

TRACKER CONTROL SYSTEM

User MANUAL

OMCO SOLAR[®]

OIM-500 Revision 1

OMCO StarTM Controller User Manual

OMCO StarTM Is a Trademark of OMCO Solar[®]

OMCO Origin[®] Is a Registered Trademark of OMCO Solar[®]

NOTICE

Changes to **OMCO Origin** Tracker components are common as OMCO Solar continuously strives for product improvements.

All products within the same model classification should remain functionally equivalent and compatible with one another, even though there may be slight differences based on product improvements or other changes.

OMCO Solar reserves the right to make changes to the design and specifications applicable to any **OMCO Origin** Tracker components at any time without notification or update to this document.

CONTACT INFORMATION

For information regarding OMCO Solar and its product, please visit www.omcosolar.com.

To request a quote or to discuss your tracker needs, please email your request to info@omcosolar.com or call 602.352.2700.

CERTIFICATIONS

OMCO Solar operates a Quality Management System which complies with the requirements of ISO 9001.

OMCO Solar is compliant with UL 3703.

OMCO Solar is compliant with FCC Part 15 B

This standard covers **OMCO Origin** Trackers for modules listed to UL 1703.

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OVERVIEW

PURPOSE

This document may be used to plan installation of the **OMCO Star** Tracker Control System, including developing resource estimates for installation of **OMCO Star** components. For more specific information on the individual components, refer to their specific manuals as listed in the Related Documentation section.

NOTE: Failure to install **OMCO Star** controls in the manner described in this document may void the warranty.

SCOPE OF DOCUMENT

This document provides installation and assembly information in support of the **OMCO Star** Tracker Control System and includes details regarding installation that may not be included in the project Construction Drawings.

This document:

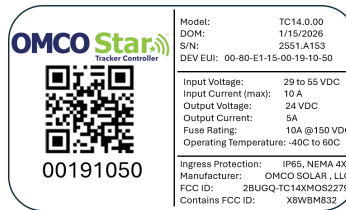
- ▶ **Does not** substitute for site-specific construction drawings prepared by or on behalf of the Owner to determine relevant project layout, design and installation requirements for the project location.
- ▶ **Does not** substitute for the permitting documents required for system installation at the relevant location.
- ▶ **Does not** suggest any unsafe installation practices.
- ▶ **Does not** provide guidance for designing a PV power plant incorporating an **OMCO Star** Control System.

DOCUMENT REVISION HISTORY

Revision	Description	Date	Approved By
0	Initial Release	6/6/25	MK
1	Updates	9/18/2025	Lepolve and Nick or Randy
2	Updates	11/26/2025	Steve Ouandji
3	New Grantee code	1/15/2026	Steve Ouandji

DECLARATION OF CONFORMITY

Tracker Controller TC1.4.0 is in conformity with the essential requirements and other relevant provisions of the CE, FCC, and UL. Under FCC ID: 2BUGQ-TC14XMOS2279



FCC Statement:

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply as a digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference in radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment Via Bluetooth to reboot

Consult the dealer or an experienced radio/TV technician for help. FCC Radiation

Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated at a minimum distance of 20cm between the radiator& your body. This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

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KEY DEFINITIONS

Certain terms in this document are defined as:

TERM	DEFINITION
OMCO Star Tracker Control System	A solar tracker control system consisting of OMCO Star components that have been installed and commissioned in accordance with all applicable requirements, including this Installation Manual.
OMCO Origin Tracker	An assembly of OMCO Origin Tracker Components that have been installed and commissioned in accordance with all applicable requirements, including the applicable Installation Manual.
OMCO Star components	Components and hardware supplied by OMCO Solar that are assembled, installed, and commissioned by Owner, in accordance with all applicable requirements.
Owner	The Owner, purchaser, installer, contractor or operator of any OMCO Star components and hardware, and their permitted assigns subcontractors and personnel as applicable.

