S48-100LFP STACK-LV BATTERY OPERATING MANUAL

Rolls

BATTERY ENGINEERING



Recommended safety, installation, operation and troubleshooting procedures for Rolls S48-100LFP STACK-LV (Lithium Iron Phosphate) Energy Storage Systems.


Rolls

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WARNING

To Reduce the Risk of Injury, read all instructions

ARC FLASH AND SHOCK HAZARD

DO NOT short the battery terminals

DO NOT reverse connections (polarity) from charger or battery

DO NOT overcharge or over discharge

DO NOT operate battery beyond the published voltage, current or temperature limit

DO NOT drop, strike, puncture, disassemble, modify, incinerate or crush

DO NOT expose to high temperatures or fire

DO NOT submerge. IP52. Not certified for installations with salt spray, nor in marine environments.

IN CASE OF LEAKED ELECTROLYTE KEEP AWAY FROM EYES OR SKIN.
REFER TO NFPA 70E FOR PPE REQUIREMENTS.



ROLLS S48-100LFP STACK-LV

Rolls S-Series S48-100LFP STACK-LV 51.2-volt Lithium Iron Phosphate (LFP/$LiFePO_4$) Energy Storage System (ESS) batteries are designed for use in larger-scale, 48V (51.2V nominal) systems, for grid-connected backup and off-grid purposes. Rolls S48-100LFP STACK-LV batteries are designed to scale in parallel capacity only at this voltage level, with communication between batteries and externally connected equipment.

Failure to install or use this battery as instructed may result in damage to the product that may not be covered under the manufacturer warranty. See warranty terms & conditions for full details.

Note: This manual offers installation, charging and troubleshooting guidance for the Rolls S48-100LFP STACK-LV battery only.

See Rolls S24-2800LFP ESS & S48-6650LFP ESS Battery Operating Manual for usage instructions specific to Rolls S24-2800LFP ESS and S48-6650LFP ESS (Energy Storage System) models.

See Rolls R-Series, G-Series & S-Series Drop-in LFP Battery Operating Manual (grey and red plastic cases, BCI sizes) manual for usage instructions specific to Rolls R-Series, G-Series & S-Series drop-in LFP models.

See Rolls S48-100LFP ESS Battery Operating Manual (19" rack mount battery) for usage instructions specific to Rolls S48-100LFP ESS model.

Nominal voltage of an LFP battery differs from equivalent lead-acid batteries.

LFP Battery	Lead-Acid Battery
Cell Voltage = 3.2V	Lead-Acid Battery
Battery Nominal Voltage 51.2V (16 cells)	Battery Nominal Voltage 48V (24 cells)

WARNING: EXPLOSION, ELECTROCUTION, OR FIRE HAZARD

- A battery can present a risk of electric shock, burns from high short circuit current, fire, or explosion.
- Ensure cables are properly sized for the system current and cable runs are as short as possible, reducing line inductance and voltage spikes, which can damage the BMS or external equipment.
- Ensure adequate airflow around batteries and that they are clear of debris.
- Never smoke or allow a spark or flame near the batteries.
- Always use insulated tools.
- Avoid dropping tools onto batteries or other exposed electrical parts.
- Cold temperatures can be especially damaging to batteries after even a single low temperature event.
    - Never charge a Rolls S48-100LFP STACK-LV battery below 0°C (32°F).
    - Never discharge a Rolls S48-100LFP STACK-LV battery below -20°C (-4°F).
- Never charge a battery with a deformed or bulging case.
- Do not expose Rolls S48-100LFP STACK-LV batteries to ambient temperatures exceeding 60°C (140°F) during operation, and do not store for extended periods of time above 45°C (113°F).
- Do not incinerate or expose to open flames.
- If a battery must be decommissioned/removed, always open the breaker first, then remove the grounded terminal from the battery. Make sure all devices are disconnected.
- When installing, leave adequate clearance between battery systems, walls and other electrical devices consistent with local code requirements.
- When replacing batteries, use the same make, model & quantity of batteries.
- Do not mix old and new batteries on the same DC bus after the first year of installation.
- Avoid any fall or collision during the installation process.
- Do not dismantle or remove the battery components.
- Battery maintenance & servicing must be carried out by qualified personnel only under the guidance of Rolls Battery. Unauthorized access, servicing, or tampering of individual modules will void the manufacturer's warranty.

VERSION HISTORY/CHANGELOG

Rev.	Changelog	Author/Editor	Date
1.0	Release Version	Jordan Torrealba	2025/08/31
2.0	Storage Instructions	Jeff Myles	2026/04/08

This document is NOT APPLICABLE to the following models	
S-Series LFP (S_ _-_ _ _LFP) **G-Series LFP** (G_ _-_ _ _LFP) **R-Series LFP** (R _____ LFP)	**48V LFP ESS Models** S48-100LFP ESS
	



⚠ Warning

Electrical shock hazard. Do not open. No user serviceable parts inside. Unauthorized access, servicing, or tampering of individual modules will void the manufacturer's warranty. Maintenance can only be carried out by authorized personnel under the guidance of Rolls Battery.



⚠ Warning

WARNING: To Reduce the Risk of Injury, read all instructions.



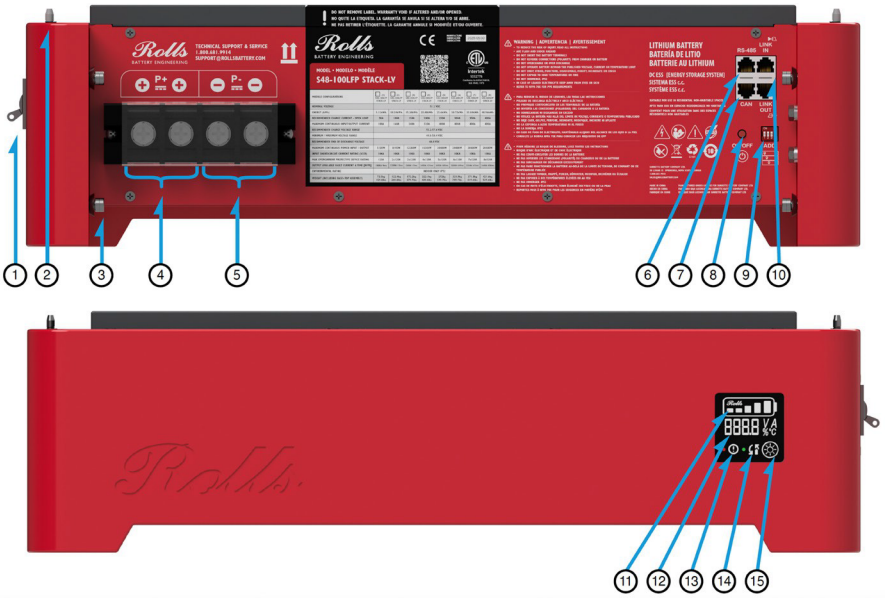
⚠ Warning

For indoor use only – "Suitable for use in residential dwelling units where permitted."

