

USER MANUAL

EX1

EX-360XDP-C



Disclaimer

While every precaution has been taken to ensure the accuracy of the contents of this guide, Expion360 assumes no responsibility for errors or omissions. Note as well that specifications and product functionalities may change without notice. Find the latest updates online at expion360.com.

Important

Please be sure to read and save the entire manual before using the products. Misuse may result in damaging the products, causing harm, or incurring serious injury. Read this manual in its entirety before using the products. Instead of saving this manual, refer to the digital version of this manual on the Expion360 website for any updates and future reference.

<https://expion360.com/pages/customer-support>

About Us

Safety

Expion360 lithium batteries use lithium iron phosphate (LiFePO₄/LFP) chemistry, which is the best choice for RV, marine, and off-grid power storage applications because of its high degree of safety and long cycle life.

Quality

Every Expion360 battery uses cells that are UL 1642 recognized (file no. MH64383) and meets the highest standard in safety and performance. Internal power distribution cables are mechanically connected (bolted), rather than soldered, to lower contact resistance and provide a robust physical connection point. The internal power-distribution plates connecting the cells, battery management system (BMS), and internal terminals are solid copper.

Our proprietary case contains structural elements to protect the battery pack and BMS inside from the effects of vibration and movement. The battery's oversized power terminals provide a large electrical and physical connection point to accommodate high ampacity power cables and our unique and innovative bus bars.

Service

The Expion360 technical support department has experts on standby to assist you. For assistance with our products, please contact us by phone or email any weekday during business hours.

support@expion360.com

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Please read each warning carefully to prevent damage to the unit and injury to operators.
Ignoring warnings can potentially void the warranty.

WARNINGS:

- ⚠ DO NOT drop the battery.
- ⚠ DO NOT open the battery.
- ⚠ DO NOT short-circuit the battery.
- ⚠ DO NOT submerge the battery in water.
- ⚠ DO NOT use the battery as a starter battery.
- ⚠ DO NOT use batteries of different ages and/or capacities.
- ⚠ DO NOT connect EX-360XDP-C in series.
- ⚠ DO NOT connect more than four batteries in parallel.
- ⚠ DO NOT attempt to repair the battery if it malfunctions.
- ⚠ DO NOT charge the battery above 14.6 VDC.
- ⚠ DO NOT charge the battery at or below 32°F or 0°C.
- ⚠ DO NOT charge the battery above its maximum charge rate.
- ⚠ DO NOT discharge the battery below 10.5 VDC.
- ⚠ DO NOT discharge the battery at or below -4°F OR -20°C.
- ⚠ DO NOT discharge the battery above its maximum discharge rate.
- ⚠ DO NOT leave the battery connected when in storage.
- ⚠ DO NOT leave the battery fully discharged for an extended period.
- ⚠ DO NOT install the battery with its side, or top to the floor.

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Installation

Improper Battery System Installation Voids the Warranty

Expion360 recommends installing the batteries in a temperature-controlled area. Unlike lead-acid, our batteries do not exhaust any harmful vapor and may be installed inside a trailer, motorcoach, truck camper, or boat cabin. Installing the batteries within an insulated or conditioned space is always recommended, especially if the batteries could be exposed to temperatures below 32°F. If the batteries must be installed in an outside battery box, be sure to confirm the battery box has drain holes to prevent water from filling the box.

The EX-360XDP-C battery should only be installed with the feet down and the terminals up. We recommend using our unique tie-down system with every installation to eliminate unwanted movement and reduce vibration. Check our website for more information on tie-down solutions for the Expion360 batteries.

When connecting multiple batteries with the Expion360 Bus Bars or power cables, tighten the M 8 x 1.25 hex bolts to 8 lb-ft (96 lb-in) using an adjustable torque wrench. Make sure all connections are well organized and secured to prevent short circuits. Ensure all cables and circuit protection (fuses and/or circuit breakers) are properly sized for the entire system. See details about circuit protections in [Circuit Protection](#).

Battery System Configurations

Do not mix batteries of different ages and sizes in one battery system. Use the Expion360 Bus Bars or 4/0 AWG cables of the same length when connecting multiple batteries. Before installing batteries for use in parallel, all batteries must be charged to 100%.

Parallel Installation

Connecting multiple batteries in parallel will increase the available energy (watt-hour), charge and discharge rates (current) and add capacity (amp-hour) to use the battery system. The voltage will not increase. Up to (4) batteries may be connected in a single parallel string. Additional strings may be connected to a common bus bar with equal-length cables to increase the battery system capacity.

Important: Any batteries wired in parallel using cables must be connected by cables of equal length and gauge (AWG).

Series Installation

DO NOT connect EX-360XDP-C batteries in series.

Installation Diagram

Battery Terminal

The depths of the female battery terminal threads are no more than 12 mm. Consider this when determining the proper bolt length to secure bus bars, cable lugs, and any washers that will be affixed to the terminal connection pad. If too much torque is applied to a bolt, the female threads of the battery terminal will be stripped, and the damage will not be covered under warranty due to product misuse. Consider the 12 mm thread depth when selecting the bolts so that they do not bottom out. Conversely, a minimum of 3 threads must be engaged before applying 8 lb-ft of torque so as not to damage the threads. Use a permanent marker to mark the position of the screws/nuts and battery terminal. Check the mark annually, and tighten the screws/nuts if the mark is not aligned.

