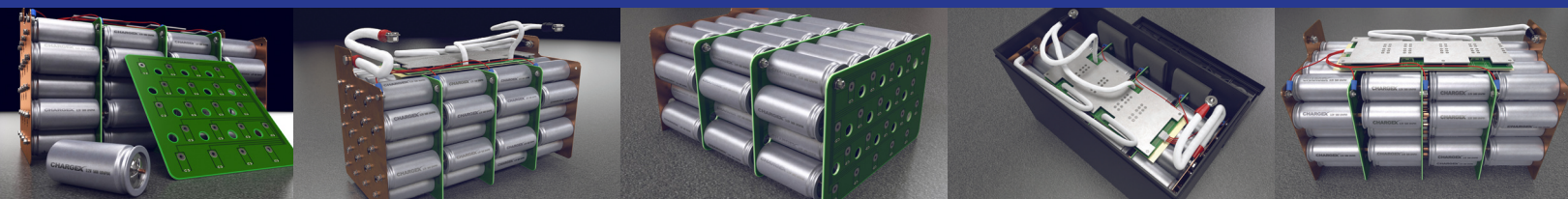


TECHNICAL SPECIFICATIONS



12V 20AH LITHIUM ION BATTERY



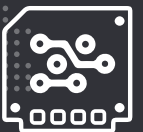
SAFE



**LiFePO₄
TECHNOLOGY**

BUILT IN BMS

Internal Battery Management System



HIGH OUTPUT

200 Cold Cranking Amps and 21.6 Usable Amp Hours



DROP-IN REPLACEMENT

Plug and Play for any application currently using a Lead Acid, AGM or Gel Battery



Model: **CX20**

12V 20AH Lithium Ion Battery (LiFePO4) **GROUP SIZE N/A** **DEEP CYCLE + STARTING** **BMS**

COMMERCIAL | MARINE | RV | GOLF | AUTOMOTIVE | UPS | OFF-GRID

The ChargeX® CX20 - 12V 20AH Lithium Ion Battery features the latest and most advanced Lithium Iron Phosphate - LiFePO4 Battery Technology and is designed for Deep Cycle applications. The CX20 is engineered with our - High Output 3.2V Stainless Steel LiFePO4 Cells that are bolted together for Rigid Strength and Current Conductivity vs. the tab welded method. The CX20 is Plug and Play for any application that currently uses lead acid, gel or agm batteries.

ADVANTAGE*

POWER | ENERGY

| | |
|------------------------------------|----------------------------------|
| Nominal Voltage | 12.8V |
| Charge Voltage | 14.4V - 14.6V |
| Peak Discharge (5 Sec) | 200A |
| Continuous Charge / Discharge Rate | 20A |
| Capacity (amp hours) | 20AH |
| Capacity (watts) | 240WH |
| Chemistry | Lithium Iron Phosphate (LiFePO4) |

ADVANTAGE*

DIMENSIONS | WEIGHT

| | |
|------------|---------|
| Group Size | N/A |
| Weight | 7.7 Lbs |
| Length | 7" |
| Width | 2.9" |
| Height | 6.5" |

ADVANTAGE*

TEMP PERFORMANCE

| CELCIUS | FARENHEIT | USABLE CAPACITY |
|---------|-----------|-----------------|
| 60° | 140° | 103% |
| 50° | 122° | 102% |
| 40° | 104° | 100% |
| 30° | 86° | 100% |
| 20° | 68° | 98% |
| 10° | 50° | 92% |
| 0 | 32 | 83% |
| -10 | 14 | 80% |
| -20 | -4 | 70% |
| -30 | -22 | 60% |
| -40 | -40 | 10% |
| -50 | -58 | 0% |

ADVANTAGE*

TECHNOLOGY

| | |
|-----------------------|----------------------------------|
| Usable Capacity (AH) | 21.6AH |
| Depth of Discharge | >100% DOD |
| Reserve Minutes @ 20A | 60 min |
| Reserve Minutes @ 10A | 120 min |
| Self Discharge | <3% per mo |
| Chemistry | Lithium Iron Phosphate (LiFePO4) |
| Cell Type | Cylindrical |
| Modular | Series or Parallel Connection |

ADVANTAGE*

SAFETY | PROTECTION

| | |
|---------------------------------------|---------|
| Automatic Low Voltage Disconnect | 8V |
| Automatic Short Circuit Protection | Instant |
| Automatic Over Voltage Protection | 15.8V |
| Automatic Reverse Polarity Protection | Instant |
| Internal Cell Thermal Safety Fuse | Yes |
| Flame Retardant Electrolyte | Yes |
| Length Way Circuit Boards | Yes |
| Automatic Internal Cell Balancing | Yes |
| Automatic Fault Recovery | Yes |
| Explosion Proof Stainless Steel Cells | Yes |



