
- The battery connection may be wired to one battery or a bank of batteries. The following instructions refer to a singular battery. However, it is implied that the battery connection can be made to either one battery or a group of batteries in a battery bank.
- Multiple models of controllers can be installed in parallel on the same battery bank to achieve a higher charging current. Each controller must have its solar module(s).
- Select the system cables according to 5A/mm^2 or less current density following 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 the solar system, the 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 of PV modules can be calculated. The below table is for reference only.

XTRA1206N/2206N:

System voltage	36 cell Voc＜23V		48 cell Voc ＜31V		54 cell Voc＜34V		60 cell Voc＜38V	
	Max.	Best	Max.	Best	Max.	Best	Max.	Best
12V	2	2	1	1	1	1	1	1
24V	2	2	-	-	-	-	-	-

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

XTRA1210/2210/3210/4210N:

System voltage	36 cell Voc＜23V		48 cell Voc＜31V		54 cell Voc＜34V		60 cell 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	72 cell Voc＜46V		96 cell 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/m^2, Module Temperature 25℃, Air Mass1.5.)

XTRA3215/4215N:

System voltage	36 cell Voc＜23V		48 cell Voc＜31V		54 cell Voc＜34V		60 cell 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

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

XTRA3415/4415N:

System voltage	36 cell Voc＜23V		48 cell Voc＜31V		54 cell Voc＜34V		60 cell 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	72 cell Voc＜46V		96 cell 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.)

2.3 Wire Size

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

- **PV Wire Size**

The PV array output varies with the PV module size, connection method, and sunlight angle. The PV array's short circuit current(ISC) can calculate the minimum PV wire size. Please refer to the value of Isc in the PV module specification. When PV modules are connected in series, the Isc equals a PV module Isc. When PV modules are connected in parallel, the Isc equals the sum of the PV modules' Isc. The Isc of the PV array must not exceed the controller's maximum PV input current. Please refer to the table below:

NOTE: All PV modules in a given array are assumed to be identical.

*** Isc=short circuit current(amps) Voc=open circuit voltage.**

Model	Max. PV input current	Max. PV wire size*
XTRA1206N XTRA1210N	10A	4mm^2/12AWG
XTRA2206N XTRA2210N	20A	6mm^2/10AWG
XTRA3210N XTRA3215N XTRA3415N	30A	10mm^2/8AWG
XTRA4210N XTRA4215N XTRA4415N	40A	16mm^2/6AWG

*** These are the maximum wire sizes that will fit the controller terminals.**

CAUTION	When the PV modules are connected in series, the open-circuit voltage of the PV array must not exceed 46V (XTRA**06N), 92V (XTRA**10N), 138V (XTRA**15N) at 25℃ environment temperature.

➢ **Battery and Load Wire Size**

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

Model	Rated charge current	Rated discharge current	Battery wire size	Load wire size
XTRA1206N XTRA1210N	10A	10A	4mm^2/12AWG	4mm^2/12AWG
XTRA2206N XTRA2210N	20A	20A	6mm^2/10AWG	6mm^2/10AWG
XTRA3210N XTRA3215N XTRA3415N	30A	30A	10mm^2/8AWG	10mm^2/8AWG
XTRA4210N XTRA4215N XTRA4415N	40A	40A	16mm^2/6AWG	16mm^2/6AWG

CAUTION	• The wire size is only for reference. Suppose there is a long distance between the PV array, the controller, and the battery. In that case, larger wires can be used to reduce the voltage drop and improve performance.

	• The recommended battery wire is selected when the battery terminals are not connected to any additional inverter.

2.4 Mounting

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. • Risk of electric shock! When wiring the solar modules, the PV array can produce a high open-circuit voltage, so disconnect the breaker before wiring and be careful.
CAUTION	The controller requires at least 150mm of clearance above and below for proper airflow. Ventilation is highly recommended if mounted in an enclosure.

Installation Procedure:

Figure 2-1 Mounting

Step 1: Determination of the installation location and heat-dissipation space

The controller shall be installed in a place with sufficient airflow through the controller radiators and a minimum clearance of 150 mm from the upper and lower edges of the controller to ensure natural thermal convection. See Figure 2-1: Mounting

CAUTION	Suppose the controller is to be installed in an enclosed box. In that case, ensuring reliable heat dissipation through the box is important.

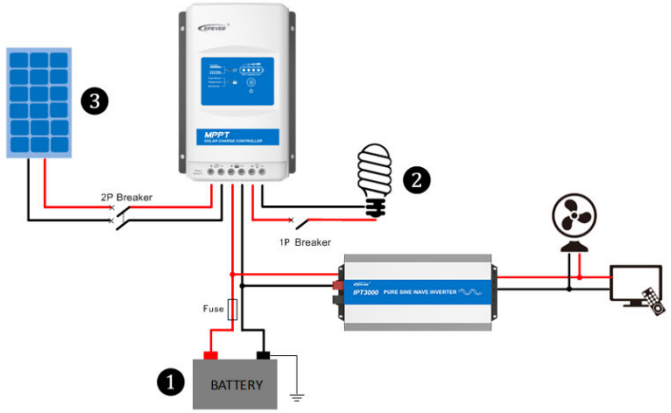


Figure 2-2 Schematic of wiring diagram

Step 2：Connect the system in the order of ❶battery ➔❷ load➔ ❸PV array by Figure 2-2," Schematic Wiring Diagram" and disconnect the system in the reverse order❸❷❶.

CAUTION	• While wiring the controller, do not connect the circuit breaker or fast-acting fuse and ensure that the electrode polarity is correctly connected. • A fast-acting fuse whose current is 1.25 to 2 times the rated current of the controller must be installed on the battery side with a distance from the battery not greater than 150 mm. • Suppose the controller is to be used in an area with frequent lightning strikes or an unattended area. In that case, it must install an external surge arrester. • Suppose an inverter is to be connected to the system. In that case, you must connect the inverter directly to the battery, not to the load side of the controller.

Step 3：**Grounding**

XTRA N series are common-negative controllers; all the negative terminals can be grounded simultaneously, or anyone is grounded. However, according to the practical application, the negative terminals of the PV array, battery, and load can also be ungrounded. Still, the grounding terminal on the shell must be grounded. It effectively shields the electromagnetic interference from the outside and prevents some electric shock to the human body.

CAUTION	A common-negative controller for a common-negative system, such as the motorhome, is recommended. The controller may be damaged if a common-positive controller is used and the positive electrode is grounded in the common-negative system.

Step 4：Connect accessories

- Connect the remote temperature sensor cable

Temperature Sensor
（Model:RT-MF58R47K3.81A）

Remote Temperature Sensor Cable (Optional)
（Model:RTS300R47K3.81A）

Connect the remote temperature sensor cable to the interface ① and place the other end close to the battery.

CAUTION	Suppose the remote temperature sensor is not connected to the controller. In that case, the default battery charging or discharging temperature setting is 25 °C without temperature compensation.

- **Connect the accessories for RS485 communication**

Refer to chaper4 **“Control Parameters Setting.”**

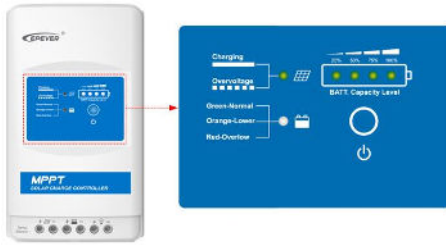
Step 5：Power on the controller

Connect the battery fast-acting fuse to power the controller. Then check the battery indicator's status (the controller operates normally when the indicator is lit in green). Connect the fast-acting fuse and circuit breaker of the load and PV array. Then the system will be operating in preprogrammed mode.

CAUTION	If the controller is not operating properly or the battery indicator on the controller shows an abnormality, please refer to 5.2 “Troubleshooting.”

3 Display units

3.1 Basic Display unit(XDB1)



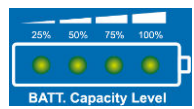
(1) Charging and battery LED indicator

Indicator	Color	Status	Information
	Green	On Solid	PV charges the battery with a low current
	Green	OFF	1. No sunlight 2. Connection error 3. Low PV voltage
	Green	Slowly flashing(1Hz)	Normal charging
	Green	Fast flashing (4Hz)	PV Over voltage
	Green	On Solid	Normal
	Green	Slowly flashing (1Hz)	Full
	Green	Fast flashing (4Hz)	Over voltage
	Orange	On Solid	Under voltage
	Red	On Solid	Over discharged
	Red	Slowly Flashing(1Hz)	Battery Overheating Lithium battery Low temperature①
All LED indicators fast flashing at the same time			System voltage error②
			Controller Overheating

① When a lead-acid battery is used, the controller doesn't have low-temperature protection.

② When a lithium battery is used, the system voltage can't be identified automatically.

(2) Battery Capacity Level Indicator



- **Battery Capacity Level (BCL)**

Indicator	Color	Status	Information
☆○○○	Green	25% Indicators slowly flashing	0< BCL <25%
●☆○○	Green	50% Indicators slowly flashing 25% Indicators are ON	25%≤BCL <50%
●●☆○	Green	75% Indicators slowly flashing 25%,50% Indicators are ON	50%≤BCL <75%
●●●☆	Green	100% Indicators slowly flashing 25%,50%,75% Indicators are ON	75%≤BCL <100%
●●●●	Green	25%,50%,75%,100% Indicators are ON	100%

"○" Indicator is OFF； "●" Indicator is on Solid；"☆" Indicator is slowly flashing.

