



## PWM SOLAR CONTROLLER USER MANUAL

Thank you for choosing KT Solar's 12V & 24V Compatible PWM Solar Controller. Please refer to this user manual before using or installing this product.

### Models available to the range:

KT70780 - 5A 12V - 24V PWM Solar Controller  
KT70781 - 10A 12V - 24V PWM Solar Controller  
KT70783 - 20A 12V - 24V PWM Solar Controller  
KT70784 - 15A+15A 12V - 24V Dual PWM Solar Controller

### Compatible Battery Types

AGM, WET, CALCIUM, GEL, LTO, LiFePO4, Li-ion

### Operational Instructions

Once your PWM Solar Controller is connected to a solar power source and/or a battery, the LCD display back-lighting will illuminate. Power source and battery voltages will display and the solar controller is now ready for setting battery chemistry and charging.

### Setting Battery Chemistry Type

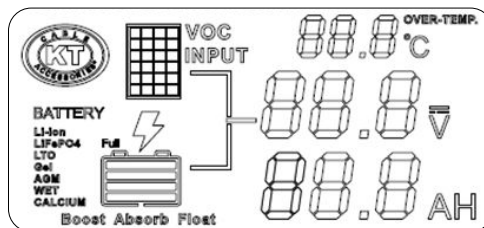
**Press Set** button once to activate setting mode, KT logo will begin to flash. For Single PWM Solar Controllers (5A, 10A & 20A), a list of types of batteries light up for selection by operating **Up or Down Arrow buttons**.

For 15A+15A Dual PWM Solar Controller press **Left Arrow button to set Battery A**. A full list of battery chemistry types illuminate for selection. Or, **press Right Arrow button to set Battery B**, a full list of battery chemistry types illuminate for selection.

**Press Up or Down Arrow buttons to select battery type**. The selected battery type will flash on and off. **Press Set button** to confirm selection. For 15A+15A Dual PWM Solar Controller, **press Set button** to confirm setting after both battery types are selected. KT logo will stop flashing on and off, and will remain solid upon battery selection confirmation. The setting will stay in memory, even after disconnection, unless settings are reset.

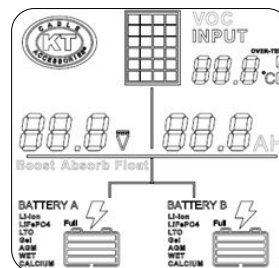
**Note:** AGM is the default battery type. The system will automatically turn off the back-lighting and exit setting mode in 30 seconds when no setting action is detected.

**Warning:** Incorrect battery type setting may result in a malfunction of solar controller and cause damage to your battery. It is highly recommended to select the correct battery chemistry type once connected to avoid damage of the batteries.



### 5, 10, 20A Single PWM Solar Controller Display

### 15+15A Dual PWM Solar Controller Display



### Display

The LCD display cycles through 'Real-time' charging data in the below sequence at different intervals:

**Cycle Sequence:** Solar Source > Battery A > Battery B.

When Battery A or B is not connected, the system omits its interval by skipping to the next interval.

**15 Seconds for Solar Source:** VOC (Voltage Open Circuit) 5 seconds + Charging Input Voltage 10 Seconds, meanwhile Total Charging Current Input 15 seconds;

15 Seconds for Battery A: Battery A Voltage 15 seconds, Battery A Charging Current 10 seconds, Charging AH 5 seconds, Battery A Temperature is displayed throughout the cycle of 15 seconds only if the provided temperature probe is connected;

**(Battery B only relative to 15A+15A Dual PWM Solar Controller)**

15 Seconds for Battery B: Battery B Voltage 15 seconds, Battery B Charging Current 10 seconds, Charging AH 5 seconds, Battery B Temperature is displayed throughout the cycle of 15 seconds only if the provided temperature probe is connected.

LCD Backlighting turns off in 60 seconds when one cycle of display is complete. Touch any key to turn on the backlighting.

