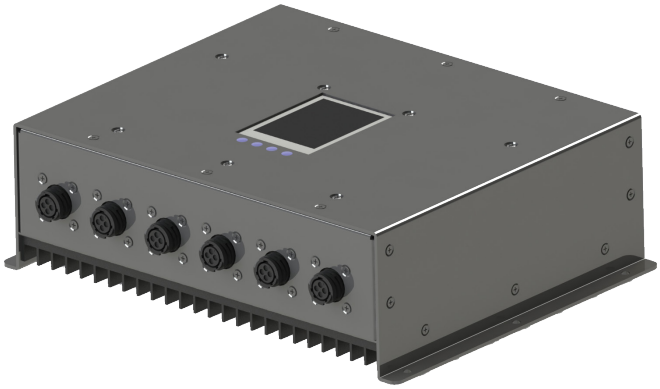
CHARGETEK

6-Bank Charger

Versatile and Programmable 6-bank Lithium/LiPO Charging System



- *California Energy Requirement compliant*
- *Fully isolated and programmable banks*
- *Sealed Unit with optional fan cooling*
- *Customized charge algorithms*
- *Transient protected input/output*
- *Over temp protection with auto reset*
- *Overcurrent / overvoltage protected*
- *Digital and Ethernet Communications*
- *Remote GUI monitoring*
- *AC and DC input options*
- *Diagnostic Routine*
- *Reverse polarity protected*
- *Four Year Warranty*

Description

The CTMB6 is a 6 bank versatile and sophisticated charging system for charging lithium and LiPO batteries and battery packs. Each bank can be programmed independently for either type of battery.

With a wide operating temperature range (-20C to 50C) and environmentally rugged design, it is especially suited for high end industrial applications. The CTMB6 precisely controls the charging algorithm to insure a complete recharge every time.

Each bank is electrically isolated with no common negative or positive, and operation is completely automatic. This multibank charging system has six factory standard battery algorithms that can be customized upon request. A user friendly and very informative LCD display is the programming interface. The display also has a digital volt meter, amp meter, charging status and timing indicators.

The enclosure is completely sealed from dust, other environmental contaminants and is splash proof. The CTMB6 can be connected indefinitely making it ideal for remote and standby applications.

An optional fan can be added for operation in extremely high ambient temperatures,This multibank product can be ordered with input and output power connectors per customer specification.

AC input model specifications

PARAMETER	DESCRIPTION / CONDITIONS
AC input voltage range	3 input ranges covering 85 VAC - 240 VAC
Input AC amps (max)	Model Dependant
AC input configuration	AC input: line, neutral , chassis ground
Connector	IEC 320

DC input model specifications

PARAMETER	DESCRIPTION / CONDITIONS
DC input voltage range	4 input ranges covering 18 VDC to 140 VDC
Input DC amps (max)	Model Dependant
DC input configuration	DC input: DC Power, DC Return, Chassis ground
Connector	PP-75 Anderson

Charging specifications

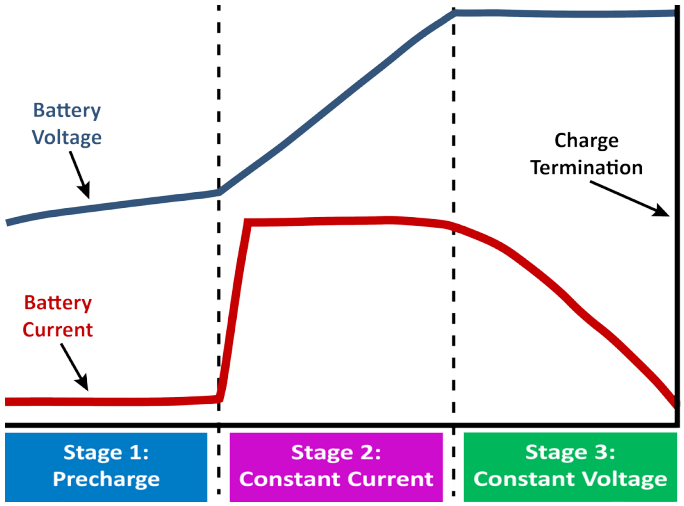
Lithium-ion/LiPO battery charging curve

A three stage charge routine which is recommended by lithium-ion and LiPO battery manufacturers is described below.