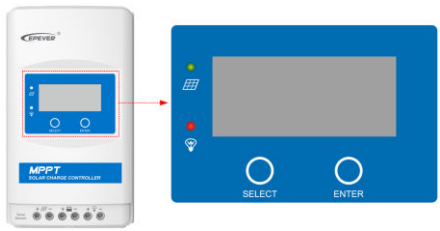
- **Load status**

Battery Capacity Level	Green	on solid	The load is ON
	Green	OFF	The load is OFF

(3) Button

In the manual mode, it can control the On/Off of the load via the button

3.2 Standard Display unit (XDS1)



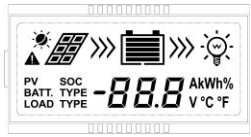
(1) LED indicator

Indicator	Color	Status	Instruction
	Green	On Solid	PV charges the battery with a low current
	Green	OFF	1. No sunlight 2. Connection error 3. Low PV voltage
	Green	Slowly Flashing(1Hz)	Normal charging
	Green	Fast Flashing (4Hz)	PV Over voltage
	Red	On Solid	Load ON
	Red	OFF	Load OFF

(2) Button

Mode	Note
Load ON/OFF	It can turn the load On/off in manual load mode via the ENTER button.
Clear Fault	Press the ENTER button
Browsing Mode	Press the SELECT button
Setting Mode	Press the ENTER button and hold on 5s to enter the setting mode Press the SELECT button to set the parameters, Press the ENTER button to confirm the setting parameters or no operation for 10s. It will exit the setting interface automatically.

(3) Interface



Note: The display screen can be viewed clearly when the angle between the end-users horizontal sight and the display screen is within 90°. If the angle exceeds 90°, the information on the display screen cannot be viewed clearly.

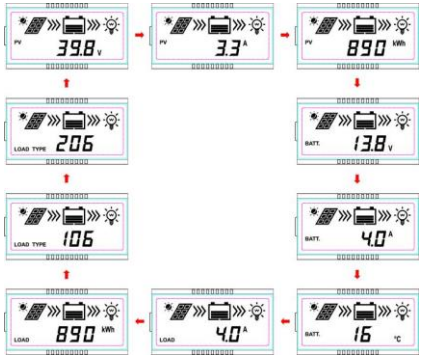
1) Status Description

Item	Icon	Status
PV array		Day
		Night
		No charging
		Charging
	PV	PV Voltage, Current, Generated energy
Battery		Battery capacity, In Charging
	BATT.	Battery Voltage, Current, Temperature
	BATT. TYPE	Battery Type
Load		Load ON

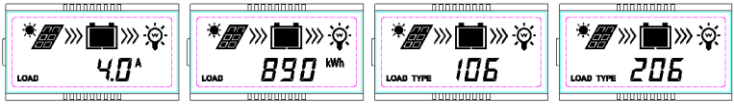
		Load OFF
	LOAD	Current/Consumed energy/Load mode

2) Browse interface

Press the SELECT button to display the following interfaces in a cycle.



3) Load parameter display



Display: Current/Consumed energy/Load working mode-Timer1/ Load working mode-Timer2

4) Setting

① Clear the generated energy

Operation:

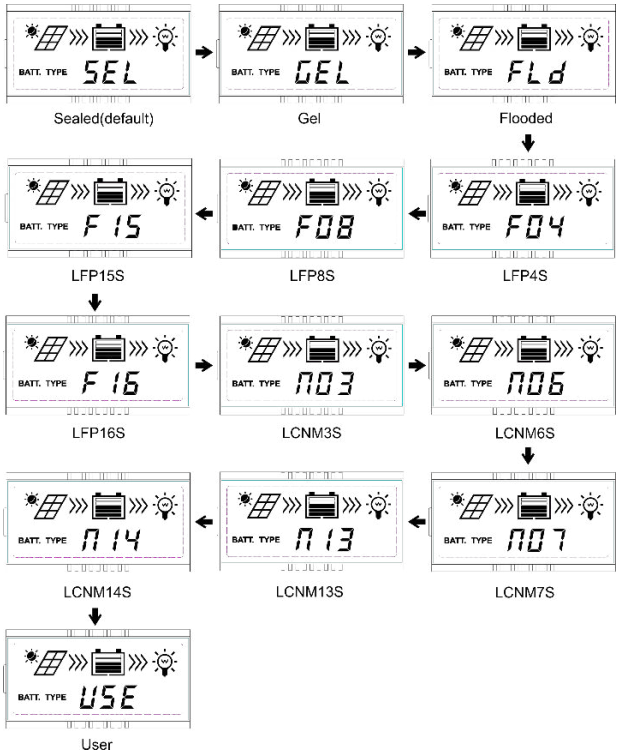
Step 1: Long-press the ENTER button under the generated energy interface, and the value will flash.

Step 2: Press the ENTER button to clear the generated energy.

② Switch the battery temperature unit

Press the ENTER button and hold 5s under the battery temperature interface.

③ Battery type



Note: If the controller supports 48V system voltage, the battery type will display LiFePO4 F15/F16 and Li(NiCoMn)O2 N13/N14.

Operation:

Step1: Press the SELECT button to jump to the battery voltage interface.

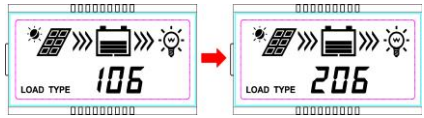
Step2: Long-press the ENTER button until the battery-type interface flashes.

Step3: Press the SELECT button to change the battery type.

Step4: Press the ENTER button to confirm.

CAUTION	Please refer to chapter 4.1 for the battery parameters setting when the battery type is User.

④ **Load mode**



Operation:

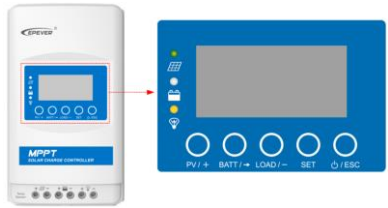
Step1: Press the SELECT button to jump to the load type interface and long-press the ENTER button until the load type flashes.

Step2: Press the SELECT button to select the load type.

Step3: Press the ENTER button to confirm.

NOTE: Please refer to chapter4.2 for the load working modes.

3.3 Advanced Display unit (XDS2)



(1) Indicator

Indicator	Color	Status	Instruction
	Green	On Solid	PV charges the battery with a low current
	Green	OFF	1. No sunlight 2. Connection error 3. Low PV voltage
	Green	Slowly Flashing(1Hz)	Normal charging
	Green	Fast Flashing(4Hz)	PV Over voltage
	Green	On Solid	Normal
	Green	Slowly Flashing(1Hz)	Full
	Green	Fast Flashing(4Hz)	Over voltage
	Orange	On Solid	Under voltage
	Red	On Solid	Over discharged
	Red	Slowly Flashing(1Hz)	Battery Overheating Lithium battery Low temperature④
	Yellow	On Solid	Load ON
	Yellow	OFF	Load OFF

PV&BATTLED fast flashing	Controller Overheating System voltage error②

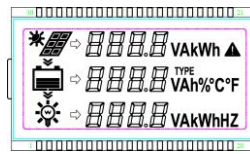
① When a lead-acid battery is used, the controller doesn't have low-temperature protection.

② When a lithium battery is used, the system voltage can't be identified automatically

(2) Button

PV / +	Press the button	PV browsing interface
		Setting data +
	Press the button and hold 5s	Setting the LCD cycle time
BATT / →	Press the button	BATT browsing interface
		Cursor displacement during setting
	Press the button and hold 5s	Setting the battery type, battery capacity level, and temperature unit.
LOAD / −	Press the button	Controller load browsing interface
		Setting data
	Press the button and hold 5s	Setting the load working mode
SET	Press the button	Enter into setting interface
		Switch the setting interface to the browsing interface
		Confirm the setting parameter
⏻ / ESC	Press the button	Exit the setting interface

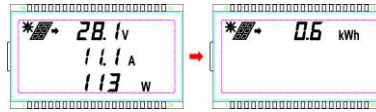
(3) Display



Note: The display screen can be viewed clearly when the angle between the end-users horizontal sight and the display screen is within 90°. If the angle exceeds 90°, the information on the display screen cannot be viewed clearly.

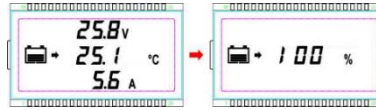
Icon	Information	Icon	Information	Icon	Information
	Day		Not charging		Not discharging
	Night		Charging		Discharging

1) PV parameters



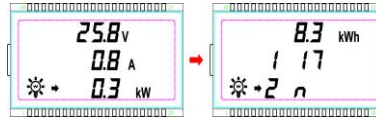
Display：Voltage/Current/Power/Generated Energy

2) Battery parameters



Display：Voltage/Current/Temperature/Battery capacity level

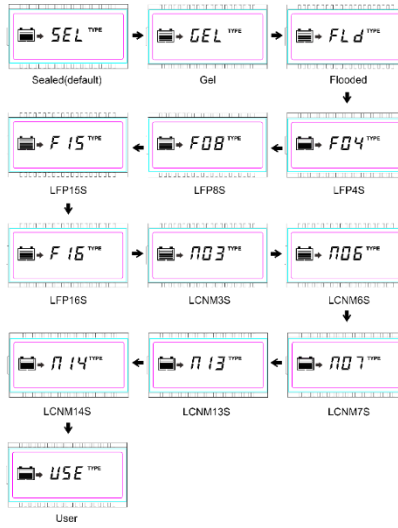
3) Load parameters



Display：Voltage/Current/Power/ Consumed energy/Load working mode-Timer1/ Load working mode-Timer2

(4) Setting parameters locally

1) Battery type



Note: If the controller supports 48V system voltage, the battery type will display LiFePO4 F15/F16 and Li(NiCoMn)O2 N13/N14.

Operation:

Step 1: Press the BATT/- button to browse the battery parameters on the initial interface. Then, press the SET button to enter the battery parameters setting interface.

Step 2: Long-press the BATT/- button to enter the battery-type interface.

Step 3: Press the PV/+ or LOAD/- button to select the battery type.

Step 4: Press the SET button to confirm.

Step5: Continue to press the SET button twice or wait for 10S of no-operation to automatically go back to the battery parameters setting interface.

CAUTION	Please refer to chapter 4.1 for the battery control voltage setting when the battery type is User.

2) Battery capacity

Operation:

Step 1: Press the BATT/- button to browse the battery parameters on the initial interface. Then, press the SET button to enter the battery parameters setting interface.

