SM3x Help Index

Help files can be accessed by selecting a field inside the SM3x Configuration Monitor and pressing the F1 key

Monitor

This screen only displays real•time information while connected to an SM3x controller. Therefore is does not display anything when working in the “Offline” with this Configuration Utility (see the Save & Restore section for details on accessing Offline mode).

Various areas only appear when that functionality is available (e.g., AC Monitoring).

Any reading displaying “••••“ means that value is not possible to display, either because a sensor is not fitted, or because the input sensor has not been mapping in the Input Configuration. For example, the Ambient Temperature Sensor is an optional extra, so in most systems is not fitted. Therefore it is displayed as “••••“.

DC Metering

V_{sys}

This is the “System Voltage”. It is the voltage that is displayed on the SM3x LCD screen.

In Input Configuration Vsys is actually called “Bus 1 Voltage”.

In the Input Configuration, the SM3x is told where this voltage comes from (as a measurement). It is one of the most vital/basic settings in the system, and is usually the very first statement in the Input Configuration, as shown here:

In nearly all systems Bus 1 Voltage will be mapped to Voltage Input 1 (note the SM3x can monitor two DC Bus voltages at the same time, hence “Bus 1” and “Bus 2” voltages). This is because Voltage Input 1 in the SM3x is physically connected to the voltage sense wires in the “RJ45” internal communications cable. This comm’s cable is usually connected directly to the Rectifier/Converter backplane PCB, where links and series 4k7 resistors connect to the rectifier DC output.

The other essential voltage that needs to be set in the Input Configuration is the Rectifier Bus Voltage. This is the voltage that the SM3x uses to control the DC bus when the Rectifier Voltage Control is enabled. This is set in the Input Configuration like this:

I_{rect}

This is the “Rect Amps” on the SM3x LCD screen. In the SM3x Input Configuration it is called the “Summed Rectifier Current”.

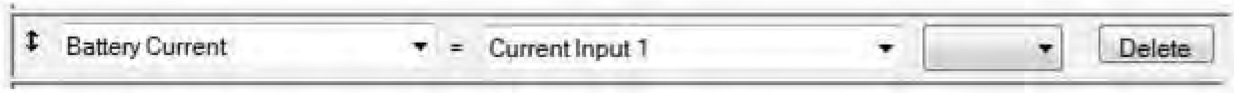
“Summed Rectifier Current” does not need to be declared in the Input Configuration as it is always the sum of all the rectifiers connected in the internal system communications bus.

I_{batt}

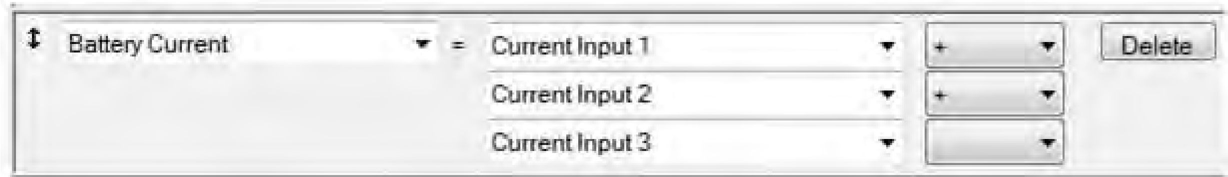
This is the “Batt Amps” displayed on the SM3x LCD screen.

In SM3x Configuration it is called the “Battery Current”.

Typically in Newmar power systems, a current shunt is provided to measure battery current. Therefore in SM3x Input Configuration the Battery Current is simply mapped to the Current Input circuit that the shunt is wired to. For example, if the battery shunt is physically wired to the SM3x Current Input 1, then you would simply declare the Load Current as follows:



In the case where you have, say 3 battery strings, each with an individual shunt, and they are wired to SM3x Current Inputs 1, 2 & 3, then you would write the Input Configuration statement as follows:



Note that if you hover over the I_{batt} field, then a pop•up window appears called "Battery Monitor Status". This window gets populated when you have installed some level of Battery Condition Monitoring (BCM). When BCM is installed the pop•up window will display all of the cell/bloc voltages you have programmed as well as the string currents & temperatures that may have been programmed.

I_{load}

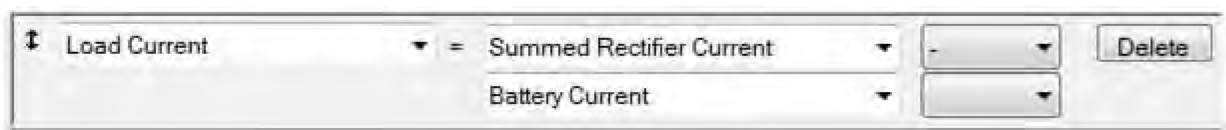
This is the "Load Amps" on the SM3x LCD screen.

In the SM3x Input Configuration it is called the Load Current and it does require declaration/mapping in the Input Configuration.

Typically in Newmar power systems a current shunt is provided to measure battery current, and because the rectifier current is also known, then we can conclude:

Load Current = Rectifier Current – Battery Current

This is entered in the Input Configuration as shown here:



Note that if a system were to have both a battery shunt and a load shunt, then the Load Current would simply be set to equal the Current Input circuit that the shunt is wired to.

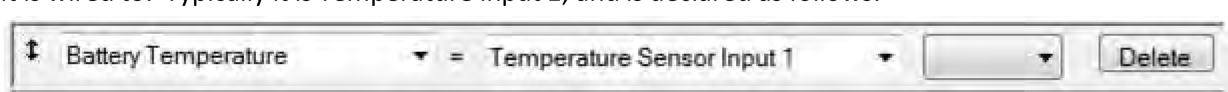
For example, if the load shunt was physically wired to the SM3x Current Input 3, then you would simply declare the Load Current as follows:

T_{batt}

This appears as "Batt Temp" on the SM3x LCD screen.

In most Newmar systems it is supplied as a standard item.

The SM3x has two physical temperature inputs, so in the Input Configuration the SM3x must be told which input it is wired to. Typically it is Temperature Input 1, and is declared as follows:



This appears as “Amb. Temp” on the SM3x LCD screen.

In most Newmar systems it is an optional item, and as such is not declared/mapped in the Input Configuration. If it is fitted, then it is usually wired to Temperature Sensor Input 2, and the Input Configuration statement would look like this:

Battery Capacity

When the battery current has reached zero amperes at float voltage for more than 10 minutes, this resets to 100%.

As a battery discharges the amperage and the time of discharge are calculated against the Battery Capacity declared in the Battery Capacity field of the Charge Page to give a prospective Battery Capacity remaining.

Alarms

As alarms occur in the system, this is the area they are displayed.

Note that just because an alarm may appear here, it does not necessarily mean that it is extended remotely or via the relay alarm outputs. For alarms to be extended remotely via the relay contacts, then they need to be mapped in the Relay/Output Logic section (it is also in this section that you can map alarms to the SNMP User Traps).

Pre•defined SNMP alarms are set in the SNMP Alarm Trap Settings on the Network page.

AC Metering

Up to two AC Metering Modules (PCBs) can be connected to an SM3x.

The AC Metering section only appears if an AC Meter is actually fitted to the system.

The set•up for AC Metering (whether it is single or three phase or whether current is also monitored) is on the Mains Monitor section of the Control Page.

The set•up for the AC Alarm levels associated with AC Metering is in the AC Alarms section of the Alarms (Levels) page.

If a certain value is **not** monitored (e.g., current if CTs are not fitted, or Phase 2 & Phase 3 if it is only a 1•phase system), then it is displayed as “••••“.

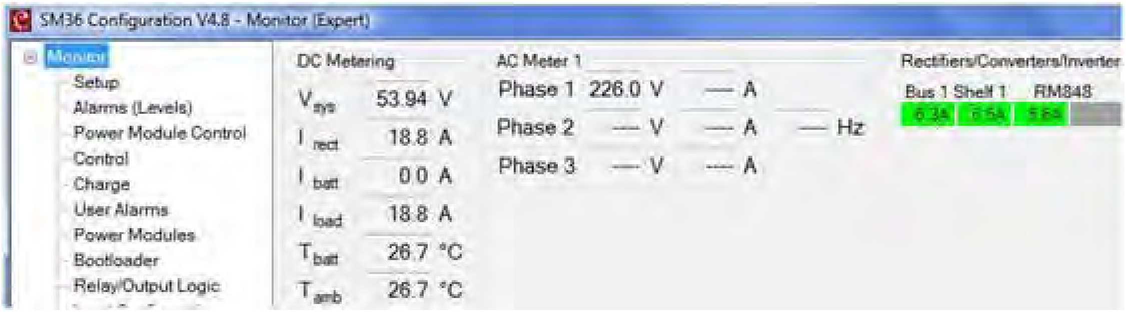
Special Case of AC Metering with RM848/RM648 Rectifiers

Note that due to the digital signal processing in the RM648/848 rectifiers, it is possible to deduce and display the AC input voltage to the system (but not the current or frequency).

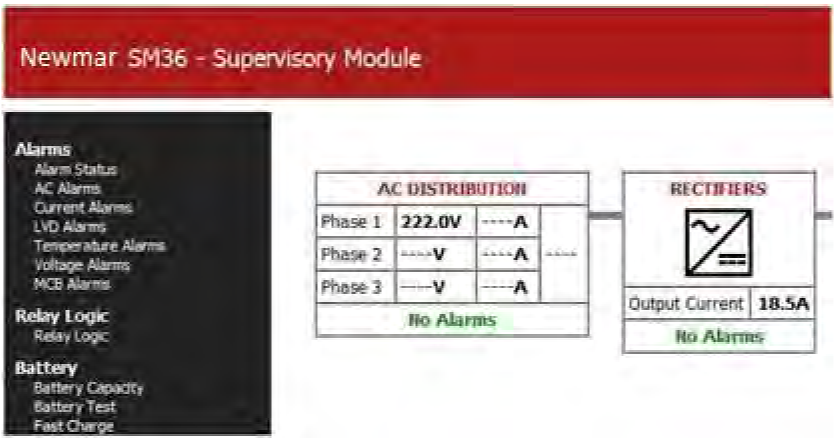
Also note that the **AC Input Voltage is only displayed when the DC output current is >0.5A per rectifier**. This is due to the methodology of the voltage detection.

The capability of these rectifiers to monitor AC voltage is only on rectifiers with firmware version “SWEN•RM848•09” or above, and with SM35/36 monitors with Version 24 Main firmware or later.

When connected, the SM35/36 automatically detects the voltage reading from one of the rectifiers. The first rectifier to respond with an AC voltage is the displayed voltage. This means that it is possible to have only one rectifier in the system that has the AC monitoring capability, and you will still get an AC voltage measurement. It does not matter which position the rectifier is in. This is displayed in the SM3x Configuration Utility (& web•page) in the same place as if the AC monitor were connected. An example of a monitor measuring a single phase input is shown here for the SM3x Config Utility:



And here for the web page:



Rectifiers/Converters/Inverters Display Section

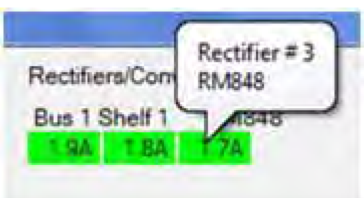
This area displays the output currents of all of the positions of modules fitted to the system.

The SM3x will only go "looking" for as many modules as are selected in the Rectifiers/Converters/Inverters Per Shelf section of the Power Module Control page.

Any positions that do not have devices in them are shown as a grey box.

Note that Inverters will self•declare.

Hovering over an active module position will show the rectifier type and position in the shelf as shown here:



If an alarm has occurred in a module, then you will also see what that alarm is by hovering over the module position, as shown here:

Status & Module Settings) and show the operating details & settings of the module.

Front Panel Settings

These are the settings that affect the LCD front panel of the SM3x.

Keypad Beep Enabled

0 = An audible "click" will be heard when a key is pressed.

Buzzer Timeout

The number of seconds the audible buzzer will go for upon an alarm activation.

0 = the buzzer will go continuously.

Press any front panel key to stop the buzzer.

Display Contrast

Adjust the contrast between the rear display dots, and the dots that are illuminated to show characters.

Optimal adjustment is 350.

This should never need adjusting, however if the display is mounted very high or low in a rack, you may like to adjust it up and down for best display of the charcters.

Backlight Minimum Brightness

The default factory setting is 20. This makes the LCD visible in a dark room, and aids visibility while working on the unit.

0 = no backlight.

Backlight Maximum Brightness

Default is 200.

Maximum setting is 255. There is no noticeable difference between 200 & 255.

The brightness reverts back to "Minimum" after about 1 minute.

Rotate Display

Values: 0, 1, 2, or 3.

Different values will invert, rotate or mirror the display. The purpose of this setting is to cater for different manufacturers LCD screens.

The value should be set in the factory, however, if you replace the display or main PCB, and the display appears inverted or backwards, then select a different number until the display appears correctly.

Display Language

Self explanatory. Select the desired display language from the options available.

Front Panel PIN Number

This can be set so that a four digit number has to be entered if changes are to be made from the front panel. Note that due to the limitations of the 3•button front panel, you must scroll up or down to select the number.

So it is advisable to set the number slightly up or down around zero (e.g., 0008 or 9993).

Real Time Clock

This is self explanatory.

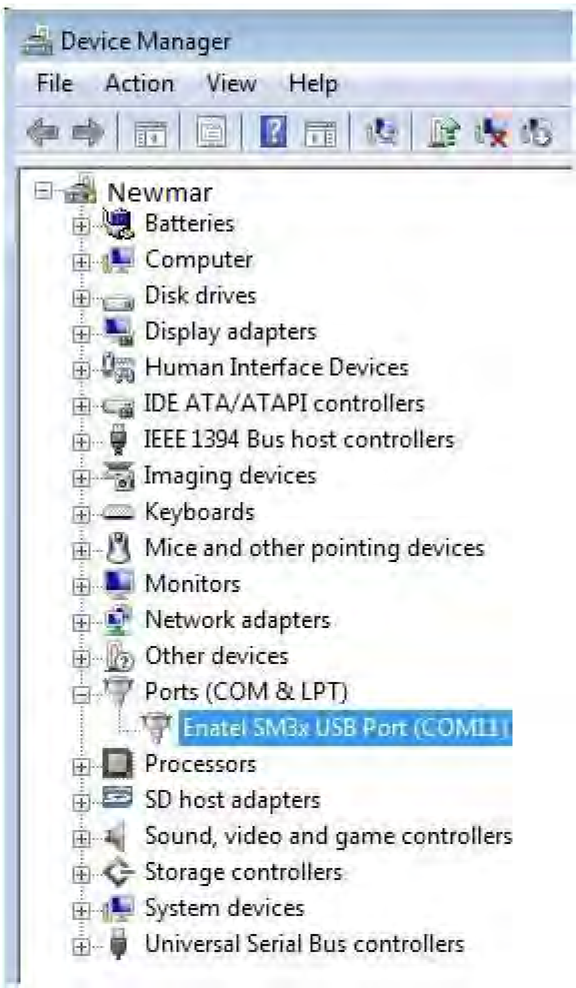
The only thing to note is that it does **not** dynamically update when you are connected to an SM3x.