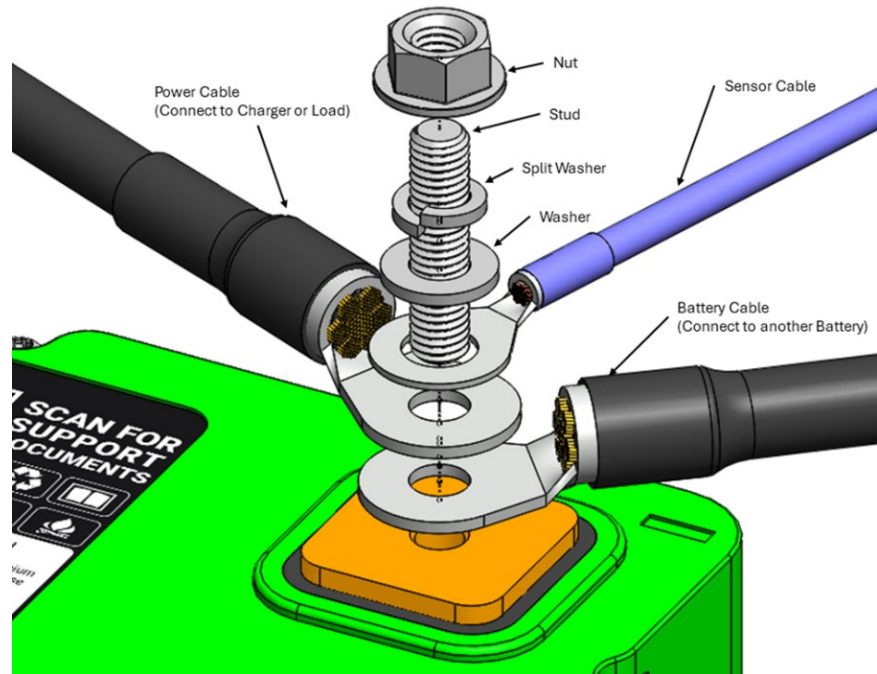


Figure 1: Battery terminal with cable connections, secured by stud and nut.

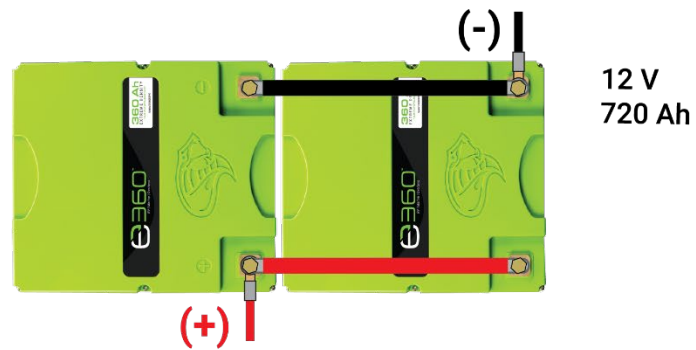
Torque to 8 lb-ft (96 lb-in). Do not finger-tighten. Do not over tighten. Check thread depth vs. bolt length. The female thread depth of the battery terminals is 12 mm.

Wiring Requirements

Wiring should meet all local codes and standards and be performed by qualified personnel such as a licensed electrician. The NEC (National Electric Code, ANSI/NFPA 70) for the United States and the CEC (Canadian Electrical Code) for Canada provide the standards for safe wiring. The NEC/CEC lists requirements for wire sizes, overcurrent protection, and installation methods/standards. There are standards and requirements specific to Recreational Vehicles (RV) that are published by RVTI (Recreational Vehicle Training Institute) that should be taken into consideration before installing in an RV. There are standards and requirements specific to Marine Crafts that are published by the American Boat and Yacht Council (ABYC) that should be taken into consideration before installing in a boat.

See the [Recommended Wire Gauge](#) section below to help you choose the correct wiring for the installation. Wiring between 2 batteries must be equal in length.

Battery System Examples



Battery Management System (BMS)

See the [Battery Specifications](#) page for complete BMS protection settings.

Short Circuit Protection

If a short circuit occurs, the BMS disconnects to protect the battery. When the short circuit condition is corrected, the BMS automatically reconnects. If it does not reconnect, a charge is required to reset it.

Overvoltage Protection

If the charge voltage is higher than 15.2 Vdc, the BMS will disconnect to protect the battery. The BMS will automatically reconnect when the battery voltage falls to 14.0 Vdc. If the BMS does not reconnect, a charge is required to reset the BMS. In some cases, it may take some time for the battery voltage to drop to 14.0 Vdc.

Undervoltage Protection

If the battery reaches the minimum voltage of 8.8 Vdc, the BMS will disconnect to protect the battery. A charge is required within one week to prevent permanent damage that will void the battery warranty. When the battery voltage rises above 10.0 Vdc, the BMS will reconnect. Some chargers will not charge if an open circuit is detected as the BMS has disconnected. We recommend using the Expion360 DC-DC charger or a conventional AC-DC charger to avoid this open circuit problem and an Expion360 Battery Monitor to display voltage clearly.

Current Protection

The BMS will monitor charge and discharge currents to protect the battery. If the charge (180A) or discharge (250A) current is too high, the BMS will disconnect to protect the battery. When a current condition is corrected, the BMS will automatically reconnect. If the BMS does not reconnect, a charge is required to reset the BMS. See the specifications page for more details.