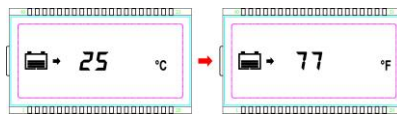
Step 2: Long-press the BATT/- button to enter the battery-type interface.

Step 3: Press the SET button to jump to the battery capacity interface.

Step 4: Press the PV/+ or LOAD/- button to set the battery capacity.

Step 5: Press the SET button to confirm.

3) Temperature units



Operation:

Step 1: Press the  button to browse the battery parameters on the initial interface. Then, press the  button to enter the battery parameters setting interface.

Step 2: Long-press the  button to enter the battery-type interface.

Step 3: Press the  button twice to jump to the temperature unit's interface.

Step 4: Press the  or  button to set the temperature units.

Step 5: Press the  button to confirm.

4) LCD cycle time

NOTE: The LCD cycle default time is 2s, and the setting time range is 0~20s.

Operation:

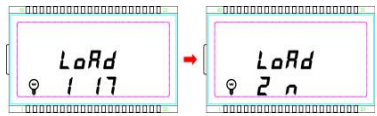
Step 1: Press the  button to browse the PV parameters on the initial interface. Then, press the  button to enter the PV parameters setting interface.

Step 2: Long-press the  button to enter the LCD cycle time interface.

Step 3: Press the  or  button to set the LCD cycle time.

Step 4: Press the  button to confirm.

5) Load type



Operation:

Step 1: Press the  button to browse the load parameters on the initial interface. Then, press the  button to enter the load parameters setting interface.

Step 2: Long-press the  button to enter the load type interface.

Step 3: Press the  or  button to change the load type.

Step 4: Press the  button to confirm.

NOTE: Please refer to chapter 4.2 for the load modes.

4 Parameters Setting

4.1 Battery parameters

4.1.1 Supported battery types

1	**Battery**	Sealed(default)
		Gel
		Flooded
2	**Lithium battery**	LiFePO4(4S/8S/15S/16S)
		Li(NiCoMn)O2 (3S/6S/7S/13S/14S)
3	**User**	

Note: If the controller supports 48V system voltage, the battery type will display LiFePO4 F15/F16 and Li(NiCoMn)O2 N13/N14.

4.1.2 Local setting

WARNING	When the default battery type is selected, the battery voltage parameters cannot be modified. To change these parameters, select the "USE" type.

Step1：Enter the “USE” battery type. Detailed operations of entering the “USE” battery type are shown in the following table.

Content	XDS1 module operation steps	XDS2 module operation steps
Enter the “USE” battery type	1) Press the SELECT button to jump to the battery voltage interface, and long-press the ENTER button to	1) Press the BATT button to browse the battery parameters on the initial interface. Press the SET button to enter the battery

	enter the battery-type interface. 2) Press the SELECT button to select the battery type, such as select the battery type as F04. And then, press the ENTER button to confirm and go back to the battery voltage interface automatically. 3) On the battery voltage interface, long-press the ENTER button to enter the battery-type interface again. 4) Press the SELECT button to select the battery type as "USE."	parameters setting interface, and long-press the BATT/→ button to enter the battery-type interface. 2) Press the PV/→ or LOAD/← button to select the battery type, such as select the battery type as F04. And then press the SET button to confirm. Continue to press the SET button twice or wait for 10S of no-operation to automatically go back to the battery parameters setting interface. 3) Long-press the BATT/→ button to enter the battery-type interface again on the battery parameters setting interface. 4) Press the PV/→ or LOAD/← button to select the battery type "USE."

Step2: Set the battery parameters on the local device.

Under the "USE" interface, the battery parameters that can be local set are shown in the table below:

Parameters	Default	Range	XDS1 module operation steps	XDS2 module operation steps
System voltage level (SYS)★	12VDC	12/24/36 /48VDC	1) Under the "USE" battery type, press the ENTER button to enter the "SYS" interface. 2) Press the ENTER button again to display the current "SYS" value. 3) Press the SELECT button to modify the parameter.	1) Under the "USE" battery type, press the SET button to enter the "SYS" interface. 2) Press the SET button again to display the current "SYS" value.

			4) Press the ENTER button to confirm and enter the next parameter.	3) Press the PV/+ or LOAD/- button to modify the parameter. 4) Press the SET button to confirm and enter the next parameter.
Boost charging voltage (BCV)	14.4V	9~17V	5) Press the ENTER button again to display the current voltage value. 6) Press the SELECT button to modify the parameter (short press to increase 0.1V, long press to decrease 0.1V). 7) Press the ENTER button to confirm and enter the next parameter.	5) Press the SET button again to display the current voltage value. 6) Press the PV/+ or LOAD/- button to modify the parameter (press the PV/+ button to increase 0.1V, press the LOAD/- button to decrease 0.1V). 7) Press the SET button to confirm and enter the next parameter.
Float charging voltage (FCV)	13.8V	9~17V		
Low voltage reconnect voltage (LVR)	12.6V	9~17V		
Low voltage disconnect voltage (LVD)	11.1V	9~17V		
Lithium battery protection enable (LEN)	NO	YES/NO	Press the SELECT button to modify the switch status. **Note: It exists automatically from the current interface after no operation of more than 10S.**	Press the PV/+ or LOAD/- button to modify the switch status. **Note: It exists automatically from the current interface after no operation of more than 10S.**

★The SYS value can only be modified under the non-lithium "USE" type. The SYS value can be modified if the battery type is Sealed, Gel, or Flooded before entering the "USE" type. The SYS value cannot be modified if it is a lithium battery type before entering the "USE" type.

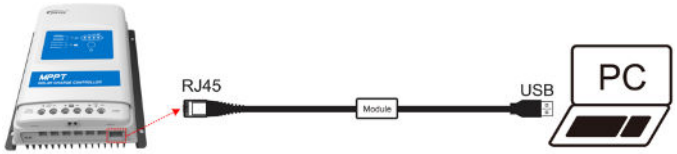
Only the above battery parameters can be set on the local controller. The remaining battery parameters follow the following logic (the voltage level of the 12V system is 1, the voltage level of the 24V system is 2, and the voltage level of the 48V system is 4).

Battery type / Battery parameters	Sealed/Gel/Flooded User	LiFePO4 User	Li(NiCoMn)O2 User
Over voltage disconnect voltage	BCV+1.4V*voltage level	BCV+0.3V*voltage level	BCV+0.3V*voltage level
Charging limit voltage	BCV+0.6V*voltage level	BCV+0.1V*voltage level	BCV+0.1V*voltage level
Over voltage reconnect voltage	BCV+0.6V*voltage level	BCV+0.1V*voltage level	Boost charging voltage
Equalize charging voltage	BCV+0.2V*voltage level	Boost charging voltage	Boost charging voltage
Boost reconnect charging voltage	FCV-0.6V*voltage level	FCV-0.6V*voltage level	FCV-0.1V*voltage level
Under voltage warning reconnect voltage	UVW+0.2V*voltage level	UVW+0.2V*voltage level	UVW+1.7V*voltage level
Under voltage warning voltage	LVD+0.9V*voltage level	LVD+0.9V*voltage level	LVD+1.2V*voltage level
Discharging limit voltage	LVD-0.5V*voltage level	LVD-0.1V*voltage level	LVD-0.1V*voltage level

4.1.3 Remote Setting

1) Setting the battery parameters by PC software

Connect the controller's RJ45 interface to the PC's USB interface via a USB to RS485 cable. When selecting the battery type as "USE," set the voltage parameters by the PC software.



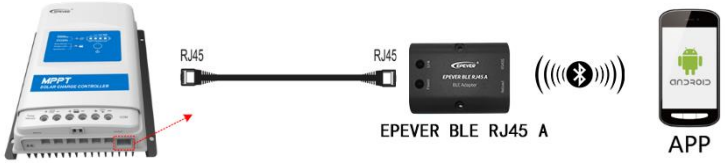
2) Setting the battery parameters by APP

- **Via an external WiFi module**

Connect the controller to an external WIFI module through a standard network cable. End-users can set the voltage parameters by the APP after selecting the battery type as "USE." Refer to the cloud APP manual for details.

- **Via an external Bluetooth module**

Connect the controller to an external Bluetooth module through a standard network cable. End-users can set the voltage parameters by the APP after selecting the battery type as "USE." Refer to the cloud APP manual for details.



3) Setting the battery parameters by MT50

Connect the controller to the remote meter (MT50) through a standard network cable. After selecting the battery type as "USE," set the voltage parameters by the MT50. Refer to the MT50 manual or aftersales engineer for details.

4) Controller parameters

✧ **Battery voltage parameters**

Measure the parameters in the condition of 12V/25ºC. Please double the values in the 24V system and multiplies the values by 4 in the 48V system.

Battery type / Battery parameters	Sealed	GEL	FLD	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 voltage warning voltage	12.0V	12.0V	12.0V	9~17V
Low voltage disconnect voltage	11.1V	11.1V	11.1V	9~17V
Discharging limit voltage	10.6V	10.6V	10.6V	9~17V
Equalize Duration	120 minutes	--	120 minutes	0～180 minutes

Boost Duration	120 minutes	120 minutes	120 minutes	10～180 minutes

- **When the battery type is "USE," the battery voltage parameters follow the following logic:**

  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 Reconnect Voltage.