IMPORTANT SAFETY INSTRUCTIONS

REFERENCE INFORMATION - **SAVE THESE INSTRUCTIONS**

INSTALLATION WARNINGS, CAUTION, AND NOTICE STATEMENTS

The following define hazard notices used in this document, their indication, and possible result if not avoided.

DANGER: Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

WARNING: Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION: Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

NOTICE: Indicates information considered important, but not hazard-related (e.g., messages relating to property damage).

In all installation and operation practices, safety must be maintained and unsafe practices avoided.

- ▶ Personal Protection Equipment (PPE) should be always used during the installation process.
- ▶ Work boots
- ▶ Hard hat, Safety glasses / proper eye protection, Cut-resistant gloves
- ▶ Safety vest

Electrically rated PPE should be worn when working on interconnected modules or other electrical system components.

To prevent electric shock:

- ▶ Disconnect ALL incoming power sources.
- ▶ More than one disconnects switch may be required to de-energize the equipment.
- ▶ Follow Lockout/Tag-out procedures.
- ▶ Request service by a qualified professional.
- ▶ Observe safety practices in every step of the process and report any unsafe or hazardous condition to your supervisor immediately.

SYSTEM SAFETY INFORMATION

DO NOT use bolts that have been previously tightened or pre-stressed bolts that are structurally compromised as these may not retain their strength when recycled.

Read this document and review the project- specific approved Construction Drawings before beginning installation work. This document is not prescriptive regarding safety and does not purport to address all the safety concerns that may arise with its use. The Owner must become familiar with all applicable safety, health, and regulatory requirements before beginning work.

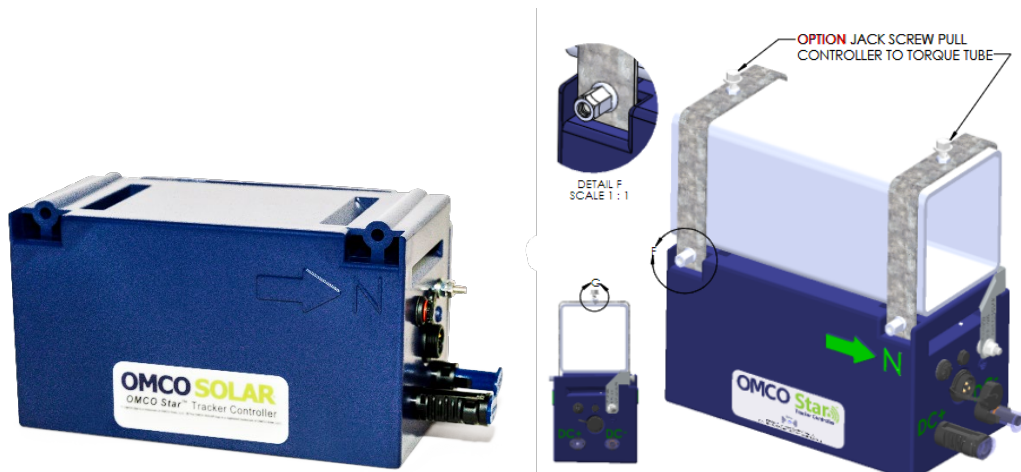
OMCO Solar cannot be held responsible for any injuries or safety incidents during the installation of **OMCO Star** controls.

SITE STORAGE GUIDELINES

While the completed tracker is rated for severe outdoor conditions, the individual components as shipped are not. Proper storage of components on site prior to installation is important to prevent damage that would not be covered by the tracker warranty. Under no circumstances should any components be allowed to sit in standing water. If the site gets sufficient water to cover the ground all components must be elevated off the ground.

These components must be stored indoors until they are installed:

- ▶ Tracker Controller



Tracker Controller Theory of Operation

Overview: The TC.14.0 Tracker controller is a solar powered embedded control field deployed self-Powered Solar Tracker Controller, solar-powered embedded control device designed to operate and monitor a single-axis photovoltaic tracking structure and support remote data transmission and control via LoRaWAN®.

