PRODUCT MANUAL

Topcon Solar Power Kit

SPECTO TECHNOLOGY
A WORLD OF SOLUTIONS

1061 E. Elizabeth Ave. Linden, NJ 07036
866-925-7737 • sales@spectotechnology.com
www.spectotechnology.com

Table of Contents

TOPCON SOLAR POWER KIT

Welcome to the Topcon Solar Power Kit manual. This guide will help you understand the features, setup, and operation of your Topcon Solar Power Kit. The kit is designed to power the Topcon Automated Total Station (AMTS), an advanced instrument used for surveying and monitoring applications. The AMTS automates the measurement of angles, distances, and coordinates, providing reliable and efficient data collection for construction, civil engineering, and geotechnical projects. Combined with the Solar Power Kit, the AMTS ensures uninterrupted performance in remote or off-grid locations, enabling seamless operation in the most demanding environments.

SAFETY INFORMATION

- **Read all instructions carefully before using the product**
- **Keep this manual for future reference**
- **Depending on the solar charge controller model, the PV voltage can be up to 450Vdc. Voltages above 50V are considered dangerous. Check your local electrical safety regulations as to the exact regulations. Dangerous voltages can only be handled by a qualified technician**

PRODUCT OVERVIEW

The Topcon Total Station is a precise instrument used for surveying construction applications, providing accurate measurements for monitoring, positioning, mapping, and layout tasks. It's known for its reliability and performance in various field conditions. To enhance its usability in remote or off-grid locations, the Topcon Total Station is accompanied by a Solar Kit which provides a portable power solution. This kit includes solar panels and necessary accessories to keep the Topcon Total Station charged and operational, ensuring continuous functionality without the need for external power sources.

Features:

- **General Across all sizes:**
  - Pole or Ground Mount kit for solar panels
  - 10ft extension cable for the solar panels
  - 15ft power cable to Delta Link with molded connector
  - Circuit breakers & Battery cable
- **Standard:**
  - 2 x 50Ah 24V LiFePO4 deep cycle battery (connected in parallel)
  - 2 x 150W 12V Solar Panels
  - Solar Controller 20Amp (Bluetooth enabled)
- **Large**
  - 3 x 50Ah 24V LiFePO4 deep cycle batteries (connected in parallel)
  - 3 x 150W 12V Solar Panels
  - Solar Controller 20Amp (Bluetooth enabled)
  - 12V-24V transformer (for Delta Link v1 Compatibility)

Package Contents

- **Solar panel** - The number of panels varies depending on the solar kit size. Each panel is 150W)
  - Standard: 2 x (150W 12V Solar Panel)
  - Large: 3 x (150W 12V Solar Panel)
- **Solar Panel bracket** (may vary based on request, Pole or ground)
- **Battery** (the number of batteries varies depending on the solar kit size)
  - Standard: 2 x 50Ah 24V LiFePO4
  - Large: 3 x 50Ah 24V LiFePO4
  - Aluminum Battery Enclosure:
    - Circuit breakers
    - Charge controller
    - Terminal block
    - Grounding lug
- **Cable**
  - MC4 to CNlinko cable for the solar panel to the battery terminal
- **Deltalink solar kit** (Optional)
  - Deltalink (Optional)
  - Deltalink Power Cable
  - Relay
  - SIM card
  - Transformer (24V regulator)
- **Geo Explorer solar kit** (Optional)
  - Modem (Optional)
  - Modem Power cable
  - Auto-Meteo (Optional)
  - AMTS Power Cable
  - Relay
- **Optional accessories**
  - Auto Leveling Tribrach (Geo Laser)
  - Auto-level power cable (geo laser cable connection)
  - AMTS Wall/Parapet Mount
  - AMTS Pillar Mount

Unpacking

- Carefully remove the product from its packaging
- Ensure all parts are included as per the package contents list