If you want to view the present time on the SM3x, then you must click the “Read” button.

When you connect to the SM3x via the USB interface and then open the SM3x Configuration Utility, you computer will connect to the SM3x via a Serial COM Port. Usually this is seamless and the COM port is automatically connected.

However, on occasion the connection may not be made. In this case, click the Scan button to make the SM3x find the connect Port number.

Should this fail, go to your computer Device Manager. If connected properly, you should get something like this under the Ports (COM & LPT) area:



If you get an error message there, you may need to re•install the drivers for the USB port on your computer. This is included on the CD that comes with your system (contained in the SM3x Configuration Utility Installation file).

Monitor Information

These are the Firmware versions and Serial Number of the monitor that you are connected to.

If you are in Offline Mode, and are viewing an uploaded .sm3x file, then these are the values associated with the monitor from which the .sm3x was extracted.

Serial Number

Self explanatory.

The first two digits are the year that the unit was manufactured, and the second two are the week of manufacture.

Main Firmware Version

The Firmware version of the Main SM3x Processor (contained on the SM3x Main Circuit Board)

ADC Firmware Version

The Firmware version of the Analog to Digital Converter on the (contained on the SM3x Main Circuit Board)

Display Firmware Version

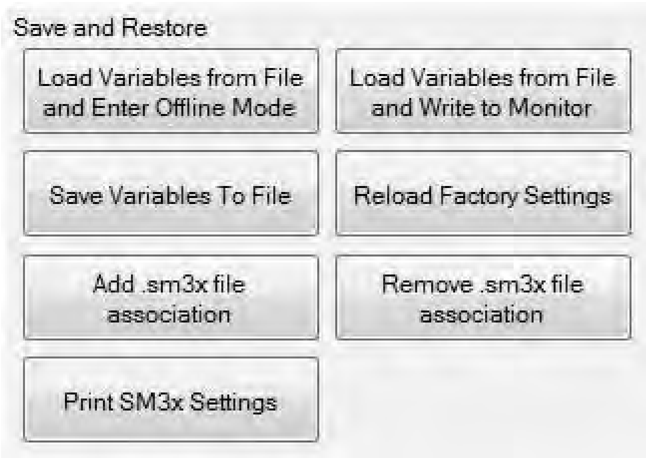
The Firmware version of the processor on the Front Panel (also contains the USB processor)

Network Firmware Version

The Firmware version of the Network Processor (contained on the Network Circuit Board that plugs into the Main PCB).

This will only be displayed if you have the SM32, SM34 or SM36 monitor (as opposed to the SM31 or SM35)

Note that when **boot-loading** new Firmware, it will primarily be the **Main** and **Network** firmware that may need updating.



The various buttons here enable you to upload or download the Configuration Files (.sm3x files) from/to the SM3x.

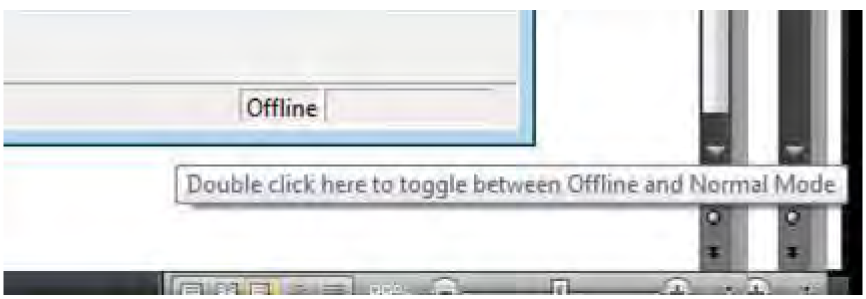
Note that when you first connect to the Sm3x, it is essential that you "Save Variables to File" so that you can roll back the settings of the SM3x in case you get lost or mess up the settings.

Load Variables from File and Enter Offline Mode

Here you can view a .sm3x file without having to be connected to a monitor (hence the term **Offline Mode**).

You can also make changes to the Configuration File and save those changes for later use (or for emailing to a site or user).

You can also enter **Offline Mode** directly by double clicking in the bottom•right area of the Configuration Utility as shown here:



To exit Offline Mode, you can double•click again in the Offline box.

Load Variables from File and Write to Monitor

From a previously created .sm3x file you can load that directly into the SM3x you are connected to.

Save Variables to File

The changes you have made while connected to the SM3x or while in Offline Mode will be saved to a file with a .sm3x extension.

Reload Factory Settings

Use this as a last resort if you have completely lost or messed up Configuration settings.

Note that the factory settings are **raw** settings (they are the settings of the monitor prior to it being fitted into your customised system) and will not necessarily have the correct mappings (of things like shunt and alarm associations) that are unique to your system.

Add .sm3x File Association

This gives you the ability to double•click a .sm3x file, and your computer will then open the Configuration Editor and load the .sm3x file values.

Remove .sm3x File Association

Self explanatory.

Print SM3x Settings

This will print all of the Configuration settings. Note that it will not print the calibration settings.

Current Alarms

Load Current High Alarm Setpoint

Self Explanatory.

This should be set in consultation with the end user and their requirements.

Charge Current High Alarm Setpoint

This refers to the Battery Recharge Current.

Most sealed lead acid battery manufacturers set a maximum acceptable recharge current for their batteries. This is typically 0.3 to 0.4 of the C_{10} rated capacity of the battery.

Again, this should be set in consultation with the end user and their requirements.

Note that some batteries do not have a maximum recharge current, and can accept recharge current as high as 1.1 or more of C_{10} (e.g., Enersys' SBS series of batteries).

Battery String Current High Alarm Setpoint

This is only relevant if Battery Condition Monitoring (BCM) is fitted.

If any of the battery string currents is different to any other by the amount entered here, a "Battery String Current High" alarm will be raised.

Note that for this alarm to be meaningful, you must fit one current shunt in each battery string.

Battery String Current Imbalance Threshold

This is only relevant if Battery Condition Monitoring (BCM) is fitted.

If any of the battery string current is different to any other by the amount entered here, a "Battery String Current Imbalance" alarm will be raised.

Note that for this alarm to be meaningful, you must fit one current shunt in each battery string.

Battery Discharge Threshold

The SM3x will not register that the battery is in discharge unless the discharge current exceeds this threshold.

This purpose of this setting is to:

- stop nuisance alarms or battery discharge events
- if BCM is enabled, it prevents nuisance of the Battery Discharge Log
- stop the battery amp-hours monitoring accumulating if there is a small current reading error (especially around a 0A reading).

Temperature Alarms

These alarms are reasonably self•explanatory.

Note that a Battery Temperature sensor is fitted as standard on Newmar Power Systems.

The SM3x has two physical temperature inputs, so in the Input Configuration the SM3x must be told which input it is wired to. Typically the Battery Sensor is connected to Temperature Input 1, and is declared as follows:

In most Newmar systems the Ambient Temperature sensor is an optional item, and as such is not declared/mapped in the Input Configuration.

If it is fitted, then it is usually wired to Temperature Sensor Input 2, and the Input Configuration statement would look like this:

Battery Temperature Low Alarm Setpoint

Typically set to 0°C, however the final setting should be made in consultation with the Customer/User.

Battery Temperature High Alarm Setpoint

Typically set to 40°C, however the final setting should be made in consultation with the Customer/User.

Battery Temperature Hysteresis

Typically set to 1°C.

The hysteresis setting can be used for setting different triggers for temperature levels. For example, a customer wanted to trigger a Low Voltage Disconnect (LVD) to disconnect at 40°C, and reconnect at 35°C. So the High Temperature Alarm Setpoint was set to 40°C, and the hysteresis to 5°C.

Ambient Temperature Low Alarm Setpoint

Only relevant if an ambient temperature sensor is fitted, and it is mapped/declared in the Input Configuration as shown above.

Ambient Temperature High Alarm Setpoint

Only relevant if an ambient temperature sensor is fitted, and it is mapped/declared in the Input Configuration as shown above.

Ambient Temperature Hysteresis

Only relevant if an ambient temperature sensor is fitted, and it is mapped/declared in the Input Configuration as shown above.

AC Alarms

The alarms are only relevant if an AC Monitoring Card is installed in your system, or in systems with the Newmar 600/800W rectifiers (RM648/848), where AC Voltage is measured from the rectifier (see the Monitor section, under the AC Metering heading).

For more details on AC Metering set•up, see the Mains Monitor section.

AC Voltage High Alarm Setpoint

Self explanatory.

AC Voltage Low Alarm Setpoint

Self explanatory.

AC Phase Lost Alarm Setpoint

This is normally set to 90V (for a nominal 230V input system). It represents a point at which the phase voltage has collapsed to a point that you can assume it is completely lost.

AC Current High Alarm Setpoint

This alarm is only relevant if Current Transformers are fitted along with the AC Monitoring card.

AC Frequency High Alarm Setpoint

Frequency is automatically measured when an AC Monitor Card is fitted.

However, frequency is **not** measured when the RM648/848 rectifiers.

AC Frequency Low Alarm Setpoint

Frequency is automatically measured when an AC Monitor Card is fitted.

Voltage Alarms

Newmar designs and manufactures Rectifiers and DC/DC Converters which use the same SM3x series of supervisory modules. As a result, systems may have 2 DC busses to monitor. This is why you will see two sets of alarms for up to two DC busses.

Bus 1 Voltage is normally regarded as the primary DC Bus. It is the voltage displayed on the SM3x LCD, and is called Vsys on the Monitor page of SM3x Config.

One pair of non•urgent high/low voltage alarms is provided, and one pair of urgent high/low voltage alarms is provided for each bus.

High Voltage Alarm Bus 1 Setpoint

In standard systems this regarded as the urgent high voltage alarm (for Bus 1).

In a 48V system the default factory setting is 57.60V.

High Float Alarm Bus 1 Setpoint

In standard systems this regarded as the non•urgent high voltage alarm (for Bus 1).

In a 48V system the default factory setting is 55.60V.

Low Float Alarm Bus 1 Setpoint

In standard systems this regarded as the non•urgent low voltage alarm (for Bus 1).

In a 48V system the default factory setting is 52.80V.

Low Voltage Alarm Bus 1 Setpoint

In standard systems this regarded as the urgent low voltage alarm (for Bus 1).

In a 48V system the default factory setting is 47.00V.

High Voltage Alarm Bus 2 Setpoint

In standard systems this regarded as the urgent high voltage alarm (for Bus 2).

If Bus 2 is a 24V bus, the default factory setting is 28.80V.

High Float Alarm Bus 2 Setpoint

In standard systems this regarded as the non•urgent high voltage alarm (for Bus 2).

If Bus 2 is a 24V bus, the default factory setting is 27.80V.

Low Float Alarm Bus 2 Setpoint

In standard systems this regarded as the non•urgent low voltage alarm (for Bus 2).

If Bus 2 is a 24V bus, the default factory settings is 26.40V.

Low Voltage Alarm Bus 2 Setpoint

In standard systems this regarded as the urgent low voltage alarm (for Bus 2).

If Bus 2 is a 24V bus, the default factory settings is 23.50V.

Battery Symmetry Threshold

This is only relevant if Battery Condition Monitoring (BCM) is fitted.

If any of the battery cell/bloc voltages is different to any other by the amount entered here, a “Battery Cell Voltage Symmetry” alarm will be raised.

If the "Cell" measurement is 12V, then a setting of 2V for this alarm is typical, if the Cell measurement is 2V, then a setting of 0.2 to 0.3V is typical. However, please consult with the battery manufacturer or end customer/user for final setting values.

Note that for the purposes of this alarm the nominal "Cell" voltage refers to the nominal bus voltage divided by "Number of Cell Voltages per String" as defined in the Battery Condition Monitoring definition. For example, in a nominal 48V system, if the "Number of Cell Voltages per String" is 4, then the nominal "Cell" voltage is 12V.

Battery String Open Threshold

This is only relevant if Battery Condition Monitoring (BCM) is fitted.

This alarm is based on the voltage difference between the System Bus Voltage and the voltage at the battery terminal. For this alarm to work the Battery Condition Monitoring must be set up with voltage sensors at the battery terminals as well as at the inter•cell/bloc level.

Low Voltage Disconnect Alarms

The SM3x can control up to 3 Normally Open or Normally Closed LVD contactors.

It can control up to 2 magnetically latched contactors.

Magnetically latched contactors require no energy to keep them closed or open, only a pulse to make them change state, whereas N.O. or N.C. contactors require permanent energy to keep them in one state or the other.

Due to the stability and security of operation of magnetically latched contactors, Newmar uses them on their systems on preference to Normally Open or Normally Closed contactors.

Note that, in most Newmar systems, the SM3x is kept powered even after the battery LVD may have opened. For more information on setting up LVDs, see the LVD & Relay Control section.

LVD 1 Disconnect Setpoint

The default setting is 43.0V (1.8Vpc) for nominal 48V systems.

When the battery LVD opens, the Bus voltage measured by the SM3x will collapse to near zero.

LVD 1 Reconnect Setpoint

The default setting is 48.0V (2.0Vpc) for nominal 48V systems.

Note that this is the DC Bus voltage that must get to this level, not the battery voltage.

LVD 2 Disconnect Setpoint

If a second LVD is not fitted to the system, the default setting of this value is 15V.

This avoids any confusion when looking at the alarm levels as to which LVD alarm threshold is the relevant one.