PRODUCT DESCRIPTION

Rolls S48-100LFP STACK-LV series Energy Storage Systems (ESS) are a series of stackable ESS modules. These batteries are intended for installation in systems requiring between 5kWh and 40kWh of storage per DC system, with up to 400A (20kW) discharge capability. Larger systems above 40kWh storage should take advantage of AC coupling to combine ESS systems on the AC bus.

REAR PANEL FEATURES



Rear Panel Features		Front Panel Features
1. External Breaker	6. RS-485 Communication	11. Display SOC Indicator
2. Assembly Locator Pin	7. CAN BUS Communication	12. Volt/Current/Temp Display
3. Rear Panel Mount	8. BMS On/Off Button	13. Display Alarm Indicator
4. Positive Terminal (2xM8)	9. DIP Address Switch	14. Display RUN Indicator
5. Negative Terminal (2xM8)	10. LINK IN/LINK OUT Ports	15. Display On/Off Button

INSTALLATION

For installation instructions, please refer to the S48-100LFP STACK-LV Installation Guide packaged with the LFP STACK BASE+TOP ASSEMBLY.

	For the English version of the Rolls S48-100LFP STACK-LV Battery Installation Manual, scan the code. Or consult our website: rollsbattery.com	

Note: Only trained electrical power system technicians (or equivalent) should install the battery system. Before installing or removing the battery, make sure that the system is disconnected from any power source and that each battery module is turned off. Distribution cabling needs to be handled carefully with reasonable protective measures to avoid shorting or inadvertent connections during maintenance and operation.

UL9540A Compliance

This device complies with UL9540A Test Method for Evaluating Thermal Runaway Fire Protection in Battery Storage Systems:

UL 1973 Compliance
This device complies with ANSI/CAN/UL 1973:2022 Ed.3
Test Organization: Intertek
Report Number: 241213059GZC-001
Date Issued: 4 June 2025

UL 9540 Compliance
This device complies with UL 9540:2023 Ed.3
Test Organization: Intertek
Report Number: 241212095GZU-001
Date Issued: 9 July 2025

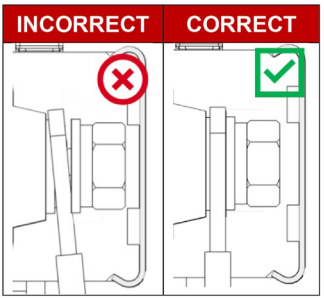
UL 9540A Compliance
This device complies with ANSI/CAN/UL 9540A:2025 Ed.5
Test Organization: Intertek
Report Number: 241212104GZC-001
Date Issued: 6 July 2025

PARALLEL BATTERY ESS INSTALLATION

Rolls S48-100LFP STACK-LV batteries can be combined in parallel to increase system capacity and power delivery. Rolls S48-100LFP STACK-LV batteries can support up to 8 battery modules in parallel and is certified to UL 9540 & UL 1973 and tested to the unit level standard of UL 9540A under the following product names with overall system dimensions provided for reference.

MODEL	SYSTEM DIMENSIONS (WxDxH)
S48-100LFP STACK-LV	600x450x320mm
S48-200LFP STACK-LV	600x450x480mm
S48-300LFP STACK-LV	600x450x640mm
S48-400LFP STACK-LV	600x450x800mm
S48-500LFP STACK-LV	600x450x960mm
S48-600LFP STACK-LV	600x450x1120mm
S48-700LFP STACK-LV	600x450x1280mm
S48-800LFP STACK-LV	600x450x1440mm

Each unit comes with two (2) positive and two (2) negative 200A busbars. Included with LFP STACK BASE+TOP ASSEMBLY are two additional busbar combiners, each having 2x M8 lugs and 2x M8 threaded inserts, to attach external cabling. Please refer to the installation instructions for recommended installation order. Busbars must always be installed completely flush and parallel to the terminal or mating busbar to avoid potential high resistance contacts.



The following table highlights the maximum current rating for the noted system configurations. These must be noted on the label during installation, per the installation manual.

CONFIGURATION MAXIMUM CURRENT REFERENCE								
MODEL	S48-100LFP STACK-LV	S48-200LFP STACK-LV	S48-300LFP STACK-LV	S48-400LFP STACK-LV	S48-500LFP STACK-LV	S48-600LFP STACK-LV	S48-700LFP STACK-LV	S48-800LFP STACK-LV
Modules	1	2	3	4	5	6	7	8
Capacity (Ah)	100	200	300	400	500	600	700	800
400A Busbar Configuration (Dual Positive & Dual Negative Busbars)								
Max Charging Current	100A	160A	240A	320A	400A	400A	400A	400A
Max Discharging Current	100A	160A	240A	320A	400A	400A	400A	400A
C-Rate	1.0C	0.80C	0.80C	0.80C	0.80C	0.67C	0.57C	0.50C

Note: Factory settings for current limits in closed-loop communication are based on a 400A Busbar configuration (busbars are included in packaging). Each of the four terminals on the S48-100LFP STACK-LV module has a maximum current limit of 200A. For all installations, code compliance, and adherence to certifications, installation of the four (4) supplied busbars, connected on the two (2) positive terminals & two (2) negative terminals, per battery, is required (See installation instructions).

DO NOT install closed-loop systems with a 200A (single) busbar configuration.

Refer to firmware update instructions online or contact support if a 200A closed-loop configuration is required.

Note: For optimal cell cycle life, current setpoints may be limited based on external environment, either at the charger or inverter/hybrid inverter. Refer to CHARGING GUIDELINES below for more details.

Note: Refer to the Communication Interface section for the parallel communication cable and external CAN/RS-485 connections.