The controller performs the following primary functions:

- Actively positions the tracker row to follow the sun using a closed loop tracking algorithm.
- Receives downlinks to perform protective actions during harsh weather or fault conditions.
- Communicate with 3rd party control system for monitoring, command execution and OTA.
- Execute safe mechanical movements while meeting electromagnetic compatibility and radio emission regulatory requirements per FCC standards.

The controller is designed for outdoors in utility-scale solar tracker arrays and operates in electrically harsh and environmentally exposed environments.

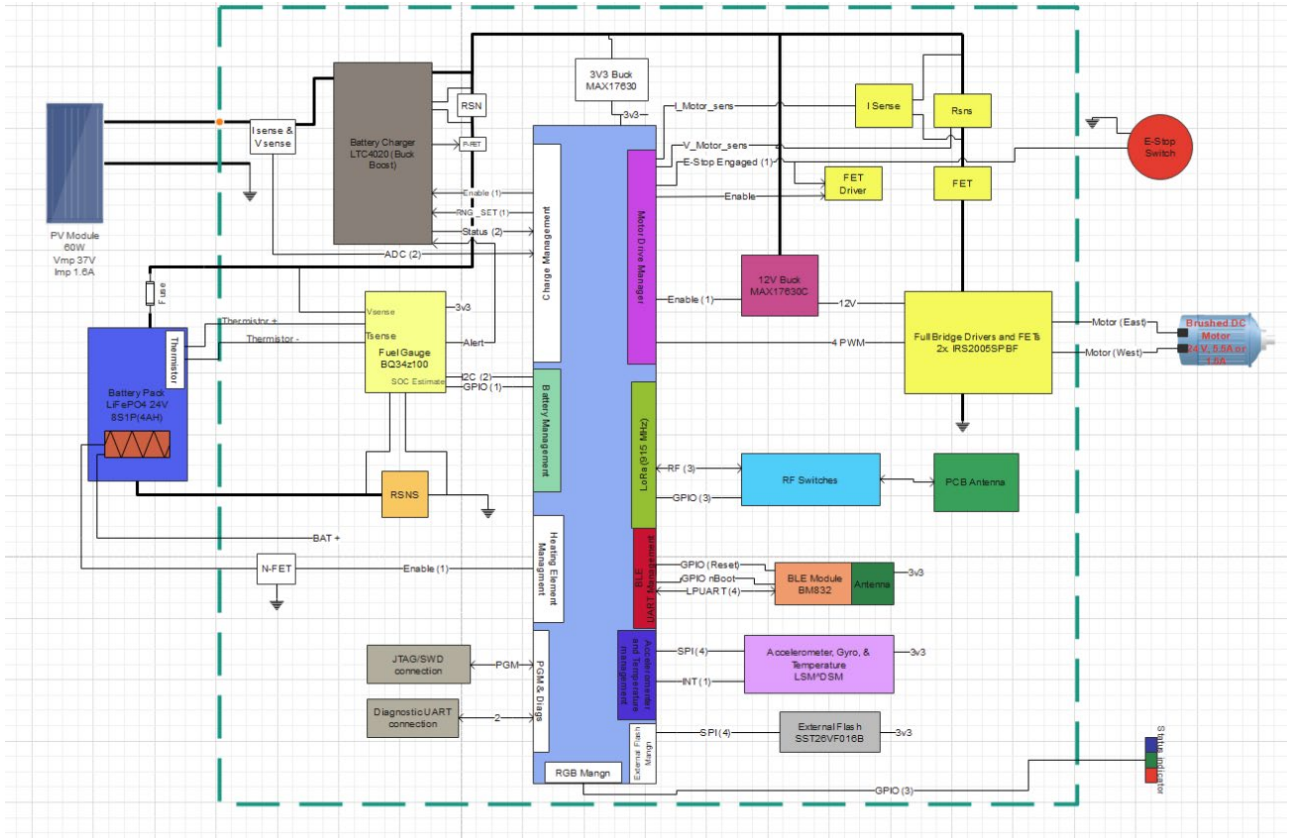
► Features

- Battery Operated with 4Ah LiFe Battery
- Support LoRaWAN® wireless communication
- Multiple triggering conditions and actions
- Embedded watchdog for network stability
