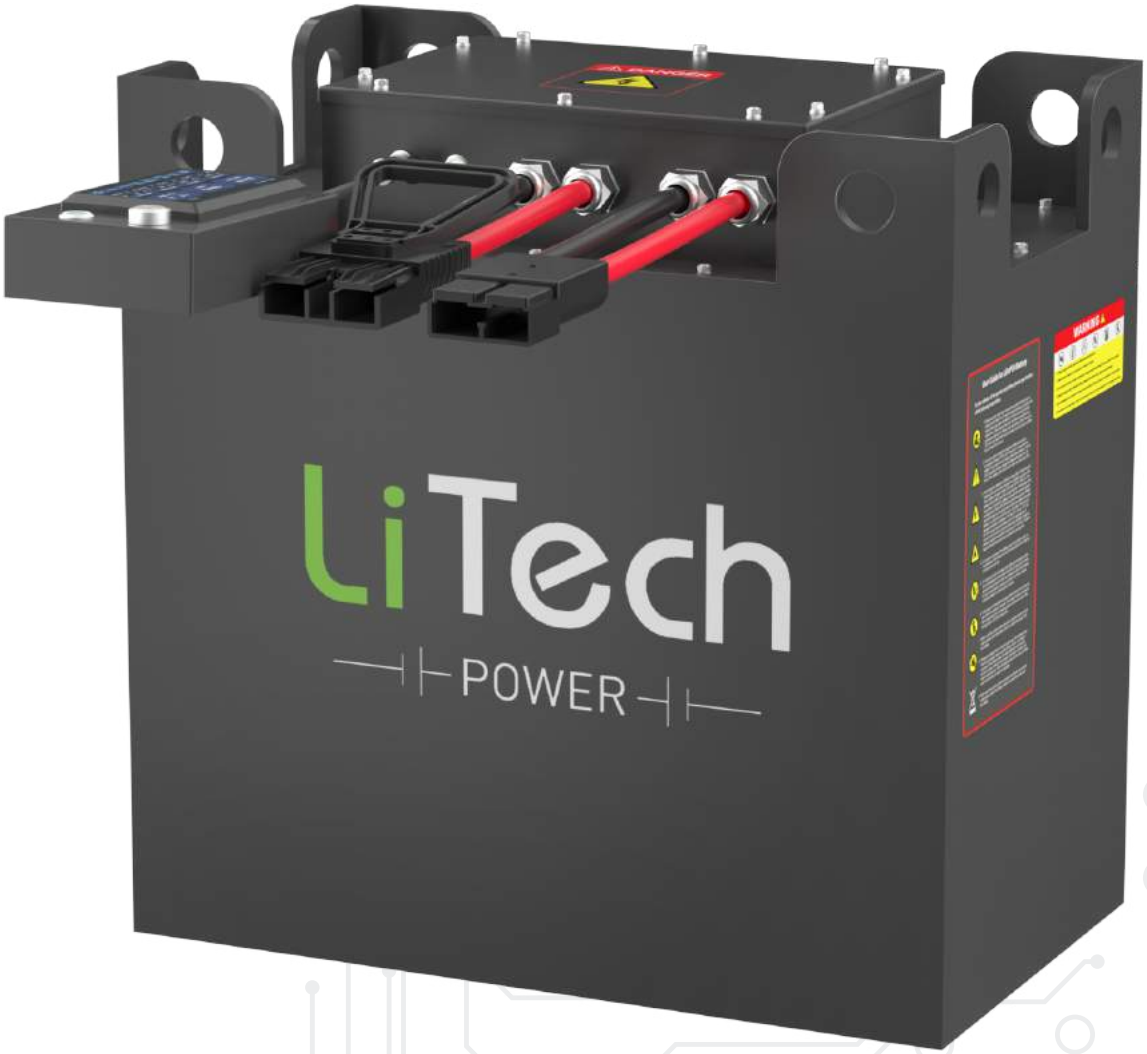
Specification of

LiTech Power Forklift LiFePo4 38.4V 210Ah Battery Pack

Model No.: LP36210F001



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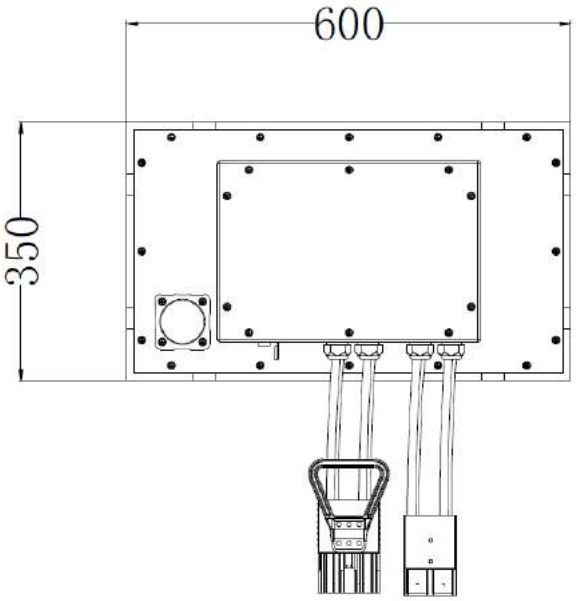
1. General

LP36210F001 is an intelligent Lithium-Ion Phosphate (LiFePo4) rechargeable Battery Pack with Battery Management System integrated, typically design for eForklift / eTruck / Airport GSE..., nominal voltage at 36V/38.4V, rated capacity at 210Ah / 8.064KWh, with intelligent LCD display and alarm buzzer, with Anderson Connector for discharge and REMA connector for charge, with heavy-duty strong stainless metal casing rated at IP65 waterproof level, with ON/OFF Switch, with CANBus/RS485 communication protocols, 4G/LTE/GPS/GPRS tracking and real-time battery monitoring on-line / battery remotely upgrading on-line functions are also optional available (please contact our support).

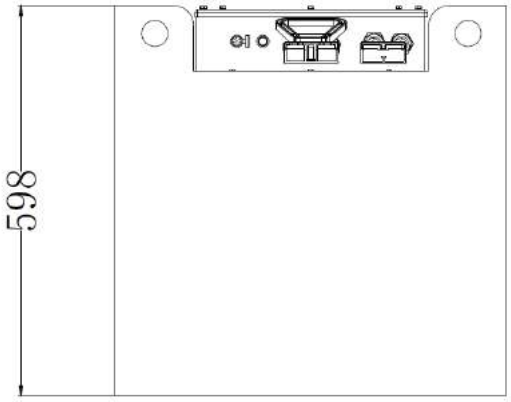
2. Battery Pack basic characteristics (see appendix of battery charge & discharge curves)

2.1 Capacity (@ 0.5C, 25±2°C)	Nominal Capacity: 210Ah (based on cells' HVC&LVC)	
	Minimum Capacity: 205Ah (based on cells' HVC&LVC)	
2.2 Nominal Voltage	36V/38.4V	
