2. Synchronisation

In order to keep your battery monitor delivering accurate status information about your battery, it is important to regularly synchronise your battery monitor with your battery. As explained in the quick start guide, a synchronisation step is also needed before you can actually use your battery monitor. During operation, the battery monitor automatically indicates when a synchronisation is required, by displaying the message SYNCHRONISE battery.

A synchronisation step means nothing more than performing a complete charge cycle on your battery. A charge cycle will be considered complete when the battery charge is restored in the battery charger’s float voltage, which is the last stage of the charging process. In this stage the battery is considered full. Default: 52.8V Range: 16.0V - 66.0V Step size: 0.2V

Performing synchronisations regularly is also important to keep your battery healthy and to increase its lifetime. You will notice that if you are often performing full charge cycles yourself, the battery monitor will most likely not display the SYNCHRONISE battery message, since the battery is already kept synchronised with the battery monitor.

Besides automatic synchronisations based on meeting the Auto-Sync Functions, you can also manually synchronise the battery monitor with your battery when your battery is fully charged. This can be accomplished by pressing both + and - keys simultaneously. Default: OFF Range: OFF / [1] / [ ]1..[ ]8

3. Status menu

The Status menu is a read only menu that shows the battery monitor’s current status of several items. This menu can be accessed by the following sequence:

When the Status menu is entered, you can use the + and - keys to browse through the different status items. By pressing the MENU key, the selected status item can be viewed. Pressing the MENU key again, will then step back to the Status menu. From any menu position, the Normal Operating Mode can be accessed again by pressing the MENU key for 3 seconds. This will also save any Function value changes to internal memory. When no keys are pressed for 15 minutes, while operating in a user defined setup menu, the battery monitor will automatically return to the Normal Operating Mode again without saving any Function value changes. The following Status menu items are available:

S1 : Alarm Status. When multiple alarms are activated, use the + and - keys to browse through the currently active alarms. When no alarms are activated, this item displays “-”.
S2 : Days running. The number of days the battery monitor is operating to monitor your battery. This item needs when a battery reset has been executed (see Reset menu).
S3 : Days since last synchronised. The number of days the battery monitor has not been synchronised. This item needs when the battery monitor is synchronised or when a battery reset is executed (see Reset menu).
S4 : Charge Efficiency Factor (CEF). This charge efficiency factor used by the battery monitor. Depending on the value set in Function F5.6, this item displays the automatically calculated CEF or the manually set CEF.

4. History menu

The History menu is a read only menu that shows the battery monitor’s History data. History data are special events that occurred while operating your battery monitor. The following History menu items are available:

H1 : Battery history

H1.0 Average discharge in Ah. This number will be recalcualted after each synchronization.
H1.1 Average discharge in %. This number will be recalcualted after each synchronization.
H1.2 Deepest discharge in Ah.
H1.3 Deepest discharge in %.
H1.4 Temp Sleep hours. The total number of Amperes removed from the battery. When exceeding 10000Ah, the units are kAh and the value displayed must be multiplied by 1000.
H1.5 Total Amperes charged. The total number of Amperes charged to the battery. These Amperes are not compensated by the Charge Efficiency Factor (CEF). When exceeding 10000Ah, the units are kAh and the value displayed must be multiplied by 1000.

H2 : Alarm history

H2.0 Number of Low battery alarms.
H2.1 Number of Main battery low voltage alarms.
H2.2 Number of Auxiliary battery low voltage alarms.
H2.3 Number of Main battery high voltage alarms.
H2.4 Number of Auxiliary battery high voltage alarms.

5. Function setup menu

In the Function setup menu, your battery monitor can be adjusted to fit into your system. Look at the value of each item and set according to your needs. This menu can be accessed by the following sequence:

When the Function setup menu is entered, you can use the + and - keys to browse through the different Functions. By pressing the MENU key, the selected Function value can be viewed. Pressing the MENU key again, will then step back to the Function menu. From any menu position, the Normal Operating Mode can be accessed again by pressing the MENU key for 3 seconds. This will also save any Function value changes to internal memory. When no keys are pressed for 15 minutes, while operating in a user defined setup menu, the battery monitor will automatically return to the Normal Operating Mode again without saving any Function value changes. The following Functions are available:

F1 : System properties

F1.0 Charge’s float voltage (Auto-Sync parameter). This value must be equal to your battery charger’s float voltage, which is the last stage of the charging process. In this stage the battery is considered full. Default: 52.8V Range: 16.0V - 66.0V Step size: 0.2V
F1.1 Charge’s float current (Auto-Sync parameter). When the current is below this percentage of the battery capacity (see Function F5.0), the battery will be considered as fully charged. Make sure this Function value is always greater than the minimum current at which the charger maintains the battery or stops charging. Default: 2.0% Range: 0.5 - 10.0% Step size: 0.1%
F1.2 Auto-synchronisation time (Auto-Sync parameter). This is the time the Auto-Sync parameters F1.0 and F1.1 must be met in order to consider the battery as fully charged. Default: 240sec Range: 5 - 300sec Step size: variable
F1.3 Discharge floor. This is the reference point at which the battery needs to be recharged. When the State-of-charge percentage falls below this value the charger indicator starts flashing while the remaining time shows 0:00 and the State-of-charge bar is empty. Default: 50% Range: 0 - 99% Step size: 1%
F1.4 Battery temperature. In this Function the average battery temperature can be adjusted. The value will be the actual battery temperature measured. A temperature sensor is connected to the battery monitor. Default: +20°C Range: -20..+50°C / AU Step size: 1°C
F1.5 Time remaining averaging filter. Specifies the time window of the moving averaging filter. There are three settings, where setting 0 gives the fastest Timeremaining readout response and setting 3 gives the slowest. The best setting willdepend on the type of battery load and your personal preference. Default: 0 Range: 0 - 2 Step size: 1
F1.6 Auto-Synchronisation. Only change this setting when F3.1 to F3.1 and F4.2 are set correctly. Default: 2.0%, when the battery is already full. Default: OFF Range: OFF / [1] / [ ]1..[ ]8

F2 : Low battery alarm settings

F2.0 Low battery alarm On (% SOC). When the State-of-charge percentage has fallen below this value, the alarm relay will be activated (depending on F2.6). Default: 50% Range: 0 - 99% Step size: 1%
F2.1 Low battery alarm On (Volts). When the battery voltage has fallen below this value, the alarm relay will be activated (depending on F2.6). Default: 42.0V Range: 16.0 - 66.0V Step size: 0.2V
F2.2 Low battery alarm Off (% SOC). When the State-of-charge percentage has risen above this value and the alarm relay was activated, the alarm relay will deactivate again. When “FULL” is selected, the alarm relay is deactivated when the Automatic-Sync parameters are met. Default: 80% Range: 1 - 100% / FULL Step size: 1%
F2.3 Low battery alarm On delay time. The time the Low battery alarm On conditions, F2.0 and F2.1, must be met before the alarm is activated. Default: 10sec Range: 0 - 300sec Step size: variable
F2.4 Minimum Alarm Off time. Minimum time that the alarm relay stays activated even if the State-of-charge percentage has risen above the Low battery alarm Off setpoint (F2.3). The minimum alarm delay is indicated in minutes, and the relay will stay activated until the State-of-charge percentage has risen above the Low battery alarm Off setpoint (F2.3). Function units are minutes hours.
F2.5 Maximum Alarm Off time. Maximum time that the alarm relay stays activated even if the State-of-charge percentage is still below the Low battery alarm Off setpoint (F2.3). The maximum alarm delay is indicated in minutes, and the relay will stay activated until the State-of-charge percentage has risen above the Low battery alarm Off setpoint (F2.3). Function units are minutes hours.
F2.6 Enable Low battery alarm / Use contact. Select “OFF” to disable the low battery alarm. Select “[1]” to use the battery monitor’s internal alarm relay. Select “[1]” to “[8]” to use an external alarm contact (only for use with optional Alarm output expander). Default: [1] Range: OFF / [1] / [ ]1..[ ]8