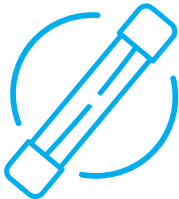
CELL SAFETY FEATURES AND DESIGN 1.1

The main issue with all lithium batteries is cell overheating and rupturing due to over-charging. CHARGEEX® Lithium battery systems have several layers of safety redundancy at the cell level. Notably, an internal thermal fuse between the anode and cathode which shuts down the cell before overheating occurs, to prevent pressure build-up. In the unlikely event this thermal fuse fails, pressure releases through a 1.5MPa safety vent to the cell's electrolyte composition that includes a highly effective flame-retardant additive. These conditions would likely only occur if a charger or controller failed spiking current into the battery. The BPS is designed to protect the cells from this anomaly by opening at 15.8V and would have to fail in the closed state allowing excess current into the cells. **The 12V 20AH is built with 16 cylindrical 3.2V 5AH (32650) cells combined with 4 sets of 4 cells in parallel and then combined in series. All 16 cells are matched by measuring 10 consistencies during several charge / discharge cycles at the end of production.**



Retardant

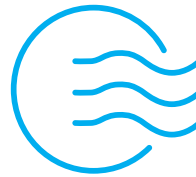
FLAME RETARDANT ELECTROLYTE:
Chargex® cells are safeguarded with flame retardant additive in the electrolyte for best safety.



Thermal Fuse

INTERNAL CELL SAFETY FUSE:

Our latest cell technology has a built-in thermal safety fuse between the anode and cathode that breaks in the unlikely event a cell begins to overheat.



Safety Vent

HIGH PRESSURE SAFETY VENT:
A high pressure safety vent will flip open to release energy and prevent explosion if exposed to extreme heat.



Explosion Proof

STAINLESS STEEL CELL:

Every Cell is manufactured in an explosion proof stainless steel cylindrical case.



CELL SAFETY FEATURES AND DESIGN 1.2

Cell Balancing

The BMS balances the cells by sending more current through the *Lengthway Circuit Boards* and into the cells with a lower voltage. The BMS will also discharge any cell that exceeds 3.65V during charging.



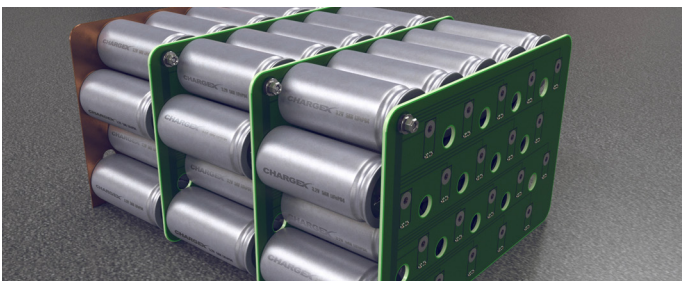
Bolted Cells

Most of our cells positive and negative terminals are bolted vs the more common tab welded method. This creates a superior connection for higher amperage loads and better current conductivity.



Lengthway Board

The *Lengthway Circuit Boards* have a unique function of over-current and cross-protection. The cells' bolt-through *Lengthway Circuit Board* provides balancing, even current flow, short circuit protection and add rigid strength to the battery pack.

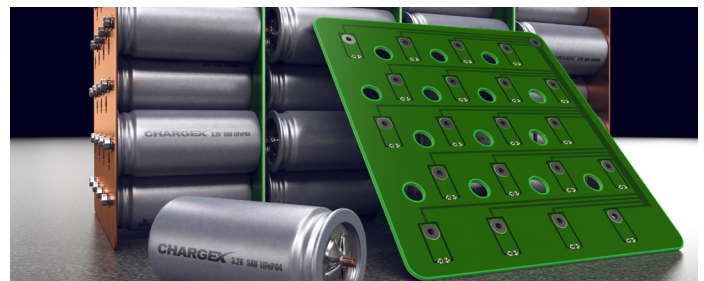


Cell Matching Processes

1. Consistency of Self Discharge
2. Consistency of Voltage
3. Consistency of Inner Impedance
4. Consistency of Capacity
5. Consistency of Cycle Life
6. Consistency of Platform
7. Consistency of Constant Current Rate
8. Consistency of Cell Power Control
9. Consistency of Parallel Module Control
10. Consistency of Finished Battery Module