**Ampere Hour:** This unit detects and displays charging ampere hour of each charging process, reaching its maximum digit at 199AH (when AH becomes greater than 99.9AH, the display omits the decimal point and digit behind to display a three-digit integer). AH data will refresh itself once the battery is disconnected.

Temperature reading displays as '---' until provided 5m temperature sensors leads are properly connected to the solar controller and battery. It is compulsory to connect temperature sensor between this solar controller and any type of Lithium battery.

Throughout the charging process, a flash sign above each battery icon and battery percentage bars will flash. **'Full'** will display when a battery is fully charged. Refer to table below for percentage details of each type of battery type:

Battery Types (12V)	0%	25%	50%	75%	100%	FULL
LifePO4	10.50V	12.40V	12.80V	13.50V	13.70V	14.00V
LTO (L14T15012)	10.50V	12.40V	12.80V	13.50V	13.70V	14.00V
GEL	10.50V	12.00V	12.30V	12.60V	13.20V	13.80V
AGM	10.50V	12.00V	12.30V	12.60V	13.20V	13.80V
WET	10.50V	12.00V	12.40V	12.80V	13.20V	13.80V
CALCIUM	10.50V	12.00V	12.40V	12.80V	13.20V	13.80V
Li3+/Li-ion	9.50V	10.20V	11.10V	11.60V	11.80V	12.00V
Charging Stages	BOOST				ABSORB	FLOAT
					MAINTAINING FLOAT/FULL	

Sign "A" displays next to temperature digits when 'Battery A' data is on; For 15A+15A Dual PWM Solar Controller Sign "B" turns on next to temperature reading when 'Battery B' data is on display.

### Charging Stages

**TRICKLE:** This regulator will trickle charge an over-discharged battery below 0% (refer to table above) however, no less than 7V at minimal current to "waken up" the battery, until the battery reaches at the lowest boost charging point. At this stage, the Flash (Lightening Bolt icon) above battery icon flashes.

**BOOST:** This stage is a constant current charging process that continues until the battery is 75% charged. BOOST indicates on the display.

**ABSORB:** This is a constant voltage charging stage between 75% and fully charged. Charging current decreases as the battery voltage rises. ABSORB indicates on the display.

**FLOAT:** When the battery is charged up to its nominal full capacity (i.e., 13.8V for AGM), this solar controller reverts to FLOAT charging mode with minimal charging current until fully charged at 14.3V (AGM).

**FULL:** When the battery is fully charged to its maximum capacity (i.e., 14.3V for AGM), FULL is displayed and the battery percentage bars and charging sign 'Flash' (Lightning Bolt icon) stops flashing, then will remain solid. Charging will stop for 1 minute.

**MAINTAINING FLOAT:** When the battery is discharged below its nominal full capacity (i.e., 13.8V for AGM), this regulator maintains the battery by charging it at a rate equal to its self-discharging rate. Both signs FULL and FLOAT stay on, Flash (Lightning Bolt icon) flashes intermittently at this stage.

## Internal Temperature Protection

- When the internal working temperature reaches 85°C, the unit will stop the charging process. The LCD backlighting will flash and an Over-Temperature icon will indicate.
- When internal working temperature reduces to 65°C charging will restart at full capacity.

## Battery Temperature

- External temperature detection and display is activated once the 5m temperature probes provided are correctly connected to the solar controller and battery.
- When battery temperature reaches at 65°C, battery protection kicks in, charging stops and the display will begin to flash.
- Charging will restart when the battery temperature drops down to 45°C.
- Warning: when any type of Lithium battery is connected to the solar controller, it is MANDATORY to connect the provided temperature probe/probes between the solar controller and each battery. The charging process will not start whilst the temperature sign “—” flashes blank.