2.3 Internal impedance (AC, 1Khz, SOC30%~40%)	≤ 50mΩ	
2.4 Discharge Cut-off Voltage	30.0V	
2.5 Max. Charge Cut-off Voltage (from Charger)	43.8V	
2.6 Standard Charge & Standard Discharge *	Standard Charge 42A (0.2C) & Standard Discharge 105A (0.5C)	
2.7 Max. Continuous Charge Current *	≤105A (recommended value for better lifespan, cell is at rated 0.5C charge, 25±5°C)	
2.8 Max. Continuous Discharge Current *	210A	
2.9 Max. Discharge Peak Current *	420A for 10 seconds	
2.10 Cycle Life 4000 @ 100% DOD 5000 @ 80% DOD 6000 @ 70% DOD 8000 @ 50% DOD	≥ 4000 cycles After 4000 cycles in 100% DOD charge and discharge at rated current with 25±3°C and within 45%-50% huminity environment, the residual discharge capacity is above 80% of nominal capacity	
2.11 Protections	OVP, OCP, OTP, UVP, UTP...all must have protections adopted, (multi temp. sensor implemented)	
2.12 Weight	180kg ± 10kg (not including counterweight)	
2.13 Max. Dimension	600 x 350 x 598 mm (L*W*T, actual dimension ≤ max. dimension)	
2.14 Operating Temperature (recommended)	Charge	0℃ ~ 45℃ (F)
	Discharge	-20℃ ~ 60℃ (F)
2.15 Storage Temperature (recommended)	Within 1 month	-5℃ ~ 35℃ (SOC 50%)
	Within 6 months	0℃ ~ 35℃ (SOC 50%)