LVD 2 Reconnect Setpoint

If a second LVD is not fitted to the system, the default setting of this value is 10V.

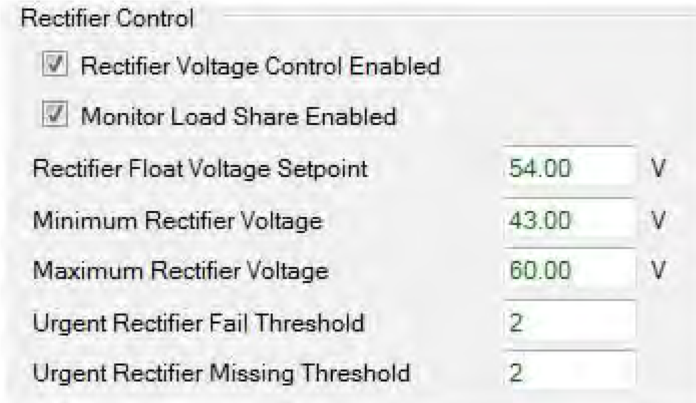
LVD 3 Disconnect Setpoint

If a third LVD is not fitted to the system, the default setting of this value is 15V.

LVD 3 Reconnect Setpoint

If a third LVD is not fitted to the system, the default setting of this value is 10V.

Rectifier Control



Rectifier Voltage Control Enabled

The purpose of this feature is to improve the accuracy of the float voltage to the batteries.

The Default setting is enabled.

The long term float voltage (when the battery is fully charged and drawing almost no current) is one of the most important parameters affecting the battery life.

Voltage is sensed at the DC system bus. So with this enabled, as the system load increases (& the rectifier output voltage droops due to circuit resistance), the SM3x ensures that the voltage at his point is maintained.

In systems without this active voltage control, typical regulation will be up to •0.5V from zero to full load. With this enabled, regulation can be reduced to better than 0.1V, and is often better than 20 or 30mV.

Note that the SM3x needs to be told where this voltage comes from (i.e., what physical input it is wired to).

The SM31 through SM34 series have two physical voltage inputs called VS1 and VS2. The SM35/36 have just one, VS1 (VS2 on these monitors is used for other internal measurements such as MCB fail inputs).

In nearly all systems Rectifier Bus Voltage will be mapped to Voltage Input 1.This is because Voltage Input 1 in the SM3x is physically connected to the voltage sense wires in the “RJ45” internal communications cable. This comm’s cable is usually connected directly to the Rectifier/Converter backplane PCB, where links and series 4k7 resistors connect to the rectifier DC output.

This is set in the Input Configuration like this:

Or like this (if Bus 1 Voltage is already been set to Voltage Input 1, see Vsys description under DC Metering):

To improve functionality of this feature, many larger systems sense voltage at the point where the battery “tees” off the main rectifier bus. Thus the voltage to the battery is precisely controlled during float operation (because the battery current is near zero, so there will be virtually no voltage drop from this point to the battery).

If this is the case, voltage sensing on the rectifier backplane is no longer used (links are removed, see the Backplane Manual for details), and separate wires (with 4.7k0 resistors in series) are fitted to sense the voltage at the battery “tee” point. This connection detail will be shown on the System Schematic diagram that will have been provided with your system.

Monitor Load Share Enabled

The purpose of this feature to provide active load sharing (current sharing) between individual rectifier modules.

The Default setting is enabled.

Note that this is not the same as the Load Share Enable function as set in the Rectifier/Converter Settings section of the Power Modules page. The Rectifier Load Share function occurs on a rectifier•to•rectifier basis, independent from the SM3x. However, the Rectifier Load Share must be enabled (which is default) before the Monitor Load Share will operate.

With Monitor Load Share enabled, the SM3x will tell the rectifier modules what their prospective output voltages should be in order to maintain equal load sharing between units. When a system has under•gone a step load change, or has just been turned on, it can take a few minutes for this control function to stabilise.

Accuracy is typically better than 0.5% (specification is 2%), and in terms of current, you will see that rectifiers are typically within 0.3 to 0.5A of each other.

It should be noted that highly accurate load sharing is not particularly necessary as the origins of this feature lay in the performance of the old thyristor controlled rectifiers. With switch•mode technology, whether one rectifier outputs an amp or two different to another does not affect either its performance or lifetime.

Rectifier Float Voltage Setpoint

This sets the output voltage of the system.

This voltage should be the long•term float voltage required for the battery, and as such should be set strictly in accordance with the battery manufacturers recommendations.

If no battery is fitted, then this voltage will be recommended by the customer, or simply let at the default value.

It should be the target battery float voltage at 25°C. The default value is 54.0V (for a 48V system), as this is a common battery float voltage.

For nominal 24V systems, the default Float Voltage is 27.0V.

For nominal 108V systems, it is 121.5V.

For nominal 120V systems, it is 135.0V.

If Temperature Compensation is enabled, then the SM3x will either add or subtract to this voltage accordingly.

Minimum & Maximum Rectifier Voltage

These settings set the maximum and minimum voltages that the rectifiers can be controlled to.

These are typically set to the maximum rectifier control range of 43.0V and 60.0V respectively (for 48V systems), and are not normally changed unless by specific customer request.

Urgent Rectifier Fail Threshold

In larger systems with more than, say 8 or 10 rectifier modules, it may be regarded that if one rectifier fails, then it is not worth sending a technician to site to swap it out.

As a result, this setting enables the customer to choose how many rectifiers failing may constitute an Urgent Alarm.

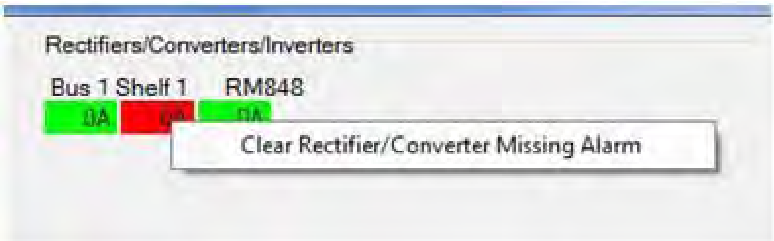
In very large systems with more than say 30 rectifiers, this may be set to 3 or 4, given that perhaps up to half of the rectifiers may be there just to provide battery recharge current, so the loss of a few rectifiers may have minimal impact on the system, and still retain a good level of redundancy.

Note that to extend this alarm remotely, it must be mapped to a relay output (In the Relay Output Logic), or selected as an enabled SNMP Trap.

Urgent Rectifier Missing Threshold

Similar to the Urgent Rectifier Fail Threshold, except a Rectifier Missing Alarm is created if a rectifier is physically pulled out of the system, or if communication to that rectifier is lost.

Note that if a rectifier is permanently removed, the Rectifier Missing Alarm can be cleared by right•clicking while hovering over the affected rectifier module and clicking on the "Clear" dialog box, as shown here:



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Rectifiers/Converters/Inverters Per Shelf

Background

A monitor communicates to the rectifier, converter, inverter and auxiliary system modules using serial communications over RJ45 patch cables. The monitor has two separate serial communication connections.

These are the Primary Serial Bus connector (BUS 1) which is on RJ45 connector J101 and Secondary Serial Bus Connector (BUS 2) which is on RJ45 connector J102.

Note that BUS2 (connector J102 on the SM3x) does **not** have any power supply capability, either from rectifier/converter backplanes, or to any peripheral modules (hence you cannot connect any I/O modules to it).

In smaller system all serial communications are generally done using BUS1 only. However, in larger systems the capacity of BUS1 may be exceeded. In these cases the guide for use of each bus is as follows:

- Rectifier modules should be connected to BUS1, but if there is insufficient capacity on this bus to accommodate them all, then the balance can be placed on BUS2.
- DC-DC converters can be placed on either BUS1 or BUS2 (but are normally placed on BUS2 to avoid confusion).
- Inverters should be placed on BUS1.
- System auxiliary modules which require supply voltage from the rectifier bus (BCM ACM, etc) can only be connected to BUS1.
- SM3x I/O expansion boards can only be connected to BUS1.

The monitor serial bus capacities are is as follows:

BUS1 Up to:

- 63 combined Rectifier Modules, Inverters and DC•DC Converters
- 4 SM3x I/O Expansion Boards
- 2 AC Metering Modules (ACM)
- 4 Battery Condition Monitors (BCM)
- 1 Static Transfer Switch (SBM)

BUS 2 Up to:

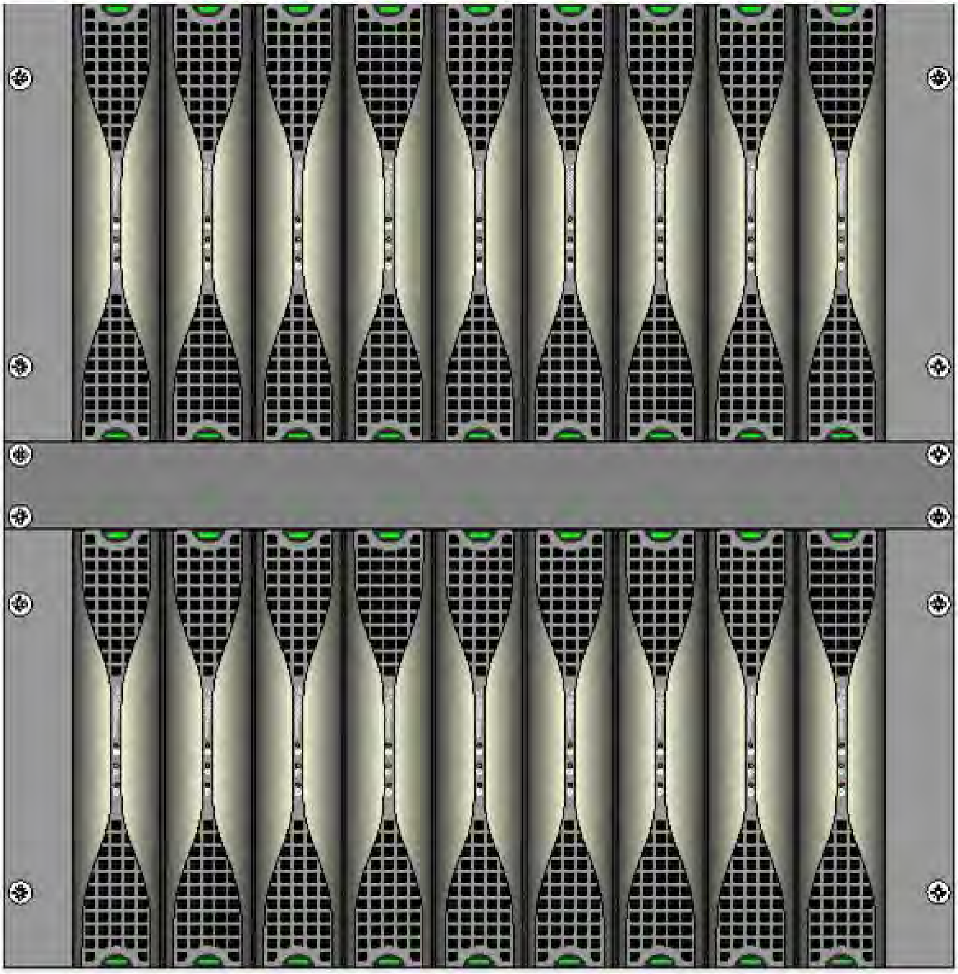
- 63 combined Rectifier Modules and DC•DC Converters

Setting the Number of Modules per Shelf

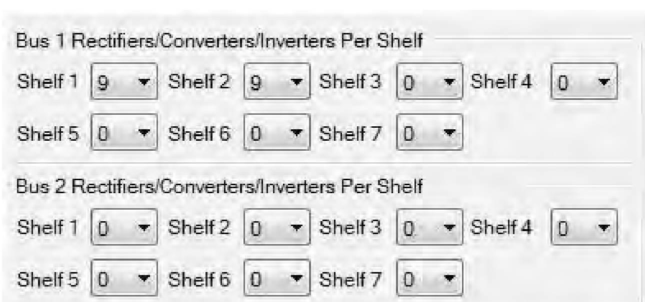
The selections made here dictate two things:

1. How many modules the SM3x will “look” for and,
2. The layout on the mimic diagram in the Monitor page of both the SM3x Configuration Utility and the Web Page layout.

So for a system that has two shelves of rectifiers in a 9•across format like this:



The selection should look like this:



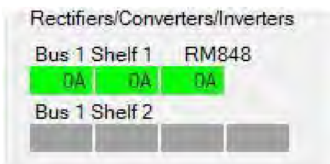
The resultant Monitor page display will look like this:

Note that this shows only 3 rectifiers fitted to two shelves. You can see from the grey boxes that the monitor is “looking” for the remainder of the rectifiers.

If there will only ever be a maximum of 7 rectifiers fitted, as in this Compact system:

Then the selection should look like:

To yield a display like this:



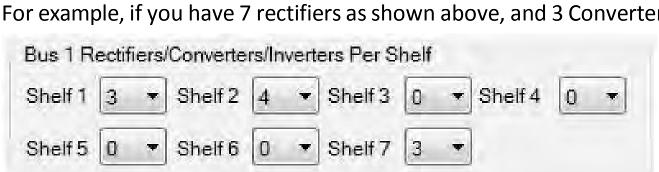
Note that it is important to select close to the real number of rectifiers that will be monitored. This greatly improves the monitor response time so that it does not go "looking" for rectifiers that are not there.

Mixing Rectifiers and Converters

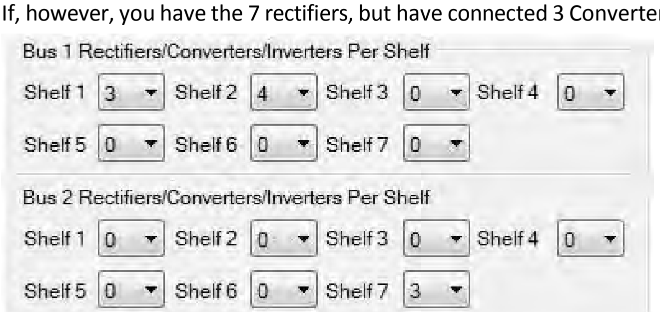
Due to the ability to mix both rectifiers and DC/DC converters on the same communications Bus, the following applies:

- Rectifiers are addressed from the top•right forward and,
- Converters are addressed from the bottom-left backwards.