F3 : Low voltage alarm settings

F3.0 Main battery low voltage alarm On. When the Main battery voltage falls below this value, the message “Lo” will appear on the display and the selected alarm relay will be activated (depending on F3.2). Default: 42.0V Range: 16.0 - 66.0V Step size: 0.2V
F3.1 Main battery low voltage alarm Delay. This is the time the Main battery low voltage alarm On condition, F3.0, must be met before the alarm is activated. Default: 10sec Range: 0 - 300sec Step size: variable
F3.2 Enable Main battery low voltage alarm / Use contact. Select “OFF” to disable the Main battery low voltage alarm. Select “[1]” to “[8]” to use the battery monitor’s internal alarm relay (only for use with optional Alarm output expander). Default:OFF / OFF / [1] / [ ]1..[ ]8
F3.3 Auxiliary battery low voltage alarm On. When the Auxiliary battery voltage falls below this value, the message “Lo” will appear on the display and the selected alarm relay will be activated (depending on F3.5).
F3.4 Auxiliary battery low voltage alarm Delay. This is the time the Auxiliary battery low voltage alarm On condition, F3.3, must be met before the alarm is activated. Default: 10sec Range: 0 - 300sec Step size: variable
F3.5 Enable Auxiliary battery low voltage alarm / Use contact. Select “OFF” to disable the Auxiliary battery low voltage alarm. Select “[1]” to “[8]” to use the battery monitor’s internal alarm relay (only for use with optional Alarm output expander).

F4 : High voltage alarm settings

F4.0 Main battery high voltage alarm On. When the Main battery voltage rises above this value, the message “Hi” will appear on the display and the selected alarm relay will be activated (depending on F4.2). Default: 64.0V Range: 20.0 - 70.0V Step size: 0.2V
F4.1 Main battery high voltage alarm Delay. This is the time the Main battery high voltage alarm On condition, F4.0, must be met before the alarm is activated. Default: 5sec Range: 0 - 300sec Step size: variable
F4.2 Enable Main battery high voltage alarm / Use contact. Select “OFF” to disable the Main battery high voltage alarm. Select “[1]” to “[8]” to use the battery monitor’s internal alarm relay (only for use with optional Alarm output expander).
F4.3 Auxiliary battery high voltage alarm On. When the Auxiliary battery voltage rises above this value, the message "FAIL" will appear on the display and the selected alarm relay will be activated (depending on F4.5).

Default : 16.0V Range : 10 - 26.0V Step size : 0.1V

F4.4 Auxiliary battery high voltage alarm On delay. This is the auxiliary battery high voltage alarm on condition. F4.3 must be met before the alarm is activated.


F4.5 Enable Auxiliary battery high voltage alarm / Use contact. Select "OFF" to disable the Auxiliary battery high voltage alarm. Select "1" to use the battery monitor's internal alarm relay. Select "[1]" to [3] to use an external alarm contact (only for use with optional Alarm output expander).


<table>
<thead>
<tr>
<th>F5 : &quot;MAIN BATTERY PROPERTIES&quot;</th>
</tr>
</thead>
</table>
| **F5.0 Battery capacity.** Your main battery capacity in Ah.
| **F5.1 Nominal discharge rate (C-rate).** The discharge rate in (hours) at which the battery manufactures rate your battery's capacity.
  Default : 20h Range : 1 - 20h Step size : 1h |
| **F5.2 Nominal temperature.** The temperature at which the battery manufacturer rates your battery's capacity.
  Default : 20°C Range : 0 - 45°C Step size : 1°C |
| **F5.3 Temperature coefficient.** This is the percentage that your battery's capacity changes with temperature. The unit of this value is percent capacity per degree Celsius. The setting "OFF" disables temperature compensation.
  Default : 0.5%/°C Range : OFF / 0.01 - 1.00 Step size : 0.01%/°C |
| **F5.4 Peukart's exponent.** The Peukart's exponent represents the effect of reducing battery capacity at higher discharge rates. When the Peukart value of your battery is unknown, it is recommended to keep this value at 1.25. A value of 1.00 disables the Peukart compensation.
  Default : 1.25 Range : 1.00 - 1.50 Step size : 0.01 |
| **F5.5 Self discharge rate.** This is the rate at which the battery loss capacity by itself, even when it is not used. The unit of this value is percent capacity per month at the Nominal temperature (F5.2). The "OFF" setting disables self-discharge compensation.
  Default : 3.0%/Month Range : OFF / 0.1 - 25.0%/Month |
| **F5.6 Charge Efficiency Factor (CEF).** CEF is the ratio between the energy removed from a battery during discharge and the energy used during charging to restore the original capacity. It is recommended to keep this value at "OFF" (automatic calculation). The setting "OFF" disables charge efficiency compensation.
  Default : OFF / 0.1% - 5.0% / 1.0% |
<table>
<thead>
<tr>
<th><strong>F6 : BATTERY MONITOR PROPERTIES</strong></th>
</tr>
</thead>
</table>
| **F6.0 Firmware version.** Displays the firmware version of the battery monitor (read only).
  Default : x.xx |
| **F6.1 Shunt Amp Rating.** This Function is linked to F6.2 and represents the Amp rating of your shunt at the given voltage indicated by F6.2. Included with your battery monitor is a 500mA/50mV shunt, meaning that at 500mA flowing through the shunt, a voltage of 50mV is generated across the small " Kelvin " screw terminals of the shunt. The voltage will be used by the battery monitor to measure the amount of current.
  Default : 500A Range : 10 - 9999A Step size : variable |
| **F6.2 Shunt mA Rating.** This Function represents the milliAmp rating of your shunt at the current indicated by F6.1. The battery monitor supports 50mA and 60mA shunts.
  Default : 50mA Range : 50 - 60mA |
| **F6.3 Backlight.** Represents the duration of backlight activation in seconds after key press. The backlight can also be set to be always " ON " or always " OFF. Function setting " AU " activates the backlight automatically when charge / discharge current exceeds 5mA or when a key is pressed.
  Default : 30sec. Range : OFF / F5.3 - 300G / AU Step size : variable |
| **F6.4 Alarm contact polarity.** Enables selection between a normally open (NO) and normally closed (NC) contact.
  Default : NO Range : NO / NC |

