



Aegis Battery

Product Specification and Use Manual

Customer:

Customer Model name: Golf-ALF-048105M

Customer P/N:

Issuing Date:

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1. Scope

This document is suitable for the introduction of (51.2V) 48V 105Ah power battery pack performance specifications.

2. Battery pack specification

Package	No.	Item	General Parameter		Remark
	1	Combination method	3.2V100Ah Cell-16S1P		LiFePO4
	2	Rated Capacity	Typical	105Ah	Standard discharge after Standard charge (package)
			Minimum	100Ah	
	3	Factory Voltage	52.0V-54.40V		Mean Operation Voltage
	4	Voltage at end of Discharge	35.2V		Discharge Cut-off Voltage
	5	Charging Voltage	57.6V		
	6	Internal Impedance	≤20mΩ		Internal resistance measured at AC 1KHz after 50% charge The measure must uses the new batteries that within one week after shipment and cycles less than 5 times
	7	Standard charge	Constant Current: 20A Max Constant Voltage: see No.5 cut-off: 0.02CA		Charge time : Approx 5-6 h
		Limiting current	10A		
	8	Standard discharge	Constant current: 50A end voltage: see NO.4		
	9	Maximum Continuous Charge Current	100A		T≥10°C
	10	Maximum Continuous Discharge Current	100A		T≥10°C
	11	Operation Temperature Range	Charge: 0~45°C		Bare Cell: 60±25%R.H.
			Discharge: -20~55°C		
12	Storage Temperature Range	Less than 8 months≤ -10~35°C		at the shipment state 60±25%R.H.	
		less than 3 months: -10~45°C			
		Less than 7 day: -20~65°C			
13	Dimensions	654 mm x 406 mm x 165 mm 25.8 in x 16.0 in x 6.5 in		See size diagram	
14	Weight	48±1Kg (~106 lbs)		Include case	
15	Cycle life	General life models ≥ 2000 times High life models ≥ 4000 times		90%DOD-0.2C/0.5C Charge/Discharge25°C 90%DOD-0.2C/0.5C 25°C	

3. Battery Management System

3.1 BMS Specification

1) The BMS is designed for a 16 series lithium battery.

2) The BMS have all functions which are

- ◆ overcharge detection function
- ◆ over discharge detection function
- ◆ over current detection function
- ◆ short detection function
- ◆ Temperature detection function
- ◆ balance function
- ◆ communicate function
- ◆ Total capacity function
- ◆ Storage history function