For example, if you have 7 rectifiers as shown above, and 3 Converters all connected to BUS1, then select the following:



If, however, you have the 7 rectifiers, but have connected 3 Converters to BUS2, then select the following:



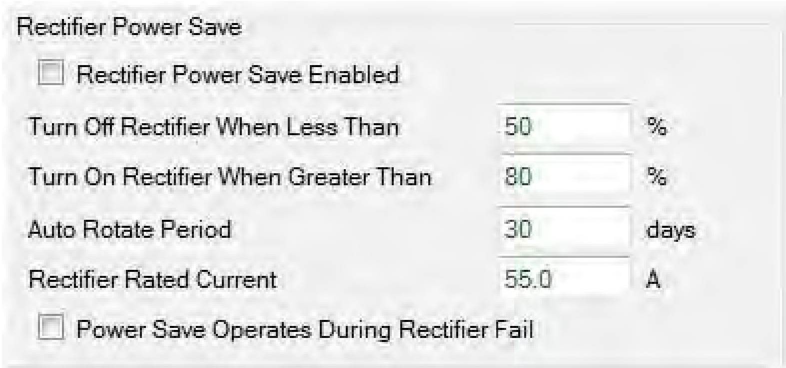
Addressing Problems

If it appears that the SM3x is not "seeing" all of the modules you have fitted, there are a couple of things you can do.

1. Enable all 9 positions on all shelves to see if the missing modules appear.
2. Check the backplane link placement as described in the respective Backplane Manual. Some of the link settings on the

backplanes dictate which position a shelf is in (i.e., whether it is the “top” shelf, or one underneath).

Rectifier Power Save



The default Rectifier Power Save setting is for it to be disabled.

The purpose of Power Save is to make the rectifiers operate in a load area that is near the rectifier’s peak operating efficiency (typically between 50% and 90%).

It operates by sequentially turning off a rectifier (into a cold stand•by state) every minute until the power level (of an individual rectifier) is greater than the “**Turn Off Rectifier When Less Than**” setting.

The percentage is the percentage of the “**Rated Rectifier Current**” entered.

Extra rectifiers will turn back on if the load increases to the “**Turn On Rectifier When Greater Than**” setting.

The Auto Rotate Period will cycle a rectifier off, and another one back on after this period. It does this in a sequential manner to ensure even lifetime operation of the rectifiers.

The “**Power Save Operates During Rectifier Fail**” option does precisely what it states. Without this enabled, if a rectifier fails, then the Power Save mode is turned off.

The minimum number of rectifiers left turned on is 2 so that n+1 redundancy is maintained.

The **Converter Voltage Control** and **Converter Load Share** enabled functions are very similar to the equivalent rectifier settings in the Rectifier Control section.

12V Converter Voltage Setpoint

This sets the output voltage of any 12V output DC/DC Converters.

Once entered, this voltage is stored in the EPROM of each of the Converter Modules attached.

24V Converter Voltage Setpoint

This sets the output voltage of any 24V output DC/DC Converters.

Once entered, this voltage is stored in the EPROM of each of the Converter Modules attached.

48V Converter Voltage Setpoint

This sets the output voltage of any 48V output DC/DC Converters.

Once entered, this voltage is stored in the EPROM of each of the Converter Modules attached.

60V Converter Voltage Setpoint

This sets the output voltage of any 60V output DC/DC Converters.

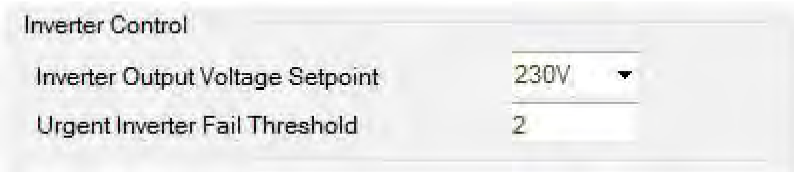
Once entered, this voltage is stored in the EPROM of each of the Converter Modules attached.

Urgent Converter Fail Threshold

This operates in a similar manner to the Urgent Rectifier Fail Threshold in the Rectifier Control section.

Inverter Control

When inverters are connected to your Newmar power system, this is where you set up the inverter



See also the Inverter Settings section of the Power Modules page.

Depending on the version of Inverter fitted to the system (see the Inverter Installation Manual for more information), the selectable output voltages are:

110V

115V

120V

208V

220V

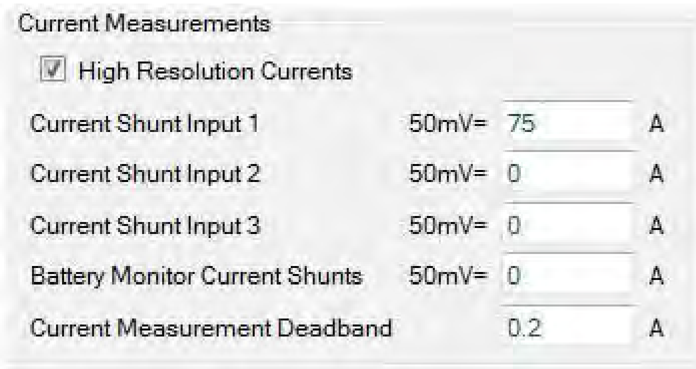
230V

240V

Note that at the time of writing, the inverter series are only available with nominal 48V input.

There are two levels of inverter fail alarms; Inverter Non•urgent Fail and Inverter Urgent Fail.

The number of inverters to fail that will cause an Urgent Inverter Fail alarm is set in the **Urgent Inverter Fail Threshold**.



This is where the system current measuring shunts are set up.
The example you see here is for an Newmar µCompact system where we use a 75A/50mV shunt to measure battery current.
Note that the assigning of the shunt for measuring Battery Current is not done here. That gets set up/assigned in the Input Configuration, under the heading Measurements, “Current Inputs 1 thru’ 3”.

High Resolution Currents

Normal resolution for current measurement is to units of amps.
With high resolution enabled the SM3x measures to accuracy of 0.1A.
Note that if you make the change to enable High Resolution Currents, then if you had a Current Measurement Deadband of 2A, this will change to 0.2A.
Furthermore, if you change the resolution, the actual measurement the SM3x makes is to tenths of an amp, so you will need to change any of the current measurement values in Input Configuration to reflect this. For example, if you had an IF statement dependant on the Input Current 1 being greater than 50A:

With High Resolution Currents enabled you would need to change it to this:

It is recommended that High Resolution Currents only be used for systems with output currents of less than approximately 100A.
In High Resolution mode the LCD will display up to 99.9A, and then auto•range to display, say 101A. However, the Monitor page in the Configuration Utility will continue to display the current to the first decimal place.

Current Shunt Inputs 1 thru’ 3

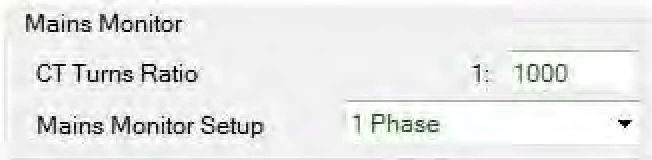
These inputs are physical inputs on the SM3x circuit board.
Simply enter the shunt current ratings here that match the shunt attached to the system.

Battery Monitor Current Shunts

This is the rating of the shunts that are connected to the Battery Condition Monitor. Each BCM card has 8x ±50mV current inputs, and each SM3x can monitor up to 4 BCM cards.
The setting assumes that all shunts connected are of the same rating.
Note that you can access each of the BCM current inputs individually in the Input Configuration (under the heading “Battery Monitors 1 thru’ 4”).

Current Measurement Deadband

This is the threshold below which the SM3x assumes the current is zero.
This is required to prevent nuisance Ahr counting at near zero levels simply due to digitisation/accuracy.
It also prevents odd/unusual current readings at zero load levels such as negative load current readings.



The set•up of the Mains Monitor is relatively simple (see also the Monitor section).

This section is only relevant if you have a Mains Monitor card installed in your system.

When you have a Mains Monitor PCB attached to the system, the AC Alarms are also enabled.

Included below is the Installation Manual of the AC Monitor card.

CT Turns Ratio

This is the turns ratio of the current transformers attached (if fitted).

Current transformers for measuring AC current are optional.

Mains Monitor Setup

Here you have the choice of:

- 1 Phase with Current
- 1 Phase
- 3 Phase with Current
- 3 Phase

Simply choose the setting of the configuration you have connected. If you have current transformers, choose the “with Current” options.

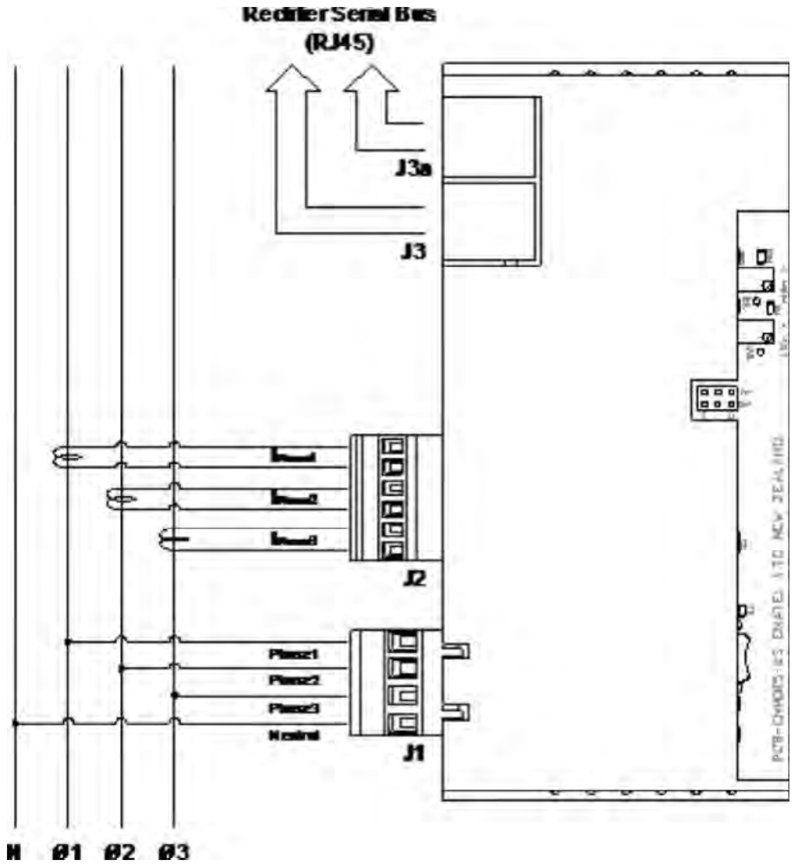
AC Mains Monitor Board Manual

Mains Voltages are present on this module. Care must be taken when working in any area of the AC distribution. The monitor should be mounted inside the AC distribution module and is directly connected to the AC supply. Mounting distance of a least 10mm should be maintained between the module and the system by use of PCB standoffs.

AC Metering Module

The AC Metering Module can be added to theSM3x Supervisory Modules if AC supply metering is required.

There are two choices in set•up. The most simple to set up is to monitor only input voltage and frequency. For this option, simply connect to header J1 as outlined below, and do not connect anything to J2. Secondly, input current can be measured by fitting appropriate current transformers (CTs). In this case connect the CT outputs to header J2.



Connection

Voltage is measured through connecter J1.

- Phase1 is connected to pin 1
- Phase2 is connected to pin 2
- Phase3 is connected to pin 3
- Neutral is connected to pin 4

Current is measured with the AC conductor passing through a current transformer (CT). The outputs of the current transformer are connected to connecter J2.

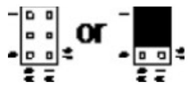
- Phase1 CT is connected to pin 1 and pin 2
- Phase2 CT is connected to pin 3 and pin 4
- Phase3 CT is connected to pin 5 and pin 6

This module is connected to the SM3x via the rectifier serial bus. This should be accessed on the rectifier backplane by connecting connector J3 (or J3A) on the mains monitor to backplane RJ45 connector (see specific manual for backplane connector identifier).

The mains monitor is to be connected to the secondary RJ45 connector of the backplane, using the primary connector to connect directly to the monitor.

For systems which contain backplanes that are fitted with only one RJ45 connector for the rectifier serial bus, the recommended connection is from backplane to J3 of the mains monitor and from J3A of the mains monitor to the SM3x.

For monitoring multiple 3•phase inputs connection of up to 2 mains monitors can be connected to the SM3x.



Address 1 for connection of single or primary AC Monitor

Address 2 for connection of secondary AC Monitor

Note: *if more than one peripheral is to be fitted to the rectifier serial bus then it is recommended to fit a 7•way RJ45 Connector Panel (PSU•ASM•RJ45x7) to keep the connection between the monitor and rectifiers as uninterrupted as possible.*

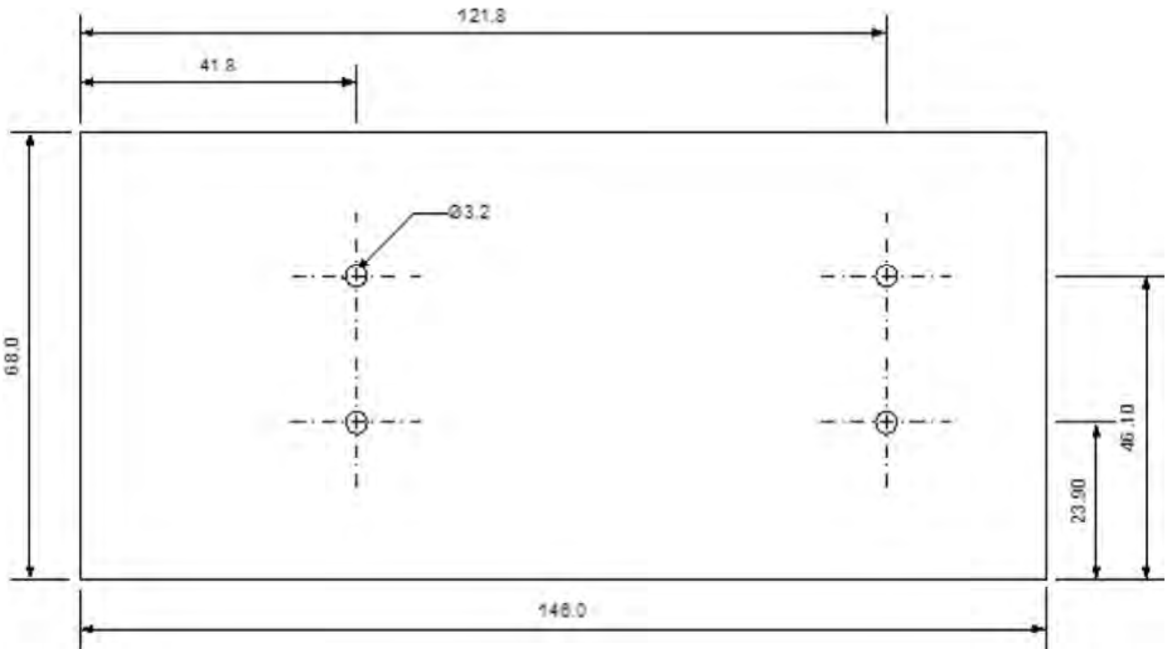
Selecting a Current Transformer (CT)

The AC Metering Module allows for the three individual AC currents to be measured. Each of these inputs has a range 0•100mA so the CT must be chosen to ensure the input current to the module is within this range, e.g. for a maximum peak current of 100A then a CT to measure this should have a minimum 1000:1 turns ratio.

