



WeCo Batteries & Morningstar

Introduction:

With over four million sold since 1993, Morningstar is recognized as the expert in charging technology throughout the solar industry. As solar-plus-storage becomes more prevalent in mainstream installations, battery chemistries are becoming more advanced—and battery makers are increasingly looking for ways to help their customers maintain and protect their long-term investment.

Morningstar's *Energy Storage Partner Program™* (ESP) makes it possible for selected premium battery partners to offer additional value and support for their customers by offering them a more proven, better documented and controlled storage system. With energy storage typically accounting for a very large share of the overall system's cost, ESP helps advanced chemistry battery manufacturers to provide the maximum level of assurance that system owners and operators need. This document is intended to provide essential information and recommendations for integrating Morningstar charge controllers with the Energy Storage Partner's batteries. Proper integration of these products is dependent upon successful implementation of the custom settings outlined in the sections below. These settings are the result of cooperation between manufacturers and have been agreed upon by both parties.

Manufacturer and Battery Overview:

WeCo is an Italian manufacturer of lithium batteries for solar applications, based in Florence Italy. With an annual capacity of over 300,000 batteries / year. WeCo collaborates with the best manufacturers of solar inverters and chargers.

The new XP batteries series can be monitored via WiFi app and can be set via the Bluetooth APP.

With a third party insurance, WeCo guarantees 120 months /7000 cycles.

WeCo Website: <https://wecobatteries.com/>

Model: 4K4 PRO, 5K3 XP

Voltage: 48V

Amp Hour Capacity: 90Ah, 105 Ah

Maximum of 5 batteries in parallel (open loop)

Storage

Recommended storage temperature = -20°C + 45°C (25°C recommended)

Max SoC storage = 50%

Requires inspection and recharge every three months (max charging current is 0.1C). Max SoC storage is 50%

Low Temperature

At temperatures below -7°C the BMS will allow only 0.1C charging

Current below -7°C the charge is forbidden.

As part of the 120 months performance Warranty, Charge and Discharge shall be in the range 20-25°C, < 0,5C

Any usage outside this range is not covered by Performance Warranty





For optimal integration please use the following settings (12V settings are entered into the MSView Setup Wizard as indicated and multiplied by 4 for 48V settings)

Absorption Voltage = 13.7 V / 54.8 V

Absorption Time = 20 minutes

Temperature Compensation = 0.0 V/degC (Disabled)

Float/Float Voltage/Timeout = Enable / 13.6 V / 54.6 V/ 30 minutes

Float cancel not enabled

Equalize = Not enabled

Battery HVD/High Voltage Disconnect/Reconnect = Enable/14.1 V/ 56.4 V /13.5 V/ 54 V

TriStar Load control settings

Load LVD (Low Voltage Disconnect) = 12.65 V/ 50.6 V

Load LVR (Low Voltage Reconnect) = 13.1 V/ 52.4 V

Optional Recommended Settings:

Absorption Ext = Not enabled

Battery Service Reminder = Not enabled

Max Regulation Limit = Not enabled

Battery Current Limit = Optional (not required since the WeCo battery max charging current = 100A)

TriStar Load control optional settings:

Delay Before Load LVD = 1 min (Possibly longer for cold temperatures)

Load Current Compensation; Optional: Can be calculated based on -1.8V / battery Ah for 48V lithium batteries reduces Load LVD based on size of load with respect to battery Ah capacity)

Examples for 100Ah battery: 1 battery= -1.8/100 Ah = -.018 V/A; 2 batteries in parallel = -1.8/200 Ah = -.009

Load HVD/High Voltage Disconnect/Reconnect..... Enable/15.00 V/14.00 V (May help to protect loads from potentially harmful voltage spikes that can be caused by external charging sources continuing to operate during battery removal)

Battery Charge LED Indications (Not intended for accurate SoC measurement):

LED G → G/Y 75%+ = 13.35 V/ 53.4 V

LED G/Y → Y 50% - 74% = 13.2 V/ 52.8 V

LED Y → Y/R 25% - 49% = 13 V/ 52 V

LED Y/R → R 10% or below = 12.65 V/ 50.6 V

Notes:

The performance of systems using these settings may vary depending on use conditions and application.

Lithium batteries include a Battery Management System (BMS) that can implement an internal battery disconnect in the event of an internal fault, high or low temperatures, high or low battery voltages or other conditions.





It is important that proper low voltage load disconnect settings are used to prevent over-discharging to the point where the BVMS doesn't disconnect due to self-consumption of the controller and other devices which will disable charging in the morning.

In case of a battery cell high voltage condition the WeCo BMS may disconnect the battery internally. This is not likely to happen with the settings provided but if this does occur lowering the charge voltage setting can be considered or cells of the battery may need to be balanced. Contact WeCo for more information about balancing the cell voltages.

Damage to the controller due to a battery disconnect during charging is typically not covered under warranty. Incidental damage to loads is also not covered under warranty.

Monitoring of the system with Morningstar Live View or MSView and WeCo monitoring software is recommended to determine if adjustments to the settings may be considered.

The Eco batteries include two configurable dry contacts which can be used to disable charging of the TriStar solar controllers before a BMS high voltage disconnect occurs. Please contact Morningstar support for more information on how to configure the dry contacts to disable charging.

These settings are available for the Morningstar controllers listed below:

TriStar MPPT models - TS-MPPT-30 (30A), TS-MPPT-45 (45A)45A and TS-MPPT-60 (60A)

TriStar MPPT 600V model - TS-MPPT-60-600V-48 (60A)

TriStar [PWM] models - TS-45 (45A) and TS-60 (60A) - Charging control or Load control modes

Relay Driver - RD-1 for Load control

Communications hardware required for programming Custom Settings with MSView:

EMC-1 Ethernet MeterBus Converter- <http://www.morningstarcorp.com/products/ethernet-meterbus-converter/>

All TriStar, TriStar MPPT, TS-MPPT-600V includes an RS-232 port for connection to a PC.

Tripp Lite U209-000-R USB / Serial DB-9 (RS-232) Adapter Cable (not available from Morningstar) for USB PC interface

All TS-MPPT-60 (150V and 600V) models also include an Ethernet port and EIA-485 port.

MSView Software Download: <http://www.morningstarcorp.com/msview/>

MSView Configuration Files: <https://www.morningstarcorp.com/wp-content/uploads/WeCo-MSView-Configuration-Files.zip>

Other links:

[Morningstar Best Practices by Battery Chemistry](#)

[Morningstar Custom Settings Info Pages](#)

IMPORTANT:

WeCo Batteries and Morningstar Corporation are separate companies with unaffiliated ownership. Neither WeCo Batteries nor Morningstar Corporation make any warranties explicit or implied with this product information.

Morningstar makes no representation or assumption of liability regarding the charging requirements for any type of battery or model.

Some of the materials presented may be based on information provided by other parties, such as battery specifications and operating parameters.

Performance may vary depending on use conditions and application.