- Industrial case design with wide operating temperature range
- Compliant with standard LoRaWAN® gateways and network servers
- Quick and easy configuration with NFC

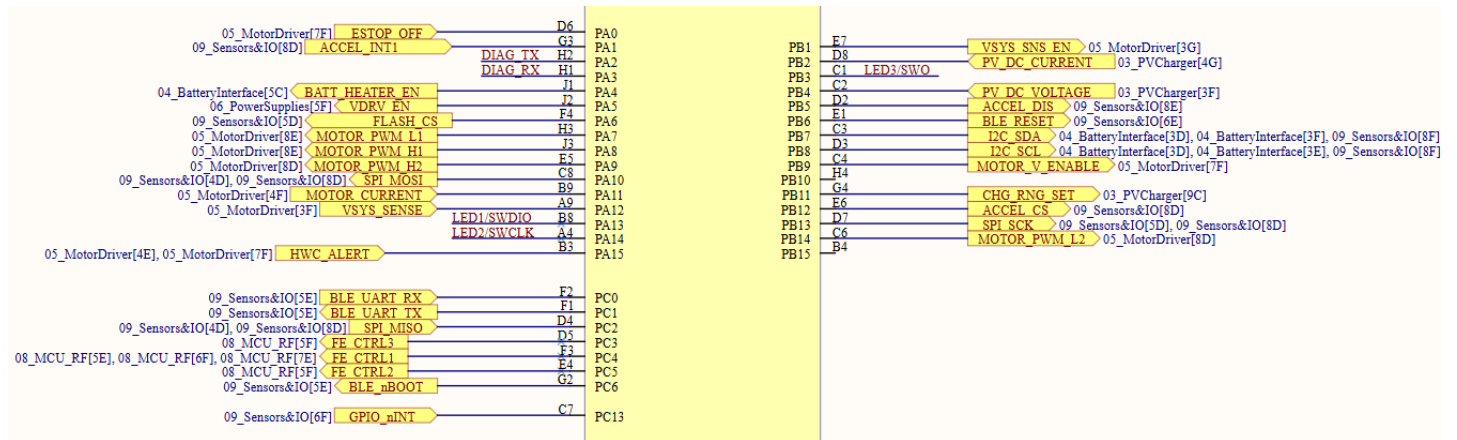
► LED indicator

LED	Indication	Status	Description
SYS	System Status	Static On	System Powered On
		Flashing On / Flashing On	Factory Mode (Tracker not Calibrated)
		Slow Flashing On	Setup Mode
		Fast Flashing On	System Works
		Flashing On	System error (all fault conditions)

► System Block diagram:



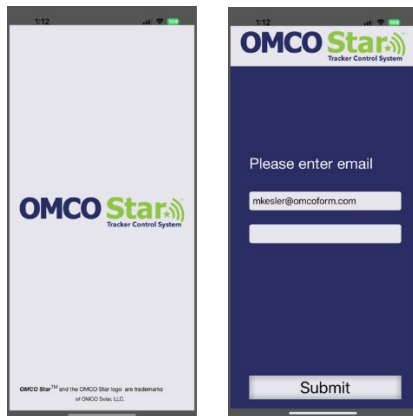
► Pin configuration



► NFC configuration:

The **OMCO Star** phone app allows users to set up a Tracker Controller for use. It can also be used for occasional maintenance.

1) Startup: When the app is opened, this is the first screen:



Enter your company e-mail address and your password.