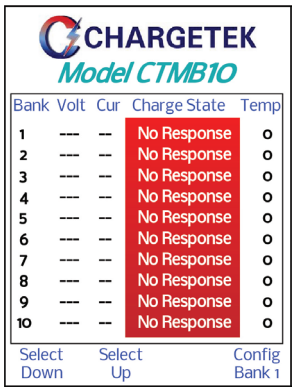
Stage 1: Precharge. If the battery is deeply discharged, a precharge of approximately 300mA is applied until the voltage is 2.8 volts/cell.

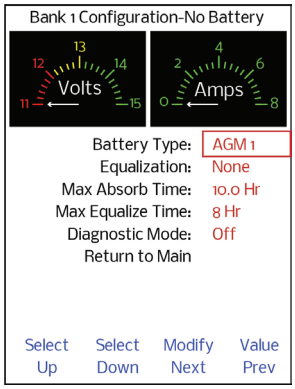
Stage 2: Constant current mode. The charger provides constant current until the battery voltage is V_{tpf} volts/cell.

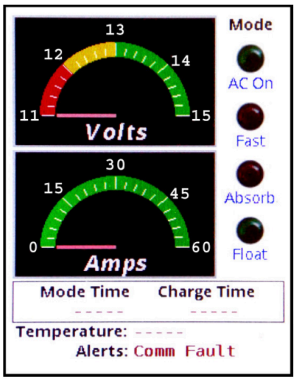
Stage 3: Top off mode. This is the final stage of the charging routine. The battery voltage is maintained at approximately V_{tpf} volts/cell. When the charging current decreases to 300mA, the charge is terminated until the next discharge cycle



Standard LCD DIsplays







6 Bank Lithium/LiPO Common Specifications

CHARGING PARAMETERS	DESCRIPTION
Termination current (I_{trm})	500mA +/- 50mA standard or defined by program selection
Termination transition time-out	3 hours
Minimum battery start voltage	2.5V/cell
Standby battery drain	<400uA with input power off
Termination V_{bat} rate (dv/dt)	V_{bat} < 0.9 * V_{tpf}, I_{bat} > 0.5A, dv/dt < 200mv/hour
Max charging time	Terminate if > I_{max}/3 > 15 hours
Overvoltage protection	Maximum Charging Voltage + 1.0V
Output noise and ripple (PARD)	<150mV, 100MHz BW
Regulation	± 0.5%
Efficiency	Minimum 80% at max load

6-bank Charger Ordering Guide,p/n Mx6a*b-cd-r*

<table>
<tr><th>P/N Field</th><th>Definition</th><th>Options</th><th>Description</th></tr>
<tr><td>a</td><td>Battery Chemistry</td><td>T - Lithium
L - LiPo</td><td>Battery Chemistry</td></tr>
<tr><td>x</td><td>Enclosure Options</td><td>A - High Power Enclosure
B - Medium Power Enclosure</td><td>Describes the enclosure type, see Output and Mounting section for descriptions.

The enclosure is a factor of voltage and current options, see the description of options c, d below.</td></tr>
<tr><td>b</td><td>Input Power Type and Ranges</td><td>For AC input chargers, three options; A, B and V are available