✧ **Lithium Battery voltage parameters**

Battery type / Battery parameters	LFP				
	LFP4S	**LFP8S**	**LFP15S**	**LFP16S**	**User①**
Over voltage disconnect voltage	14.8V	29.6 V	55.5V	59.2V	9~17V
Charging limit voltage	14.6 V	29.2 V	54.7V	58.4V	9~17V
Over voltage reconnect voltage	14.6 V	29.2 V	54.7V	58.4V	9~17V
Equalize charging voltage	14.5 V	29 .0 V	54.3V	58.0V	9~17V
Boost charging voltage	14.5 V	29.0 V	54.3V	58.0V	9~17V
Float charging voltage	13.8 V	27.6 V	51.7V	55.2V	9~17V
Boost reconnect charging voltage	13.2 V	26.4 V	49.5V	52.8V	9~17V
Low voltage reconnect voltage	12.8 V	25.6 V	48.0V	51.2V	9~17V
Under voltage warning reconnect voltage	12.2 V	24.4 V	45.7V	48.8V	9~17V
Under voltage warning voltage	12.0 V	24.0 V	45.0V	48.0V	9~17V
Low voltage disconnect voltage	11.1 V	22.2 V	41.6V	44.4V	9~17V

Discharging limit voltage	11.0 V	22.0 V	41.2V	44.0V	9~17V

① The battery parameters under the "User" battery type are 9-17V for LFP4S. They should be x2 for LFP8S and x4 for LFP15S/LFP16S.

Battery type / Battery parameters	LNCM					
	LNCM3S	LNCM6S	LNCM7S	LNCM13S	LNCM14S	User①
Over voltage disconnect voltage	12.8 V	25.6 V	29.8 V	55.4V	59.7V	9~17V
Charging limit voltage	12.6 V	25.2 V	29.4 V	54.6V	58.8V	9~17V
Over voltage reconnect voltage	12.5 V	25.0 V	29.1 V	54.1V	58.3V	9~17V
Equalize charging voltage	12.5 V	25.0 V	29.1 V	54.1V	58.3V	9~17V
Boost charging voltage	12.5 V	25.0 V	29.1 V	54.1V	58.3V	9~17V
Float charging voltage	12.2 V	24.4 V	28.4 V	52.8V	56.9V	9~17V
Boost reconnect charging voltage	12.1 V	24.2 V	28.2 V	52.4V	56.4V	9~17V
Low voltage reconnect voltage	10.5 V	21.0 V	24.5 V	45.5V	49.0V	9~17V
Under voltage warning reconnect voltage	12.2 V	24.4 V	28.4 V	52.8V	56.9V	9~17V
Under voltage warning voltage	10.5 V	21.0 V	24.5 V	45.5V	49.0V	9~17V
Low voltage disconnect voltage	9.3 V	18.6 V	21.7 V	40.3V	43.4V	9~17V
Discharging limit voltage	9.3 V	18.6 V	21.7 V	40.3V	43.4V	9~17V

① The battery parameters under the "User" battery type are 9~17V for LFP4S. They should be x2 for LFP8S and x4 for LFP15S/LFP16S.

- **When the battery type is "USE," the Lithium battery voltage parameters follow the following logic:**

  A. Over Voltage Disconnect Voltage>Over Charging Protection Voltage(Protection Circuit

Modules(BMS))+0.2V;

B. Over Voltage Disconnect Voltage>Over Voltage Reconnect Voltage＝Charging Limit Voltage ≥ Equalize Charging Voltage＝Boost Charging Voltage ≥ Float Charging Voltage>Boost Reconnect Charging 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 Reconnect Voltage;

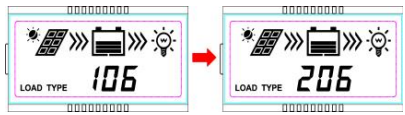
F. Low Voltage Disconnect Voltage ≥ Over Discharging Protection Voltage (BMS)+0.2V

CAUTION	The required accuracy of BMS is no higher than 0.2V. We will not assume responsibility for the abnormal when the accuracy of BMS is higher than 0.2 v.

4.2 Load modes

4.2.1 LCD setting

1) XDS1 display and operation



When the LCD shows the above interface, it operates as follows:

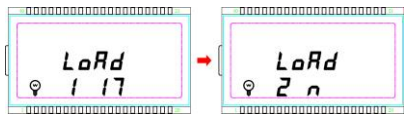
Step1: Press the SELECT button to jump to the load type interface.

Step2: Long-press the ENTER button until the load type interface flashes.

Step2: Press the SELECT button to select the load type.

Step3: Press the ENTER button to confirm.

2) XDS2 display and operation



When the LCD shows the above interface, it operates as follows:

Step1: Press the  button to browse the load parameters on the initial interface, and then press the  button to enter the load parameters setting interface.

Step 2: Long-press the  button to enter the load type interface.

Step 3: Press the  or  button to change the load type.

Step 4: Press the  button to confirm.

3) Load mode list

1**	Timer 1	2**	Timer 2
100	Light ON/OFF	**2 n**	Disabled
101	The load will be on for 1 hour after sunset	**201**	The load will be on for 1 hour before sunrise
102	The load will be on for 2 hours after sunset	**202**	The load will be on for 2 hours before sunrise
103 ～ 113	The load will be on for 3～13 hours after sunset	**203 ～213**	The load will be on for 3～13 hours before sunrise
114	The load will be on for 14 hours after sunset	**214**	The load will be on for 14 hours before sunrise
115	The load will be on for 15 hours after sunset	**215**	The load will be on for 15 hours before sunrise
116	Test mode	**2 n**	Disabled
117	Manual mode(Default load ON)	**2 n**	Disabled

CAUTION	When selecting the load mode as the Light ON/OFF mode, Test mode, and Manual mode, only the Timer 1 can be set, and the Timer 2 is disabled and display "2 n ".

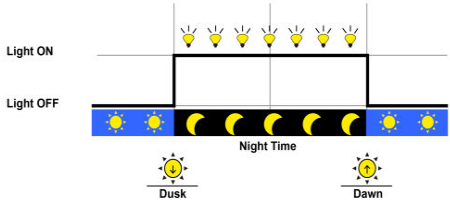
4.2.2 RS485 communication setting

1) Load mode

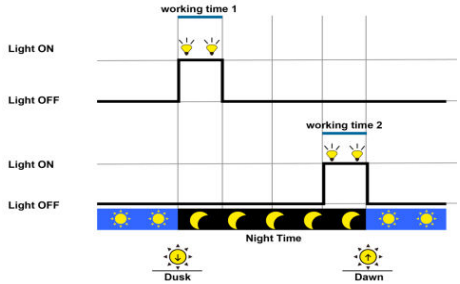
- **Manual Control (default)**

Control the load ON/OFF via the button or remote commands (e.g., APP or PC software).

- **Light ON/OFF**



- **Light ON+ Timer**



- **Time Control**

Control the load ON/OFF time by setting the real-time clock.

2) Load mode settings

Set the load modes by PC software, APP, or remote meter (MT50). For detailed connection diagrams and settings, refer to chapter 4.1.3 Remote Setting.

5 Others

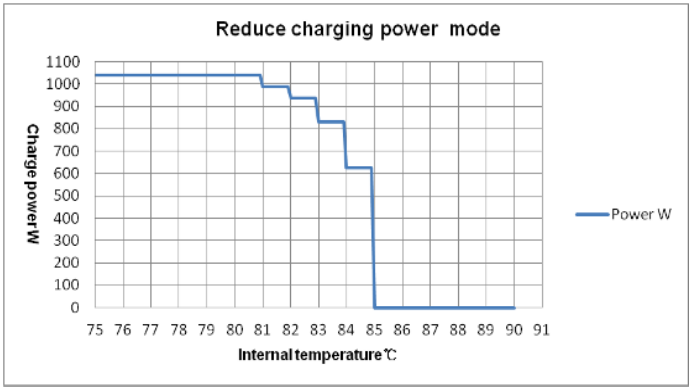
5.1 Protection

PV Over Current/power	When the charging current or power of the PV array exceeds the controller's rated current or power, it will be charged at the rated current or power. **WARNING: When the PV's charging current is higher than the rated current, the PV's open-circuit voltage cannot be higher than the "maximum PV open-circuit voltage." Otherwise, the controller may be damaged.**
PV Short Circuit	When not in a PV charging state, the controller will not be damaged in case of a short-circuiting in the PV array. **WARNING: It is forbidden to short-circuit the PV array during charging. Otherwise, the controller may be damaged.**
PV Reverse Polarity	When the polarity of the PV array is reversed, the controller may not be damaged and can continue to operate normally after the polarity is corrected. **CAUTION: The controller is damaged when the PV array is connected reversely to the controller, and the PV array's actual operating power exceeds 1.5 times the rated charging power.**
Night Reverse Charging	Prevents the battery from discharging to the PV module at night.
Battery Reverse Polarity	Fully protected against reverse battery polarity; no damage will occur to the battery. Correct the miswire to resume normal operation. **WARNING: The controller, limited to the lithium battery characteristic, will be damaged when the PV connection is correct and the battery connection is reversed.**
Battery Over Voltage	When the battery voltage reaches the over voltage disconnect voltage, it will automatically stop battery charging to prevent battery damage caused by over-charging.
Battery Over Discharge	When the battery voltage reaches the low voltage disconnect voltage, it will automatically stop battery discharging to prevent

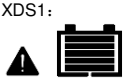
	battery damage caused by over-discharging. (Any connected loads will be disconnected. Loads directly connected to the battery will not be affected and may continue to discharge the battery.)
Battery Overheating	The controller can detect the battery temperature through an external temperature sensor. The controller stops working when its temperature exceeds 65 °C and restarts to work when its temperature is below 55 °C.
Lithium Battery Low Temperature	When the temperature detected by the optional temperature sensor is lower than the Low Temperature Protection Threshold (LTPT), the controller will stop charging and discharging automatically. When the detected temperature is higher than the LTPT, the controller will work automatically (The LTPT is 0 °C by default and can be set within 10 ~ -40 °C).
Load Short Circuit	When the load is short-circuited (The short circuit current is ≥ 4 times the rated controller load current), the controller will automatically cut off the output. Suppose the load reconnects the output five times (delay of 5s, 10s, 15s, 20s, 25s). In that case, it needs to be cleared by pressing the Load button, restarting the controller, or switching from Night to the Day (nighttime > 3 hours).
Load Overload	When the load is overloading (The overload current is ≥ 1.05 times the rated load current), the controller will automatically cut off the output. Suppose the load reconnects five times (delay of 5s, 10s, 15s, 20s, 25s). In that case, it needs to be cleared by pressing the Load button restarting the controller, or switching from Night to Day (nighttime > 3 hours).
Controller Overheating★	The controller can detect the temperature inside the battery. The controller stops working when its temperature exceeds 85 °C and restarts to work when its temperature is below 75 °C.
TVS High Voltage Transients	The internal circuitry of the controller is designed with Transient Voltage Suppressors (TVS), which can only protect against high-voltage surge pulses with less energy. Suppose the controller is to be used in an area with frequent lightning strikes. In that case, it is recommended to install an external surge arrester.