WARNING: Series connection of Rolls S48-100LFP STACK-LV batteries is NOT supported. Connecting batteries in series will directly lead to BMS failure under numerous conditions, risking cell health and user safety, and will void the product warranty.

PRECHARGE

Because of the highly capacitive DC inputs/outputs of large inverters, they may present electrically as a short circuit on initial connection. To accommodate the resulting current spike during startup, there is a programmed delay and resistor connection to avoid short circuit protection on the BMS after relay engagement. Follow the commissioning procedure in the Rolls S48-100LFP STACK-LV Battery Installation Manual. If you still have issues with startup, contact Rolls Battery Technical Support for more advanced troubleshooting tips.

LCD DISPLAY AND STATUS INDICATOR INSTRUCTIONS

	Slow Flashing 
ALARM	**RUN**

Rolls S48-100LFP STACK-LV batteries have an LCD display on the front panel to display the current state of charge estimate, temperature, current, and voltage. This display area also contains a button to illuminate the display, and 2 indicator LEDs; one alarm light for error indication, and one run light for charge and discharge information.

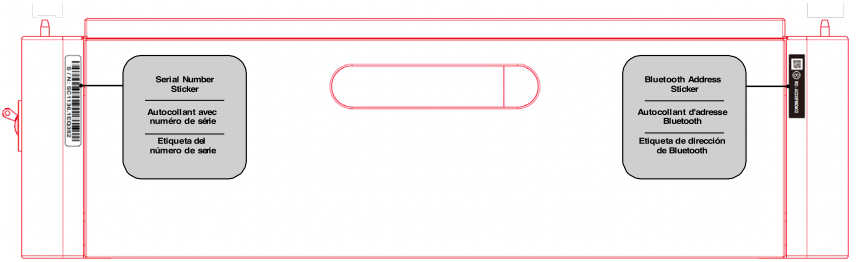
STATE	CHARGE	DISCHARGE
Run Light 	ON 	Fast Flashing 

When the battery is charging, the **RUN** light will be on. When the battery is discharging, the **RUN** light will be flashing [25% on].

BLUETOOTH/APP CONNECTIVITY

GET IT ON Google Play

Download on the App Store



Establishing a Connection

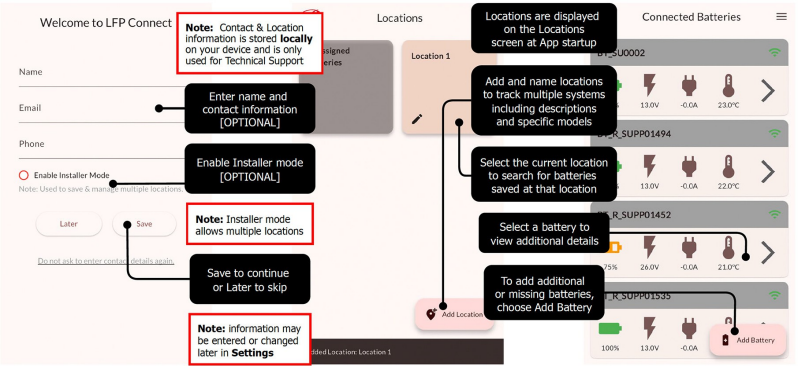
On initial app startup, you will be prompted to add you Name, Email and Phone Number. Data is stored locally on the device and only shared with Rolls Technical Support when the user voluntarily submits a technical support ticket. You may skip this step or come back to add your information at any time in the Settings menu.

If Installer mode is selected, you will be brought to the installer screen where you may add a location name to help identify and sort your batteries. Similarly, you may add details of the installation such as the battery model and number of batteries installed, as well as any ancillary equipment including inverters or chargers. This information is saved within the app and will only be shared in the event of a ticket submission to Rolls Battery Technical Support.

If you are not an installer or within each installation screen in Installer mode, select “Add battery” to search for nearby batteries. Selecting “Scan” will trigger your device to search for batteries within signal range.

Note: When making an initial connection you will be prompted to allow Rolls LFP Connect to find, connect to, and determine the relative position of nearby devices. This permission must be enabled to properly connect to a battery.

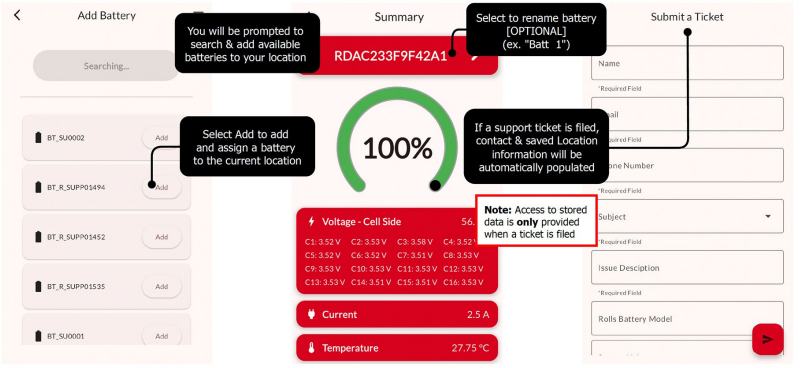
If a battery cannot be found, ensure the BMS is on, and ensure no devices which may block or interfere with a wireless signal are nearby. All batteries within range will be listed. If you are connecting to multiples batteries, refer to the individual Bluetooth device name sticker on the side of the unit to identify each battery. Once connected, you have the option to rename each battery locally through the app. This information is saved to the mobile device but does not overwrite the Bluetooth device name on the BMS. Bluetooth device names are unique and may not be sequential.



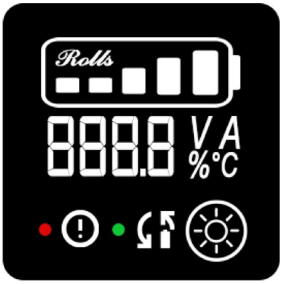
Dashboard & Support Screens

The main Dashboard screen includes a display of estimated state of charge (SOC), voltage, current, and temperature of all connected batteries. Selecting a particular battery will also display cycles, any faults, and allow you to set the inverter protocol on an ESS device.

Within the app you may also submit a support ticket directly to Rolls Battery Technical Support. Once filed, an email confirmation with ticket number will be received confirming receipt of your request and you will be contacted by a member of the Rolls Technical Support team regarding your issue. To expedite the technical support process, please complete the provided form with as much relevant information as possible to better aide Rolls Technical Support personnel in offering assistance and/or resolving an issue.