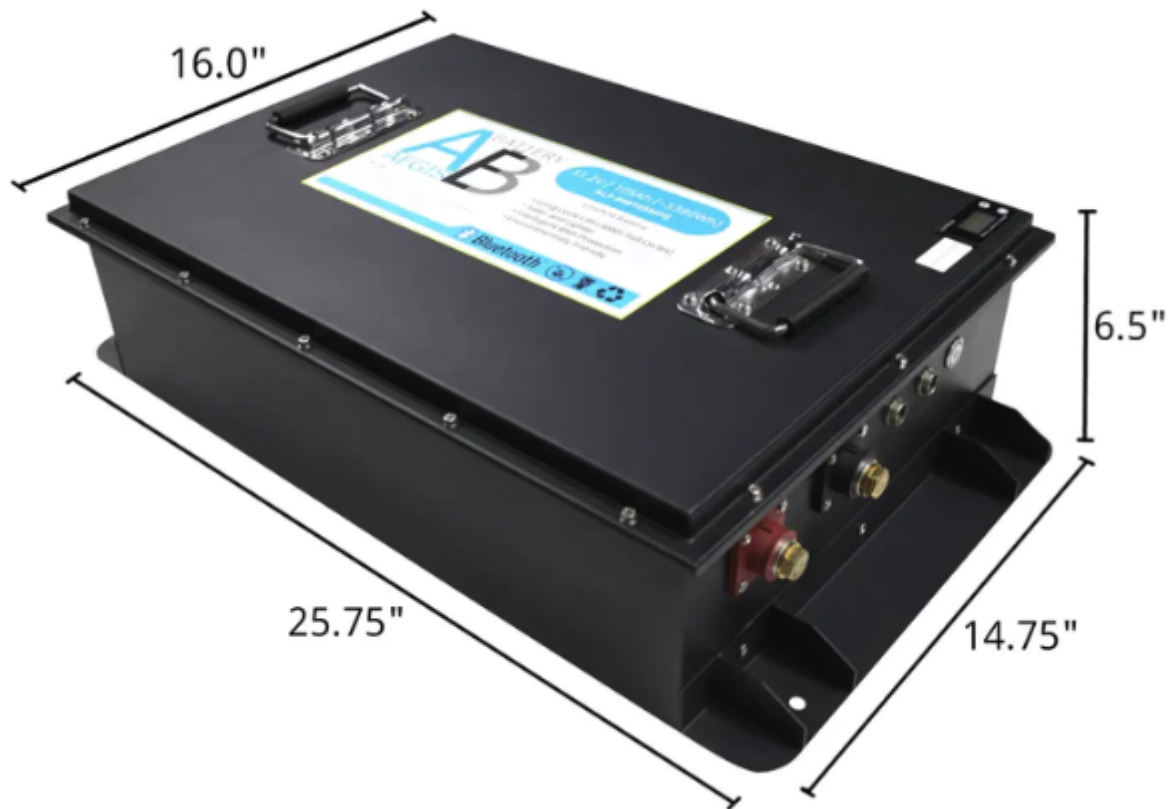
3-2. BMS Protect parameter

16S Typical value specifications

Items	Details	Standard
Cell overcharge protection	Overcharge detection voltage	3.75±0.05V
	Overcharge detection delay time	Typical:2.0 ±1.0s
	Overcharge release voltage	3.6 ± 0.1V
	Overcharge release conditions	1. The monomer voltage drops to the overcharge recovery point 2. The remaining capacity is 96% lower than the intermittent power supply capacity Two conditions must be met in order to resume
		Battery discharge current ≥1A detected
Cell over-discharge protection	Over-discharge detection voltage	2.2±0.1V
	Over-discharge detection delay time	Typical:2.0 ±1.0s
		2.6±0.1V
	Over-discharge release conditions	Self-recovery by increasing voltage or charging
Over-current protection	discharge Over-current protection current	120±5A
	discharge Over-current detection delay time	10S ± 5s
	discharge Over-current release conditions	Restore immediately after charging, or automatically recover after 60 seconds
	discharge Over-current detection delay time 2	≤500ms
	Charge OC protection current	120 ± 5A

	charge Over-current detection delay time	10S ± 5s
	charge Over-current release conditions	Automatic recover after a delay of 32S
Short protection	Short protection current	1600±320A
	Protection condition	Load short
	Detection delay time	≤1000μs
	Protection release condition	Recover by releasing load after approximately 5s
Temperature(T) protection	Charge high T protection	65±3°C
	Charge high T recover	60±3°C
	Discharge high T protection	75±3°C
	Discharge high T recover	70±3°C
	Charge low T protection	-10±3°C
	Charge low T recover	-5±3°C
	Discharge low T protection	-20±3°C
	Discharge low T recover	-10±3°C
Balance	Balance threshold voltage	3.40 ± 0.03V

4-1. Structure and size drawing



4-2. Case Structure of Battery Pack



No.	Functional Description	Remark
①	Positive terminal	
②	Negative terminal	
③	RS485 Communication	
④	External Coulomb Meter Interface	
⑤	Power Switch	
⑥	Fixed Bracket	0.5" Diameter Hole
⑦	Voltmeter	
⑧	Handle	

4-3.Accessories

Accessory #1 : Mounting Bracket



Connect the battery to mounting brackets by combining the 3 matching screws and the screw mounting holes on the battery. The position of the battery installation is shown in (#6) in the case diagram.

Accessory #2: Voltmeters



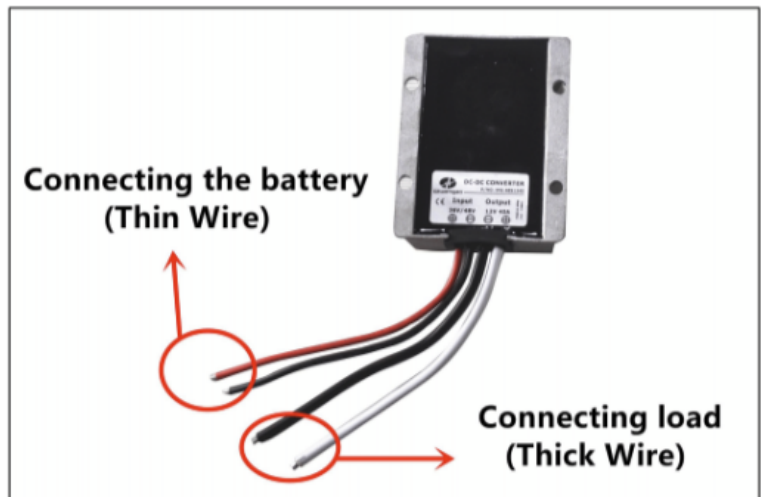
There are two voltmeters for this battery. One built in one and one external voltmeter connected via coulomb port shown in (#4) in the case diagram. Please turn off the built in voltmeter when not in use.