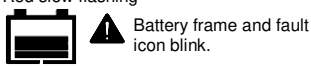
★When the internal temperature is 81℃, the reduced charging power mode is turned on. It reduces the charging power by 5%,10%,20%, and 40% with every increase of 1℃. If the internal temperature exceeds 85℃, the controller will stop charging. When the temperature declines to be below 75 ºC, the controller will resume.

For example XTRA4215N 24V system:



5.2 Troubleshooting

Possible reasons	Faults	Troubleshooting
PV array disconnection	Charging LED indicator off during daytime when sunshine falls on PV modules properly	Confirm that PV wire connections are correct and tight
Battery voltage is lower than 8V	The wire connection is correct, and the controller is not working.	Please check the battery voltage. At least 8V to activate the controller.
Battery over voltage	XDB1：Charging indicator Green fast flashing	Check if the battery voltage is higher than OVD (over voltage disconnect voltage), and disconnect the PV.
	XDS1：  Battery level shows full, battery frame and fault icon blink.	
	XDS2：Charging indicator Green fast flashing  Battery level shows full, battery frame and fault icon blink.	
Battery over-discharged	XDB1：Battery indicator Red on solid	When the battery voltage is restored to or above LVR(low voltage reconnect voltage), the
	XDS1: Battery level shows empty, battery frame and fault icon blink.	

		load will recover
	XDS2：Charging indicator Red on solid  Battery level shows empty, battery frame and fault icon blink.	
Battery Overheating	XDB1：Battery indicator Red slow flashing	The controller will automatically turn the system off. When the temperature declines to be below 55 ºC, the controller will resume.
	XDS1：  Battery frame and fault icon blink.	
	XDS2：Battery indicator Red slow flashing  Battery frame and fault icon blink.	
Controller Overheating	XDB1： PV/BATT(orange)/Battery capacity lever (four) indicator fast flashing XDS2： PV/BATT indicator fast flashing	When the heat sink of the controller exceeds 85℃, the controller will automatically cut off the input and output circuit. When the temperature is below 75℃, the controller will resume work.
System voltage error		①Check whether the battery voltage matches the system voltage level set on the controller. ②Change a matched battery or modify the system voltage level.
Load Short Circuit	1. The load has no output. 2. LCD blinks “E001.” 3. XDS1/XDS2: Load and fault icons blink. 	①Check carefully load connection, and cancel the fault. ②Restart the controller. ③Wait for one night-day cycle (night time>3 hours).
Load Overload①	1. The load has no output.	①Please reduce the number

	2. LCD blinks “E002.” 3. XDS1/XDS2: Load and fault icons blink. 	of electric equipment. ②Restart the controller. ③Wait for one night-day cycle (night time>3 hours).

① **When the actual load current exceeds the rated value, the load is cut off after a delay.**

Times of the actual load current Vs. the rated value	**1.02-1.05**	**1.05-1.25**	**1.25-1.35**	**1.35-1.5**
Delay time to cut off the load	**50s**	**30s**	**10s**	**2s**

5.3 Maintenance

The following inspections and maintenance tasks are recommended at least twice yearly for best performance.

- Make sure the controller is firmly installed in a clean and dry ambient.
- Make sure no block on airflow around the controller. Clear up any dirt and fragments on the heat sink.
- Check all the naked wires to ensure insulation is not damaged by sun exposure, 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 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 damage, high temperature, or burnt/discolored sign. Tighten terminal screws to the suggested torque.
- Clear up dirt, nesting insects, and corrosion in time.
- Check and confirm that the lightning arrester is in good condition. Replace a new one in time to avoid damaging the controller and other equipment.

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

6 Technical Specifications

Electrical Parameters

Item	XTRA 1206N	XTRA 2206N	XTRA 1210N	XTRA 2210N	XTRA 3210N	XTRA 4210N	XTRA 3215N	XTRA 4215N	XTRA 3415N	XTRA 4415N
System nominal voltage	12/24VDC③ Auto								12/24/36/48VDC③ Auto	
Rated charge current	10A	20A	10A	20A	30A	40A	30A	40A	30A	40A
Rated discharge current	10A	20A	10A	20A	30A	40A	30A	40A	30A	40A
Battery voltage range	8～32V								8～68V	
Max. PV open circuit voltage	60V② 46V③		100V② 92V③				150V② 138V③			
MPP voltage range	(Battery voltage +2V)～ 36V		(Battery voltage +2V)～ 72V				(Battery voltage +2V)～ 108V			
Rated charge power	130W/12V 260W/24V	260W/12V 520W/24V	130W/12V 260W/24V	260W/12V 520W/24V	390W/12V 780W/24V	520W/12V 1040W/24V	390W/12V 780W/24V	520W/12V 1040W/24V	390W/12V 780W/24V 1170W/36V 1560W/48V	520W/12V 1040W/24V 1560W/36V 2080W/48V
Max.	97.9%	98.3%	98.2%	98.3%	98.6%	98.6%	97.6%	97.9%	98.1%	98.5%

conversion efficiency										
Full load efficiency	97%	96.7%	96.2%	96.4%	96.6%	96.5%	95.1%	95.4%	96.9%	97.2%
Self-consumption	≤14mA(12V) ≤15mA(24V)		≤30mA(12V) ≤16mA(24V)						≤30mA(12V) ≤16mA(24V) ≤13mA(36V) ≤13mA(48V)	
Discharge circuit voltage drop	≤0.23V									
Temperature compensate coefficient④	-3mV/℃/2V (Default)									
Grounding	Common negative									
RS485 interface	5VDC/200mA(RJ45)									
LCD backlight time	Default: 60S, Range: 0~999S(0S: the backlight is ON all the time)									

① When a lithium battery is used, the system voltage can't be identified automatically.

② At minimum operating environment temperature

③ At 25℃ environment temperature

④ When a lithium battery is used, the temperature compensation coefficient must be 0 and can't be changed.

Environmental Parameters

Item	XTRA 1206N	XTRA 2206N	XTRA 1210N	XTRA 2210N	XTRA 3210N	XTRA 4210N	XTRA 3215N	XTRA 4215N	XTRA 3415N	XTRA 4415N
Environment temperature◆(100% input and output)	-25℃~+50℃(LCD) -30℃~+50℃(No LCD)						-25℃~+45℃(LCD) -30℃~+45℃(No LCD)			
Storage temperature range	-20℃~+70℃									
Relative humidity	≤95%, N.C.									
Enclosure	IP33★									
Pollution degree	PD2									

◆The controller can fully load working in the environment temperature. When the internal temperature reaches 81℃, the reducing charging power mode is turned on. Refer to chapter 5.1 Protection.

★3-protection against solid objects: protected against solids objects over 2.5mm.

3-protected against sprays to 60°from the vertical.

Mechanical Parameters

Item	XTRA1206N XTRA1210N	XTRA2206N XTRA2210N	XTRA3210N	XTRA3215N XTRA4210N	XTRA3415N XTRA4215N	XTRA4415N
Dimension (L x W x H)	175×143×48mm	217×158×56.5mm	230×165×63mm	255×185×67.8mm	255×187×75.7mm	255×189×83.2mm
Mounting size (L x W)	120×134mm	160×149mm	173×156mm	200×176mm	200×178mm	200×180mm
Mounting hole size	Φ5mm					
Terminal	12AWG(4mm^2)	6AWG(16mm^2)	6AWG(16mm^2)	6AWG(16mm^2)	6AWG(16mm^2)	6AWG(16mm^2)

Recommended cable	12AWG(4mm^2)	10AWG(6mm^2)	8AWG(10mm^2)	8AWG(10mm^2) **XTRA3215N** 6AWG(16mm^2) **XTRA4210N**	8AWG(10mm^2) **XTRA3415N** 6AWG(16mm^2) **XTRA4215N**	6AWG(16mm^2)
Weight	0.57kg	0.96kg	1.31kg	1.70kg	2.07kg	2.47kg

Certification

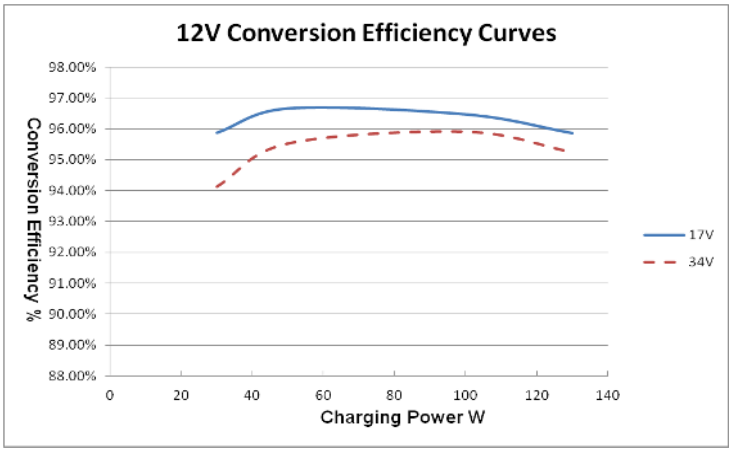
Safety	EN/IEC62109-1, UL1741, CSA C22.2#107.1
EMC(Emission immunity)	EN61000-6-3/EN61000-6-1
FCC	47 CFR Part 15, Subpart B
Performance &function	IEC62509
ROHS	IEC62321-3-1