Thermal Protection

If the temperature is too high (140°F charging, 150°F discharging) or too low (32°F charging, -4°F discharging) the battery, the BMS will disconnect to protect the battery. When the temperature is within the acceptable range, the BMS will automatically reconnect. See the [Battery Specifications](#) page for more details.

Cell Balancing

The BMS will monitor and prevent each of the four cell packs from overcharging. If the individual cell pack voltages are outside the acceptable range, the BMS will automatically balance the cell packs to bring them within range.

EX-360XDP-C Rev A Light

The LED light that is on the top of the EX-360XDP-C Rev A is an indicator of the status of the BMS. If the LED is Green, the battery voltage is above 12.6V and functioning correctly. If the LED is Orange, the battery voltage is between 12.6V and 11V. If the LED is Red, the battery voltage is below 11V. When the discharge current is greater than 250~270A, the LED will flash Red. The BMS will then disconnect after 3 seconds.



Figure 2: EX-360XDP-C REV A top with the green LED light illuminated at the snake eye.

Battery Charging

The optimal and maximum charge rates of a battery system are equal to the rates of a single battery multiplied by the number of batteries connected in parallel. To prolong the useful life of the batteries, the optimal charge rate (0.2C) is recommended. The battery system can be charged at the maximum charge rate (0.5C) for rapid power recovery if the temperature conditions listed in the [Battery Specifications](#) section are met. Never charge the battery system above the maximum charge rate. See the [Battery Specifications](#) for each battery's optimal and maximum charge rates for different temperature conditions.

Example:

A battery system has (4) 100 Ah batteries connected in parallel. The maximum charge rate of a single Expion360 battery is 50 A at 0.5C. The capacity of the battery system is 400 Ah. The maximum charge rate of the battery system is 200 A (0.5C). This method also applies to the optimal charge current.

If a battery or battery system has been discharged to zero SoC, it must be recharged within a week to prevent battery damage and void the warranty.

Charger Profile

Two-Stage CC-CV Charger

Chargers using a constant current (CC) constant voltage (CV) profile are ideal for charging LiFePO₄ chemistry batteries. We recommend charging Expion360 batteries with a target voltage of 14.6 Vdc.

The CC (bulk or boost) stage charges the battery to 95% SoC at the charger's rated current until the battery reaches the charger's voltage setting. The charger then transitions to the CV (absorption or saturation) stage at the charger's given voltage setting. It tapers the charge current down to zero as the battery reaches the charger's target voltage. The CV stage usually takes about 10 minutes, depending on the charger and the battery capacity.

The charger then enters standby mode and starts charging the battery when a lower battery voltage is detected.

Single-Stage CC Charger

A single CC stage charger can charge the battery to nearly 100% SoC. Single-stage CC chargers with target voltage settings of 14.6 Vdc may also be used to charge Expion360 batteries. However, a two-stage CC-CV charger is advised.

Multi-Stage Charger

A multi-stage (CC, CV, float, equalization) charger is primarily designed for flooded, AGM, and gel lead-acid batteries and is not an ideal selection for LiFePO₄ batteries. The multi-stage charger slows down the charging process and may not fill the battery to 100% SoC. Expion360 batteries do not require a float stage because of their low self-discharge rates. LiFePO₄ batteries do not require an equalization stage because they do not experience damaging sulfation when left at states of charge lower than 100% for long periods. The charge voltage may also rise above 14.6 Vdc during the equalization stage, which would cause the BMS to disconnect due to overvoltage protection.

Charger Sizing

Once the battery system has been appropriately sized, the specifications for the charger can be determined based on the preferred charge rate or time. A 5-hour charge time is recommended to maximize the battery's life span.

Calculation: $(R*N)/T=P_{\text{chrg}}$ or $(C*N)/T=I_{\text{chrg}}$

The desired charging time is $T = 8$ hours.

The number of EX-360XDP-C in the battery system is $N=4$.

The rated energy(R)/capacity(C) of EX-360XDP-C is 4.7kWh/360Ah.

The 12V CC-CV LFP charger power and current are P_{chrg} and I_{chrg} .

Example:

*$P_{\text{chrg}} = \text{Battery System Rated Energy} / T = (4700\text{Wh}*4)/8\text{h} = 2350\text{W}$*

Or

*$I_{\text{chrg}} = \text{Battery System Rated Capacity} / T = (360\text{Ah}*4)/8\text{h} = 180\text{A}$*

The charger's calculated current must be lower than the maximum charging rate of the battery system.

Charging Options

Shore Power Charging

Expion360 batteries should be charged by a CC-CV two-stage charger with voltage set to 14.6 Vdc. The rated charge current should never exceed the maximum charge rate of the battery system. See [Battery Specifications](#) for individual charge currents for each model.

Our batteries may be configured as an uninterruptible power supply (UPS) with an inverter charger. Inverter chargers need to be programmed before a connection is made to shore power. On the inverter charger controller, under the "Battery Type" menu, choose the "CC-CV" setting in the setup, and set the charge voltage to 14.6 Vdc. The "Custom" setting on some inverter chargers is not recommended. The additional settings are determined by the design of the power system and different inverter chargers. Please refer to the inverter charger manual or contact Expion360 support for more information.

Solar Charging

Expion360 batteries can be charged from solar power using a solar charge controller. A maximum power-point tracking (MPPT) charge controller is recommended as it has higher efficiency than a pulse-width modulation (PWM) charge controller.

Choose a solar charge controller that can be programmed for two-stage charging or one with a lithium battery setting. If using a programmable solar charge controller, set the charge to 14.6 Vdc.