PCB Mounting

The ACM circuit boards should be mounted in the power system in an area that is physically distant from the DC circuitry to avoid any accidental contact.

The mounting hole details are shown in the diagram below:



LVD and Relay Control

This is available on the Control Page:

As mentioned in the LVD Alarms help file, the SM3x can control up to 3 Normally Open or Normally Closed LVD contactors.

It can control up to 2 magnetically latched contactors.

Magnetically latched contactors require no energy to keep them closed or open, only a pulse to make them change state, whereas N.O. or N.C. contactors require permanent energy to keep them in one state or the other.

Hence "**LVD Pulse Control Active**" must be enabled whenever magnetically latched contactors are used. If you do **not** enable this with magnetically latched contactors, and an LVD signal is applied to the contactor, you will burn out the coil.

Due to the stability and security of operation of magnetically latched contactors, Newmar uses them on their systems on preference to Normally Open or Normally Closed contactors.

Note that, in most Newmar systems, the SM3x is kept powered even after the battery LVD may have opened.

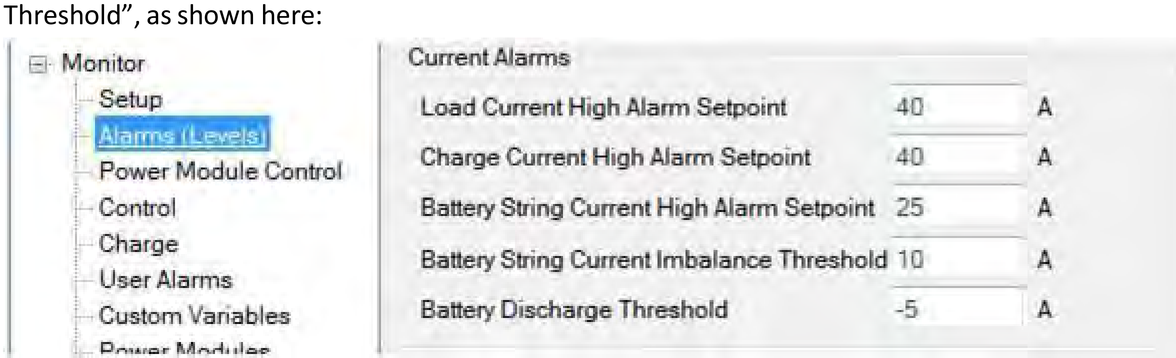
The **LVD Pulse Width** is the length of time the LVD contactor will receive its "open" or "close" pulse.

Magnetically latched contactors typically switch in less than 100msec, so the pulse is usually set between 200 and 500msec.

The **Relay Operating Delay** applies to the volts•free alarm output relays. This is the amount of time an alarm signal must be present before the relay changes state.

The **LVD Timeouts** give the user the option to open an LVD contactor based on time rather than voltage (or both).

The time entered here is the amount of time after a discharge is detected before the LVD is opened. A discharge time trigger starts when the battery current exceeds the value entered in the Current Alarms "Battery Discharge Threshold", as shown here:



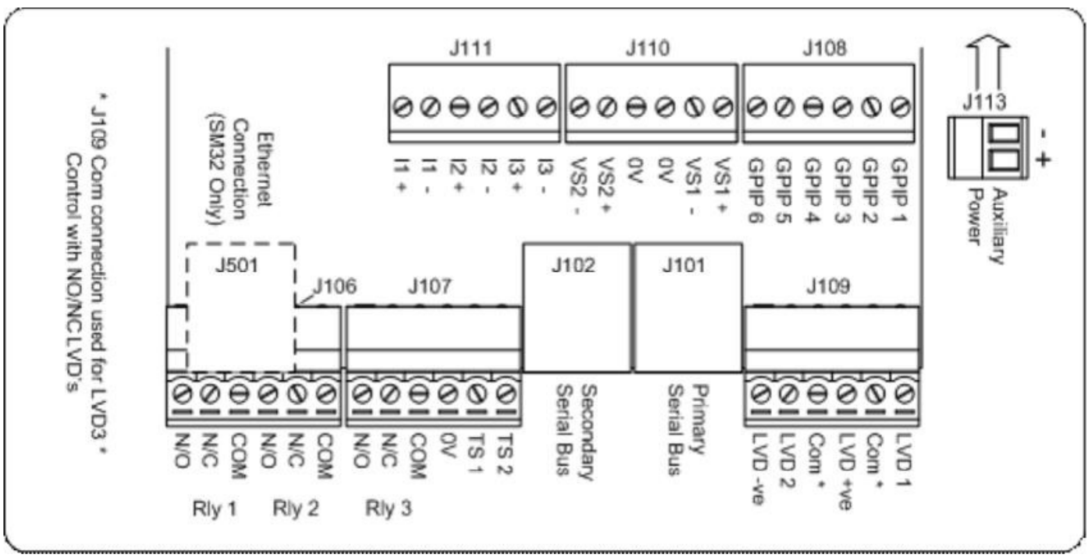
General Notes on LVD Set-up

The SM3x series of controllers uses FETs to switch the LVD contactors. This makes them very versatile and robust (as opposed to using relays) as they can switch relatively large currents and the body diode acts as a back•EMF snubber.

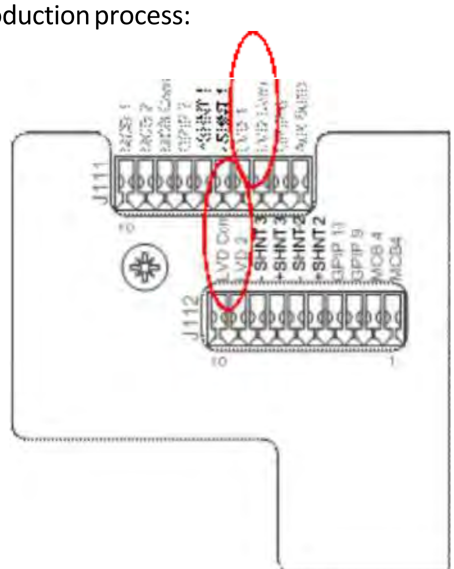
The use of magnetically latched LVD contactors enables the use of contactors with just one coil voltage rating. For example, we use a 30V coil in all systems rated from nominal 24V (due to the low pull•in voltage) up to 60V. As the coil rating is actually determined by the heating effect of current through it, we can use the 30V coil up to 60V because the operating pulse is very short so the heating effect is negligible.

Consequently the Newmar SM3x controller can be used in all systems, from the micro•compact (with load currents of just a few tens of amps), to large systems (with load currents of more than 1 or 2 thousand amps), without the need for slave relay drivers.

The SM31/32 has the LVD driver terminals arranged at the rear of the monitor, utilising 1.5mm^2 plug•in screw terminals (J109), as shown here:



The SM35/36 utilises MTA100 headers due to their small size and the fact that these connections are normally configured at the Newmar factory, and the MTA headers lend themselves to a more reliable and repeatable production process:



This area sets all of the system level current & power limits.

This is **not** the same as setting the Rectifier Current Limit. This is set in the Power Modules section.

Note that with any of these functions enabled, the bus voltage will ramp up slowly. This is so that the SM3x can detect the onset of current/power limit without overshoot (due to the non•linear nature of battery recharge current versus voltage).

Power limiting is done as a product of system current & voltage, so that the Current Limit is changed as the bus voltage changes.

Battery & System Current Limit is performed by lowering or raising the system bus voltage to achieve the desired target.

Caution: Note that if the system/battery current is to be lowered, then the bus voltage is lowered. Thus, in a system where a **constant power** load is limiting output, then as the bus voltage **decreases**, load current **increases**. Therefore in a system where the constant power load is triggering the System current/power limit, the System Current/Power Limit will **not** work. This is extremely important because if the system is limited like this, then the bus voltage will lower, flattening the battery, and ultimately causing the LVD to open, thus crashing the whole load (if Current Limit Minimum Voltage is not set correctly). In these applications, do **not** enable System Current or Power Limit.

It is possible to have all of these limits enabled at once; however it is more usual to just have one of them enabled.

In certain applications (mainly Hybrid applications) it may be desirable to have both Battery Charge Current Limit and one or other of the System Current or Power Limits enabled.

Current Limit Minimum Voltage

As described in the note above, current & power limiting operate by lowering bus voltage.

Therefore, set this value to a level that is **higher** than the LVD trip threshold to guarantee that abnormal operation of the current limit does not cause complete system failure.

Current Limit Hysteresis

As the bus voltage decreases to achieve the target Current Limit this hysteresis is applied to prevent “hunting” around this set point.

For example, if a battery size is 100Ahrs, and the Battery Current Limit is set to 25%, then the target current is 25A – 1A hysteresis, making it 24A.

This setting is usually only relevant in larger systems with larger batteries where a small increase in voltage results in a large increase in battery current.

The default setting is 1A, however, in larger systems (with batteries of say, >1000Ahrs) this can increase to 5 or 10A, or about 1% of the total battery Ahrs.

Current Limit Step Size

This is the voltage step that the SM3x will reduce the bus voltage by as soon as one of the Current/Power Limits is exceeded. This should immediately cause the over•current situation to cease.

The SM3x will then increment the voltage in smaller steps so that the current/power threshold can be carefully controlled.

This setting is useful during Hybrid control set•up where it may be desired to reduce generator load by smaller amounts rather than a large step change. This can help prevent generator over•run/over•speed.

Battery Charge Current Limit

This is set as the percentage of the C_{10} amp•hour rating of the battery as entered in the Battery Capacity section of the Charge page.

For example, if the total battery capacity is entered as 525Ahrs, then if this is set to 25%, then the Battery Current Limit will be 131A.

Newmar recommends that you set the Battery Charge Current Limit value at the highest rate possible to ensure the battery is recharged as fast as possible (this could be as high as 30%, depending on the manufacturer). However, especially in large systems, this may be more limited by the number of rectifiers available, rather than this particular setting. For telco settings, this is often set to 10% (or $0.1C_{10}$, so for a 100Ahr battery, the current limit is 10A). This is more typical of a design parameter than the need for the setting to be at this level. So a setting higher than this level should be considered to enable the fastest recharge possible. However, consult the battery manufacturer data to find the maximum value.

The Newmar default setting is 25%.

System Current Limit

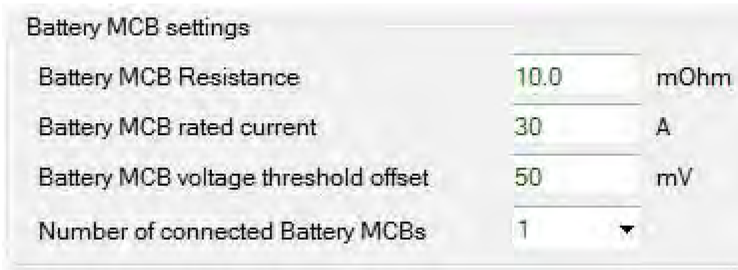
The SM3x will lower the bus voltage to try to achieve this setting. Hence with a constant power load you must use this with great caution (see the Caution note above).

In Hybrid systems with Generator Control enabled, the System Current Limit may be set dynamically as the SM3x determines that the generator may be approaching its maximum power output capability.

System Power Limit

This operates similarly to the System Current Limit, except that the system output is set as a product of system output current and bus voltage.

Thus input power (or load on the generator) can be controlled at a constant value thereby optimising its output capacity.



This is built•in electronic breaker/fuse fail detection for up to 4 battery breakers/fuses. These settings are only available on the SM35/36 series of controllers.

However, with the SM31 thru' SM34 controllers, the detection is either via auxiliary contacts on the breakers/fuses, or via voltage detection over the breaker/fuse with a fail detection routine in the Input Configuration.

The data here is usually entered at the Newmar factory and should not require adjustment.

Battery MCB/Fuse Fail Detection Logic

The fail detection routine works by detecting voltage drop across the circuit breaker.

However, with a battery fuse/breaker it is possible to have the breaker turned off and thus have almost the same voltage across the breaker. This is especially true of batteries that have been on float charge for a long time. Therefore it is logical that it would be good to detect a very small voltage across the breaker, maybe 50mV. However the problem with this is that as the battery current increases there could be a voltage drop of similar value across the breaker due to its ohmic losses.

In order to avoid this, the routine increases the detection voltage as the battery current increases. The required parameters to make this work are then:

Battery MCB Resistance

This is the fuse/breaker resistance and can be calculated from the fuse/MCB manufacturer's data with respect to the power dissipation at full current.

For example, if you have a 63A breaker and the manufacturer's data states the power dissipation at full current is 5 watts, then the MCB Resistance value is 1.25m0.

To increase the current dependency to prevent nuisance alarms, then increase this value.

Battery MCB Rated Current

This is the label rated current of the breaker/fuse.

Battery MCB Voltage Threshold Offset

At zero battery current, when the voltage drop over the fuse/breaker exceeds this value, then a Battery Breaker Fail alarm will be raised.