Installation

A Ensure that all circuit breakers are switched off to begin. (Ensure the switches are flipped downward)
B Connect the batteries by matching the red wire to the red lugs and the black wire to the black lugs.
C Connect the battery. Do not Short the terminals in the process.
D Switch the "Battery" breaker(s) to ON. (Flip the switch upward)
E Check the power to the MPPT, and make sure there is a blue light blinking where the Bulk light should be. (If the LED light does not turn on, check the fuse in the bottom left of the charge controller.)
F Connect Solar panels using the MC4 cables provided with the kit
G Switch the Solar switch to on (Flip the switch upward)
H To check the power flowing through the battery, set up the Smart Solar by using the Victron software
I Depending on the device you are using, download the Victron Connect application on the Victron Energy website.
J Open the VictronConnect app and select the charge controller on the local connect section of the app (Bluetooth connection is required. Make sure the Bluetooth on the device connecting to the Charge Controller is on)
K On the Bluetooth pair, the PIN is a 6-digit code labeled "PIN" on the side of the Charge Controller. If the Charge Controller has no label, pair Bluetooth using the pin "000000" (six zeros) and click "OK."
L A possible firmware update would start if the current version installed is outdated on the device
M Use the Victron Connect app on your phone to see the battery and solar status

- Optional – Connect the Auto-Level Tribrach
  - Plug the Orange mil-spec cable into the Battery enclosure and then to the ATL
  - Grounding Lug
    - Recommended 12-16 Gadge wire from the lug to the earth
    - Stake the earth and connect the ground wire to the stake

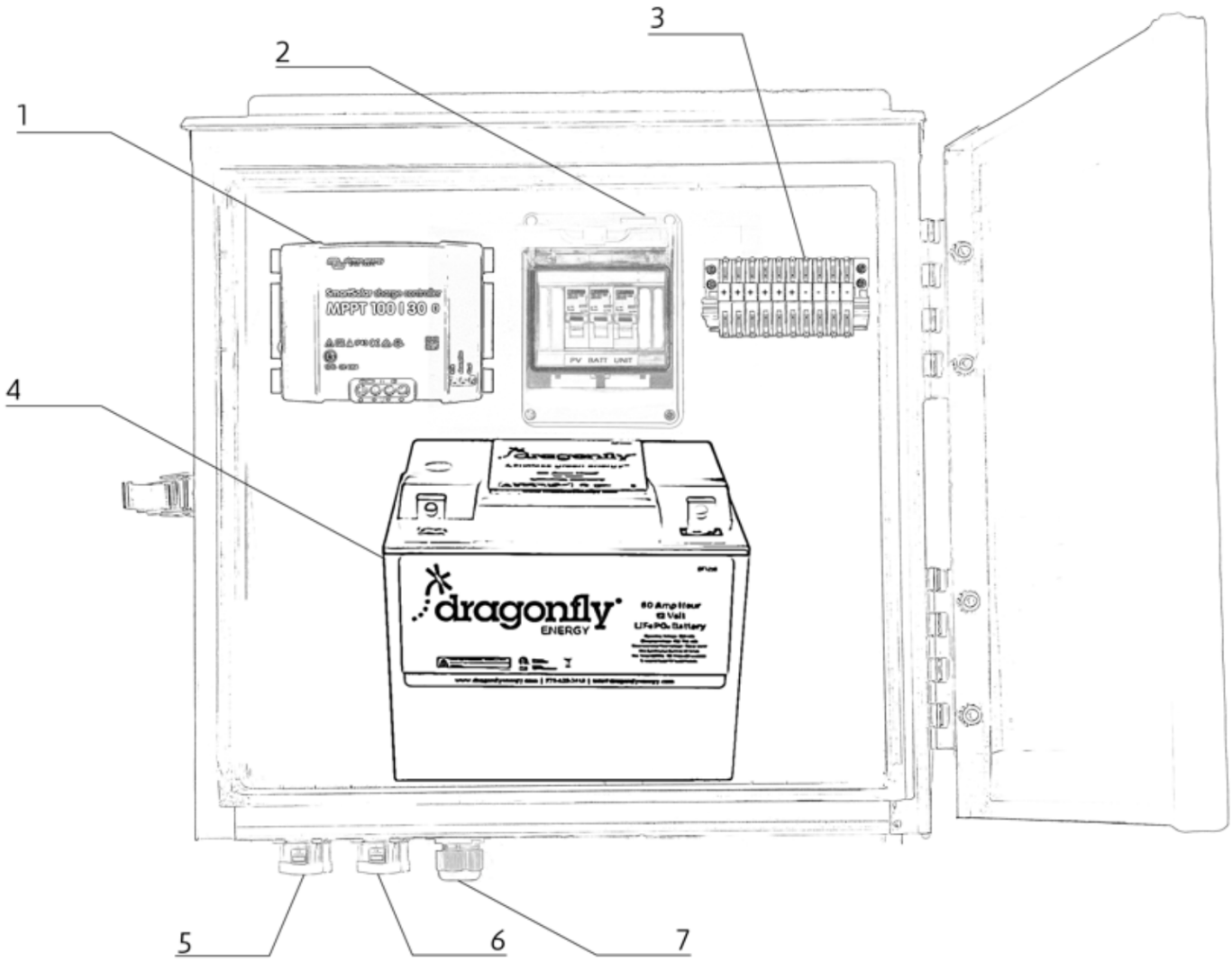
N Plug the grey AMTS cable into the AMTS
O Depending on the hardware involved in connecting the Total station wirelessly, follow the instructions below:

- Delta Solution (Click here)
- GeoExplorer (Click here)

P To set up the Topcon Total Station and Prisms related to the Total Station, instructions can be found in the links below:

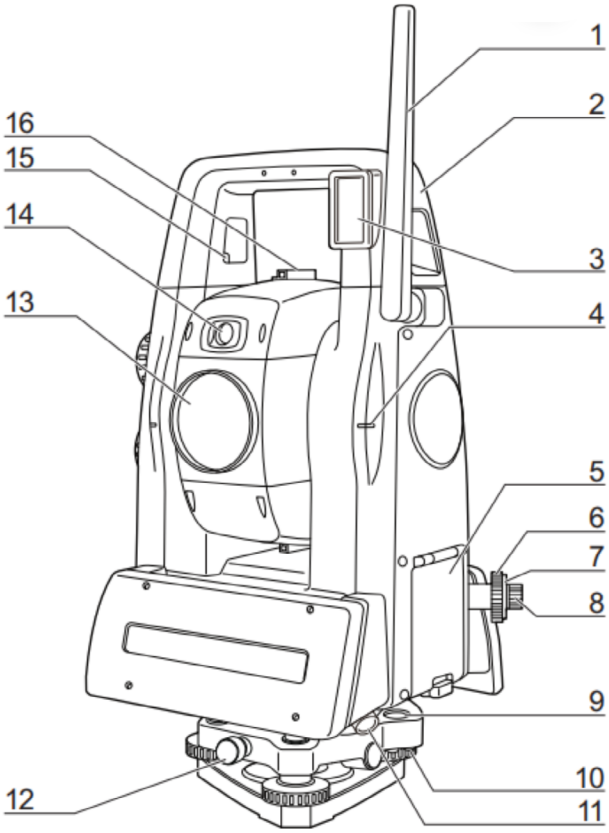
- Specto Technology Support page
- Topcon Support page

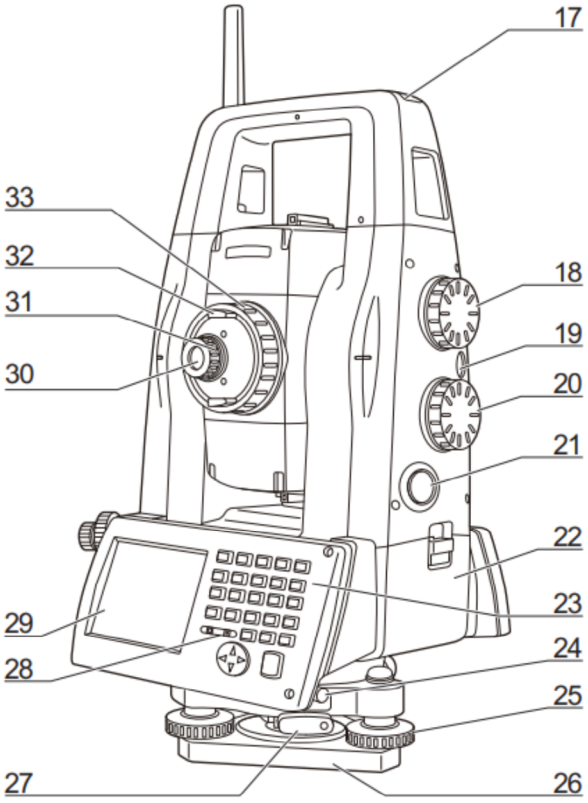
Solar Enclosure



1. Charge Controller
2. Breaker box
3. Terminal
4. Battery
5. Solar Quick Connect (PV)
6. Unit Quick Connect
7. Accessory cable gland

