

Majortel Power System Reference

Battery Circuit Charge Parameter: C-Rates

C-Rates factor calculations for charging or discharging the battery. (Reference the application chart.) Battery manufacturers will use different Cxx rates depending on the market or application at which their batteries are targeted. Typical rates used are C8 in UPS, C10 in telecommunication and C20. The most common C10 factor settings are 10% recharge based on the capacity of the battery as programmed using AHr ratings. The default setting 0.100C10 will program the controller to check the battery AHr setting and calculate the 10% size recharge current limit. The actual current measurement is taken inside the power system with a shunt placed in series circuit design, just before the connection to the battery (output) connection block.

System current limit will be active when one of two thresholds is met:
the current reading relative to the programmed percent battery size or
the 105% capacity of a rectifier(s).

Either limit reached will be the current limit of the system. Use a setting equal to 1 for maximum output with no limitation based on the battery size and current limit algorithm in the software.

Sample Calculation using C10 default setting

Battery in Amp Hour = 100
System value = 0.10 (Screen View –“Limit: 0.100C10”)
Calculated Limit (amp) = 10

By example : 100(0.10) = 10 amps

Table: C-Factor Sample Settings

System View Cxx	Default Battery Size	Effective Current Limit
0.100C10	100 AHr	10 A
1.000C10	100 AHr	100 A
0.200C10	100 AHr	20A

Battery Manufacturer’s instructions should be readily available at the installation when programming and adjusting any rectifier/charger system connected to a battery. Battery damage will occur if voltage, current or temperature conditions are allowed to exceed the battery design intent. It is recommended that the user fully understand the interaction of the rectifier system, battery and supported loads.

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Temperature Compensation

When the temperature probe is connected to the system, the controller will perform voltage control based on temperature. The insulated probe should be installed on or near the battery post for best results and accurate temperature compensation. If the probe is not connected to the power system this feature will not operate. Verify proper probe operation by monitoring the temperature on the MTS-Com screen.

Temperature coefficient setting

Obtain the temperature coefficient in mV/°C for floating charge from the battery supplier or input operation parameters manually. Input the coefficient value in mV/°C and reference temperature in °C for the battery parameters under the controller menu. Factory Default settings are center temperature 25°C and 3mV/°C per cell; based on string size. The center temperature setting range is available from 10°C through 40°C. Temp comp is only active for a temperature within the range. The range of settings for XXmV/°C is 0-500mV. User applications may change based on actual battery chemistry and manufacturer recommendations. Assume 2.25 volt per cell for the illustrations below.

Float charge value calculation

When the battery temperature (ambient probe) is higher or lower than the reference (normally 25°C temperature) the float charge voltage should change using the compensation calculation. Temperature has an inverse relationship to voltage control.

A) The Set Point voltage(V_{fc}) @ reference temperature = Float charge voltage on the bus

B) The V_{fc} +/- temperature coefficient = temperature compensated V_{fc}

For example, the chart below contains sample voltages for a range of temperatures based on 25°C center set point; offsets of +10 degrees and -5 degrees.

48V system set point for a 24 cell string and 54 V_{fc} . with a 72mV/°C coefficient a string.

3mV x 24 cell = 72mV/string for each degree

A) Set Pt V_{fc}	T °C	Comp Δ	B) Final V_{fc}
	35(+10)	-0.72V	53.28
54.00	25	0.0	54.00
	20(-5)	+0.36V	54.36

24V system set point for 12 cell string and 27 V_{fc} . with a 144mV/°C coefficient a string.

3mV x 12 cell = 144mV/string for each degree

Set Point V_{fc}	T °C	Comp Δ	Final V_{fc}
	35	-1.44V	25.56
27.00	25	0.0	27.00
	20	+0.72V	27.72

130V system set point for 60 cell string and 135 V_{fc} . with a 180mV/°C coefficient a string.

3mV x 60 cell = 180mV/string for each degree

Set Point V_{fc}	T °C	Comp Δ	Final V_{fc}
	35	-1.80V	133.20
135.00	25	0.0	135.00
	20	+0.9V	134.10