ADDITIONAL STACK-LV FEATURES



STATUS BUTTON
The screen may be illuminated using the ☼ button located below the screen.

LCD SCREEN
Use of the LCD screen provides quick and effective access to voltage, temperature, SOC, and fault information. The LCD screen will turn off when not in use, however the LEDs are persistent.

BMS PROTECTION SUMMARY

Rolls S48-100LFP STACK-LV batteries include a built-in battery management system (BMS) which offers protection in conditions where the battery voltage, current, and switch or cell temperature may be unsafe or damaging. The BMS in the S48-100LFP STACK-LV model provides protection against cell and pack overvoltage and undervoltage, charge and discharge overcurrent, high and low temperature, and short circuit. The switch architecture of the BMS allows charge and discharge to be stopped independently. Outside of intended operating conditions, the internal BMS will interrupt the current into or out of the battery independently, or disconnect it fully, as required.

Rolls S48-100LFP STACK-LV batteries include secondary protection, UL 1973 and UL 9540 certifications, and have passed unit level UL 9540A testing. In the event of a failure that cannot be managed by the BMS or damage to the BMS switch, the secondary protection device, a UL 489 relay, will be opened to disconnect the battery from the external electrical system safely. In the extremely unlikely event that these systems fail, the external breaker will disconnect the system under high current conditions.

The BMS on all S48-100LFP STACK-LV batteries also incorporates RS-485 and CAN bus communication ports. Data communication among connected batteries is carried out through separate RS-485 communication. The RS-485 and CAN bus ports can only be used one at a time.

BATTERY LIMIT	PROTECTION	RESET METHOD	COMMENTS
Cell/Pack Overvoltage.	Charge Interruption.	The cell voltage drops to the overvoltage recovery point.	If occurring more than 3 times in 2 minutes, discharge is required.
Cell/Pack Undervoltage.	Discharge Interruption.	Shut down after under-voltage protection and maintain communication for 1 minute. Charging current detected (>1A).	If occurring more than 3 times in 2 minutes, charge is required.
Extended Pack Undervoltage (Stored While Empty).	Battery Cannot be Recovered.	Always charge S48-100LFP STACK-LV batteries within 72 hours of full discharge.	-
Pack Overcurrent or Short Circuit.	Charge *and* Discharge Interruption.	Automatically reset after time delay.	If occurring more than 3 times in 2 minutes, charge is required.
High temperature at BMS or Cell.	Charge *and* Discharge Interruption.	Automatically reset after cooling.	BMS will display alarm when approaching disconnect.
Low temperature at BMS or Cell.	Charge Interruption.	Automatically reset after warming.	BMS will display alarm when approaching disconnect.
Extreme low temperature at BMS or Cell.	Charge *and* Discharge Interruption.	Automatically reset after warming.	BMS will display alarm when approaching disconnect.

BATTERY CHARGING

A lithium-specific charger following one of our compatible closed-loop interfaces is recommended and is required for the extended warranty period. Rolls S48-100LFP STACK-LV batteries are compatible with most common hybrid inverters, solar charge controllers, lead-acid battery chargers, and other electrical equipment designed for nominal voltage of the pack. Programming should adhere to the LFP charging requirements for the ESS models based on the specific configuration:

- S48-100LFP STACK-LV
- S48-200LFP STACK-LV
- S48-300LFP STACK-LV
- S48-400LFP STACK-LV
- S48-500LFP STACK-LV
- S48-600LFP STACK-LV
- S48-700LFP STACK-LV
- S48-800LFP STACK-LV

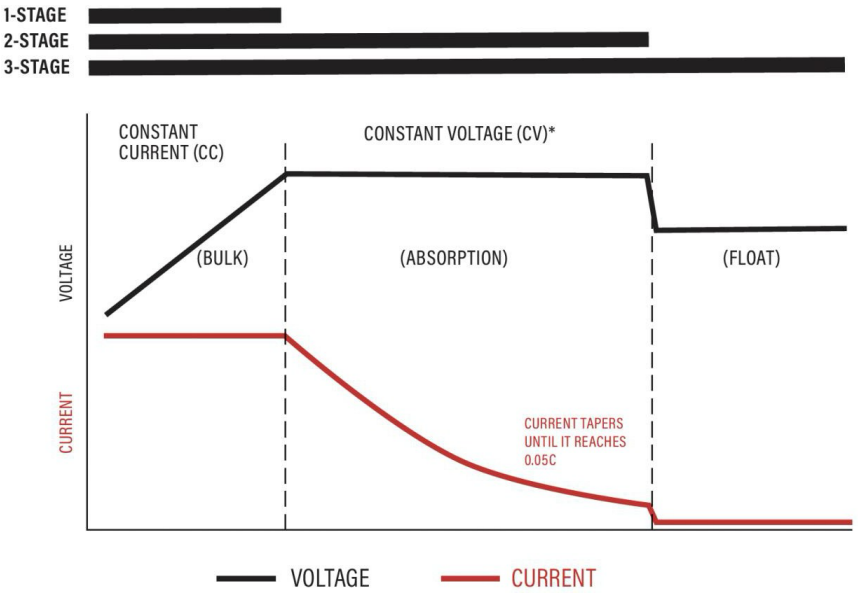
Note the recommended and maximum charge and discharge rates, and charge and discharge end points. These are specified on the product label and datasheet.

Rolls S48-100LFP STACK-LV batteries may be cycled or stored in a partial state-of-charge (PSOC). Under normal operation, the battery should be cycled from 0% depth of discharge (DOD) or 100% state of charge (SOC), to 80% DOD or 20% SOC for optimal cycle life. To prevent over-discharge, the BMS will disconnect the battery when the low voltage cut-off is reached, protecting the battery from over-discharge.

Note: LFP cells do not need maintenance charges like equalization, pulse charge, overcharge, or any others typically recommended or required for lead-acid batteries.

CHARGING GUIDELINES

Rolls S48-100LFP STACK-LV batteries may be charged in a 1, 2, or 3-stage charge profile, shown below. The specifics and recommended setpoints for these charge regimes are explained in this section, with the recommended charge profile in open loop communication being a 2-stage charge.