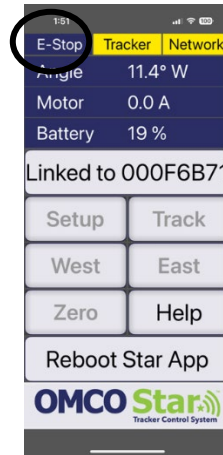
2) Connection to a Tracker Controller.



1. Open phone App from iPhone
2. Link to Device through NFC
3. Home Screen
4. Click **Setup** to Control the device via BLE
5. Under **Setup** Click **West** to move from East to West. Click **West** again to stop.
6. Under **Setup** Click **East** to move from West to East. Click **East** again to stop.

3) Emergency Stop Button.

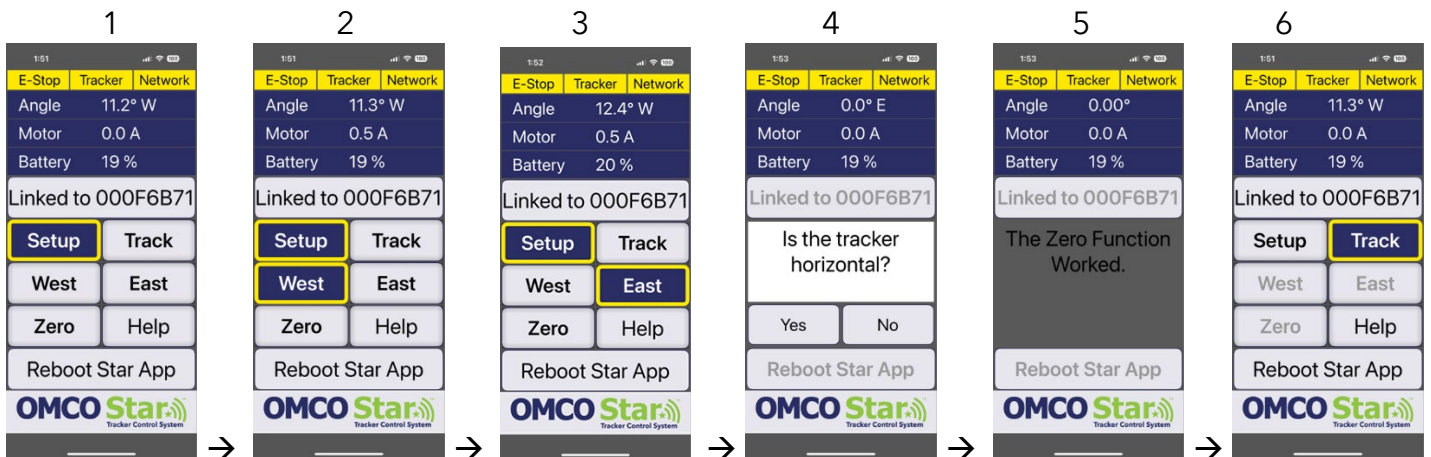
If the e-stop on the Tracker Controller is pushed in you will see this:



In that case, refer to the OMCO Star Operation and Maintenance Manual for instructions on how to reset the e-stop.

4) Calibrating the Controller (Zeroing)

The purpose of this function is to make sure the Tracker Controller's angle or tilt is calibrated. When the tracker is horizontal, the Angle shown on the app should be 0.0°. Click **Setup**.