If you are experiencing false Breaker Fail alarms when battery current is zero, then increase this value. Note that increasing this value will mean that you may have to wait longer for a Breaker Fail alarm to appear if the breaker is simply turned off (as opposed to tripping due to a short circuit or over•current).

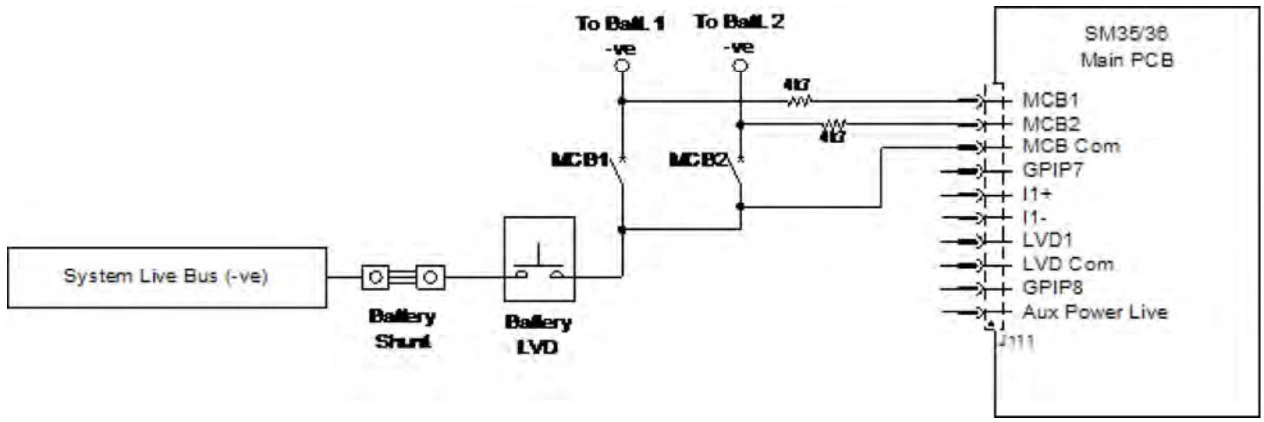
As battery current increases, then the calculation to proportionally increase this threshold comes into play.

Number of Connected Battery MCBs

This is simply the number of battery fuses/breakers connected (maximum of 4).

The sensing wires are connected to the dedicated inputs MCB1 thru' MCB4 on the SM35/36 circuit board.

Shown here is a typical connection for a 2 battery system:



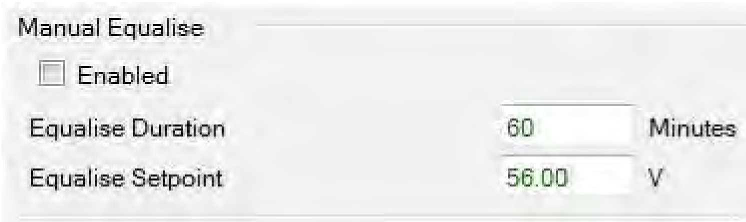
This function gives the ability to elevate the bus (& thus battery) voltage on a periodic basis. This may be used to ensure a full state of charge of the battery.

The settings are self explanatory and should be set in conjunction with consulting recommendations of the battery manufacturer.

See also:

Manual Equalise

Fast Charge



This is a simple function that will elevate the bus voltage to the level entered in the Equalise Setpoint field.

The time that the Equalise will stay active is set in the Equalise Duration field.

The Manual Equalise is activated as soon as the check•box is enabled (i.e., no “Write” command is required). This function is often used as an initialise charge when the batteries are new. If batteries have been in storage for some time many manufacturers recommend that the batteries are charged at an elevated voltage for some time when first powered up. This period can be up to 72 hours depending on the state of charge of the battery (see the battery manufacturer’s data/recommendations before setting this value).

This feature aims to reinstate the batteries to the fully charged state as quickly as possible after a discharge, without damaging the batteries.

When Fast Charge is enabled the monitor measures any battery discharge, recording the amp hours. When the recharge begins it raises the float voltage to a higher level until the total discharged amp hours has been returned to the batteries plus a percentage.

Fast Charge, once activated, will remain active until the Recharge capacity has been returned to the battery or the Fast Charge time limit expires.

Fast Charge Setpoint

This is the target voltage that the SM3x will aim for during the Charge session.

Set this value to that recommended by the battery manufacturer (usually between 2.3V/cell to 2.4V/cell (55.2 and 57.6 for 48V systems) at 25°C).

Battery Capacity Threshold

This is the battery capacity that if the battery gets below during a discharge, the SM3x will initiate the Fast Charge when AC power is restored.

For example when set at 90%, if you have a 400Ahr battery, and you have a discharge event that takes out 36Ahrs (i.e., say 9A for 4 hours), then when AC is restored the Fast Charge will **not** be activated. However, if the discharge is a 40.4Ahrs (i.e., say 10.1A for 4 hours), then when AC is restored the Fast Charge routine **will** be activated.

Fast Charge Time Limit

This is the maximum time after AC is restored that the Fast Charge routine will run for.

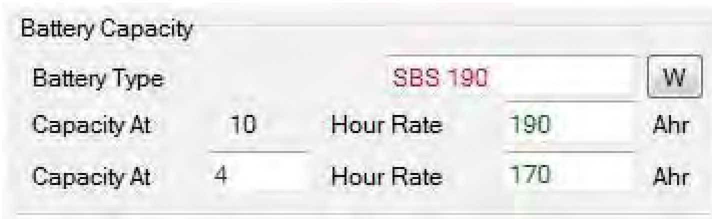
Set this as per the battery manufacturer's recommendations.

Recharge

If the Recharge amount is reached before the Fast Charge Time Limit elapses, then the Fast Charge routine will cease.

The Recharge amount is the percentage of the Ahrs taken out of the system during the last discharge.

For example, if this setting is 110%, and if 50Ahrs is taken out of the battery, Fast Charge will continue until 55Ahrs is put back in (unless the Time Limit is reached first).



The Battery Capacity area on the Charge page is where the essential battery information is entered.

The battery capacity remaining is displayed as "Battery Capacity" on the Monitor display page.

Battery Type

This is a new field made available on SM3x Configuration Utility Version 5.0 onwards (coordinated with SM3x Main firmware release Version 26 onwards).

Enter the battery type/model here. This information will then be visible when viewing the system remotely via the web page.

Capacity at 10 Hour Rate

Enter here the nominal battery capacity as stated by the manufacturer for the 10 hour rate of discharge (usually the capacity on the label).

This is the **total** Ahr capacity of all the strings connected in parallel in your system (i.e., 4x 150Ahr strings = 600Ahr).

Capacity at x Hour Rate

Refer to the battery manufacturers data, and enter here the Ahr capacity of the battery at a pre•selected rate (usually between 2 and 6 hours, depending on the expected battery back•up time).

This rate is required so that SM3x can make an estimated back•up time prediction based on Peukert's equation (see the SM3x Manual for details).

This rate must be within the expected range or you will not be able to Write the figures into the monitor.

After some minutes of discharge, the estimated time remaining is displayed on the Monitor page.

Temperature Compensation of battery float charge is highly recommended to maximise the life of sealed lead•acid batteries.

Ticking the check•box will immediately enable the Temperature Compensation function.

Note that from Version 5.0 of SM3x Configuration Utility it is now possible to control the output voltage of DC/DC converters to also have the Temperature Compensation function.

Temperature Slope Compensation

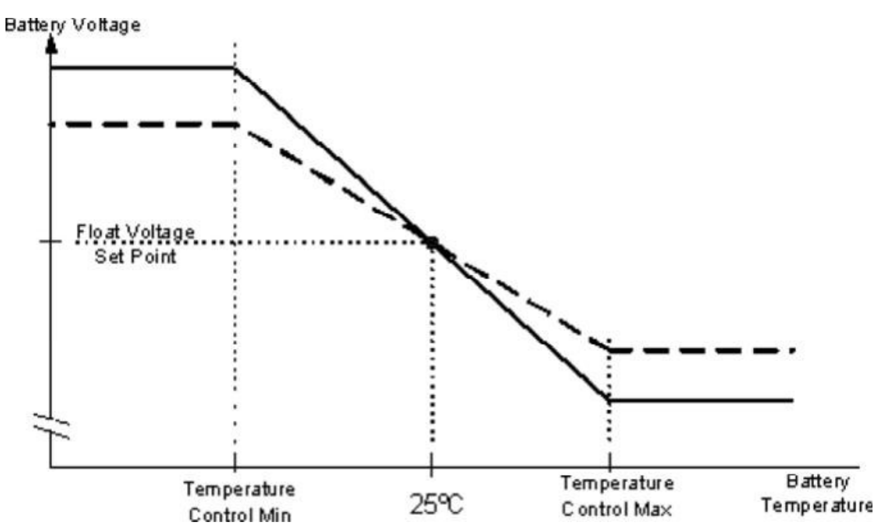
As temperature increases, the float voltage is decreased by this amount (see diagram below).

Note that the reference temperature for the SM3x is **always** 25°C.

For example, for the above settings, if the temperature is 30°C, then the voltage offset will be 24cells*5°C*•3mV = •360mV.

If the float voltage setting was 54.0V (i.e., 54.0V at 25°C), then you will observe the float voltage will be 53.64V.

Consult the battery manufacturer's datasheet to enter the correct values.



Temperature Min & Max Control Limits

These are the temperatures beyond which the voltage will no longer vary. Between the two control temperatures the voltage relates linearly to the temperature (see diagram above).

Number of Cells

These are the number of 2V cells connected in series to make up the battery string.

Typically:

Nominal Voltage	# Cells	Float Voltage at 25°C
24V	12	27.0V
48V	24	54.0V
60V	30	67.5V
108V	54	121.5V
120V	60	135.0V

The battery test function operates by lowering the rectifier output voltage, **not** by turning the rectifiers off.

In this manner, should a battery be in bad condition (or even not fitted at all), then the system will not crash.

The battery test will simply run until the bus voltage reaches the Termination Voltage shown here, and then the rectifier output voltage is returned to float, and a Battery Test Fail alarm is raised.

Note that a battery test of this nature can only ever give a rough indication if a battery is “bad”. This is due to the fact that the discharge is into the standing load on the system, whatever that may be at the time of the test – which may be hard to define, and also the test should only every be “shallow” so as not to compromise the battery capacity in the event of a real AC grid failure soon after a discharge test. A battery can often appear to be holding up well until it is maybe ½ to 2/3rds discharged, and then collapse, so a test of this nature will not normally catch this.

Manual Battery Test Enable

As soon as this check•box is ticked, the Battery Test will commence (i.e., there is no “Write” command, a check•box command is written immediately to the SM3x).

Battery Test Duration

This is the period of time the test will run for if the Termination Voltage is not reached first.

Should the Termination Voltage be reached **before** the Test Duration finishes, the Battery Test will cease, and the Battery Test Fail alarm is raised.

Battery Test Lockout Period

This is the period of time **after** a Battery Test has ceased before you can perform another Battery test. This prevents the battery being run too flat so that if a real AC outage occurs, there will still be sufficient reserve to power the system for a reasonable time.

It is possible to over•ride this function by **not** checking the next check•box (Battery Test Lockout Active).

Battery Test Lockout Active

Check this box to enable the Battery Test Lockout Active control. This prevents the battery being run too flat so that if a real AC outage occurs, there will still be sufficient reserve to power the system for a reasonable time.

Cancel on Symmetry Alarm

If this is enabled, **and** you have Battery Condition Monitoring of any sort enabled, then if a Battery Cell Voltage Symmetry alarm occurs, the Battery Test will cease, and the Battery Test Fail alarm will be raised.

The Battery Symmetry threshold is set in the Voltage Alarms section.

Clear Battery Test Alarm Button

Clicking this button will clear any Battery Test Fail Alarm that is current.

By its nature, a Battery Test Fail Alarm must be a latching alarm, and therefore requires a specific action to clear it.

Periodic Battery Test Enable & Periodic Battery Test Interval

A Battery Test can be set to occur every number of days entered in the Periodic Battery Test Interval field.

Next Periodic Battery Test

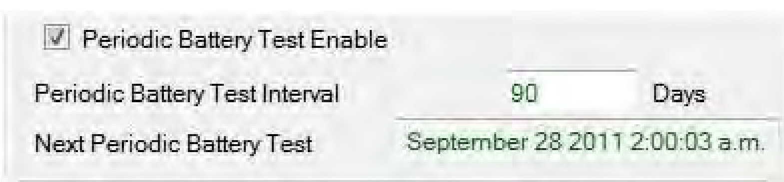
When you enable a Periodic Battery Test, the number of days you have entered is added directly to the clock in the SM3x (see Real Time Clock).

This field cannot be directly written to.

If you require the time to be different to the present time you are at, then go to the Real Time Clock and set it to the time of day you need the test to occur (for example, in the middle of the night, maybe 2:00am).

Then disable and re•enable the Periodic Battery Test, and refresh the page.

The time will then be as required, as shown in this example:



Then go back and re•set the time to the actual time (probably by setting to your PC time).

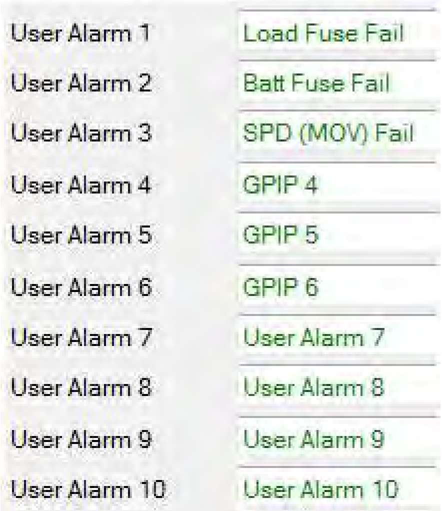
User Alarms

User Alarms are made available for the customisation of alarms specific to the customer's requirements (that may not already be available).

32 User programmable alarms are made available.

The User Alarms can be called anything the customer wants, with a maximum of 16 characters.