For DC input chargers, 4 options; 08, 09, 10 and 11 are available</td><td>AC Input Voltage Range Options:
<table><tr><th>Option</th><th>AC Input Voltage Range</th></tr><tr><td>A</td><td>85 - 140 VAC</td></tr><tr><td>B</td><td>180 - 280 VAC</td></tr><tr><td>C</td><td>85 - 280 VAC</td></tr></table>DC Input Voltage Range Options:
<table><tr><th>Option</th><th>DC Input Voltage Range</th></tr><tr><td>08</td><td>18 - 36 VDC</td></tr><tr><td>09</td><td>30 - 50 VDC</td></tr><tr><td>10</td><td>38 - 75 VDC</td></tr><tr><td>11</td><td>72 - 140 VDC</td></tr></table></td></tr>
<tr><td>c, d</td><td>Output Voltage and current options</td><td>For each output voltage several output current models are available for each enclosure type, choose voltage (c) and current options (d) for the table the right</td><td>Charging Current vs Output Voltage and Enclosure Type
<table><tr><th>Output Voltage</th><th>Voltage Option(c)</th><th>Enclosure</th><th>Output Current</th><th>Current Option(d)</th></tr><tr><td>1S-3S</td><td>1S, 2S or 3S</td><td>MA</td><td>12 Amps</td><td>12</td></tr><tr><td>1S-3S</td><td>1S, 2S or 3S</td><td>MB</td><td>5 Amps</td><td>5</td></tr><tr><td>1S-3S</td><td>1S, 2S or 3S</td><td>MB</td><td>3 Amps</td><td>3</td></tr><tr><td>4S-8S</td><td>4S,5S,6S,7S or 8S</td><td>MA</td><td>6 Amps</td><td>6</td></tr><tr><td>4S-8S</td><td>4S,5S,6S,7S or 8S</td><td>MB</td><td>3 Amps</td><td>3</td></tr><tr><td>9S-13S</td><td>9S,10S,11S,12S or 13S</td><td>MA</td><td>4 Amps</td><td>4</td></tr><tr><td>9S-13S</td><td>9S,10S,11S,12S or 13S</td><td>MB</td><td>2 Amps</td><td>2</td></tr><tr><td>14S-18S</td><td>14S,15S,16S, 17S or 18S</td><td>MA</td><td>3 Amps</td><td>3</td></tr><tr><td>14S-18S</td><td>14S,15S,16S, 7S or 18S</td><td>MB</td><td>2 Amps</td><td>2</td></tr></table></td></tr>
<tr><td>r</td><td>Options</td><td>List of Available Options, listed separated by ‘-’ characters, some options are mutually exclusive.</td><td>An: External Interface, choose n as follows:
0 - RS-232, 1 - RS-485, 2 - Wired Ethernet, 3 - CAN,
5 - Wireless Ethernet, 99 - Special
Consult factory for others</td></tr>
<tr><td colspan="4">Example: P/N MA6T10-12S4-R1 specifies a 6-bank Lithium charger with an DC input voltage range of 38 - 75 VDC using enclosure A, and has 12S (50.4V) voltage rated outputs rated at 4 amps each. An optional RS-485 interface is included.</td></tr>
</table>

Certifications and Compliance (model dependant - consult factory)

a	UL CSA
b	CE mark
c	California Energy Compliant
d	RF emissions: US FCC Part 15 Class A, CISPR 22:2009
e	IEC 555, power factor
f	IEC 61000-4-5; Class 4 Severity Level, Surge
g	IEEE C2-2012 National Electrical Safety Code
h	NFPA 70-2014 National Electric Code
i	IEC 60950 Safety of IT Equipment; Pollution Degree 2
j	WEEE and Restriction of Hazardous Substances (ROHS) Directives 2002/95/EC
k	T-Mark

Workmanship specifications

IPC-610	Acceptability of electronic assemblies IPC J-STD-006 Requirements for electronic grade solder alloys and fluxed and non-fluxed solid solders for electronic soldering applications
IPC-2221	FR4, 130C 94V-0
IPC/WHMA-A-620	Requirements and acceptance of wiring and cabling

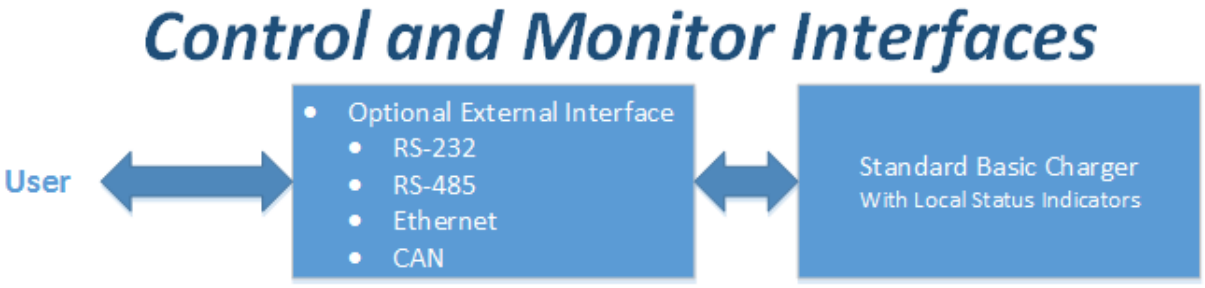
Mechanical specifications

PARAMETER	(units are in inches and pounds)
Dimensions	Enclosure A: 11.0 (L) x 8.5 (W) x 3.35 (H) Enclosure B: 18.2 (L) x 8.5 (W) x 3.35 (H)
Chassis material	Aluminum
Chassis finish	Black anodized
Clearance	15 inches all sides
Mounting	#6 screws at six locations
Battery connections	4 foot cables with ring terminals
Fan connector	Molex P/N 53048-0310
Weight	Twelve pounds
Fan noise at full speed	< 45dBA at 10 feet