To prevent the solar charge controller from charging the battery system below 32°F, a disconnect switch between the solar panels and the solar charge controller must be installed. Make sure the switch is sized to handle the voltage and maximum current of the solar array. Some solar charge controllers have a temperature sensor and can be programmed to stop charging at a specific temperature. It is advised to set this temperature to 32°F. Please refer to the solar charge controller manual or contact the Expion360 support department for more assistance.

Alternator Charging

The Expion360 battery can be charged from an alternator using a DC-DC charger equipped with settings for LiFePO₄ batteries. LiFePO₄ batteries cannot be charged directly from the alternator. The Expion360 DC-DC charger is a CC-CV two-stage charger that is designed only to charge LiFePO₄ batteries with a 25 A output current. The Expion360 DC-DC charger is simple to install and compatible with any other LiFePO₄ battery. Within the limits of the battery system and alternator specifications, up to two Expion360 DC-DC chargers can be used in parallel to achieve a higher charge rate.

Discharge

The EX-360XDP-C battery is designed for deep-cycle use only and should never be used in a starting application. The battery system's maximum continuous discharge rate is equal to the maximum continuous discharge rate of a single battery multiplied by the number of batteries connected in parallel. Never discharge the battery system above its maximum continuous discharge rate. See the [Battery Specifications](#) page for the optimal, maximum, and pulse discharge rates of each Expion360 battery.

For example:

A battery system has four 100 Ah Expion360 batteries connected in parallel. The maximum continuous discharge rate of a single Expion360 battery is 100 A (1C). The capacity of the battery system is 400 Ah. The maximum continuous discharge rate of the battery system is 400 A (1C). The same method applies to the recommended optimal discharge current and maximum pulse discharge current.

Battery Monitoring

The charge/discharge characteristic curve of a LiFePO₄ battery has a more gradual slope than lead-acid batteries. Determining the battery's state-of-charge (SoC) based on the voltage readings is not the best practice for LiFePO₄ batteries. To accurately calculate the SoC of a LiFePO₄ battery system, the Expion360 Battery Monitor is recommended. The battery monitor calculates the SoC based on measuring the current that passes through a finely tuned shunt resistor rather than voltage to give a more accurate reading of the battery system.

The Expion360 12V Battery Monitor is easy to program, simple to install, and compatible with all other brands and battery chemistries. It shows the remaining capacity (Ah), SoC (%), battery system voltage (V), charge/discharge current (A), and charge/discharge power (W). The battery monitor also shows the remaining discharge time until empty and the remaining charge time until full. Include this useful accessory for peace of mind and to see the battery metrics anytime without reading the voltage from a voltmeter at the battery terminals.

Note that the voltage displayed on the Battery Monitor will read higher or lower than the actual value if the battery has been charged or discharged within an hour of measurement. Precision will increase with time until 12 hours have passed, after which the measured voltage will not change. This is an inherent characteristic of all batteries as they are charged and discharged. A greater difference in voltage will be measured when the battery is disconnected from high current sources/loads than low current sources/loads.

Inverter

When pairing a battery system with an inverter, the maximum continuous DC current must be considered carefully. The inverter cannot have a higher maximum DC input than the battery system's maximum DC output. Otherwise, the battery's BMS may shut off due to discharge overcurrent protection. In a worst-case scenario, an oversized inverter may irreversibly damage the battery system. The example below shows minimum battery system capacities for various sizes of 12 VDC inverters with estimated discharge times at full load.

Battery size (Ah)	60	80	95	100	120	360
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1000-Watt Inverter (78 A at 12.8 V)

1 Battery		1h 1m	1h 13m	1h 18m	1h 31m	4h 42m
2 Batteries	1h 33m	2h 4m	2h 47m	2h 36m	3h 4m	9h 25m
3 Batteries	2h 20m	3h 6m	3h 40m	3h 54m	4h 36m	14h 7m
4 Batteries	3h 7m	4h 8m	4h 54m	5h 13m	6h 13m	18h 50m

2000-Watt Inverter (156 A at 12.8 V)

1 Battery						2h 21m
2 Batteries				1h 18m	1h 31m	4h 42m
3 Batteries		1h 33m	1h 50m	1h 54m	2h 18m	7h 3m
4 Batteries	1h 33m	2h 4m	2h 27m	2h 36m	3h 4m	9h 25m

3000-Watt Inverter (234 A at 12.8 V)

1 Battery						
2 Batteries						3h 27m
3 Batteries				1h 18m	1h 31m	4h 42m
4 Batteries		1h 22m	1h 37m	1h 44m	2h 2m	6h 16m

Properly size the battery system's capacity to the inverter to prevent battery damage.

Match the battery system's maximum pulse and continuous discharge current to the inverter's maximum surge and input current, respectively.

Only use inverters that have been certified to conform to UL 458 or UL 1741.

For more information about pairing inverters and battery systems with capacities that are not listed above or further details, please contact Expion360 technical support:

Support@expion360.com

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Circuit Protection

Properly sized circuit protection must consider the battery system's maximum DC output, the inverter's maximum DC input, and the size, length, and rating of the cables being used. The fuse or circuit breaker must be able to withstand the maximum continuous current that can be supplied by the battery system and must be located as close to the battery system as is safely possible. Use Blue Sea Systems fuses provided in the table below or an equivalent by an approved manufacturer.