The default setting is to label the first User Alarms as the GPIPs (General Purpose Input alarms), as shown here for the SM32:



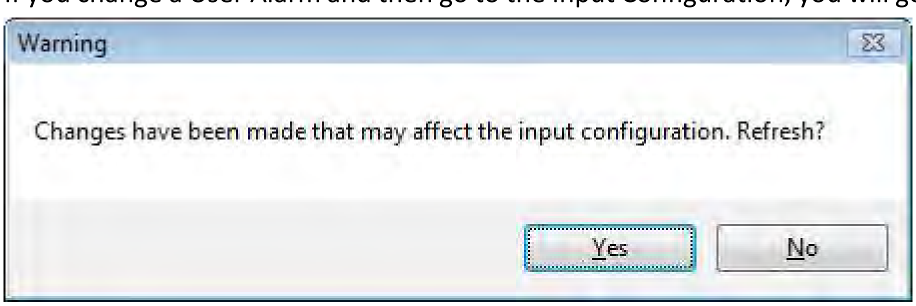
User Alarm 1	Load Fuse Fail
User Alarm 2	Batt Fuse Fail
User Alarm 3	SPD (MOV) Fail
User Alarm 4	GPIP 4
User Alarm 5	GPIP 5
User Alarm 6	GPIP 6
User Alarm 7	User Alarm 7
User Alarm 8	User Alarm 8
User Alarm 9	User Alarm 9
User Alarm 10	User Alarm 10

Note that in this example the Load & Battery Fuse Fails and the SPD Fail alarms are connected to GPIPs 1, 2 & 3. It is only as a matter of convenience that they are assigned here to User Alarms 1, 2 & 3, they could equally as well have been assigned to User Alarms 7, 8 & 9.

It is actually in the Input Configuration that the SM3x is told exactly which physical input the alarm originates from:

The main thing to remember is that it is best to assign the User Alarm names **first**, and then program the Input Configuration (this is because the alarm names are made available directly in Input Configuration).

If you change a User Alarm and then go to the Input Configuration, you will get a prompt:



When you click "Yes", you will note that the Input Configuration will also reflect these changes.

Here is the default setting for the SM35/36 User Alarms:

User Alarm 1	GPIP 1
User Alarm 2	GPIP 2
User Alarm 3	GPIP 3
User Alarm 4	GPIP 4
User Alarm 5	GPIP 5
User Alarm 6	GPIP 6
User Alarm 7	Load MCB Open
User Alarm 8	LVD Fail
User Alarm 9	User Alarm 9
User Alarm 10	User Alarm 10

Note here that the first 6 User Alarms are simply labelled GPIP 1 thru' GPIP 6. Once again, these are labelled as a matter of convenience so the user can easily re-assign/re-label the alarms as required. The User Alarm labels **do not** have to match the GPIP inputs.

Note also that User Alarms 7 & 8 are labelled as Load MCB Open and LVD Fail. This is because they are wired to GPIP 7 & 8 on the SM35/36. GPIPs 1 thru' 6 on the SM35/36 are intended to always be available for the customer to wire to, so extra GPIPs were made available with these monitors to cater for internal alarms such as Load MCB Fail & LVD Fail.

With the SM35/36 you will also see here that there is not Battery MCB fail assigned to any of the User Alarms. This is because there is dedicated circuitry and software for this purpose that detects the (potentially) small voltage drop over a battery circuit breaker. See the Battery MCB Settings on the Control page for further information on this.

Custom Variables

Custom Screen Variables are a way for users to display and log analogue inputs from peripheral devices (such as an extra I/O Card) and/or values that result from calculations in the Input Configuration (these are in the "User Variables" section) on the Monitor page and the SM3x LCD screen.

For a Custom Variable to appear, it **must** be declared in the Input Configuration section.

Once it is declared, then it automatically appears on the SM3x LCD screen.

Up to 16 Custom Screen Variables can be used.

Differences in SM3x Configuration Utility V5.0

Previous versions of SM3x Configuration had 20 User Variables available plus a "Custom Screen Variable". As applications have increased, it has become evident that there needs to be a way of displaying more than one User analogue variable.

This is now done by making 16 User Variables available called "Customer Screen Variables" 1 thru' 16.

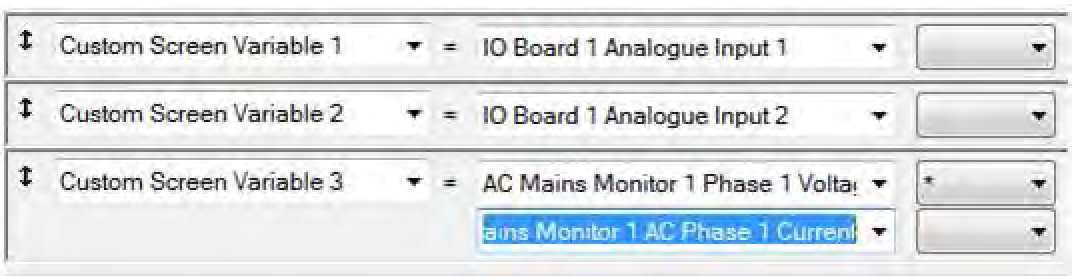
As a result you will find that Version 5.0 or greater of the Configuration Utility has 10 User Alarms, plus 16 Customer Screen Variables.

These Custom Screen Variables can now be logged in the event/periodic system logs, whereas previously it was not possible to log any User Variables or I/O Card, or BCM card values (excepting the actual BCM log).

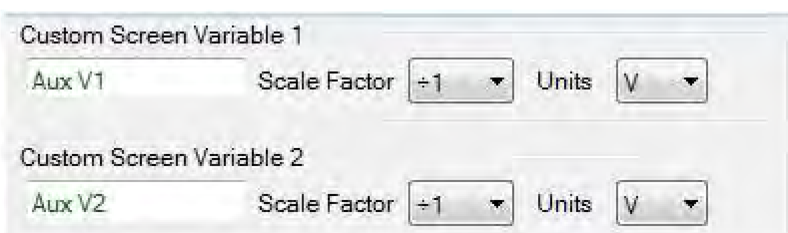
For more information about the Custom Screen Variables, please see the Custom Variables help file.

Examples

The following shows Custom Screen Variables 1 thru' 3 set up (declared) in Input Configuration:



Here you see that Custom Variables 1 & 2 will directly display the readings from the I/O board, inputs 1 & 2. If, for example these were measuring auxiliary voltages, then the Custom Screen set-up would look like this:



Custom Screen Variable Label

The Custom Screen Variable label is limited to 9 characters so that it can be displayed in the SM3x LCD.

Custom Screen Variable Units

You have a choice of the units displayed against the Custom Screen Variables.

The pre-defined units are A, V, °C, % and kW.

If these are not appropriate, you can leave that field blank (& maybe write the units into the Custom Variable Label).

Example Measuring Input Power

In the above example Custom Screen Variable 3 will theoretically display the input power from phase 1, as it is a product of the AC Monitor card phase 1 voltage and phase 1 current (for this to occur, of course you need the AC Monitor card fitted to the system with a CT to measure the AC phase 1 current).

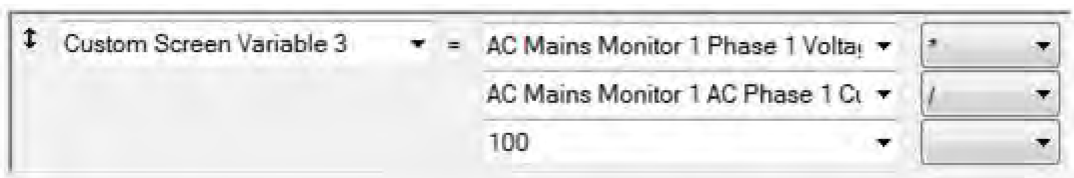
However, note that when accessing analogue values from various inputs, you must check the units that the number arrives in (see the SM3x Numeric Processing section of Input Configuration for a full list of analogue input units). In this particular example, AC volts are measured to 0.1V, so if 232V were measured, the actual number pulled into the Input Configuration is 2320. The units of current are in whole units of amps (so if 13A were being measured, the number is 13). So in this example of 232V and 13A, the resultant number will be 2320*13 = 30,160. The actual power in watts is 3,016 (3.016kW). So to display the number in kW, you will need to divide the number by 10,000.

You have a choice of where to perform the scaling. You can either scale it in Input Configuration, or scale is in the Custom Variables page. Bear in mind that scaling in Input Configuration truncates the value (i.e., it is not rounded) so that if a number is 2328, dividing it by 10 will return the number 232. This can introduce measurement errors, so if possible, scale it on the Custom Screen Variables page. However, the maximum division possible on the Custom Screen Variable page is 100. So in this example you need to use a combination of dividing the number in Input Configuration and on the Custom Screen page.

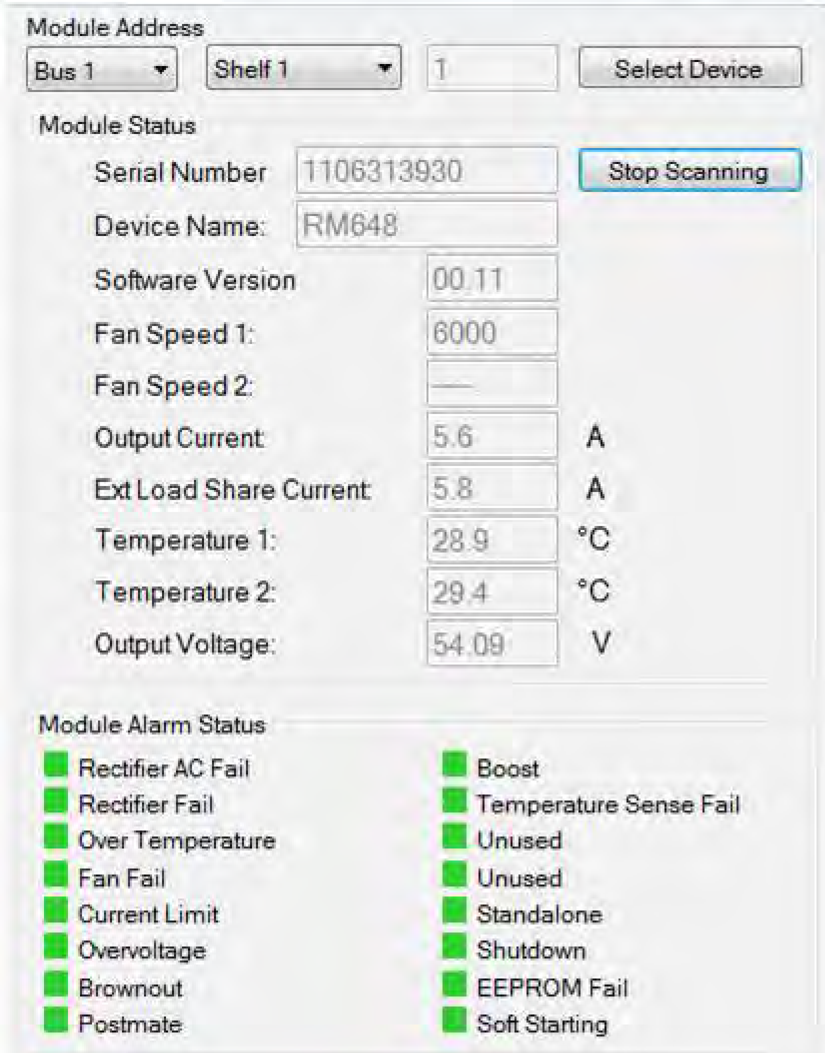
Always divide the number by as much as possible on the Custom Screen page, and do the rest in Input Configuration to minimise truncation error.

For this example, you would divide the Custom Screen Variable by 100 as shown here:

And then you would scale the rest (divide by another 100) in Input Configuration as shown here:



Power Module Status



This details all of the measurable parameters of specific to a rectifier or converter module.

Note that if an inverter is being addressed, the page changes to show the relevant inverter parameters and alarms.

As you can see from the screen-shot, the module serial number, software (firmware) version etc., are visible here. To view a different device, simple click on Select Device, or navigate to a module by clicking on the Bus and Shelf number, and the Device number.

Fan Speed

This is the Fan Speed in terms of RPM. A number of different fans are used in the Newmar Rectifier & Converter modules, so there is no definitive number that defines the maximum speed of the fan. The rated maximum fan speeds vary between 7,000 and 13,000 RPM ±10% depending on the model.

The RM3xxx (3kW) series of rectifiers have two fans, hence the two fan speeds.

Output Current

This is the actual output current of the module.

External Load Share Current

This is the average load current of all the rectifiers in the system so represents the Load Sharing target current.

Temperature 1

This is the internal temperature of the module.

Temperature 2

This is the temperature in the module measured immediately behind the fan, so represents the air intake temperature. You will find it is typically a few degrees above the ambient air intake in front of the system.

Output Voltage

This is the actual output voltage of the module as measured at the output terminals.

Module Alarm Status

These are the possible internal alarms that the module reports on to the SM3x. Most are self-explanatory, but a few a worthy of further explanation:

Note that a **Rectifier AC Fail** will always cause a **Rectifier Fail** alarm as well. This is because it is not possible to distinguish between an AC failure and a true rectifier failure as by its nature, an AC failure causes the rectifier circuitry to go “dead”.

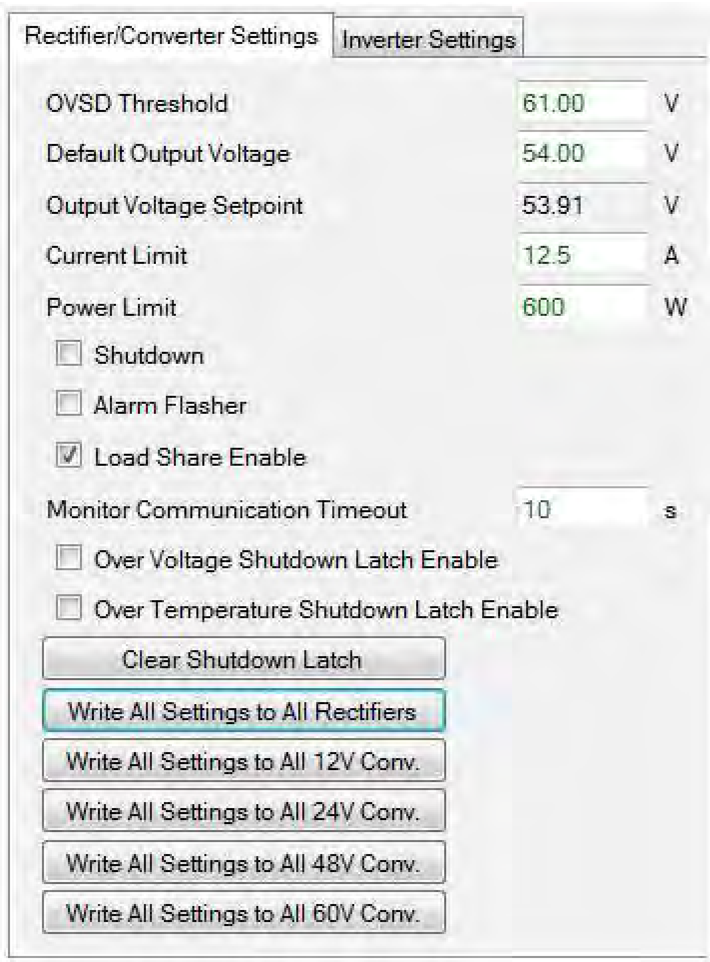
Overvoltage refers to output overvoltage, not input overvoltage.