Environmental specifications

PARAMETER	DESCRIPTION / CONDITIONS
Operating environment	Indoor/outdoor - IP67 -not submersible
Storage temp.	-40°C to +80°C
Operating temp.	-20°C to +50°C at maximum output over entire DC voltage range
Humidity	0°C to +95°C relative humidity (non-condensing)
Operational altitude	10,000 feet
Vibration	MIL-STD-810 or IEC60068-2-6 and -2-64 as applicable
Shock	MIL-STD-810 or IEC60068-2-27 as applicable
Isolation	Input - chassis: 2KVDC Input - output: 2KVDC Output - chassis: 500VDC
DC leakage current	Input - chassis: < 200uA at 2KVDC Input - output: < 100uA at 2KVDC
AC leakage current	< 3.5mA at 264VAC, 60Hz

Control and monitoring



Standard Control Functions:

- On/Off
- Terminating Voltage
- Current Limiting
- Termination Current
- Pre-charge Current

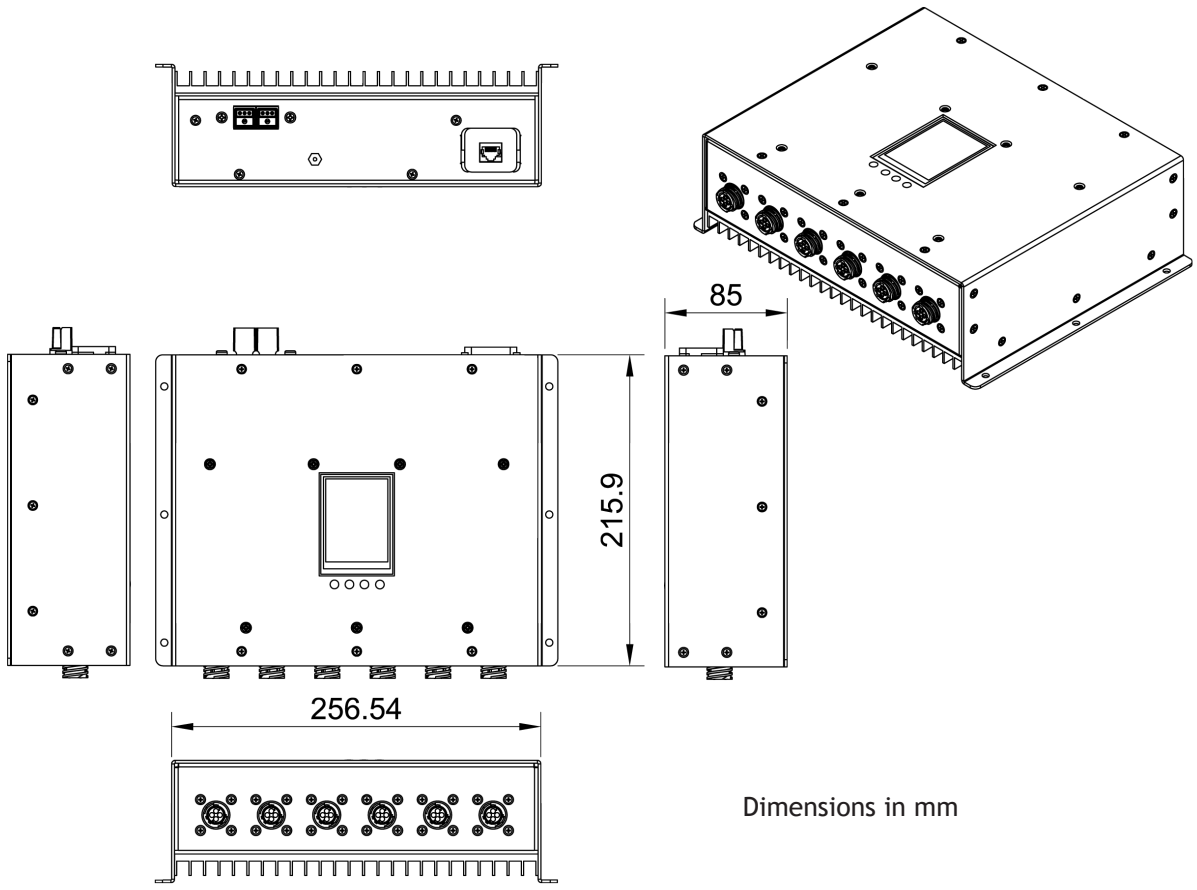
Standard Monitoring Functions:

- Charger State
- Voltage
- Current
- Control Settings
- Temperature
- Status, Warnings, Errors

Standard Monitoring Functions:

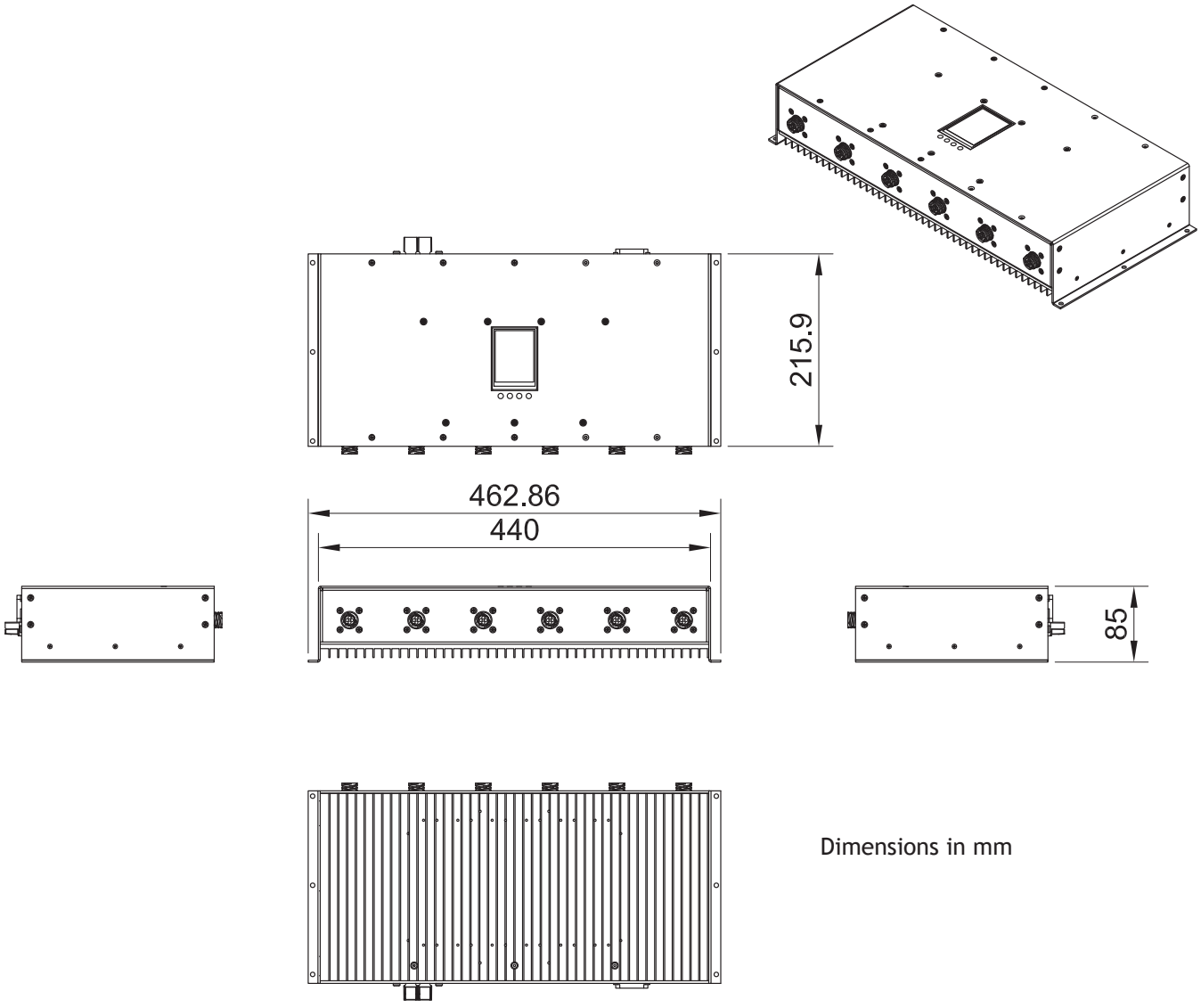
- Charger State
- Errors

Outline and mounting (Enclosure A)



Dimensions in mm

Outline and mounting (Enclosure B)



Dimensions in mm