Representation of 1, 2, and 3-Stage Charging Profiles

Representation of recommended 3-stage Constant Current/Constant Voltage (CC/CV) charging. The first dotted line represents the transition from CC to CV when the voltage limit is reached. Once the battery reaches the constant voltage limit, the battery is held by the charger at this voltage until the current decreases to 0.05C. At this point the battery is at 100% state of charge (SOC). Any current continuing to flow in the float stage is attributable to balancing activity of the BMS.

CHARGING SOURCE: LEAD-ACID BATTERY CHARGER

Customers may choose to replace lead-acid batteries with lithium models. Most lead-acid battery chargers may be used to charge Rolls LFP batteries if the charger is properly configured to operate within recommended charge current and voltage limits.

The pre-programmed voltage settings for AGM or OPzV GEL models may be in line with LFP charge voltage settings and can sometimes be used if direct voltage control is not possible for your charger. However, flooded lead-acid batteries often require higher charge voltage settings. If left configured for charging flooded batteries, the higher charge voltage can trigger the BMS to restrict charging to protect the battery, effectively resulting in a 1-stage charge. If this occurs repeatedly, or the charger cannot be configured at a lower charge voltage, it may be necessary to replace the charger.

1-STAGE CHARGING – CC (CONSTANT CURRENT)

When charging with a single-stage constant current charger, charge at the recommended charge current until the battery reaches its termination voltage.

1-STAGE CHARGE PROFILE		
Recommended Charging Current for Optimal Life		
Temperature Range	**Optimal Current**	
0-10°C (32-50°F)	≤ 0.2C	
10-35°C (50-95°F)	≤ 0.5C	
35-55°C (95-131°F)	≤ 0.2C	
Maximum Continuous Charging Current		
S48-100LFP STACK-LV	1.0C	100A
S48-200LFP STACK-LV	0.80C	160A
S48-300LFP STACK-LV	0.80C	240A
S48-400LFP STACK-LV	0.80C	320A
S48-500LFP STACK-LV	0.80C	400A
S48-600LFP STACK-LV	0.67C	400A
S48-700LFP STACK-LV	0.57C	400A
S48-800LFP STACK-LV	0.50C	400A

SYSTEM	48V (51.2V) NOMINAL
TERMINATION VOLTAGE	57.6V

Note: 1-Stage CC Charging may be required if charging from a source which is not efficient to run at lower power. However, it may only charge the battery to 90-95% SOC and offers minimal balancing time for the BMS. For these reasons, 2-Stage CC/CV charging is recommended to ensure the battery reaches full SOC.

2-STAGE CHARGING – CC/CV

When charging with a two-stage constant current/constant voltage (CC/CV) charger, charge at the recommended charge current, by operating temperature, until the battery reaches the “absorption” voltage or constant voltage (CV) limit. The charger then holds the battery at CV until the charge current decreases to ≤0.05C (termination current). It is recommended to increase absorption time based on parallel batteries consistent with the table below.

The recommended absorption (constant voltage) voltage is shown below. If the charger has a pre-set voltage setting or cannot be programmed, an absorption voltage in the range below is also acceptable.

Note: lower voltage will lead to longer charge times but will also improve balancing performance.

2-STAGE CHARGE PROFILE		
Recommended Charging Current for Optimal Life		
Temperature Range	**Optimal Current**	
0-10°C (32-50°F)	≤ 0.2C	
10-35°C (50-95°F)	≤ 0.5C	
35-55°C (95-131°F)	≤ 0.2C	
Maximum Continuous Charging Current		
S48-100LFP STACK-LV	1.0C	100A
S48-200LFP STACK-LV	0.80C	160A
S48-300LFP STACK-LV	0.80C	240A
S48-400LFP STACK-LV	0.80C	320A
S48-500LFP STACK-LV	0.80C	400A
S48-600LFP STACK-LV	0.67C	400A
S48-700LFP STACK-LV	0.57C	400A
S48-800LFP STACK-LV	0.50C	400A

SYSTEM	48V (51.2V) NOMINAL
RECOMMENDED ABSORPTION VOLTAGE	55.4V
ABSORPTION RANGE (ACCEPTABLE)	54.0V - 57.0V (20-30 mins per parallel battery)
TERMINATION CURRENT	≤0.05C

Absorption Timer: When manually setting charger settings, a proper Absorption Timer is critical to enable balancing of the parallel batteries and maintaining overall system capacity. Setting the time at 20-30 mins per parallel string is recommended when Absorption is based on a timer.

Note: If limited charge time is not a concern within your system architecture, reducing the Absorption voltage will increase charge time and allow the BMS more time to ensure cells remain balanced. As batteries age, variances may become more apparent due to small changes in manufacturing or uneven wear, requiring more time to maintain cell balance.

3-STAGE CHARGING - LEGACY LEAD-ACID SYSTEMS, INVERTER/CHARGER HARDWARE

When programming an inverter/charger or charge controller equipment using a 3-stage charge sequence (2-stage with an additional "Float Voltage" after the charge is terminated), the following charging parameters should be programmed to properly charge Rolls S48-100LFP STACK-LV batteries:

3-STAGE CHARGE PROFILE		
Recommended Charging Current for Optimal Life		
Temperature Range	**Optimal Current**	
0-10°C (32-50°F)	≤ 0.2C	
10-35°C (50-95°F)	≤ 0.5C	
35-55°C (95-131°F)	≤ 0.2C	
Maximum Continuous Charging Current		
S48-100LFP STACK-LV	1.0C	100A
S48-200LFP STACK-LV	0.80C	160A
S48-300LFP STACK-LV	0.80C	240A
S48-400LFP STACK-LV	0.80C	320A
S48-500LFP STACK-LV	0.80C	400A
S48-600LFP STACK-LV	0.67C	400A
S48-700LFP STACK-LV	0.57C	400A
S48-800LFP STACK-LV	0.50C	400A

SYSTEM	48V (51.2V) NOMINAL
BULK to ABS VOLTAGE	57.6V
ABSORPTION VOLTAGE	55.4V (20-30 mins per parallel string)
ABS to FLOAT	≤0.05C
FLOAT VOLTAGE	54.4V

Absorption Timer: When manually setting charger settings, a proper Absorption Timer is critical to enable balancing of the parallel batteries and maintaining overall system capacity. Setting the time at 20-30 mins per parallel string is recommended when Absorption is based on a timer.

Temperature Compensation: If the inverter/charger or charge controller uses Temperature Compensation this should be turned off when charging Rolls S48-100LFP STACK-LV batteries. Turn off the Temperature Compensation settings and disconnect the sensor to ensure the correct voltage regulation from the charging device.