Fuse Rating	Class T Fuse P/N	ANL Fuse P/N
60 A	N/A	5123
80 A	N/A	5124
100 A	N/A	5125
110 A	5112	N/A
125 A	5113	N/A
150 A	5114	5127
175 A	5115	5128
200 A	5116	5129
225 A	5117	N/A
250 A	5118	5131
300 A	5119	5133
350 A	5120	5135
400 A	5121	5136
500 A	N/A	5137
600 A	N/A	5161
750 A	N/A	5163

Figure 3: Class T fuses are recommended to protect the power system due to their lower voltage drop and higher efficiency. For the budget-conscious consumer and lower current applications, ANL fuses are sufficient (at the cost of reduced system efficiency). Use fuse and breakers from the following approved manufacturers to protect against overcurrent events and ensure the safety of the Expion360 battery system: Blue Sea Systems, Littlefuse, Eaton, or Bussman.

For Class T fuses between 110 to 200 A, use Blue Sea Systems fuse holder 5007100.

For Class T fuses between 225 to 400 A, use Blue Sea Systems fuse holder 5502100.

For ANL fuses between 60 to 200 A, use Blue Sea Systems fuse holder 5005.

For ANL fuses between 225 to 750 A, use Blue Sea Systems fuse holder 5503.

Recommended Wire Gauge

1. Calculate the circuit's maximum sustained amperage. The easiest way is to use the maximum load drawn by the inverter or converter in your system. If this is measured in watts, divide the maximum watt draw by 12.0. This equals the inverter/converter's amp draw. Measure the distance from the batteries to the inverter/converter and back for the total length of the wire run.
2. Determine if the circuit runs in an engine space or non-engine space. Engine spaces are assumed to be at 50C°, and non-engine spaces are assumed to be at 30C°.
3. Multiply the maximum amp draw by the distance of the circuit to calculate for feet x amps (abbreviated as Famps).
4. Base the wire on the 3% or 10% voltage drop. In general, items that affect the safe operation of the recreational vehicle (running lights, electronics, and distribution panel supply circuits) use 3%; all other loads (cabin lights) use 10%.
5. Now look at the table below.
 - a) Starting in the column that has the correct voltage (12V, 24V, 36V) and voltage drop shown at the top.
 - b) Go down the list of numbers until you arrive at a value greater than the calculated Famps.
 - c) Move left to the Ampacity column to verify that the circuit's total amperage does not exceed the maximum allowable amperage of the wire size for that row.
 - d) Finally, move left to the wire size column to select the correct wire size.

Example:

You have a 200Ah battery system with a 1500W inverter charger. The inverter charger is 10 feet from the battery bank.

$10\text{ft} * 2 = 20\text{ft}$ (total circuit to and from the battery)

$1500\text{W} / 12.8\text{V} = 117.2\text{A}$ (Maximum amp draw from the inverter)

$117.2\text{A} * 20 = 2344$

Wire Size		Minimum Acceptable	Wire Ampacity	Wire Ampacity	12 Volts Volt Drop		24 Volts Volt Drop		32 Volts Volt Drop	
AWG	Metric*	CM area	non-engine	engine	3%	10%	3%	10%	3%	10%
16	1	2336	25.0	21.3	86	288	173	576	230	768
14	2	3702	35.0	29.8	138	459	275	918	367	1223
12	3	5833	45.0	38.3	219	729	437	1458	583	1944
10	5	9343	60.0	51.0	348	1159	695	2317	927	3090
8	8	14810	80.0	68.0	553	1843	1106	3686	1474	4915
6	13	24538	120.0	102.0	879	2929	1757	5858	2343	7811
4	19	37360	160.0	136.0	1398	4659	2796	9319	3727	12425
2	32	62450	210.0	178.5	2222	7408	4445	14815	5926	19754
1	40	77790	245.0	208.3	2803	9342	5605	18684	7474	24912
0	50	98980	285.0	242.3	3536	11788	7073	23576	9430	31434
00	62	125100	330.0	280.5	4457	14858	8915	29715	11886	39620
000	81	158600	385.0	327.3	5619	18731	11239	37462	14985	49950
0000	103	205500	445.0	378.3	7086	23620	14172	47241	18896	62988

Note: This chart assumes wire with 105°C insulation rating and AWG wire sizes.

Figure 3: Systems, Blue Sea. "Voltage Drop in Conductor - Wire Sizing Chart." Blue Sea Systems, www.bluesea.com/resources/535/Voltage_Drop_in_Conductor_-.

Accessed 25 Mar. 2024.

1. With a 3% voltage drop at 12V, you will move down the column below to the next number that is larger than 2344, which in this case is 2803.
2. Move left across that row from 2803 to the Wire Ampacity non-engine column. The Ampacity listed is 245. This is higher than 117.2; continue to step 3. If 245 A was lower than the amp draw you initially found in your calculations, move down the column to an ampacity higher than your amp draw.
3. Move left along that row to the Wire Size AWG. For the 245 A row, the wire will be 1 AWG. This is the recommended wire size for the wire run from your batteries to the Inverter.