Annex I Conversion Efficiency Curves

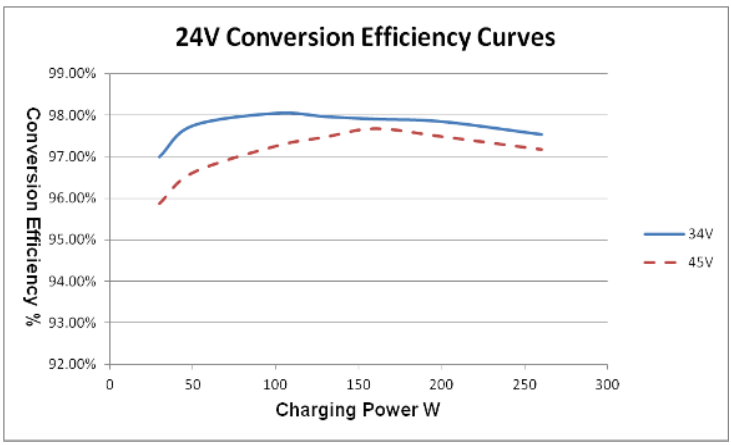
Illumination Intensity: 1000W/m² Temp: 25ºC

Model: XTRA1206N

1. Solar Module MPP Voltage(17V, 34V) / Nominal System Voltage(12V)

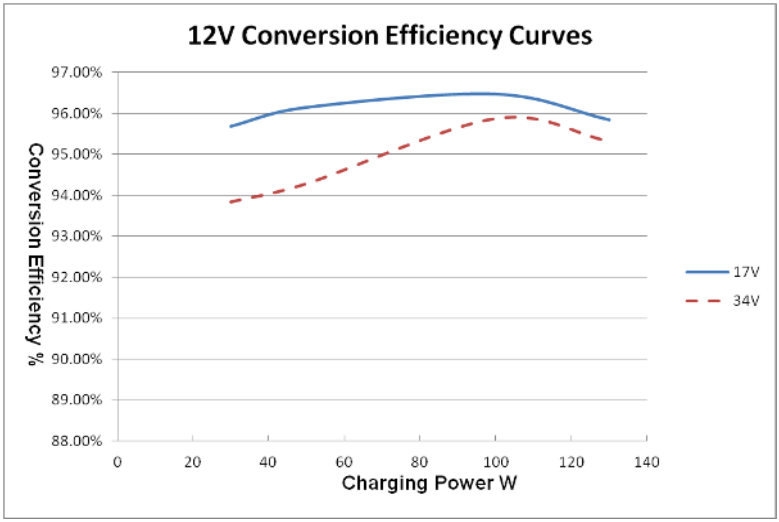


2. Solar Module MPP Voltage(34V,45V) / Nominal System Voltage(24V)

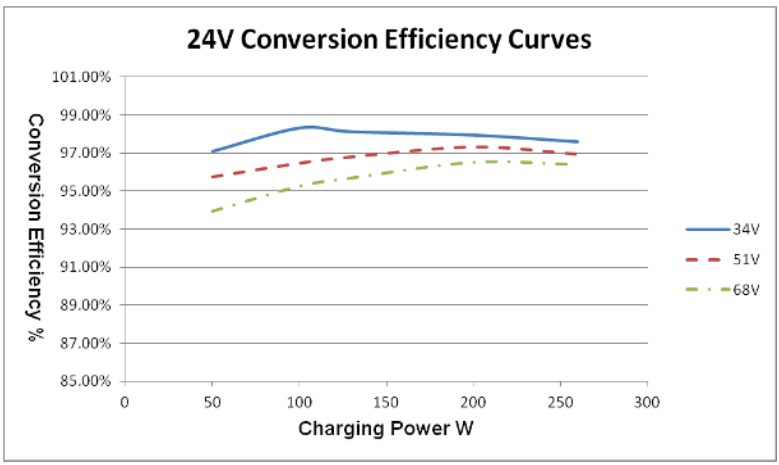


Model: XTRA1210N

1. **Solar Module MPP Voltage(17V, 34V) / Nominal System Voltage(12V)**



2. **Solar Module MPP Voltage(34V,51V,68V) / Nominal System Voltage(24V)**



Model: XTRA2206N

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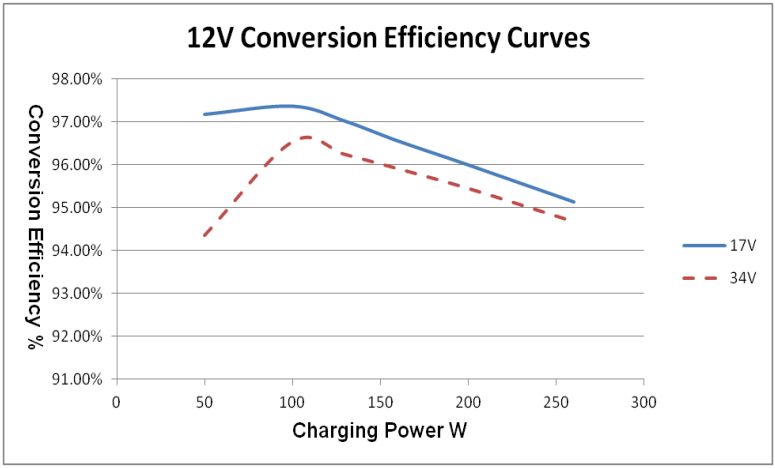
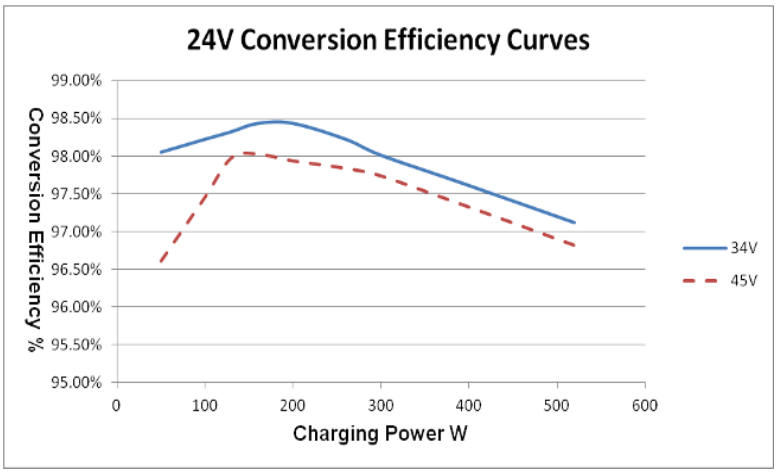
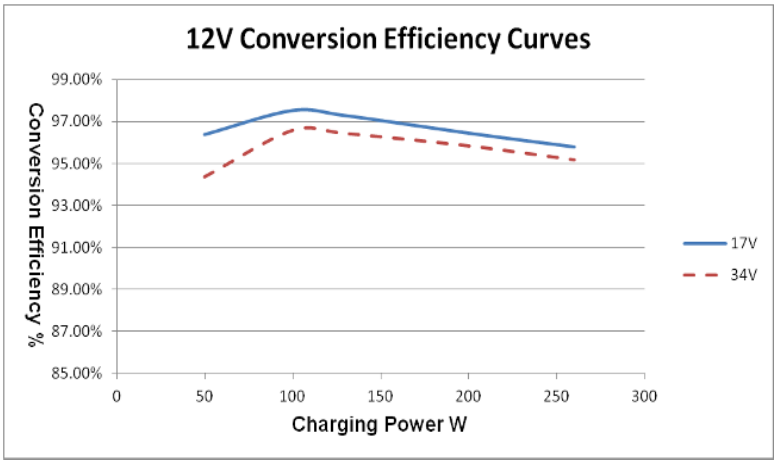