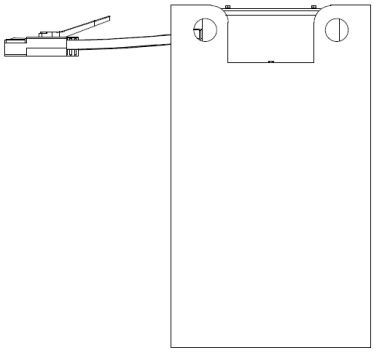
3. Mechanical Dimension Drawing



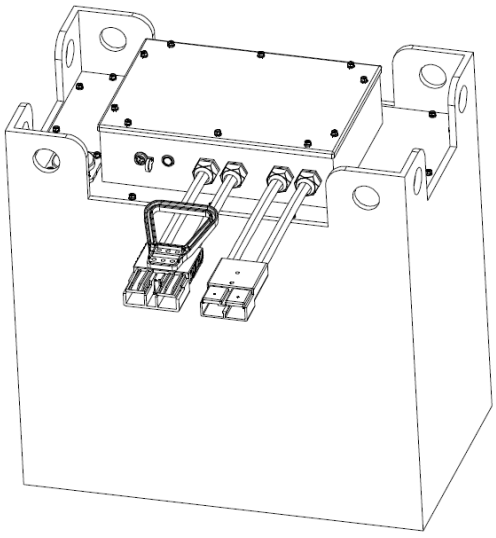
Battery Top Side Review



Battery Front Side Review



Battery Side Review - 2D



Battery Overall Review 2D

4. Interface Definitions

- ❶ Battery Control Panel - including real-time LCD display for SOC, battery status, error, warning display... and ON/OFF Switch and Alarm buzzer.
- ❷ Alarm buzzer - buzzer goes off when any protections or warning modes are triggered.
- ❸ ON/OFF Switch - this is an additional switch on the battery for easy operation just in the cabin, no need open the battery compartment under the seat to turn on/off the battery.
- ❹ LTE/4G/GPS/GPRS antenna - for real-time battery monitoring on-line and also for GPS/GPRS tracking, support remotely upgrading firmware on-line too.
- ❺ Communication protocol - CANBus + RS 485 for LCD, buzzer, ON/OFF and Parameter Reading on PC.
- ❻ ON/OFF Switch.
- ❼ Cable Protection Grommet.
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- ❾ REMA Connector for charge - can be customized accordingly to match your original lead acid battery plug.
- ❿ Anderson Connector for discharge - can be customized accordingly to match your original lead acid battery plug.
- ⓫ BMS + Relay + Fuse + Shunt Compartment
- ⓬ Lifting Eyes for easy installation by crane or forklift

