

# 12 V Super-Phosphate® Battery

## Installation and operating instructions



### 1. Safety

Make sure to study and follow all instructions. Misusing the 12V Super-Phosphate battery may cause it to overheat or ignite.

- Do not short-circuit the power terminals.
- Do not reverse connect the power cables.
- Do not disassemble the unit.
- Do not subject the unit to excessive vibrations or drop the unit.
- Do not immerse the unit.
- Do not expose the unit to fire or temperature higher than 100°C (+212°F). It may cause the cell safety vent to open which renders the unit inoperable.

### 2. Important Recommendations

If smoke is emitted from a unit, stay clear of the smoke and evacuate the area until the smoke dissipates. See Figure 1 for operator interface features.

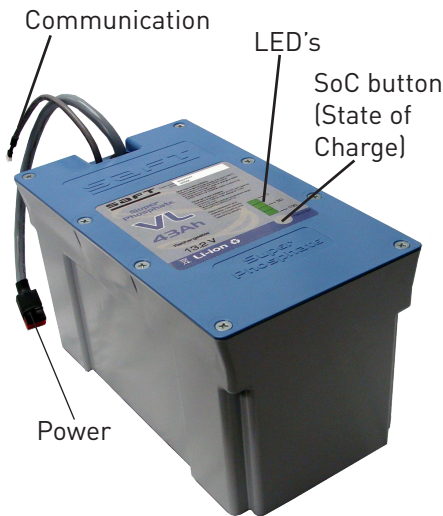


Figure 1 - 12V Super-Phosphate® battery top view

### 3. Unpacking and Inspection

When shipped, the 12V Super-Phosphate battery is packaged in accordance with UN3480 Class 9 Group 2. Unpack and make sure all items were received.

If items were not received or if anything is damaged contact your local Saft representative.

Part No	Description
3841MFE0400	Super-Phosphate® battery
326634	Power Interface Cable
326635	Communication Interface Cable
38LFPO4	Battery Charger

Table 1 - Super-Phosphate® battery and available items

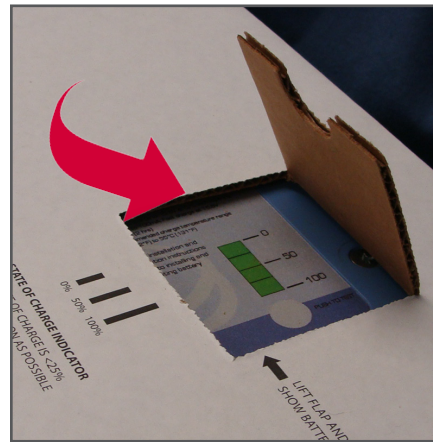


Figure 2 - Access the unit

If long storage is planned, check and note the SOC (State of Charge) according to Figure 1 and Table 2. An access panel in the packaging allows you to access the unit without removing it from the box.

Refer to Figure 2. This will help to plan the next maintenance charge.

Keep the 12V Super-Phosphate battery in its original packaging for continued storage or for transportation.

### 4. Storage

Store the battery in its original packaging and in typical warehouse conditions. The temperature should be between 10°C to 55°C (50°F to 131°F).

SOC LED (steady for 5 s)	★★★★	★★★○	★★○○	★○○○
Minimum SOC	≥ 75%	≥ 50%	≥ 25%	< 25%

Table 2 - SOC (State of Charge) LED legend

**NOTE:** The 12V Super-Phosphate battery unit will automatically record its state and periodically initiate cell balancing if necessary.

**IMPORTANT:** It is mandatory to check the SOC while in storage every 6 months. If <25%, charge as soon as possible. See Figure 1 and table 2.

If the 12V Super-Phosphate battery is stored at a low SOC for too long, it may eventually over discharge and render the unit inoperable.

**To conduct a maintenance charge:**

- Connect according to Section 7
- Make sure the set-point voltage on the charger is 15.6 V
- Charge according to Section 7

### 5. Transportation

Use the original packaging or equivalent. Follow the necessary transportation rules for Li-ion batteries by consulting with your company's standard practice and your local transportation regulations.

Secure the 12V Super-Phosphate battery to prevent violent shock and other items from falling onto it.

### 6. Installation

See Figure 1 for 12V Super-Phosphate battery features.