RV Installations:

As stated in the RVTI Level 2 Electrical Systems material, current-carrying conductors (cables/wires) used in low-voltage wiring systems of an RV are required to be of the stranded copper type. Conductors of sizes 6 through 18 AWG or SAE need to be evaluated by a third-party listing agency such as UL or CSA. The identification mark of the listing agency needs to be printed on the wire. Any conductor used needs to be sized according to the load and overcurrent protection provided. Low-voltage conductors used in RV's interior must have a minimum insulation rating of 90°C. Low-voltage conductors in the engine compartment or under the chassis where the conductors are within 10 in. of any exhaust system component must be rated at least 125°C. The temperature rating will usually be printed on the wire along with other information. If the temperature rating of the wire cannot be determined, do not use it.

Marine/Boat Installations:

Color	Type of DC conductor
Green or green with yellow stripes	DC grounding conductor
Black or yellow	DC negative conductor
Red	DC positive conductor

Conductors for marine installations have strict guidelines, including the color of the wire that needs to be used for each connection. Per the ABYC Marine Electrical Certification, DC conductors follow the color coding in the table above. Alternative labeling or even color methods for DC conductors are allowed, but the requirements do specify that a wiring diagram and/or wiring legend be created for the boat and included in the boat's documentation.

Wiring should meet all local codes and standards and be performed by qualified personnel such as a licensed electrician. The NEC (National Electric Code, ANSI/NFPA 70) for the United States and the CEC (Canadian Electrical Code) for Canada provide the standards for safe wiring. The NEC/CEC lists requirements for wire sizes, overcurrent protection, and installation methods/standards. The recommendations given by our technical support team are for guidance purposes only. Installers are responsible for independent evaluation and verification of suitability and compatibility. Any reliance on these recommendations is at the installer's own risk.

Connecting Batteries

Single String Battery System

For small battery systems with fewer than four batteries or a single string configuration, circuit protection (fuse or circuit breaker) should be installed close to the battery system positive terminal before connecting to the load. The fuse rating is based on the battery system's maximum continuous discharge rate.

Example:

If the maximum continuous discharge rate of a 400 Ah battery system is 400 A, this battery system should be paired with a 400 A DC fuse. In this example, any wires connecting the battery system to the inverter must also be properly sized for a 400 A continuous current.

Multi-string Battery System

For large battery systems with multiple string configurations, the circuit protection (fuses or circuit breakers) should be installed close to each string's battery system positive terminal before connecting to the common bus bar. The fuse rating is based on the maximum continuous discharge rate of each string of the battery system.

For example:

If the maximum continuous discharge rate of two strings of parallel-connected batteries is 800 A with 400 Ah on each string, the battery system should be paired with a 400 A DC fuse on each string. The cables connecting the two strings to the inverter must be sized properly for the maximum 800 A current.

For more information about correctly sizing circuit protection for the battery power system, please contact an authorized installer or Expion360 technical support:

Support@expion360.com

+1 (541)797-6714

Battery Life

The battery is considered to reach the end-of-life (EoL) when the remaining available capacity is less than 70% of the original capacity. The cycle life of Expion360 batteries is tested at a charge/discharge rate of 0.2C/1C, 77°F, and 100% depth-of-discharge (DoD). Please note that many factors can affect battery cycle life. Using the recommended charge and discharge rates will offer longer battery life.

DoD

The cycle life of our EX-360XDP-C batteries is tested by discharging them to 100% DoD. The optimal window for operating LFP batteries is a DoD between 20% and 80%. To accommodate this, slightly oversize the capacity of the battery system so that the DoD is about 80% for each cycle. This is beneficial to the batteries and will help prolong the battery life.

Example:

In a 12 Vdc system, if 300 Ah is required for each cycle, a battery system with a 360 Ah capacity is recommended.

Operating Temperature Range

Operating LFP batteries at extremely low or high temperatures will significantly decrease their cycle life. Please ensure the battery system is well-ventilated or cooled during high temperatures and heated at low temperatures. Maximum battery life can be achieved when operating temperatures are as close to 77°F as possible.

Charge/Discharge Rate

Charging and discharging the battery at higher than recommended rates will generate more heat within the cells. Since temperature is the primary factor that affects the cycle life, consider the charge/discharge specifications with regard to ambient temperature extremes when configuring the battery power system. The specifications page at the end of this manual considers both safety and the maximum life cycle when recommending optimal parameters for the battery system.

Storage Condition

Most users will see their batteries in storage more often than active daily use. Please consider the following instructions in the next section to prolong the battery life during storage periods of one month or longer.

Storage

Properly storing the battery system between 20% and 80% state-of-charge (SoC) will prolong the battery life, and using a battery monitor to assist with tracking the SoC is highly recommended. If a battery monitor is unavailable, measure the voltage with a voltmeter (set to DC). If the battery is found to be less than 13.3 Vdc, charge it, and store the battery at 13.4 Vdc. Note that the battery voltage will read low or high if it has been discharged or charged within an hour of measurement. Precision will increase with time until 3 hours have passed, after which the voltage measurement will not change.

Before storing, the battery system must be completely isolated from any loads (DC load, inverter, etc.) and charging sources (converter charger, solar charger, etc.). The Expion360 Battery Monitor can be left on the battery system to check its status. Charge the battery system to full capacity and recalibrate the battery monitor before using the battery system after storage.

Please follow the guidelines below for the storage time lengths.

1 month: 13.4 Vdc, -4°F to 113°F.

3 months: 13.4 Vdc, 32°F to 95°F.

Completely discharge and charge the battery system to 13.4 Vdc every 3-6 months.