2. **Solar Module MPP Voltage(34V,45V) / Nominal System Voltage(24V)**

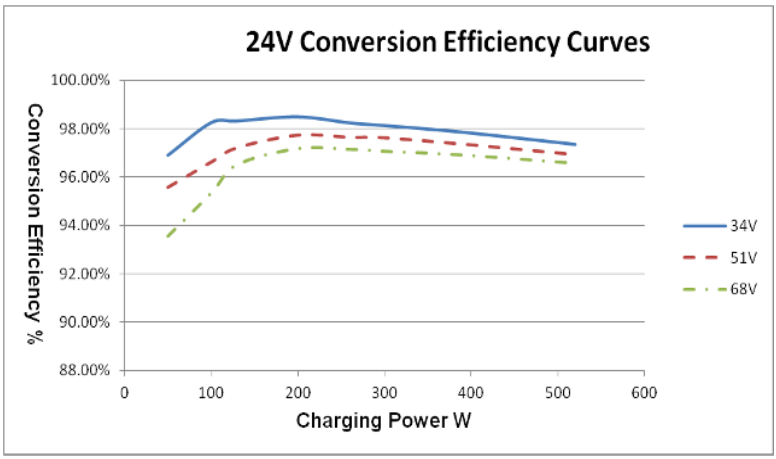


Model: XTRA2210N

1. **Solar Module MPP Voltage(17V, 34V) / Nominal System Voltage(12V)**

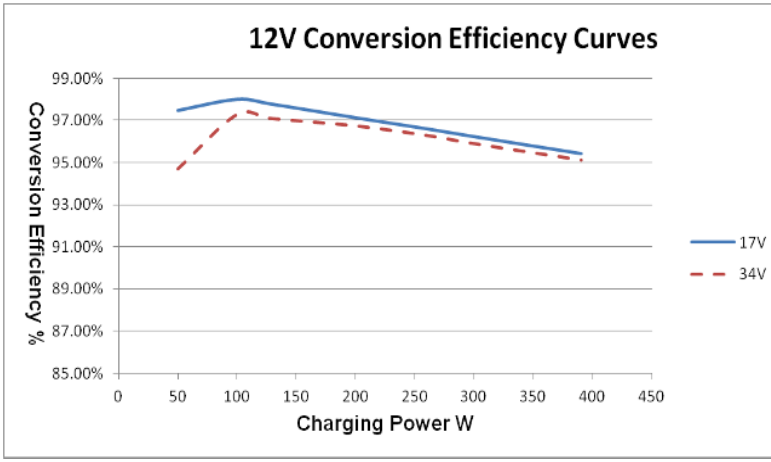


2. **Solar Module MPP Voltage(34V,51V,68V) / Nominal System Voltage(24V)**

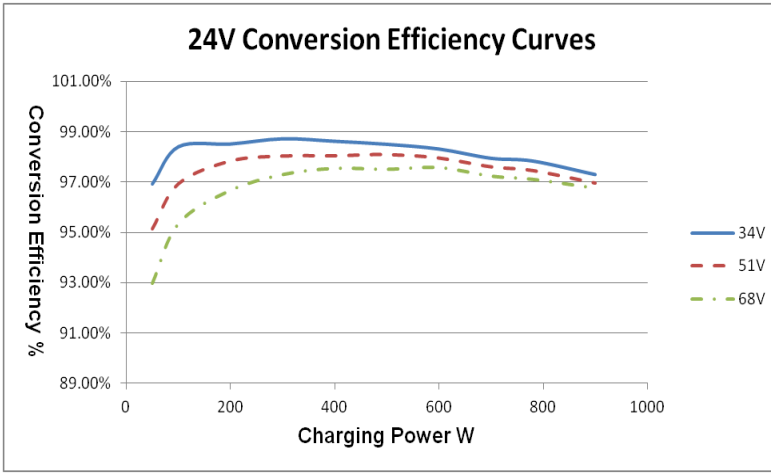


Model: XTRA3210N

1. **Solar Module MPP Voltage(17V, 34V) / Nominal System Voltage(12V)**

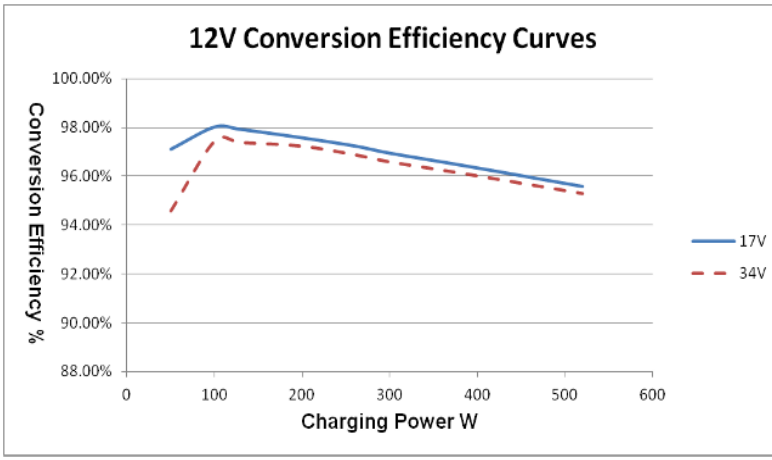


2. **Solar Module MPP Voltage(34V,51V,68V) / Nominal System Voltage(24V)**

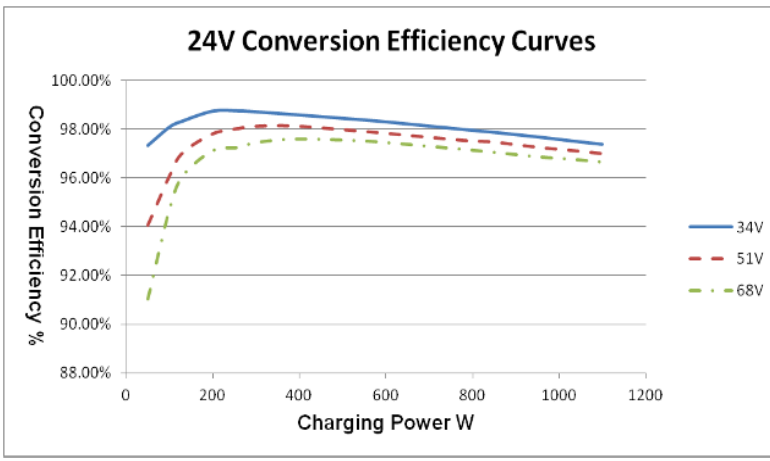


Model: XTRA4210N

1. **Solar Module MPP Voltage(17V, 34V) / Nominal System Voltage(12V)**

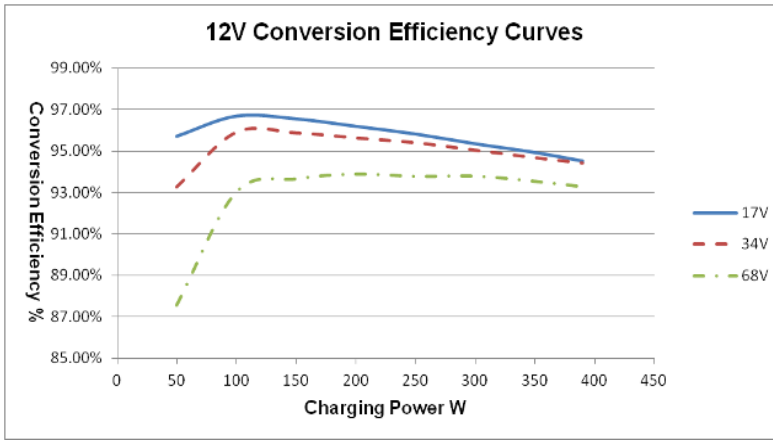


2. **Solar Module MPP Voltage(34V, 51V,68V) / Nominal System Voltage(24V)**

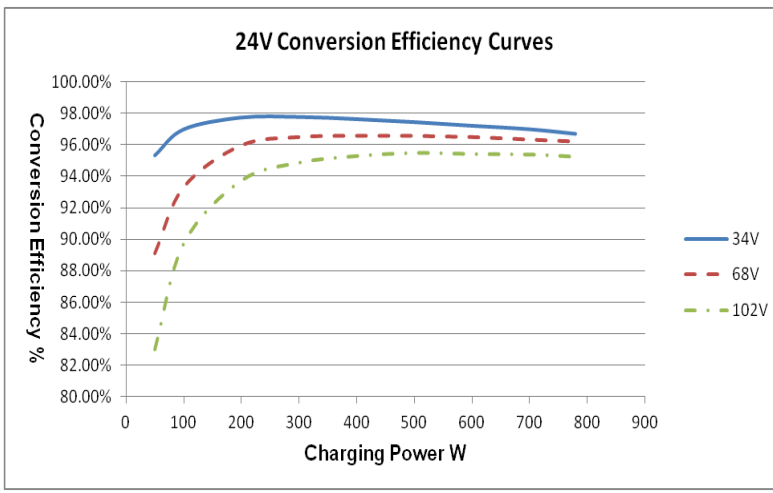


Model: XTRA3215N

1. Solar Module MPP Voltage(17V, 34V, 68V) / Nominal System Voltage(12V)

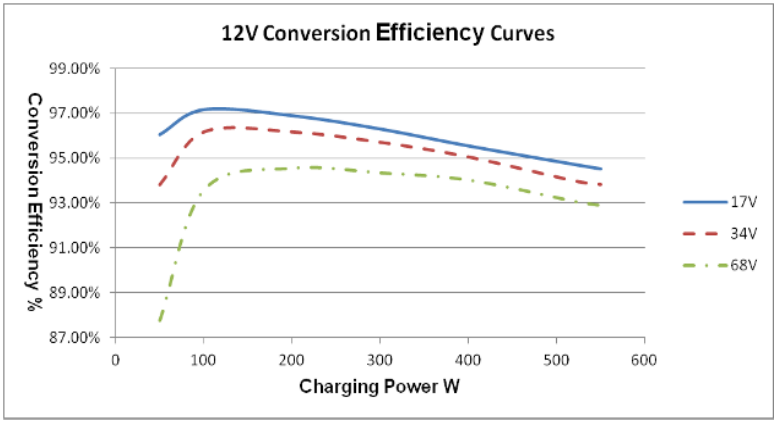


2. Solar Module MPP Voltage(34V, 68V, 102V) / Nominal System Voltage(24V)

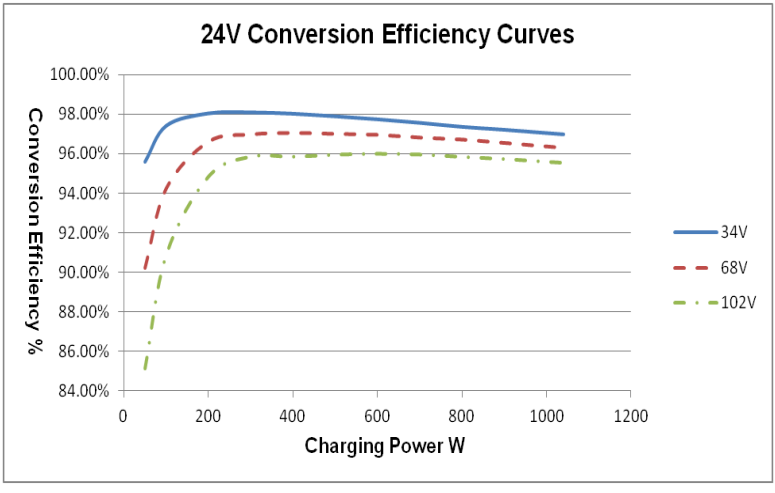


Model: XTRA4215N