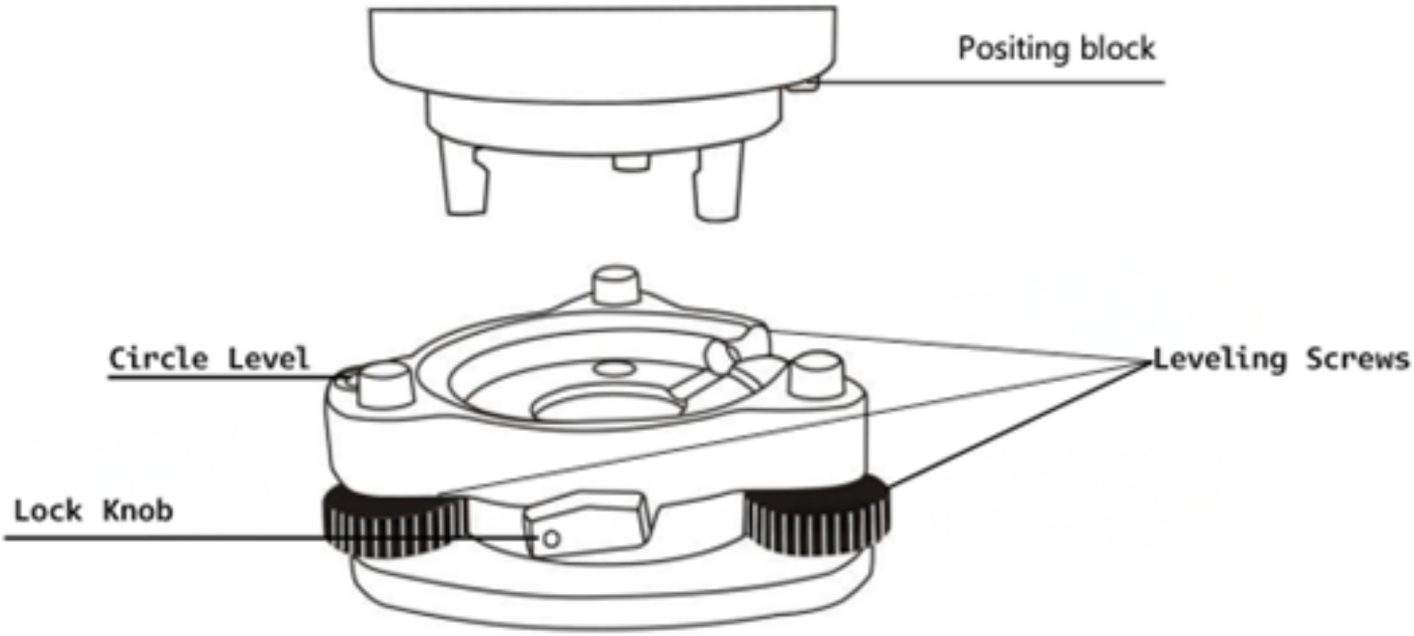
Topcon





1. Bluetooth antenna
2. Handle
3. Beam detector for remote
4. Height mark
5. Interface hatch
6. Plummet focusing ring
7. Plummet reticle cover
8. Plummet eyepiece
9. Bubble Level
10. Level adjusting screws
11. Serial connector
12. Tribrach locking screws
13. Objective lens
14. Searchlight
15. Handle locking screw
16. Sighting collimator
17. Tubular compass slot
18. Vertical jog
19. Power key
20. Horizontal jog
21. Trigger key
22. Battery cover
23. Keyboard
24. Stylus
25. Leveling foot screw
26. Base plate
27. Tribrach clamp
28. Lum sensor
29. Display unit
30. Telescope eyepiece
31. Telescope eyepiece screw
32. Telescope knob
33. Telescope focusing ring

Parts of the Tribrach



Cleaning

- Clean the total station lens by removing all dust or debris with a soft cloth (Careful not to damage or scratch the lens)
- Clear all remnants on the prisms to obtain an accurate result from the Total station

Storage

- To prevent any damage, ensure proper care of the Total Station by securely storing and transporting the unit both on and off-site
- Keep the Total station in case when it is not being used
- The carrying case is custom-made to hold your total station and protect the unit from impacts. Although it might seem convenient to place additional accessories inside, doing so could potentially cause damage Switch the “Battery” breaker(s) to ON. (Flip the switch upward)
- Make sure every battery is fully charged. Next, unplug the battery from any loads by removing one battery’s negative connection. The batteries lose roughly 2-3% of their capacity each month on average.