Accessory #3: External meter shunt (Included with Multiple Units & for Parallel Use Only)



When two sets of golf cart batteries are connected in parallel, the external voltmeter needs to be connected to this external shunt to correctly display the capacity of the parallel battery pack. If it is a single battery, there is no need for this shunt, simply connect the voltmeter directly to the battery.

Accessory #4: 12V Voltage Regulator / Reducer

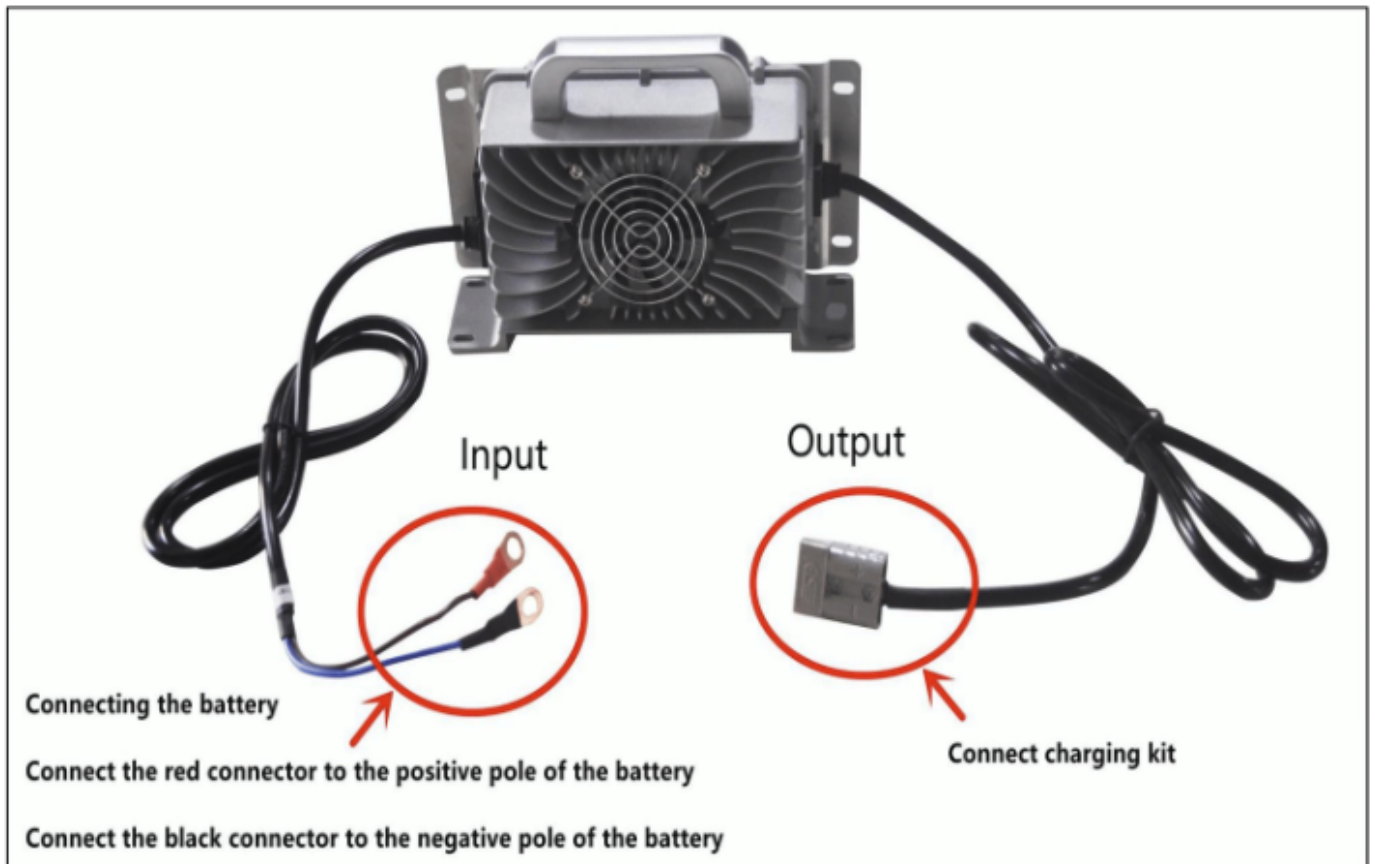


This unit provides 12V power for other devices that may be on the golf cart such as the radio or USB charging. You can connect this directly inline with the main battery terminals (#1)(#2) via ring terminals and it will reduce the power from 36V/48V to 12V to power other devices while still providing main power to your golf cart. See diagram below to see the connection layout.