| **F6.5 Not available.** |
| **F6.6 Temperature unit selection.** Enables selection between degrees Celsius (°C) and degrees Fahrenheit (°F) in the temperature readout.
  Default : °C Range : °C / °F |
| **F6.7 Auxiliary input mode.** This Function is used to configure the VA input terminal on the Auxiliary battery monitor, and can be set in two modes. In mode "0", the VA input operates in normal voltage measurement mode. In mode "1", the VA input is used to control the backlight. In this mode, the backlight is switched ON if an input voltage higher than 2V and switched OFF again if the voltage is below 1V.
  Default : 0 Range : 0 / 1 |
| **F6.8 Communication mode.** This Function is used to configure the data output mode. There are four data output modes:
  - Mode "0" : "WB/P-Pro broadcast" (default)
  - Mode "1" : "WB/P-Pro (request mode)
  - Mode "2" : E-Alert 501 compatibility mode (broadcasting)
  - Mode "3" : E-Alert 501 compatibility mode (request only)
  Default : 0 Range : 0 / 1 / 2 / 3 |
| **F6.9 Setup lock.** When set to "ON", all functions (except this one) are locked and cannot be altered. The Setup menu is also locked.
  Default : OFF Range : OFF / ON |

### 6. Reset menu

#### 6.1 When the Reset menu is entered, you can use the < and > keys to browse through the different reset items. By pressing the MENU key, the selected reset item can be viewed. The default value for all reset items is "OFF". To actually reset the selected item, use the < and > keys to change the value from "OFF" to "ON". Pressing the MENU key again, will return the display to the previous menu. Normal Operating Mode is activated again by pressing the MENU key for 3 seconds. The following Reset menu items are available:

- **rStA** : Reset Alarm. Use this reset item to reset or ignore all current alarms.
- **rStB** : Reset Battery Status. Use this reset item to reset your current battery status (CEF, State-of-charge and battery history). You can use this reset item after you have installed a fresh battery of the same specifications as the previous one.
- **rStF** : Reset Functions. This reset item can be used to reset all Function values to factory default values.

#### 6.2 Checking the status of your battery

- **State-of-charge and/or time-to-go readout not accurate** - Check if all current is flowing through the shunt (the negative terminal of the battery may only contain the wire going to the battery side of the shunt). - Current sense leads from the shunt are reversed. - Check all Battery Properties Functions (F5) - Check if battery monitor is synchronized.

#### 6.3 Display returns " - - - - " in temperature readout

- Connection with temperature sensor is lost. Check for label connections and/or cable damage.

### 8. Warranty conditions

Whisper Power (Pty) Ltd will replace any defective parts for free from defects in workmanship or materials for 24 months from the date of purchase. During this period WP will repair or replace any part of the product for free of charge. WP is not responsible for any costs of the transport of this product.

This warranty is void if the product has suffered any physical damage or alteration, either internally or externally, and does not cover damage arising from improper use or from use in an unsuitable environment.