Equalization: Equalization should **never** be used; elevated charge voltages are unacceptable for LFP batteries and will lead to the BMS disconnecting the charging path. It should be **turned off**, or the Equalization Voltage setpoint should be reduced to the appropriate system Float Voltage, above.

Some charger models may require additional firmware, programming, or parameters. Please contact your inverter/charger or charge controller manufacturer for assistance with these settings, if required.

OPEN LOOP CONFIGURATION MAXIMUM CURRENT REFERENCE								
MODEL	S48-100LFP STACK-LV	S48-200LFP STACK-LV	S48-300LFP STACK-LV	S48-400LFP STACK-LV	S48-500LFP STACK-LV	S48-600LFP STACK-LV	S48-700LFP STACK-LV	S48-800LFP STACK-LV
Modules	1	2	3	4	5	6	7	8
Capacity (Ah)	100	200	300	400	500	600	700	800
400A Busbar Configuration (Dual Positive & Negative Busbars)								
Max Charging Current	100A	160A	240A	320A	400A	400A	400A	400A
Max Discharging Current	100A	160A	240A	320A	400A	400A	400A	400A
C-Rate	1.0C	0.80C	0.80C	0.80C	0.80C	0.67C	0.57C	0.50C
Recommended Charge and Discharge Current	50A	100A	150A	200A	250A	300A	350A	400A
Recommended C-Rate	0.50C	0.50C	0.50C	0.50C	0.50C	0.50C	0.50C	0.50C

Note: The recommended charge and discharge currents provided above are intended to represent design maximums for your system. Designing your system around limiting discharge rate to ≤ 0.5C will maximize system life, however the BMS will not limit you to this operating condition.

CHARGING TEMPERATURE

Due to the chemistry of Lithium-ion cells, these batteries cannot accept high charge current at lower operating temperatures without risking cell damage and permanent loss of capacity.

Rolls S48-100LFP STACK-LV batteries may be safely charged between 0°C to 55°C (32°F to 131°F). However, because cycle wear is accelerated below 10°C (50 °F), charge current should be limited to 0.2C (20% of battery capacity) for optimal longevity. Similarly, at high temperatures, charge current should be limited to ≤0.2C when operating at temperatures from 35°C to 55°C (95°F to 131°F) as noted below.

To maintain optimum performance and durability of Rolls S48-100LFP STACK-LV batteries, the following recommended charge current limits should be followed and set at the inverter or charger, where available:

TEMPERATURE	RECOMMENDED CHARGE CURRENT
< 0°C (< 32°F)	DO NOT CHARGE
0-10°C (32-50°F)	≤ 0.2C
10~35°C (50-95°F)	≤ 0.5C
35~55°C (95-122°F)	≤ 0.2C
> 55°C (> 122°F)	DO NOT CHARGE

Note: Due to the internal chemistry, S48-100LFP STACK-LV batteries may be discharged at ambient temperatures as low as -20°C (-4°F). However, they cannot be charged at the same temperature. At temperatures between -20°C (-4°F) and 0°C (32°F) batteries can still deliver energy. However, they cannot be charged. The ambient temperature must be above 0°C (32°F) to enable charging. At temperatures between -20°C (-4°F) and 0°C (32°F), energy may be consistently drawn from the battery without being replenished as expected, which may lead to full discharge.

COMMUNICATION INTERFACE

The BMS of the battery pack has one external CAN bus communication port and one external RS-485 communication port for closed-loop communication. All inverters, when set with proper voltage and current setpoints for charge and discharge, can be used with our batteries. A list of inverters which can take advantage of closed-loop communication can be found in Appendix A.

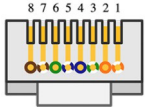
Note: Closed-loop communication is essential for long-term performance and is a requirement of product registration and the extended warranty offered on the S48-100LFP STACK-LV model.

CAN COMMUNICATION

The CAN bus port pinout is shown below. See **Appendix A** for compatible inverters.

Communication Standard	Baud Rate
CAN	500k Standard

Plug Pin	Description
1-6	NC
7	Can-H
8	Can-L



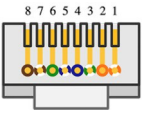
Note: The CAN bus pinout above enables connection to a Victron inverter using a normal ("straight") ethernet cable.

RS-485 COMMUNICATION

The RS-485 port pinout is below. See **Appendix A** for compatible inverters.
When connecting between batteries over RS-485, a standard network cable is used.

Communication Standard	Baud Rate
RS-485	9600

Plug Pin	Description
1	RS-485-B
2	RS-485-A
3-8	NC

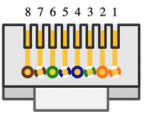


LINK UP AND LINK DOWN COMMUNICATION

Batteries should be connected to each other via a separate RS-485 interface, with ports dubbed "LINK UP" and "LINK DOWN".

Communication Standard	Baud Rate
RS-485	INTERNAL

Plug Pin	Description
1-6	NC
7	RS-485-A
8	RS-485-B

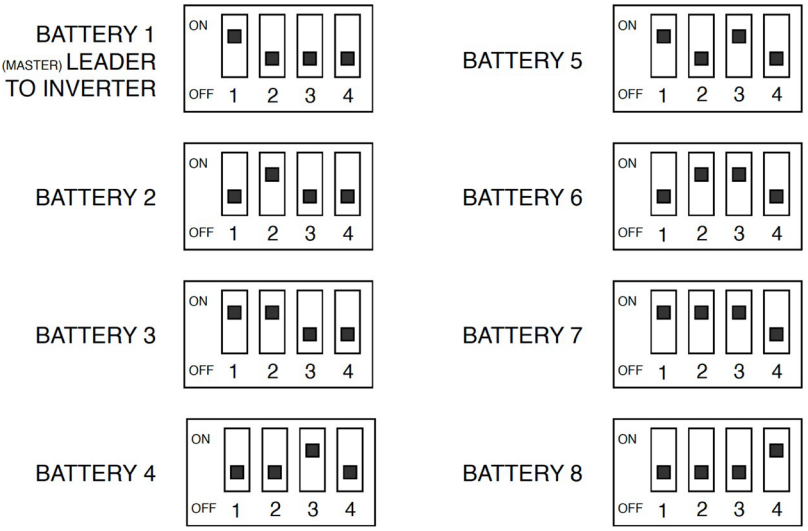


BMS STORAGE FUNCTION

The internal BMS logs alarm, protection, and fault status. These can be reviewed through Rolls LFP Connect (Android/IOS) or via the Rolls LFP Desktop V2 software by connecting to the individual battery under analysis. This is required for the extended warranty. Refer to the Communication Interface section and Rolls LFP Desktop V2 Manual for instructions to connect your PC and the BLUETOOTH/APP CONNECTIVITY section for connecting your mobile device.