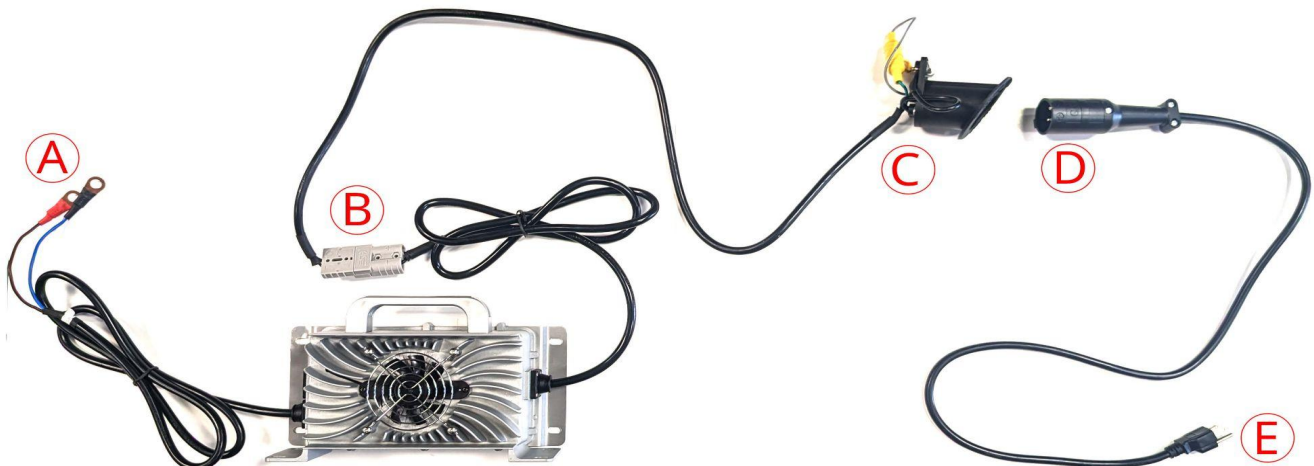


- A) Ring terminals to connect to the main battery (Red = Positive; Black = Negative)
- B) Heat Shrink over connections to prevent short circuits
- C) Ring terminals to connect to your 12V devices (White = Positive; Black = Negative)

Accessory #5: 48V 15A / 20A Smart Charger

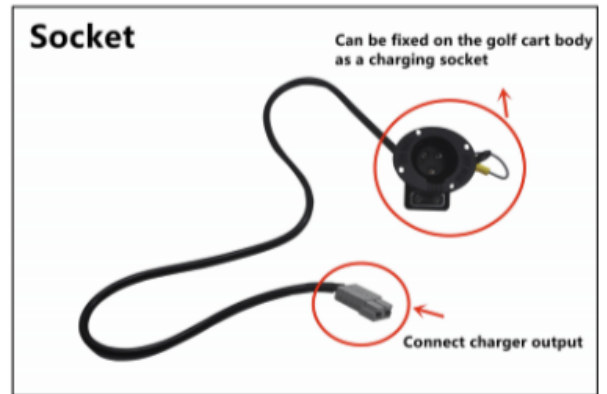
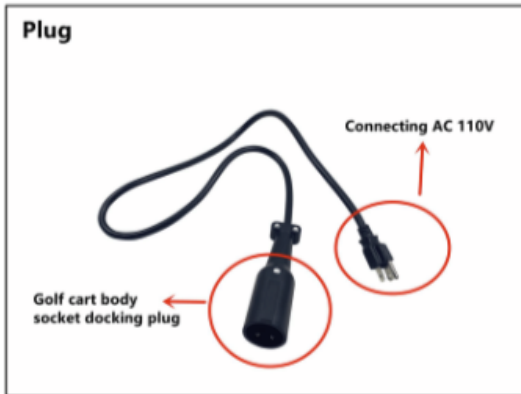


This smart charger is designed to be mounted in the golf cart and provides smart charging to the battery. The ring terminals are connected to the main battery terminals (#1)(#2) and SB50 will plug into the CC Docking Cable SB50 side. (see below “**CC Charging Docking Kit**”). Together this provides a quick detach CC charging port solution for charging your golf cart easily.