1. **Solar Module MPP Voltage(17V, 34V, 68V) / Nominal System Voltage(12V)**

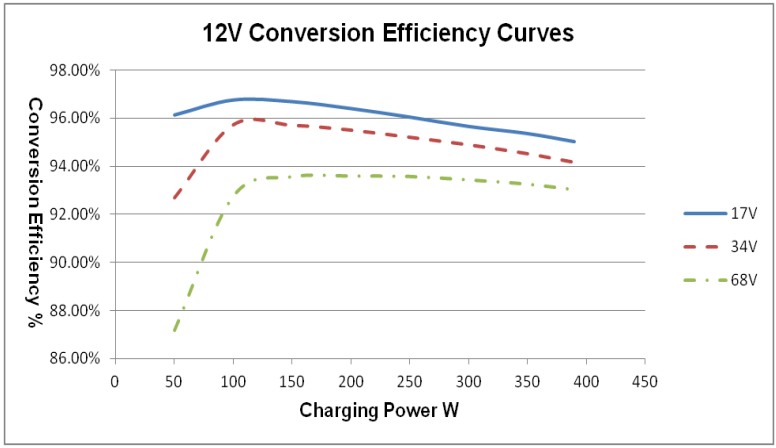


2. **Solar Module MPP Voltage(34V, 68V, 102V) / Nominal System Voltage(24V)**

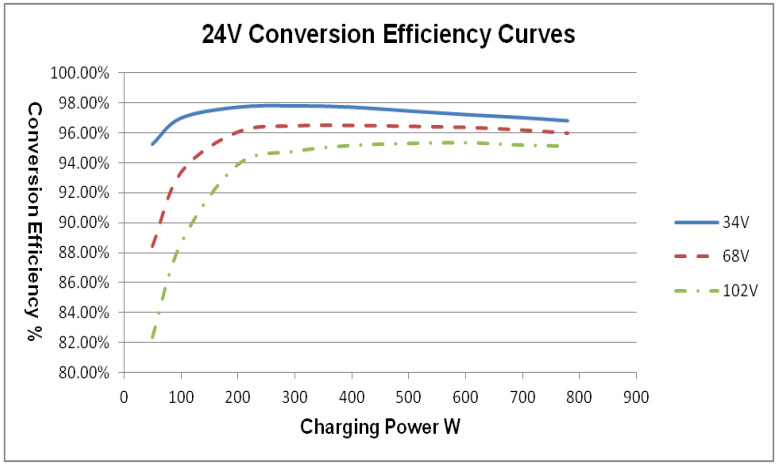


Model: XTRA3415N

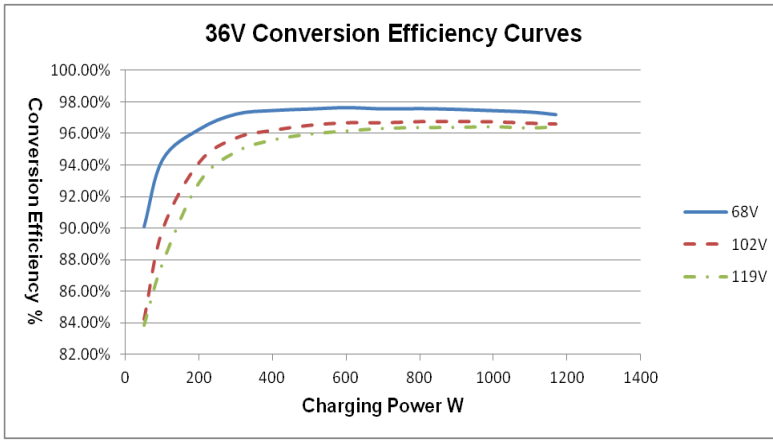
1. Solar Module MPP Voltage(17V, 34V, 68V) / Nominal System Voltage(12V)



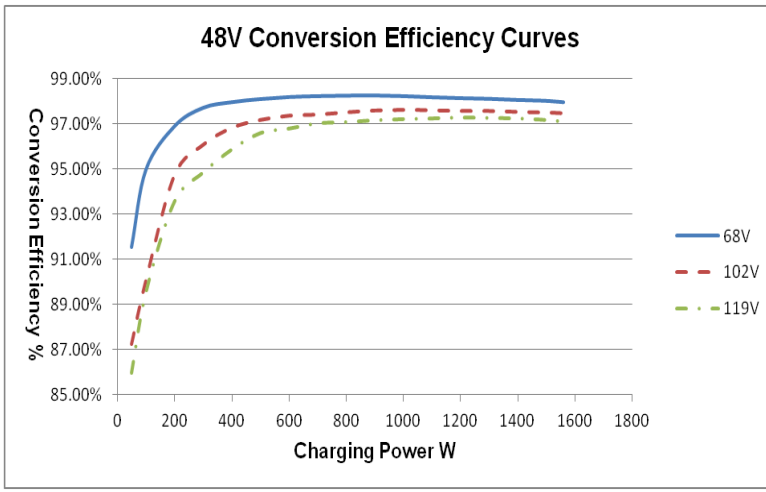
2. Solar Module MPP Voltage(34V, 68V, 102V) / Nominal System Voltage(24V)



3. **Solar Module MPP Voltage(68V, 102V, 119V) / Nominal System Voltage(36V)**

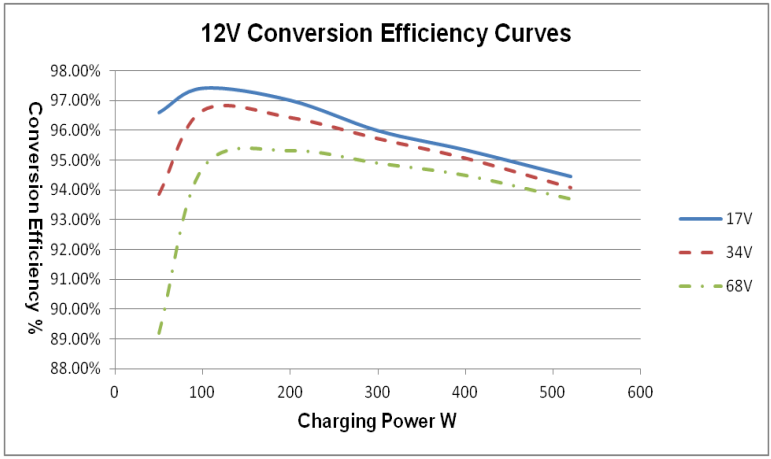


4. **Solar Module MPP Voltage(68V, 102V, 119V) / Nominal System Voltage(48V)**

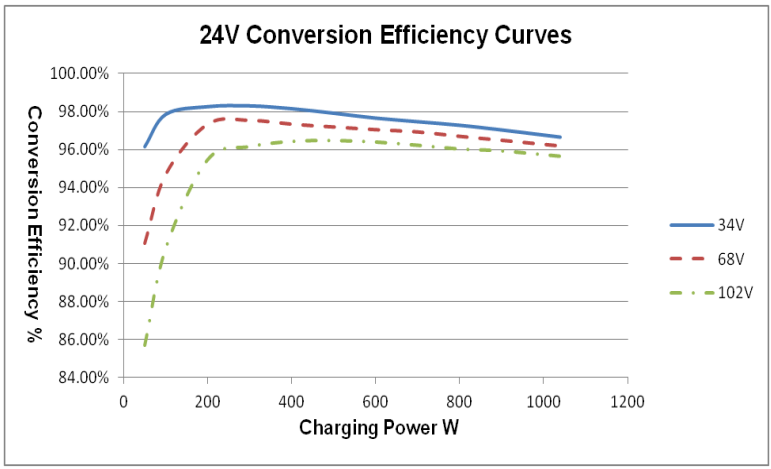


Model: XTRA4415N

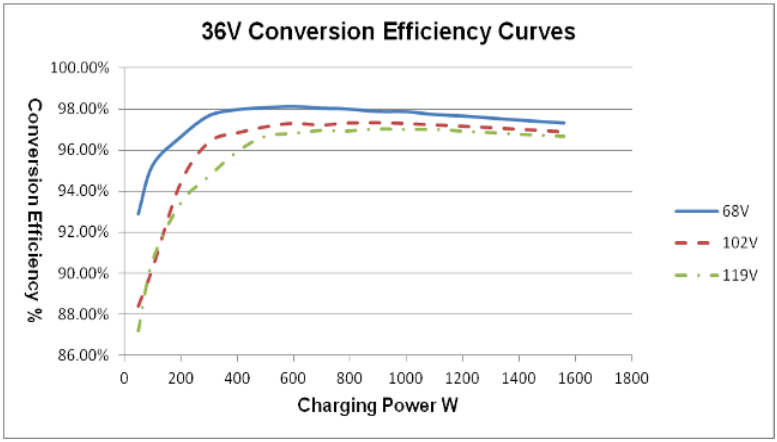
1. **Solar Module MPP Voltage(17V, 34V, 68V) / Nominal System Voltage(12V)**



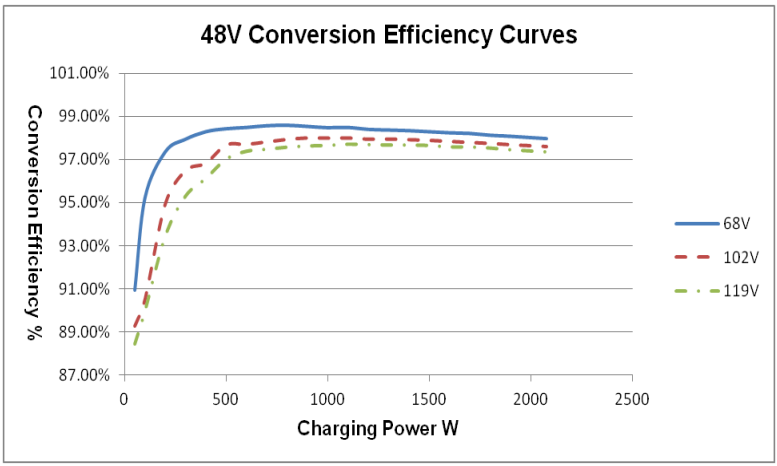
2. **Solar Module MPP Voltage(34V, 68V, 102V) / Nominal System Voltage(24V)**



3. **Solar Module MPP Voltage(68V, 102V, 119V) / Nominal System Voltage(36V)**



4. **Solar Module MPP Voltage(68V, 102V, 119V) / Nominal System Voltage(48V)**



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