CAN BUS PARALLEL PACK SELECTOR SWITCH 4-DIP

When multiple battery packs are connected in parallel, each battery pack should be properly addressed through the DIP switches on the front of each battery. Depending on how many batteries are connected, you will use the same number of DIP switches (up to 8), but the first address will always be first, the bottom battery in the stack; the second address will always be second, the second lowest battery; etc. Each battery has 1 DIP switch containing 4 switches. See the figure below for addressing each pack. The Rolls S48-100LFP STACK-LV Battery Installation Guide contains more details and step-by-step instructions for this procedure.



TROUBLESHOOTING

Appendix C lists some of the common errors that may occur during normal operation. When the alarm indicator in ON, the type of error is displayed on the LCD screen of the battery pack. Additionally, when the battery is connected to Rolls LFP Desktop V2 via PC, or to the Rolls LFP Connect mobile app, the warning or error message is displayed in the software. In a closed-loop configuration, the error information will be sent to the inverter over the applicable communication bus.

STORAGE

Rolls LFP batteries have operating and storage temperature limitations. These should be followed to ensure the battery remains in good working order and to prevent the possibility of cell and component damage or failure. Rolls LFP batteries include cylindrical or prismatic cell types as well as various electronic components. As a result, storage temperature limits may vary by battery model as outlined.

For optimal performance, Rolls recommends storing S48-100LFP STACK-LV batteries in ambient temperatures between -5°C (23°F) and 45°C (113°F).

Rolls manufacturer warranty terms for S48-100LFP STACK-LV batteries require storage in temperatures above -25°C (13°F) and no higher than 55°C (131°F) in line with component limitations. Product damage or failure due to extended exposure to temperatures at or outside of this range would not be covered under warranty.

STORAGE	TEMPERATURE RANGE
RECOMMENDED	-5°C (23°F) to 45°C (113°F)
COMPONENT LIMIT	-25°C(-13°F) to 55°C (131°F)

Rolls S48-100LFP STACK-LV batteries do self-discharge and should be charged once per year, at minimum, when stored for extended periods. For temperatures above 40°C (104°F) the battery should be charged every 3 months as self-discharge increases in warmer temperatures. Do not store Rolls S48-100LFP STACK-LV batteries at temperatures above 55°C (131°F).

In cold climates, charge/discharge the battery to between 60-80% state of charge, disconnect from any external system, and store the battery off site, above -25°C (-13°F).

For seasonal applications, Rolls S48-100LFP STACK-LV batteries should not be left connected to an offline system or disconnected and stored in a space where ambient temperatures may fall below the -25°C (-13°F) or above 55°C (131°F).

NOTE: Ensure the breaker and BMS are **OFF** during storage.

TRANSPORTATION

The battery modules and all accessories are shipped in compliance with UN38.3, belonging to UN3840, Lithium batteries. Ensure that all modules are checked for shipping damage before accepting them, in accordance with our warranty policy.

RECYCLING

Rolls S48-100LFP STACK-LV batteries should be properly disposed of at an authorized lithium recycling facility. Do not remove product labels and/or recycling information from the battery case.

The battery should be discharged before disposal unless otherwise instructed. To prevent a possible short circuit, the terminals should be covered with a protective cap or non-conductive tape before disposal.

LFP GLOSSARY

Amp, Ampere
Unit of electrical current. Abbreviated “A”.

Amp-Hour
Unit of electrical energy, one amp of current flowing for one hour. Abbreviated “Ah”.

BMS (Battery Management System)
The BMS, or Battery Management System, is an electronic device which protects the cells inside a battery. The BMS used in Rolls batteries protects them from unsafe voltage, current, and temperature conditions, and balances cells for optimal pack performance. A BMS is required for any lithium-ion battery system with series-connected cells due to the safety requirements and performance characteristics of the cells.

C-Rate
Battery charge and discharge rates are often described as a “C-Rate”, defined as:

$$C - Rate = \frac{(Rated\ Capacity)}{Charge/Discharge\ Current)}$$

For example, if a 100Ah battery was charged at 50A, but discharged at 100A, it would be charged at a rate of C/2 and discharged at a rate of C. This rate is independent of system voltage.

CANBUS
Controller Area Network (CAN) bus is a communication protocol which allows multiple devices to send and receive relevant information between them without the need for a host to manage the communication.

Cell
A single battery, independent of chemistry. Each cell is at the base voltage for the given chemistry; 2.0V for flooded lead acid, 3.2V for lithium iron phosphate. Many cell form factors exist, resulting in different capacities and performance characteristics. These may be combined in series to form a battery of higher voltage.

CC/CV (Constant Current / Constant Voltage)
The typical charge profile of a LFP battery. CC/CV or Constant Current/Constant Voltage charging is a 2-stage charge, first at constant current until the battery voltage reaches a given limit, and then at constant voltage as the current accepted by the battery naturally reduces until the battery is full.

Cycle
A “cycle” is a somewhat arbitrary term used to describe the process of discharging a fully charged battery down to a particular state of discharge. For Rolls Batteries, a cycle is defined as 90% depth of discharge, or going from full charge down to 10% state-of-charge.

Cycle Life
The total energy throughput of a battery, defined in terms of the amount of equivalent charge/discharge cycles it can withstand before its effective capacity is reduced to a certain amount, usually 80% of original/rated capacity.

LFP (Lithium Iron Phosphate)
LFP, or Lithium Iron Phosphate is a specific type of Lithium-ion battery chemistry. Referring to the cathode material of the battery, this chemistry is characterized by its long cycle life, long calendar life and safety, in overcharge conditions, compared to other battery chemistries.

RS-485
RS-485 is a serial communication standard, which defines the electrical transmission characteristics which enable multiple devices to connect over the same network (multi-point).

SOC (State of Charge)
State of Charge (SOC) represents the fullness of the battery from 0%-100%.