- A) Ring terminals connect to the main battery terminals
- B) SB50 connection to docking port
- C) Docking port that is mounted on the golf cart
- D) CC Plug to allow quick connect / disconnect for charging
- E) Standard 110V Plug to outlet

Accessory #5 (contd): CC Charging Docking Kit



Docking Effect Diagram

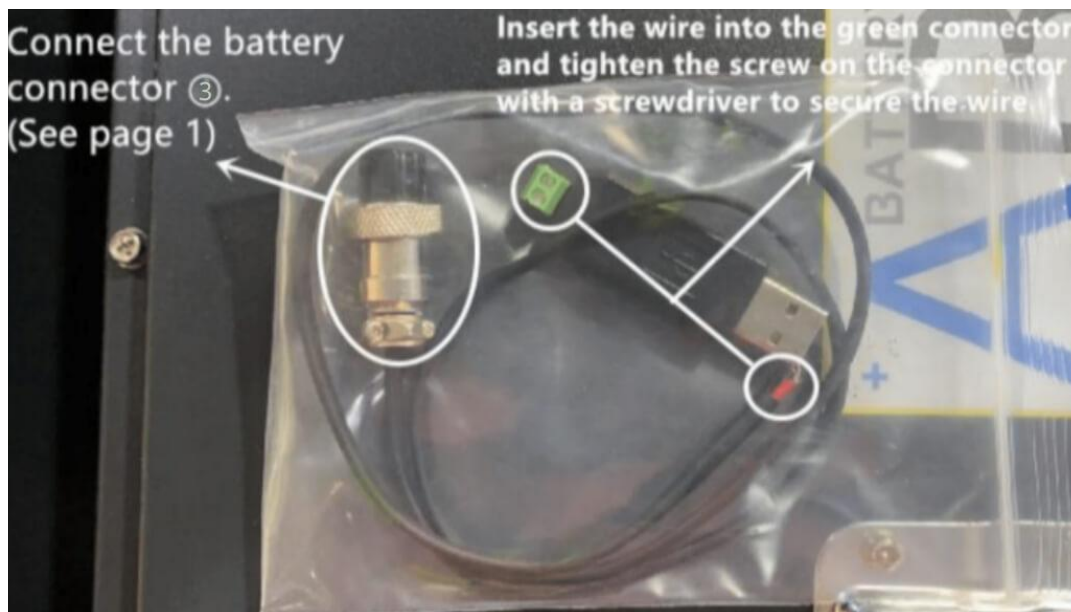


Use For:

Connect AC electric supply and charger.

Only 110V connection allowed, 220V connection prohibited

Accessory #6: RS485 communication adapter



This provides a USB connection via port (#3) for data from the Battery Management System (BMS). You may need special software to communicate with the BMS and set parameters. This is not normally needed by most users, as we already set the optimal protection and charge/discharge settings.

Accessory #7: Parallel Connection

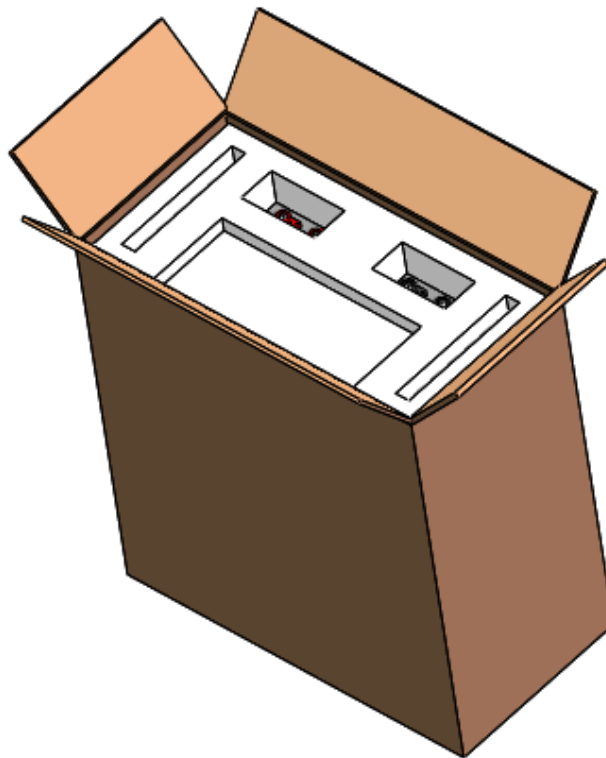


As shown above, you can connect multiple units in parallel to achieve an even longer run time capacity (Ah). For multiple unit orders, we provide the necessary cables and external shunt box.