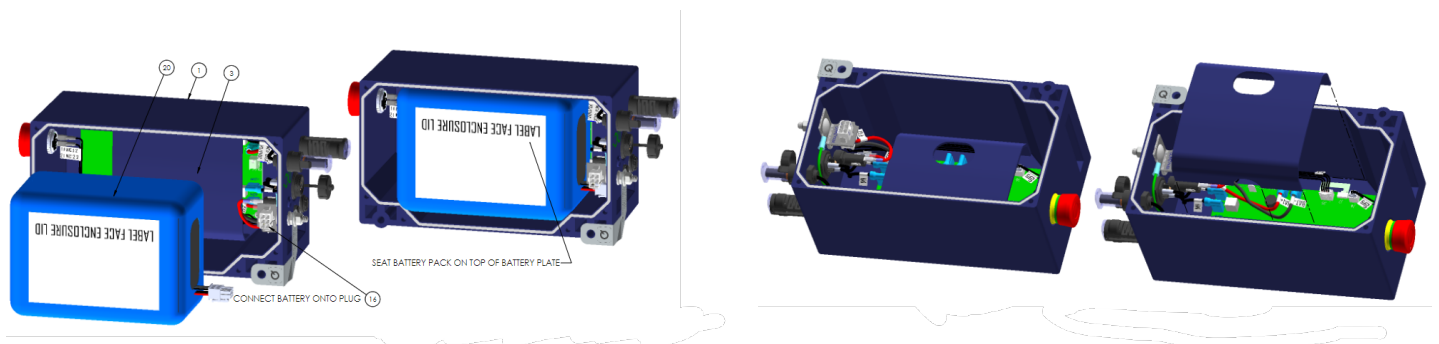


1. Click **Setup** to Calibrate the Controller
2. Under **Setup**, depending on angle, Click **West** or Click **East** to move to 0.0 angle.
3. Under **Setup**, depending on angle, Click **West** or Click **East** to move to 0.0 angle.
4. When Angle reads 0.0 on the app Click **Yes** to confirm
5. App Confirms the device has been calibrated to horizontal Zero.
6. Click **Track** to setup autonomous tracking Functions.

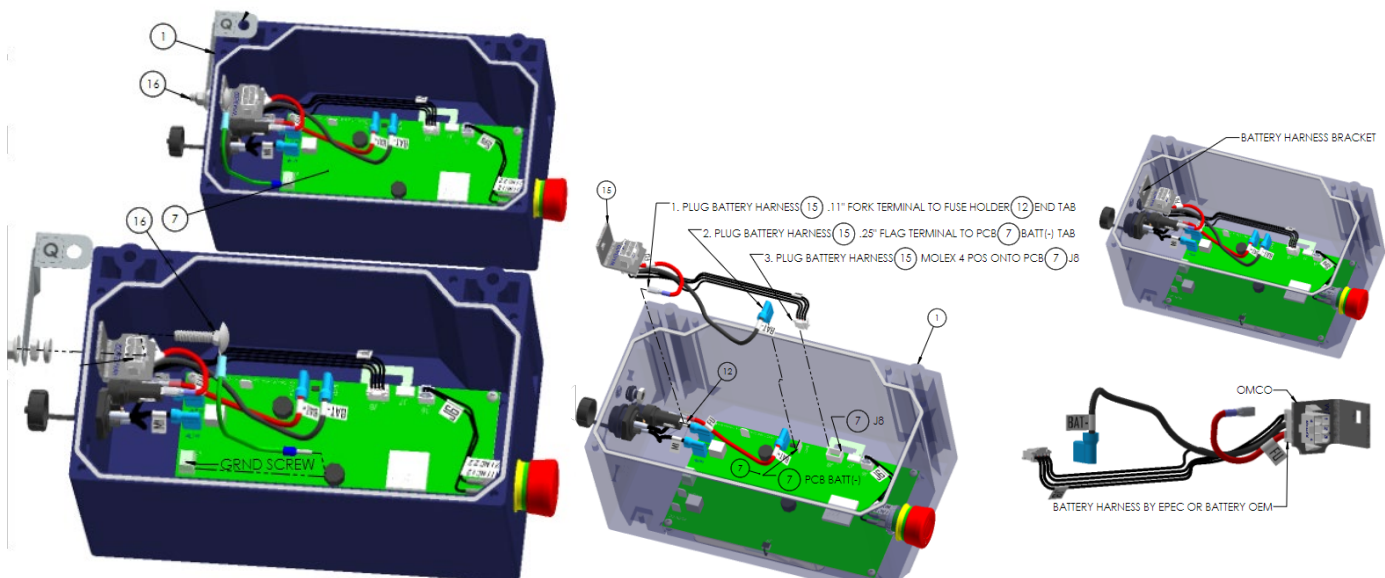
► Hardware Overview:



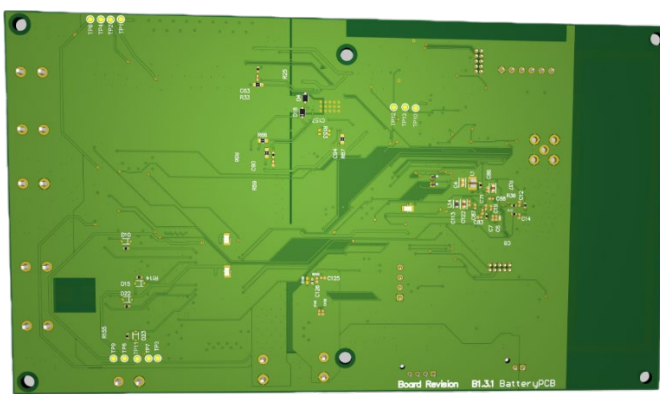
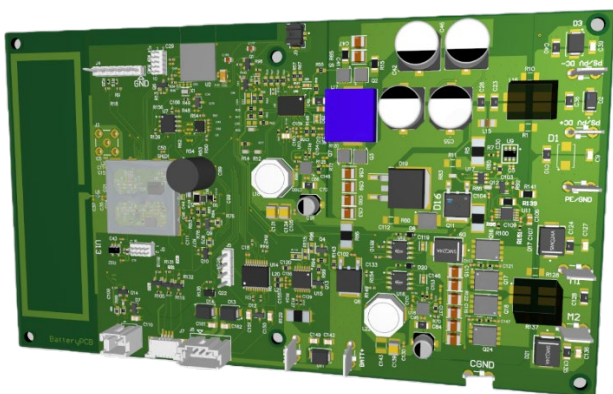
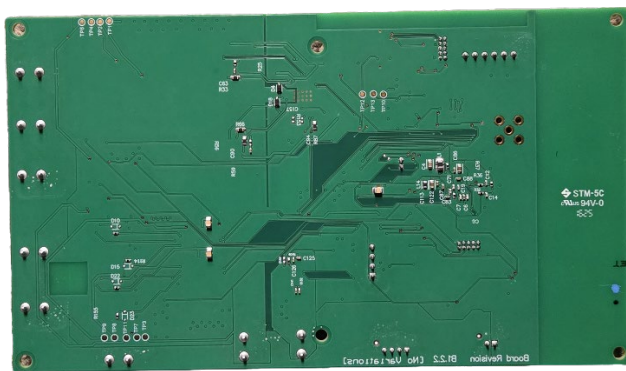
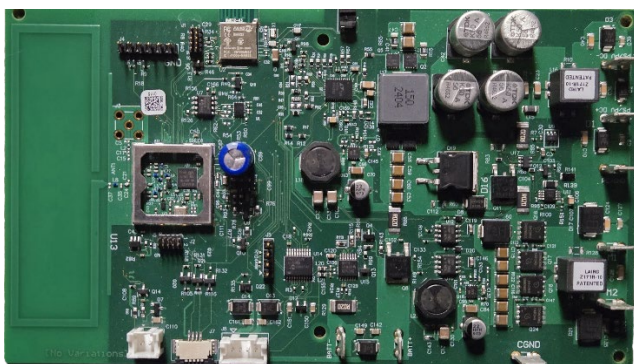
Photos from tracker controller



Tracker controller drawings



Tracker controller wiring



Tracker controller PCB (internal Pictures)