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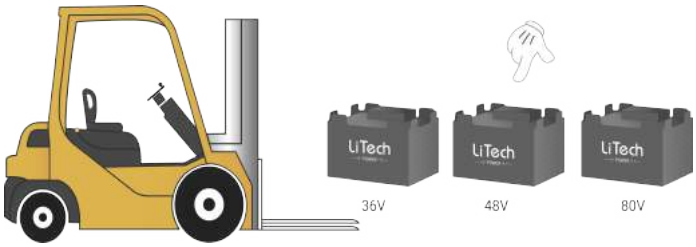
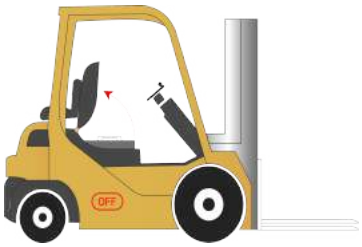
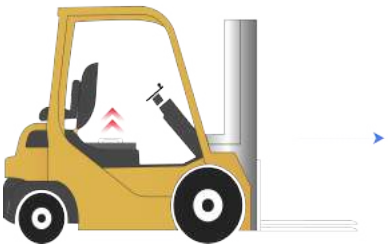
5. Installation



❶ Consult LiTech or the reseller for correctly selecting the right Battery for your Feet



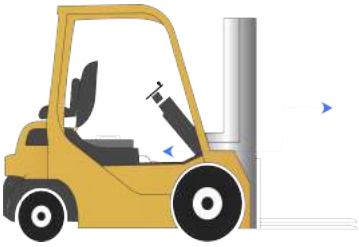
❷ Turn Off the Vehicle & Open the battery compartment under the seat



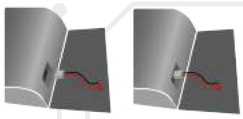
❸ Unplug your old Lead-Acid Battery wirings

❹ Take out the old Lead-Acid Battery with a Forklift or Crane

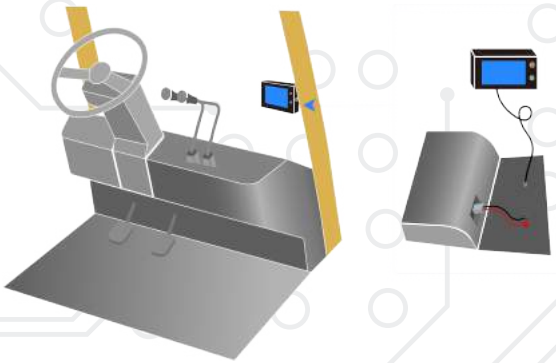
❺ Install LiTech LiFePO4 Battery with a Forklift or Crane



❻ Plug in all the wirings



❼ Make sure all wirings are firmly plugged in



❽ Mounting the LiTech Battery Control Panel (LCD+ON/OFF Switch+Buzzer) Cabin Frame

• The control panel is including real-time display LCD for battery SOC and Health Status, Error, alarm/warnning displaying, warnning/alarm buzzer for any errors or warnning alarms, one switch also integrated for turning on and off the battery from the operation cabin directly, no need open the battery compartment under the seat to turn on/off the battery, the control panel comes with strong magnet, it is can be easily to magnet on the frame.

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5. Charging

- Unlike lead acid batteries, charging LiTech LiFePO4 batteries no needs a specific charging room, no needs worry charging explosion or sulfuric acid leakage and can charging the battery directly on the vehicle.
- Make sure only using LiTech original charging machine to charge the battery, LiTech battery communicates with LiTech charging machine thru CANBus and RS485 for optimized charging, other brand charging machines may not compitable with LiTech Battery and could result fire accident.
- Battery and the charging machine will automatically switch off the charging once battery is fully charged, and it supports opportunity charging during coffee break/lunch break, simply drive to the charging station and plugin the charging hose to get a charge.
- The LiTech battery is delivered with a charge of approximately 30% according to the legal shipping regulations, before using, please fully charge LiTech battery.
- Charging below 0°C and above 45°C is prohibited by the built in intelligent BMS, as this could lead to cell damage, only charge the battery at ambient temperature between 0°C to 45°C maximum, to maximize the battery life, we recommend charging the battery between 10°C ~ 25°C if possible.
- If need charging under 0°C ambient temperature, please reach out to our support to have the heating pads implemented, heating pad heats up the cells upto 5°C with energy from the charging machine first, then allow charging kicks in to the battery, this is an optional function.