Circuit Protection

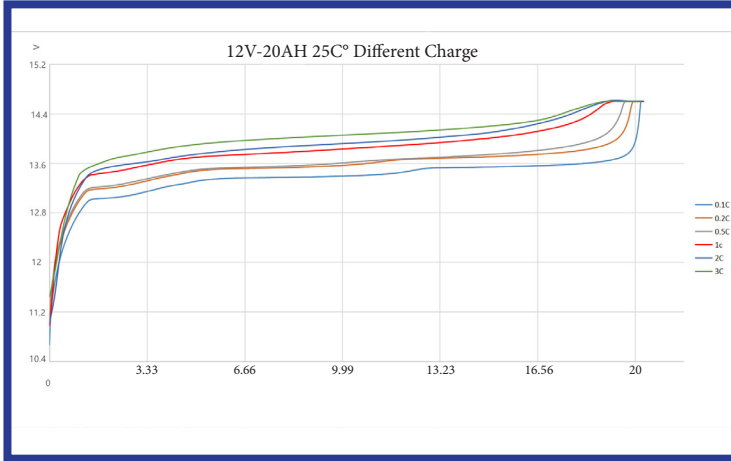
If a cell overheats or if the battery is penetrated by a metal object the *Lengthway Circuit Board* will disconnect the impacted cells allowing the rest of the battery to continue to function normally.



PHYSICAL SPECIFICATIONS

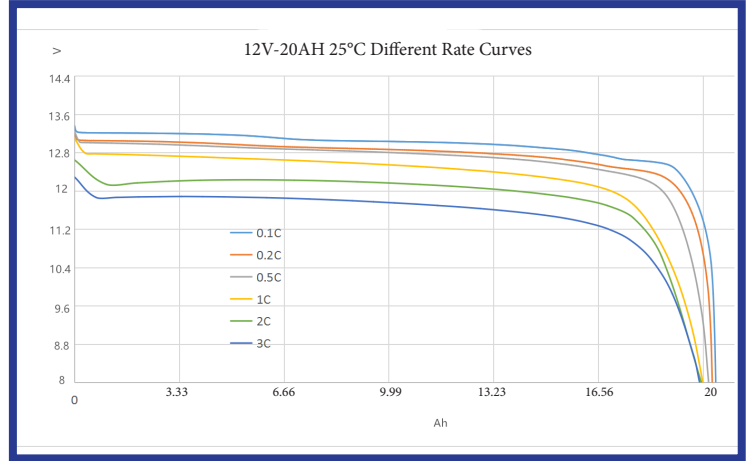


Chart 1



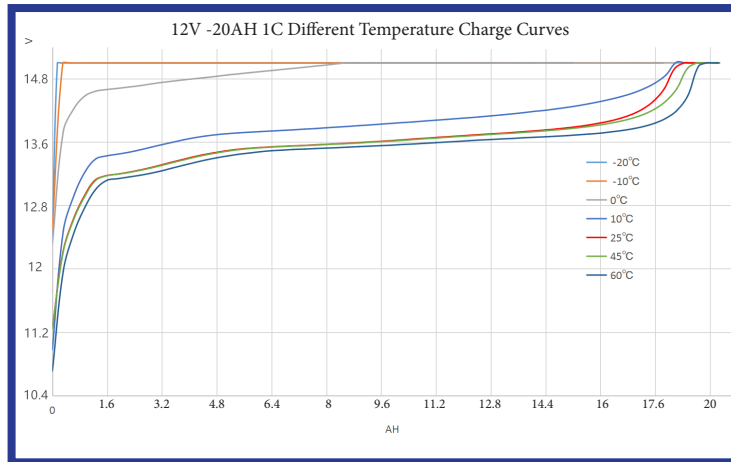
Charging rate at different amps

Chart 2



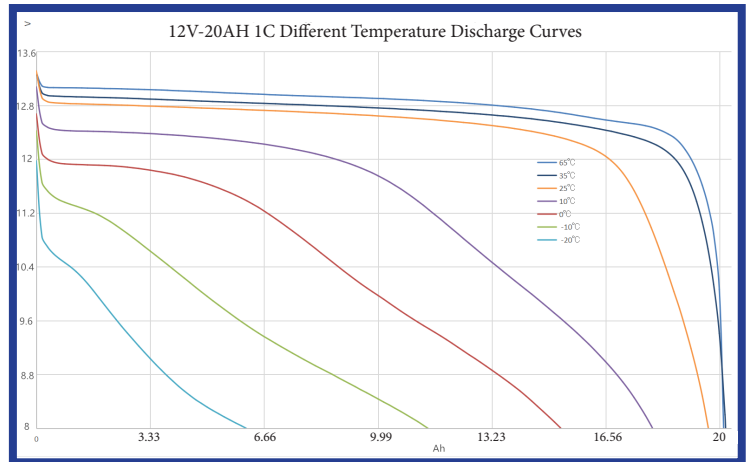
Discharge rates at nominal temperatures

Chart 3



Charging rates at different temperatures

Chart 4



Various discharge rates at different temperatures