Due to all batteries' inherent self-discharge, it is advised to check the voltage displayed on the battery monitor periodically. If the voltage is below 12 Vdc at any time, check the battery system and make sure it is completely disconnected from any load. Charge the battery system to 13.4 Vdc and disconnect the charger. Isolating the batteries from the charger and load ensures no parasitic draw can still be applied from third-party accessories.

WHEN BATTERIES ARE PLACED IN STORAGE FOR LONGER THAN 2 to 4 WEEKS...

Charge the battery system to 50% state-of-charge or an open circuit voltage of about 13.4 Vdc. Disconnect all positive and negative cables from the battery terminals to prevent parasitic loads and irreversible battery damage.

IF BATTERIES ARE DISCHARGED TO 0% SoC...

Immediately charge the battery system to 13.4 Vdc and confirm that all positive and negative cables have been disconnected from the battery terminals. All batteries using LiFePO₄ chemistry will be permanently damaged if discharged to 0% SoC and left for over **one week**.

This is an inherent characteristic among all lithium iron phosphate batteries. The warranty excludes coverage for such damage due to the end-user neglecting the batteries.

Accessories

The products listed below are compatible with Expion360's EX-360XDP-C batteries.

Model EX-BM350-KT: Battery monitor with display and complete installation kit.

Model EX-25DC: Expion360 DC to DC 25 A, 14.6 Vdc, 2-stage charger.

Model EX-360-TDS: Single battery tie-down system for the 360 Ah battery.

Model EX-360-BUS-Set: Aluminum bus bar (highly efficient for connecting batteries).

For questions regarding these products, feel free to contact Expion360 technical support:

Support@expion360.com

+1 (541)797-6714

Battery Specifications

	Parameters ¹		EX-360XDP-C
General	Battery Nominal Voltage		12.8V
	Battery Rated Capacity (@ 0.2C, 25°C)		368Ah
	Battery Rated Energy (@ 0.2C, 25°C)		4710Wh
	Internal Impedance (@ 1kHz AC, 25°C)		≤5mΩ
	Battery Self-discharge Rate (@ 25°C)		<5% per month
	Battery Cycle Life ²		>4000
	Max. Parallel Connections (per string)		4
	Max. Power / Current (per string)		5kW / 400A ³
	Cell		LiFePO ₄
	Communication		-
	Battery Size		EX1
	Battery Dimensions (L. x D. x H.)		12.8 x 14.6 x 10.4in (325 x 370 x 265mm)
	Battery Weight		101lb (45.5kg)
	Case Material		ABS
Charge	Method		CC-CV
	Voltage	Max.	14.6V
		Float	13.6V
		High Voltage Protection	15.2V
		High Voltage Protection Release	14.0V
	Current	Optimal	72A
		32°F ~ 50°F (0°C ~ 10°C)	Max 72A
		50°F ~ 140°F (10°C ~ 60°C)	Max 180A
		Protection Release Condition	Disconnect load.
	Temp.	Operating	32°F ~ 140°F (0°C ~ 60°C)
		Protection Release	40°F ~ 120°F (5°C ~ 50°C)
		Protection Release Condition	Temperature meets protection release. Disconnect load.
Discharge	Voltage	Optimal Shut-off (resting)	12V
		Low Voltage Protection	8.8V
		Low Voltage Protection Release	10V
	Current	Optimal	180A
		Max. Continuous	250A
		Max. Pulse	300A (2s)
		Protection Release Condition	Disconnect load.
	Temp.	Operating	-4°F ~ 150°F (-20°C~ 65°C)
		Protection Release	5°F ~ 130°F (-15°C~ 55°C)
		Protection Release Condition	Temperature meets protection release. Disconnect load.
Short	Short Circuit Release Condition		Disconnect load.
Storage	Recommended		50% SoC
	1 month		-4°F ~ 113°F (-20°C ~ 45°C)
	3 months		32°F ~ 95°F (0°C ~ 35°C)
	Maintenance		Discharge-charge cycle every 6 months.
Certifications			UL 1642 For Cells, File no. MH64383
			UN3480, UN38.3
			Certified compliant to UL 1973 by TEi Listing Services, File no. 22D01

¹ Measurement tolerance. Voltage/Current: ± 3%. Temperature: ± 9°F (5°C). Time delay: ± 1s.

² Charge/Discharge @0.2C/0.5C, 25°C, 100% DoD reach 80% Capacity retention.

³ Depending on the size of ring terminals/cables/busbars.

Warranty

Expion360 online product registration with proof of purchase is required for warranty coverage.

True 12-Year Warranty

Expion360 warrants each EX-360XDP-C battery sold by Expion360 or any of its authorized dealers, distributors, and OE manufacturers to be free of manufacturer defects in material and workmanship under normal use for 12 years from the date of sale as determined by the customer's sales receipt as proof of purchase. Expion360, at its sole discretion, will only repair or replace the battery and/or parts of the battery in question if it is determined to be defective in material and/or workmanship by the Expion360 Technical Support Team. Expion360 reserves the right to deny a warranty claim if the battery is determined, upon inspection, to be at its normal end of life or used improperly, even if within the Warranty Period. Expion360 batteries can be submitted for a warranty claim once.

Receiving a replacement battery after a warranty claim does not restart the warranty period or allow for additional warranty claims from the End User. Expion360 online product registration is also required for warranty coverage. The end user can register the batteries here:

<https://expion360.com/pages/product-registration>

0-8 Years/2000 Cycles

Within the first 8 years or 2000 cycles (whichever comes first) of the warranty period, subject to the exclusions listed below, Expion360, at its sole discretion, will repair or replace the battery and/or parts of the battery in question if the Expion360 Technical Support Team determines that they are defective in material and/or workmanship.