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7. Storage

Please keep the battery in the cool and dry environment: Within 1 month -5°C~35°C or Within 6 months 0°C~35°C, relative humidity ≤75%, please charge the battery pack (around 50% SOC) regularly (every 60-90 days) to keep its chemistry active and longer lifespan. Long shelf time without charging the battery, the battery may completely depleted or totally died. Please DO remove the battery from your device when battery NOT IN USE for long time.

8. Warranty

All LiTech Power products are covered by a 5-year limited warranty. The warranty covers premature failure due to defects in materials and / or workmanship. Any breakage caused by accidental damage or as a result of abuse or misuse is not covered. The warranty is limited to the original purchaser and is not transferable.

The warranty is void if the warranty sticker or soak-water-sticker is removed from the product or if the battery has been modified in any way. Please charge your battery directly after each use. Leaving your battery in discharged state will seriously and permanently damage its performance. Please note we cannot upheld warranty claims in these circumstances. Your battery will degrade over time and with use, such degradation is not covered by warranty.

9. Notice

The information in this specification subject to change without prior notice. The information contained in this document is for reference only and should not be used as a basis for product guarantee or warranty. For applications other than those described here, please consult LiTech Power directly.

10. Caution

* Please read the specification carefully before testing or using the battery, as improper handling of Lithium battery may result in loss of efficiency, heating ignition, electrolyte leakage or even explosion.

* While testing the battery of charging and discharging, please use the testing equipment special for Li-ion battery. Do NOT use the ordinary source of constant current and constant voltage, which fails to restrict charge and discharge to battery in order to prevent the battery from being overcharged and over-discharged, triggering battery malfunction or explosion.

* When charging and discharging to the battery or packing it into the equipment, do NOT reverse the terminals of cathode and anode or it will make the battery overcharging and over-discharging, causing the battery to lose efficiency seriously and even explode.

* Do NOT weld the battery directly, do not disassembly the battery.

* Do NOT put the battery together with metal products such as necklace, hairpin, coin or screw in the pocket or in the bag; neither store them together. Do NOT connect the positive and negative electrode directly with such conductive materials as metal, or it may make the battery short-circuit.

* Do NOT beat, throw or trample the battery. Do NOT put the battery into the washing machine or the high-pressure container.

* Do NOT put the battery close to heat source, for instance, fire, heater etc. Do NOT use the battery under the circumstance of burning sun or the temperature exceeding 60°C, or it may cause the battery to generate heat, heating ignition and loss of efficiency.

* Do NOT get the battery wet or throw the battery into water. When not use, it should be placed in the dry and low temperature environment.

* While using, testing or preserving the battery, if you find the battery become hot, distribute smell , change color, deform or any other abnormality, please stop using or testing immediately, and attempt to isolate and keep away from the battery.

* If the battery leaks, the electrolyte gets into the eyes, do not rub eyes, instead, rinse the eyes with plenty of water, and seek medical service. If the electrolyte gets onto the skin or clothe, wash it with plenty of water immediately.

*** 2.6 Standard Charge & Standard Discharge: Standard Charge @ 0.2C & Standard Discharge @ 0.5C, @ Ambient Temperature 25±°5C,**
*** 2.7 Max. Continuous Charge Current: cell's specs recommended 0.2C~0.5C charge for better lifespan, @ Ambient Temperature 25±5°C,**
*** 2.8 Max. Continuous Discharge Current: cell's specs recommended 1C as max continuous, 2C @ 60s, ≤80% SOC | 3C @ 60s, ≥30% SOC, @ Ambient Temperature 25±2°C,**
*** 2.9 Max. Discharge Peak Current: cell's specs recommended 2C @ 60s, ≤80% SOC | 3C @ 60s, ≥30% SOC, 5C/10C or even higher current are under limit conditions(please reach out for details) @ Ambient Temperature 25±2°C.**