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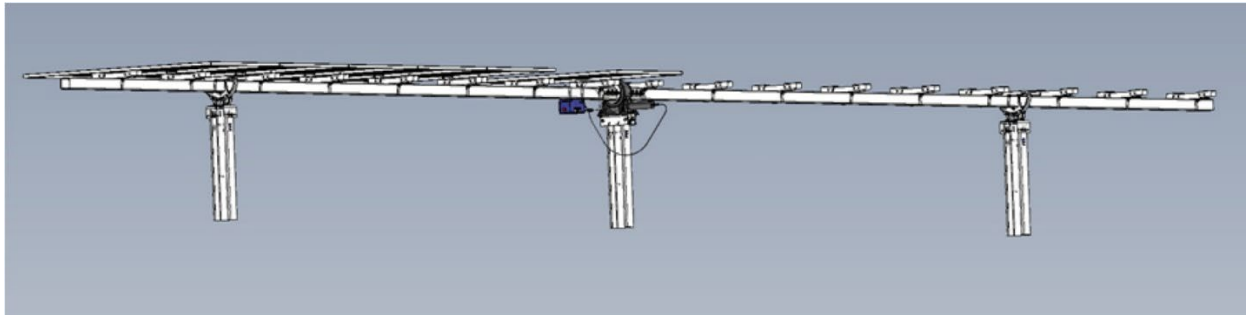
OMCO STAR CONTROLLER INSTALLATION

INSTALLING THE TRACKER CONTROLLER

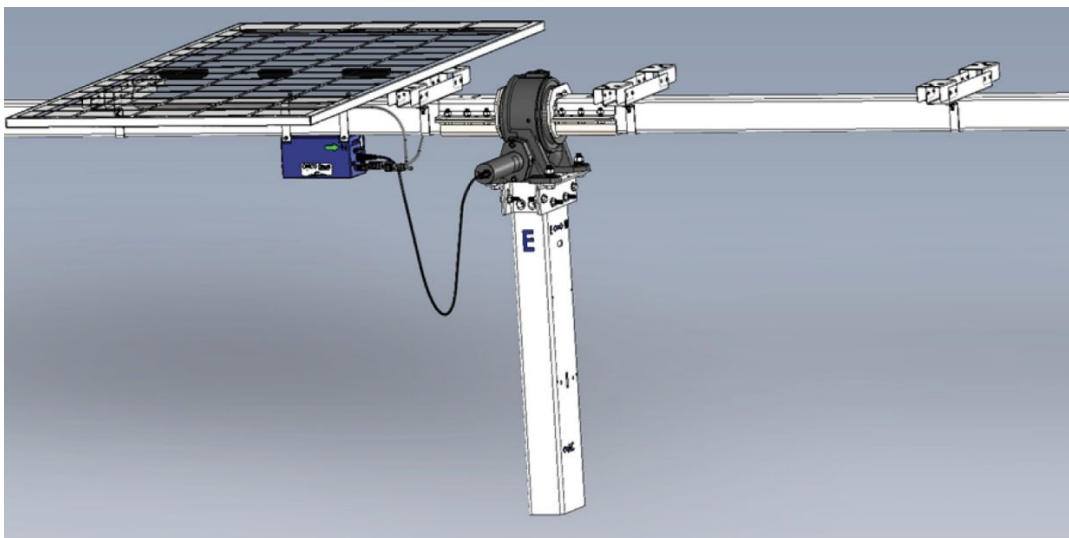
To install the Tracker Controller:

1. Mount the tracker controller using the brackets provided to install it on the torque tube. Ensure that the tracker controller is facing north. A GREEN arrow on the controller shows the direction to install. The controller must be oriented to that GREEN arrow and installed on the south side of the slew drive.

- Connect the motor cable to the tracker controller.



Install the charging module provided on top of the controller. Connect the "+" connector first, then the "-" connector. The fuse provided is 10 amps. It must be seated inside the tracker controller. Do not substitute another fuse.





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