- To complete a 12V Super-Phosphate battery installation:
  1. Connect power
  2. Connect communication cable
- Required tools
  1. Voltmeter



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### 6. Installation (continued)

#### Connect Power:

The best practice when connecting batteries in parallel is to ensure they are balanced. This is accomplished by matching the state of charge via SMBus to no more than 1% difference. Check battery polarity before connecting in parallel. An alternate means of ensuring batteries are balanced before connecting in parallel is to measure the open circuit voltage of each battery to be connected ensuring a difference of no more than 0.01V.

**IMPORTANT:** Contact Saft for evaluation before connecting batteries in series.

**IMPORTANT:** Parallel connecting can be done as long the total system discharge current never exceeds the cumulative rated discharge current of the parallel packs.

The battery can be connected with live power without damage. However, it is recommended to switch OFF any system battery breakers before connecting to the power terminals.

The 12V Super-Phosphate battery power terminals can be connected with a positive ground or floating ground only if SMBus is not used.

**IMPORTANT:** A reverse connection on the power terminals may blow the internal fuse. The fuse is not accessible.

### 7. Operation

The 12V Super-Phosphate battery is a “smart battery” and will allow only safe operation. If a key operating parameter is exceeded, the 12V Super Phosphate battery will automatically interrupt or restrict its operation until

the key operating parameter is back within acceptable limits. In this case the alarm will be reset and operation will continue normally. Some alarms are not resettable.

The 12V Super-Phosphate battery can communicate with other network devices using SMBUS protocol and offers supervision diagnostics with BMS software.

#### To Fully Charge the Battery:

Make sure that output of the rectifier is set as  $15.6\text{ V} \pm 0.04\text{ V}$ . It must be set higher than 12.4 V to allow cell balancing during re-charge.

- When the 12V Super-Phosphate battery is used in “floating operation”, for which re-charge time is not critical, the charge current can be limited to 8 A per 12V Super-Phosphate battery module.
- When the 12V Super-Phosphate battery is used in “cycling operation” the maximum current will depend on the operating temperature. As a general rule, the charge current should be limited to 20 A per 12V Super-Phosphate battery module if the operating temperature is anticipated to be mostly higher than 25°C. If the maximum allowed charged current is exceeded, the 12V Super-Phosphate battery will automatically disrupt charge current by switching charge FET off until charger is removed.

The 12V Super-Phosphate battery will accept charge current only when the temperature is above 0°C and below +55°C (+32°F and +131°F).

#### Discharging:

The battery will allow discharge above - 25°C and below +70°C (- 13°F and +158°F). The maximum allowed discharge current is 14 A and is a function of temperature. Consult Saft if higher currents are required.

The 12V Super-Phosphate battery will continuously allow discharge until one of the following is encountered:

- The charger output returns, or
- The battery reaches the minimum set SOC (0% by default), or
- The maximum allowed discharge current is exceeded, or
- The low voltage disconnect is reached (default is 11.0 V).

When the end of discharge is encountered, the 12V Super-Phosphate battery will go into under voltage protect mode.

**IMPORTANT:** After the end of discharge, the 12V Super-Phosphate battery can remain in Under Voltage Protect Mode for a maximum of 14 days. If re-charge does not begin within this time, the 12V Super Phosphate battery may be over discharged. If over discharged, it will not startup and will indicate a major alarm that is not resettable. The unit will need to be replaced.



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### 8. Maintenance

The 12V Super-Phosphate battery requires no maintenance, but checking its state of charge and taking necessary action during periodic site routines is recommended.

The SOC can be checked while in operation. Refer to Figure 1 and Table 2.

Use Saft supplied charger or verify charge output is no greater than 15.6 V.

Check the LED and verify that the SOC is normal. Refer to Table 2.

### 9. Troubleshooting

The SMBUS supervision software is the best way to interrogate a 12V Super-Phosphate battery during troubleshooting. If an abnormal operation status is noticed or the unit's operation is questionable, contact Saft

If the 12V Super-Phosphate battery emits an unusual smell, feels hot, changes shape or appears abnormal in any other way, discontinue use and consult Saft.

### 10. Removal & Recycling

1. Disconnect the power terminals.
2. Disconnect communication cables.
3. Remove the 12V Super-Phosphate battery and stage for recycling
4. Call your local Saft representative for further assistance.



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