Accessory #8: Bluetooth app

Please contact us for more information.

4-4.Packaging of Battery Pack



Battery Testing Equipment and Conditions

5. Battery Testing Equipment and Conditions

5-1. Measurement Apparatus

(1) Dimension Measuring Instrument

The dimension measurement shall be implemented by instruments with equal or more precision scale of 0.01mm.

(2) Voltmeter

Standard class specified in the national standard or more sensitive class having inner impedance not less than 10 K Ω /V.

(3) Ammeter

Standard class specified in the national standard or more sensitive class. Total external resistance including ammeter and wire is less than 0.01 Ω .

(4) Impedance Meter

Impedance shall be measured by a sinusoidal alternating current method (AC 1kHz LCR meter).

5-2. Standard Test Condition

Tests should be conducted with new batteries within one month after shipment from our factory and the cells shall not be cycled more than five times before the test. Unless otherwise defined, test and measurement shall be done under temperature of 23 \pm 2 $^{\circ}$ C and relative humidity of less than 75%, air 86Kpa~106Kpa.

5-3. Rest Period

Unless otherwise defined, 30min, rest period after charge, 30min, rest period after discharge.

6. Storage and Others

6-1. Long Time Storage

If stored for a long time (don't exceed three months with no charge), the cell should be stored in a dry and cooling place. The cell's storage voltage should be 51V-53V and the cell is to be stored in a condition that the temperature of 23 \pm 2 $^{\circ}$ C and the humidity of 45%- 75%. Long-term use of unused batteries to recharge every 3 months. Ensure that the battery voltage is within the above range.

6-2. Others

Any matters that this specification does not cover should be conferred between the customer

7. Amendment of this Specification

This specification is subject to change with prior notice.

8. Appendix Handling Precautions and Guideline For Li-ion Rechargeable Batteries

8-1. Preface

This document of 'Handling Precautions and Guideline Li-ion Rechargeable Batteries' shall be applied to the battery cells manufactured by AEGIS BATTERY.

8-2. Note 1 :

The customer is requested to contact AEGIS BATTERY in advance, if and when the customer needs other applications or operating conditions than those described in this document. Additional experimentation may be required to verify performance and safety under such conditions.

8-3.Note 2 :

AEGIS BATTERY will take no responsibility for any accident when the cell is used under other conditions than those described in this Document.

8-4.Note 3 :

AEGIS BATTERY will inform, in a written form, the customer of improvement(s) regarding proper use and handling of the battery, if it is deemed necessary.

9. Danger Warnings & Caution

Do not immerse the battery in water or allow it to get wet. Do not use or store the battery near sources of heat such as a fire or heater.

- Do not use any chargers other than those recommended by AEGIS BATTERY.
- Do not reverse the positive (+) and negative (-) terminals.
- Do not connect the battery directly to wall outlets or car cigarette-lighter sockets.
- Do not put the battery into a fire or apply direct heat to it.
- Do not short-circuit the battery by connecting wires or other metal objects to the positive (+) and negative (-) terminals.
- Do not pierce the battery casing with a nail or other sharp object, break it open with a hammer, or step on it.
- Do not strike, throw or subject the battery to severe physical shock.
- Do not directly solder the battery terminals.
- Do not attempt to disassemble or modify the battery in any way.
- Do not place the battery in a microwave oven or pressurized container.
- Do not use the battery in combination with primary batteries (such as dry-cell batteries) or batteries of different capacity, type or brand..
- Do not use the battery if it gives off an odor, generates heat, becomes discolored or deformed, or appears abnormal in any way. If the battery is in use or being recharged, remove it from the device or charger immediately and discontinue use.
- Do not use or store the battery where it is exposed to extremely hot, such as under the window of a car in direct sunlight on a hot day. Otherwise, the battery may be overheated. This can also reduce battery performance and/or shorten service life.
- If the battery leaks and electrolyte gets in your eyes, do not rub them. Instead, rinse them with clean running water and immediately seek medical attention. If left as is, electrolyte can cause eye injury.
- Do not open or modify the battery, unless specifically directed by AEGIS BATTERY, as this will void the warranty.
- If you have any further questions or concerns, please feel free to contact us via phone or email.

—— END ——