## Single Regulator Current Rating Modification:

- **Press and hold Down Arrow** for 5 seconds to display ‘current rating’ and enter amperage setting mode;
- Once in Amperage setting mode, **quick press Down Arrow** to change current from higher ratings to lower ratings. For instance, a 20A rated unit can be set at 10A, or 5A; a 10A rated unit can be set at 5A. The controller will not be able to be set at a lower amperage rated unit to a higher amperage. For instance, a 10A unit cannot be set as 20A; a 5A unit cannot be set as a 10A or 20A unit.
- **Press and Hold Down Arrow for 5 seconds** to confirm setting and exit amperage setting mode.
- Throughout this process, **press any key to exit** without saving changes.

## Safety Protection Features

- The smart programming of each solar controller prevents a battery from being overcharged.
- This solar controller is built with polarity protection
- This solar controller has short circuit protection.
- This solar controller prevents over-current charging.
- It is strongly recommended that a 45A fuse to be connected to solar panels and batteries. The solar controller protects itself, but not the solar panel and battery connected to it. Once Input and/or Output current reach 45A, the solar controller will “burp” at 50Hz until the short circuit and/or overcurrent issue is fixed.
- This solar controller prevents current flowing back from batteries to solar panel.

- This solar controller provides temperature protection. It will stop charging and flashes its LCD display backlighting when working temperature reaches 85°C. Charge process resumes when working temperature drops down to 65°C, backlighting stops flashing.
- This solar controller and its temperature probes protect batteries by ceasing the charging process when the battery temperature rises to 65°C, backlighting and Over-temp will flash.
- Charge process restarts when battery temperature drops down to 45°C. This solar controller permanently stops the charging process when the battery reaches 65°C for the third time.
- Warning: when any type of Lithium battery is connected to this solar controller, it is MANDATORY to connect provided 5m temperature probe/probes between the solar controller and each battery, and ensure that the correct battery chemistry type has been selected to avoid battery damage or explosion.

## Product Care

- This product is rated to IP65. Do not submerge this unit, or subject to constant water spray or rain.
- To clean this product, simply use a damp cloth and gently wipe any dirt or dust off the unit.
- Do not mount this product in engine bays.
- Do not mount solar controller directly to the back of monocrystalline solar panels. This can cause de-rating.

## Feedback

KT Solar design and innovate our own products based on market and consumer demand, and always welcome any feedback on our products and services. If you would like to provide us feedback, you can do this by:

- a) Sending our team an email at [marketing@ae4a.com.au](mailto:marketing@ae4a.com.au) or
- b) Following our Facebook & Instagram Pages '@ktsolaraus' and leave us a review
- c) Contacting our team directly by phone:  
East Coast - QLD, NSW, ACT, VIC, TAS: (07) 5540 7877  
West Coast: WA, NT, SA (08) 9358 7000

We also welcome you to share any images you have of your installations on our social media pages (Facebook and Instagram). Our team post daily and may re-share your installation photos with our +80K followers! To learn more about KT Solar products and services, visit [www.ktcables.com.au](http://www.ktcables.com.au).

Alternatively, to learn more about Automotive Electrical & 4WD Accessories, visit [www.ae4a.com.au](http://www.ae4a.com.au)

## Warranty Guarantee

This product carries an unconditional 12 Month Warranty against defects under the terms of the manufacturers warranty. Should the manufacturers warranty not comply with Australian Consumer Law, AECAA Pty Ltd Trading as Automotive Electrical & 4WD Accessories will provide a warranty against defects for 3 years from date of purchase on the following terms:

a ) For valid claims, Automotive Electrical & 4WD Accessories will replace the product free of charge.

b ) The warranty excludes defects from after sale damage, neglect, abuse, failure to comply with information provided in this manual, or incorrect installation. You, the purchaser, must bear all transportation costs to and from Automotive Electrical & 4WD Accessories.

c ) The benefits of this warranty are in addition to any other rights and remedies available at law.

d ) Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality.

For warranty claims:

- a ) Return the product with receipt and original packaging (if available) to the store in which the product was originally purchased.
- b) Email our team at [warranties@ae4a.com.au](mailto:warranties@ae4a.com.au) with details of the products defects and our team will assist with a resolution.