This warranty will not apply where the product has been misused, neglected, improperly installed or repaired by anyone other than WP. WP is not responsible for any lost, damaged or costs arising from improper use, in an unsuitable environment or improper installing, setuping and malfunctioning of the product.

Since WP cannot control the use and installation (according to local regulations) of their products, the customer is always responsible for the actual use of these products. WP products are not designed for use as critical components in life support devices or systems, that can potentially harm humans and/or the environment. The customer is always responsible when implementing WP products in these kind of applications. WP does not accept any responsibility for any violation of patents or other rights of third parties, resulting from the use of the WP product. WP keeps the right to change product specifications without previous notice.

*Examples of improper use are:*  
- too high input voltage applied  
- wrong short connection  
- applying battery voltage to shunt input  
- mechanically stressed enclosure or intensities due to harsh handling and/or incorrect packaging  
- contact with any liquids or oxidation caused by condensation

### 9. Technical specifications

#### 9.1 Supply voltage range

<table>
<thead>
<tr>
<th>Supply voltage range</th>
</tr>
</thead>
<tbody>
<tr>
<td>14...36VDC</td>
</tr>
</tbody>
</table>

#### 9.2 Input voltage range (auxiliary battery)

<table>
<thead>
<tr>
<th>Input voltage range</th>
<th>2.35VDC</th>
</tr>
</thead>
</table>

#### 9.3 Input voltage range (main battery)

<table>
<thead>
<tr>
<th>Input voltage range</th>
<th>0.70VDC</th>
</tr>
</thead>
</table>

#### 9.4 Input current range

<table>
<thead>
<tr>
<th>Input current range</th>
<th>-9999 / +9999A</th>
</tr>
</thead>
</table>

#### 9.5 Battery capacity range

<table>
<thead>
<tr>
<th>Battery capacity range</th>
<th>20...9999Ah</th>
</tr>
</thead>
</table>

#### 9.6 Operating temperature range

<table>
<thead>
<tr>
<th>Operating temperature range</th>
<th>-20...+50°C</th>
</tr>
</thead>
</table>

#### 9.7 Residual voltage

<table>
<thead>
<tr>
<th>Residual voltage</th>
<th>(0...35V)</th>
<th>±0.01V</th>
</tr>
</thead>
<tbody>
<tr>
<td>current</td>
<td>(0...200A)</td>
<td>±0.1A</td>
</tr>
<tr>
<td>current</td>
<td>(200...9999A)</td>
<td>±1A</td>
</tr>
<tr>
<td>current</td>
<td>(100...9999A)</td>
<td>±0.1Ah</td>
</tr>
<tr>
<td>current</td>
<td>(500...9999A)</td>
<td>±0.01Ah</td>
</tr>
<tr>
<td>time-to-go (2..24hrs)</td>
<td>±1min</td>
<td></td>
</tr>
<tr>
<td>time-to-go (24...240hrs)</td>
<td>±7hr</td>
<td></td>
</tr>
<tr>
<td>temperature (25...50°C)</td>
<td>±0.5°C</td>
<td></td>
</tr>
</tbody>
</table>

#### 9.8 Voltage measurement accuracy

<table>
<thead>
<tr>
<th>Voltage measurement accuracy</th>
<th>±0.3%</th>
</tr>
</thead>
</table>

#### 9.9 Current measurement accuracy

<table>
<thead>
<tr>
<th>Current measurement accuracy</th>
<th>±0.4%</th>
</tr>
</thead>
</table>

#### 9.10 Dimensions

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Trombetal 46mm</th>
<th>total depth 79mm</th>
</tr>
</thead>
</table>

#### 9.11 Weight

<table>
<thead>
<tr>
<th>Weight</th>
<th>95grams</th>
</tr>
</thead>
</table>

#### 9.12 Protection class

<table>
<thead>
<tr>
<th>Protection class</th>
<th>IP65 (Tempertal and IP 65)</th>
</tr>
</thead>
</table>

#### 9.13 Accessories

- WB/P-Pro connection kit  
- WB/P-Pro connection kit 3m  
- WB/P-Pro temperature sensor 10m  
- WB/P-Pro communication kit RS232  
- WB/P-Pro communication kit USB  

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*Note: the given specifications are subject to change without notice.*