Regular Checks

- Periodically check the battery voltage going to the battery to confirm there is no significant power loss
- Yearly calibration of the Total station is recommended
- Confirm that the prisms are properly mounted to structures
- Ensure that total stations without auto levels are accurately leveled within the compensator range
- Ensure that the batteries are regularly charged to 14.2V to 14.6V for internal balancing.
- Periodically check the Victronconnect Charge controller configuration. After extended time powered off, the configuration may reset to the factory config

Problem 1:

- The batteries are not holding a charge on Solar power even when Solar Status is green. This table helps determine how much solar energy can be harvested at different latitudes and the corresponding optimal tilt angles for solar panels.

Location	Latitude	Full Year Angle	Avg. Insolation on Panel (Hr)	Solar Radiance per day	% of Optimum
Calgary, Canada	51°	44°	6.6	~3.5 to 4.0 kWh/m²	70%
Chihuahua, Mexico	29°	25°	5.9	~7.0 to 7.5 kWh/m²	72%
Denver, Colorado	40°	33.5°	5.7	~4.0 to 4.5 kWh/m²	71%
Key West, Florida	25°	22.1°	6.2	~5.0 to 5.5 kWh/m²	72%
Mexico City, Mexico	19°	19.5°	5.8	~5.0 to 5.5 kWh/m²	72%
Minneapolis, Minnesota	45°	37.3°	5.4	~3.5 to 4.0 kWh/m²	71%
Quito, Exuador	0°	0.0°	6.5	~5.5 to 6.0 kWh/m²	72%
Seattle, Washington	47°	48°	4.8	~3.0 to 3.5 kWh/m²	70%
Winnipeg, Canada	50°	42°	5.1	~4.0 to 4.5 kWh/m²	70%

Problem 2:

Calibrations are invalid, but angle and distance data for all prisms are not present

- **Solution:** References are being read, but the measurement schedule is not aligned with the calibration interval and data window. To resolve the issue, make sure the calibration data window is larger than the measurement schedule of the reference prisms and longer than the calibration interval

Problem 3:

Specific prisms are showing recent angle readings but no distance or coordinates

Problem 4:

Occasionally, a software issue may cause the Topcon AMTS to become unresponsive.

- **Solution 1:** A reboot may solve the issue. A Warm boot can be performed by simply pressing the Green power button until the station powers off, then pressing the button again to turn it back on.
- **Solution 2:** If the problem is not resolved with a warm boot the next step is to perform a cold boot. A cold boot will not erase surveying data in the instrument, but all the parameters will be changed to the factory settings. If the data in the memory is necessary, BE SURE TO TRANSFER IT TO A PERSONAL COMPUTER BEFORE PERFORMING A COLD BOOT.
- To perform a cold boot, while holding {☼}, and {S.P.}, press the power key on the side of the instrument.
- The instrument is reset and powers **ON** as normal.

Product	SKU
Topcon Y-cable to connect total station & modem to AC or DC power source	SV-TC-YCAB
DC Power cable for Delta-Link (5m length)	SV-TC-DL-DC-CAB5
Solar panel (150W, 12V)	SOL-150-12
Solar panel POLE mounting kit for 2 x large 300W 12V panels	SOL-MT-300-12-PM
Solar panel POLE mounting kit for 3 x large 150W 12V panels (450W)	SOL-MT-450-12-PM
Solar panel POLE mounting kit for 3 x large 150W 24V panels (450W)	SOL-MT-450-24-PM

Warranty Information

Warranty information can be viewed on the Specto Technology Terms & Conditions page

Contact Information

Customer Support:
Phone: +1 (866) 925 -7737 ext. 3
Email: support@spectotechnology.com
Address: 1061 E. Elizabeth Ave. Linden, NJ 07036

Sales Inquiries:
Phone: +1 (866) 925 -7737 ext. 1
Email: sales@spectotechnology.com
Address: 1061 E. Elizabeth Ave. Linden, NJ 07036

www.spectotechnology.com

Specto Support