Volt
The unit of electrical potential or “pressure”. For the LFP cell chemistry, these are multiples of 3.2V, sometimes simplified to 12V, 24V, 36V, and 48V to match with compatible lead-acid systems.

APPENDIX A: INVERTER COMPATIBILITY LIST

Compatibility details and the communication standard used for compatible inverters are provided below. All inverters, when set with proper voltage and current setpoints for charge and discharge, may be used with Rolls S48-100LFP STACK-LV batteries. This list refers to inverters capable of reading battery data over CAN bus or RS-485 from connected batteries for critical information such as charge and discharge setpoints.

Note: Closed-loop communication is essential for long-term performance and is a requirement of product registration and the extended warranty offered on the S48-100LFP STACK-LV model.

INFORMATION DISPLAY VARIATIONS

Interpretation of the information provided by the BMS will varying by inverter manufacturer make/model. For example, some inverters will differentiate alarms at the cell group level, and others will treat alarms on the system level. In some cases, the inverter may not read alarm reporting. Some inverters may vary in specificity of reporting. For example, 0 Ah, 0.0Ah, or 0.00Ah may be used. Inverters often use overlapping standard protocols to ease support and compatibility. As a result, you may get much of the information your inverter is looking for before specifying inverter protocol. Refer to the inverter manufacturer's support or contact Rolls Battery Technical Support for more details as an unlisted inverter may use a standard protocol as well.

INVERTERS WITH FULL SUPPORT

Inverter Brand		Type	Protocol Selection in Rolls LFP Desktop V2	Baud
Deye	Deye	CAN	PYLONTECH	500K
Goodwe	GOODWE	CAN	PYLONTECH	500K
Pylontech	PYLONTECH	CAN	PYLONTECH	500K
SMA	SMA	CAN	SMA	500K
Sol-Ark	Sol-Ark	CAN	PYLONTECH	500K
Solis	solis	CAN	SOLIS	500K
Victron Energy	victron energy	CAN	VICTRON ENERGY (DEFAULT)	500K
Deye	Deye	RS-485	PYLONTECH	9600
LuxPowerTek	LUXPOWER TEK	RS-485	LUXPOWERTEK	9600
Pylontech	PYLONTECH	RS-485	PYLONTECH	9600

Note: Certain inverter manufacturers may choose not to read alarm status from the battery. This does not impact the battery safety nor the regulatory requirements for installation.

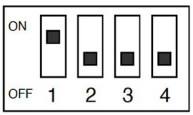
INVERTERS WITH BASIC SUPPORT

Inverter Brand		Type	Protocol Selection in Rolls LFP Desktop V2	Baud
Megarevo	MEGAREVO	CAN	MEGAREVO	500K
Must	MUST	CAN	MUST	500K
TBB Power	TBB POWER	CAN	PYLONTECH	500K
INHENERGY	INHENERGY	RS-485	INHENERGY	9600
Growatt	GROWATT	RS-485	GROWATT	9600
Voltronic	Voltronic Power Advancing Power	RS-485	VOLTRONIC	9600

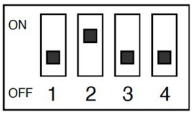
Note: These inverters will support the basics of communication for safety and regulatory requirement. However, they may not implement or display the full scope of available information. Support may vary by version and product line.

APPENDIX B: DIP TABLE

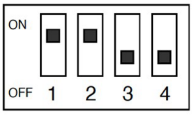
BATTERY 1 (MASTER) LEADER TO INVERTER



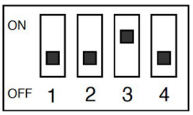
BATTERY 2



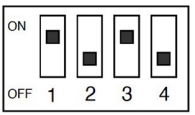
BATTERY 3



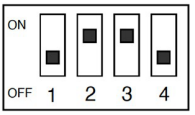
BATTERY 4



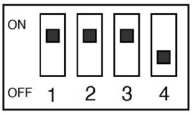
BATTERY 5



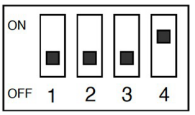
BATTERY 6



BATTERY 7



BATTERY 8



APPENDIX C: TROUBLESHOOTING REFERENCE

Unable to start	
Problem	Power switch ON, RUN Indication OFF.
Troubleshooting	1. Press the ☼ button on the front panel and check if the LED RUN indicator turns ON. If the charge is LOW, the battery will move into undervoltage protection and ALARM indication will be ON. 2. Charge the battery at the recommended voltage. Check the LED to determine if the RUN indicator has turned ON.
Solution	The battery will return to normal working condition after charging.
Unable to charge	
Problem	The battery is not fully charged but cannot be charged,
Troubleshooting	1. Confirm that the battery is turned on (check rear panel, breaker, and ☼ button). 2. Check the input/output cables are properly connected. 3. Check the battery alarm LED to see if the battery is under Protection state. If so, find the cause of the protection, and fix the problem, then restart the battery. 4. Check if the charging voltage meets the battery charging requirements. If not, adjust the power supply voltage to the proper range. 5. Ensure that adequate Absorption time or full charge time are set and available to enable module balancing. 6. Ensure the battery is operating within adequate temperature range.
Solution	The battery will return to normal working condition after charging.

TROUBLESHOOTING REFERENCE

Unable to discharge	
Problem	The battery is fully charged; will not discharge properly.
Troubleshooting	1. Confirm that the battery is turned on (check rear panel, breaker, and ☼ button). 2. Check the power cables to ensure that they are properly connected. 3. Check the display for battery voltage. If the battery voltage is too low, charge it immediately. 4. Ensure the battery is operating within adequate temperature range.
Solution	If the battery will not properly discharge after following the steps have been completed, please contact the local reseller, or contact support at Rolls Battery.

Fault Indication in ON	
Problem	The ALARM indicator is ON; other indicators are off.
Troubleshooting	1. Check the power cables to ensure that they are properly connected. 2. Check whether the charging voltage, charging/discharging current, battery/cell voltage and temperature meet the relevant protection conditions and release the “protection” state to ensure that the voltage, current and temperature are within the normal working range. 3. Power off the battery and restart to determine if the alarm remains present.
Solution	If the battery protection state cannot be released, or the alarm indicator remains ON when the battery is properly charged after it has been restarted, please contact your reseller or Rolls Battery Technical Support.

NOTES:

V2/04/26

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