8-10 Years

After 8 years and up to 10 years, if the batteries in question are determined to be defective in material or workmanship, and Expion360 deems the components to be repairable, the battery will be repaired and returned. If Expion360 deems the components not to be repairable, a new, similar battery will be offered at a discount of 40% off the published market price listed at the time of the offer. The offer is valid for 60 days after a representative from Expion360 has contacted the customer with the repairability decision.

10-12 Years

After 10 years and up to 12 years, if the batteries in question are determined to be defective in material or workmanship, and Expion360 deems the components to be repairable, the battery will be repaired and returned. If Expion360 deems the components not to be repairable, a new, similar battery will be offered at a discount of 20% off the published market price listed at the time of the offer. The offer is valid for 60 days after a representative from Expion360 has contacted the customer with the repairability decision.

Installation

Expion360 recommends a professional installation by a qualified RV, Marine, Golf Cart, or low voltage technician; however, the total warranty applies whether professionally installed or not if installation instructions are correctly followed in the User Manual.

Non-Transferable

This Limited Warranty is for the original purchaser with proof of purchase only. It is not transferable to any other person or entity. Please contact Expion360 directly regarding any warranty claim.

(support@expion360.com)

Product Return and Shipping

The product must be returned to Expion360 before warranty coverage is authorized to determine if it is defective. If the product is faulty and determined to be a warranted item, it may be repaired, returned, or replaced as determined by Expion360. Expion360 will cover Continental US ground/freight shipping of the repaired, replacement, and defective batteries within the 0 to 8-year full replacement warranty period. If the battery(s) are found to be in good working condition, the customer, dealer, or distributor will be responsible for the cost of shipping the battery(s) back. After 8 years and up to 12 years, the customer, dealer, or distributor will be responsible for the cost of Continental US ground/freight shipping of the replacement battery(s).

Battery Storage

Before storing Expion360 lithium batteries for periods longer than 3 months, ensure the batteries are at 50% to 80% state of charge using the Expion360 battery monitor. If the battery is not equipped with a battery monitor, measure the voltage with a multimeter to confirm the state of charge is not below 50%. Do not store batteries below 50% state of charge. Completely discharge and charge the battery bank to 13.4Vdc every 3 to 6 months. Battery specifications can be found in the battery user manual to confirm the measured voltage is within an acceptable range. For further instructions, see the battery user manual. Damage to the battery(s) will not be covered under warranty if the user has failed to adhere to the storage instructions in the battery user manual.

Water Submersion

Expion360 lithium batteries are not designed to be submerged in water for any length of time and are not intended for use in environments where prolonged water exposure could be reasonably expected. If damage to the cells or BMS is incurred from water ingress into the battery case, the battery is damaged beyond repair and will not be covered under warranty.

Warranty Exclusions

Expion360 has no obligation under this Limited Warranty for any battery subject to the following conditions (including, but not limited to):

- Damage caused by road debris, dropping the battery, or collision (either while installed or object that was struck).
- Damage due to over/undercharging, over-discharging, under-sizing for application, not using surge limiting device in specific applications, and reverse polarity connections.
- Damage due to improper installations: incorrect wire sizing, loose connections, improper parallel and series connections, short-circuit, not maintaining terminals, and oversizing inverters (see owner's manual for proper inverter sizing).
- A battery that has been opened, tampered with, and/or modified.

- Used in any starting application or other application for which deep-cycle batteries are not intended.
- Environmental damage such as water submersion, fire, and extreme weather conditions.
- Improper storage conditions as defined in the battery storage section of this warranty.

Warranty Disclaimer

THIS LIMITED WARRANTY REPRESENTS THE TOTAL LIABILITY OF EXPION360 FOR ANY BATTERY. ALL OTHER WARRANTIES IMPLIED BY LAW APPLICABLE TO THE BATTERY SHALL BE LIMITED TO THE WARRANTY PERIOD STATED. EXPION360 MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. EXPION360 SHALL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING REMOVAL, SHIPPING, OR INSTALLATION EXPENSES.

The battery owner must cooperate with Expion360 Technical Support Staff or an Expion360 authorized service provider by chat, email, video call, or telephone when troubleshooting suspected battery issues. This may involve performing routine diagnostic procedures, hardware updates, eliminating possible third-party issues, and/or replacing items known to be incompatible with Expion360 batteries. If assistance is required, contact Expion360 technical support, and a technician will provide assistance using online chat, email, video call, or telephone. Expion360 RMA (Return Merchandise Authorization) documentation will be sent to the customer if the product must be returned to Expion360 for testing unless otherwise stipulated by applicable local law. In cases where it is required to return the product for further testing to Expion360, the product must be shipped to Expion360 within fifteen (15) business days. The product must be returned with the associated documentation in the provided shipping material.

Legal Rights

Some states do not allow limitations on how long an implied warranty lasts or exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to the end user. This warranty gives the end user specific legal rights, and the end user may also have other rights that vary from state to state. This warranty shall be governed by and interpreted by the laws of Oregon. This warranty is understood to be the exclusive agreement between the parties relating to the subject matter hereof. No employee or representative of Expion360 is authorized to make any warranty in addition to those made in this agreement.

Submitting A Warranty Claim

To submit a warranty claim, please contact Expion360 at support@expion360.com



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