Brownout refers to the case when the AC input drops to a level that would cause the module to limit its output power. At full power this is 175V. At lower power, the voltage at which this occurs will lower. So if the AC voltage is 110V, then brown-out will occur if more than 1260W is drawn on the DC output.

Postmate. The rectifier is “hot plug” capable. This is achieved by having one pin on the rear connector that mates after the other pins. This pin must be connected to negative bus volts and the rectifier will not start until this pin engages. If a rectifier will not start, ensure the rectifier is fully engaged in the Goldfish connector in the rectifier shelf.

Softstarting occurs whenever a rectifier starts up. It refers to the process during which the rectifier is ramping up its output current (& hence power) to provide a slow power ramp-up to an AC source such as a Generator.

Rectifier/Converter Settings



In this area all the core settings of for the Rectifier/Converters are made.

As the settings here are written directly to the Rectifier/Converter modules, this section does not work in the “Offline” mode (see the Save & Restore section for details on accessing Offline mode).

Note that settings on this page are **not** saved in the .sm3x Configuration File as these are settings stored in the power module itself.

OVSD Threshold

This is the DC output Over Voltage Shutdown voltage threshold.

If any rectifier senses the bus voltage going over this threshold, it will shut down. This threshold is primarily designed so that if a rectifier loses voltage control and its output voltage goes high, then it will shut itself down.

Any rectifier trying to increase its voltage (relative to all the rest of the rectifiers) will supply as much current as possible – i.e., it will go to full load. So as a means to detect which rectifier is causing the Over Voltage, a slope of -0.5V from no load to full load is implemented. So that if the OVSD Threshold is set to 60V, then if a rectifier is at full load, its OVSD point will be at 59.5V.

Default Output Voltage

This is a different setting to the Float Voltage (set in the Rectifier Control section).

This is the voltage the rectifiers will go to if communications are lost with the SM3x. If the Rectifier/Converter module loses communications with the SM3x for more than the time allowed for in the Monitor Communication Timeout, then the module will revert to this Default Output Voltage.

Output Voltage Setpoint

This is the target voltage the SM3x is telling the rectifiers to set to.

For example, if Equalise is enabled with a voltage of 57.6V, then this reading will be 57.6V.

Current & Power Limit

These are the maximum current or power levels that the rectifier will be allowed to output.

These settings are usually set to the maximum ratings of the rectifier (e.g., for the 2kW output RM2048 series, Current Limit is 41.7A, and Power Limit is 2000W).

The rectifier will limit to whichever of these is greater.

For example, for the RM2048, if the bus voltage is 54.0V, then the maximum power will be the over-riding limit, and you will see the rectifier start to power limit when the output current is >37A (37*54 = 2kW).

If the bus voltage is < 48V, then the current limit will start limiting at 41.7A (=2kW) and is the over-riding limit.

If Bus voltage is >48V, the Power Limit is the over-riding limit.

Shutdown

If you tick this check-box, the module that is currently being addressed (see Power Module Status) will be shut down.

Alarm Flasher

If you tick this check-box, the module that is currently being addressed will flash its orange LED. This can be used in large systems to positively identify the module you are looking at.

A remote user connected via a web browser may also use this to positively identify the module they are looking at while in contact with someone at site.

Load Share Enabled

This enables the module-to-module load sharing feature (it operates independently from the Monitor Load Share – see Rectifier Control section of the Power Module Control page).

The Rectifier Load Share must be enabled (which is default) before the Monitor Load Share will operate.

The accuracy of Rectifier Load Share is typically ±5%, whereas the accuracy of Monitor Load Share is ±2% (and typically much better than this).

Monitor Communication Timeout

This is the time beyond which the modules will revert to their Default Output Voltage if the rectifier has lost communications with the SM3x.

Over Voltage Shutdown Latch Enable

It some cases it is required that if a module shuts down due to an OVSD command, then it stays latched off until either the module is replaced, or a technician can investigate the cause of the OVSD event, and then re-starts the module. In this case the OVSD Latch Enable must be ticked.

To re-start the module and/or clear the alarm, simply click the Clear Shutdown Latch button.

Here is an example of what you might see on the Monitor page with an OVSD alarm:

Double-clicking on the module icon will take you directly to this page (the Rectifier/Converter Settings area), where you can reset/clear the alarm.

Over Temperature Shutdown Latch Enable

It some cases it is required that if a module shuts down due to over temperature, then it stays latched off until either the module is replaced, or a technician can investigate the cause of the over temperature event, and then re-starts the module. In this case the Over Temperature Shutdown Latch Enable must be ticked.

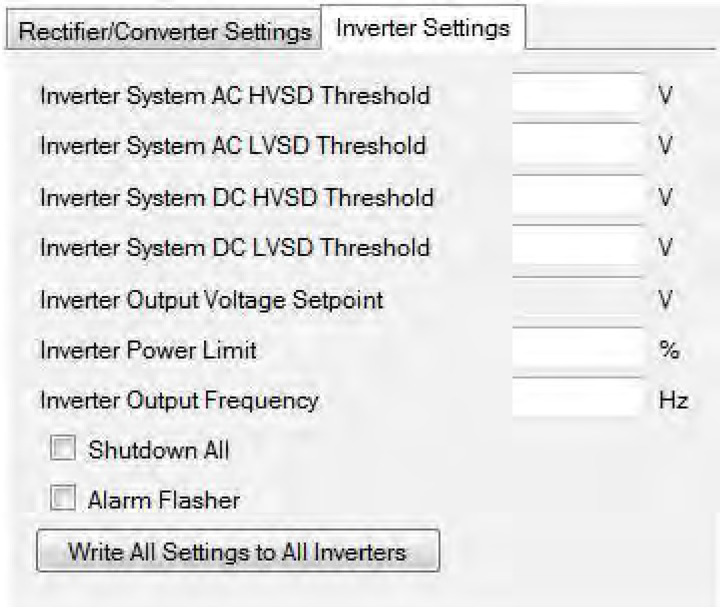
Write All Settings

Note that if you make any changes in this section **without** Writing to all modules, then those changes will only apply to the module that is currently being addressed.

It is **highly** desirable that all the modules have all the same settings (if not you may get spurious alarms and certain modules looking as if they are miss-behaving).

So once you have made any changes you would like, simply click the appropriate “Write All Settings….” button to commit those settings to the EEPROMs of all of the modules.

Inverter Settings



See also the Inverter Control section of the Power Module Control page to set the Inverter output voltage, and Inverter System Manual for more information.

Note that settings on this page are **not** saved in the .sm3x Configuration File as these are settings stored in the power module itself.

Inverter System AC HVSD Threshold

This is the inverter output High Voltage Shutdown threshold above which the Inverter will shut down and the Static Bypass (if fitted) will go to Mains bypass.

Inverter System AC LVSD Threshold

This is the inverter output Low Voltage Shutdown threshold below which the Inverter will shut down and the Static Bypass (if fitted) will go to Mains bypass.

Inverter System DC HVSD Threshold

This is the High Voltage Shutdown threshold above which the Inverter will shut down and the Static Bypass (if fitted) will go to Mains bypass.

Inverter System DC LVSD Threshold

This is the Low Voltage Shutdown threshold below which the Inverter will shut down and the Static Bypass (if fitted) will go to Mains bypass.

Inverter Output Voltage Setpoint

This displays the Inverter output voltage set-point as entered in the Inverter Control section.

Inverter Power Limit

The output power of the Inverter can be limited here to a percentage of its maximum. A percentage value is used as this then relates the same to kVA as kW.

Inverter Output Frequency

This sets the Inverter output frequency. It must be either 50Hz or 60Hz.

Shutdown All

This shuts down all Inverters. In this case if a Static Bypass is fitted, it will revert to Mains bypass.

Alarm Flasher

Similar to the rectifier alarm flasher command. It will cause the yellow LED on the front panel of the inverter currently being addressed to flash. This is so you can be sure you are talking to the correct Inverter module, plus is a check that the communications is operating correctly with the Inverter.

Write All Settings to All Inverters

If you make any changes to the settings, you will probably want to make those changes to all the inverters. This button performs that task.

Bootloader

Introduction

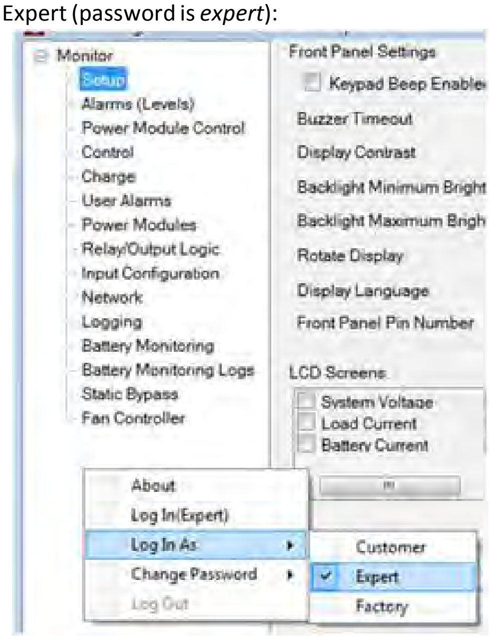
From time to time Firmware upgrades are made available to upgrade the Supervisory modules. Most often these upgrades are around the SM3x Main microprocessor and the Network microprocessor.
The filenames are in this format:
SWEN-SM36MN-24.hex
SWEN-SM32NT-18.hex
Where “MN” and “NT” refer to the “Main” & “Network” firmware respectively and the last digits are the issue number.

A summary of the Firmware issues installed in the SM3x you are viewing is visible on the Setup page under Monitor Information, an example shown here:

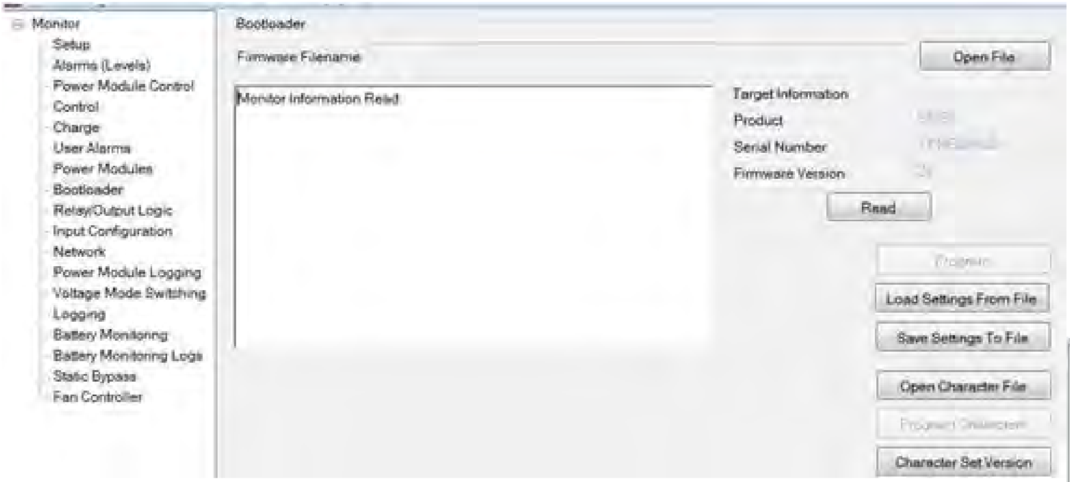
The ADC Firmware is the Analog to Digital Converter Firmware. This and the Display Firmware are relatively stable and very rarely require updating.

Bootload Procedure:

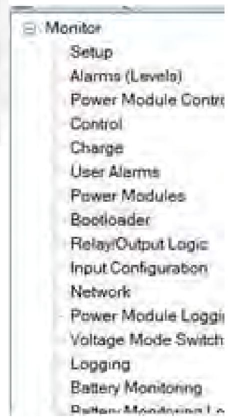
1. Open the SM3x Configuration Utility
2. Login as Expert (password is *expert*):



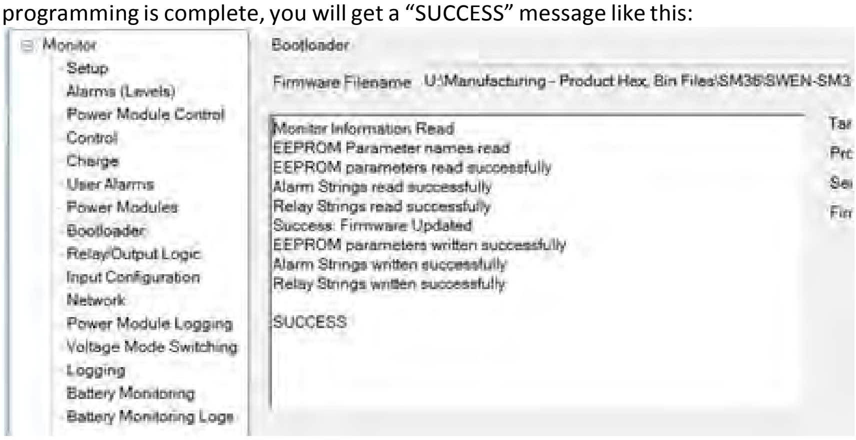
3. Go to the Bootloader page and click “Read” to check the Firmware version of the monitor you are connected to:



Click “Open File” and navigate to where you have stored the new firmware file. You should end up with a screen like this with the message “Firmware File valid and ready to program”:

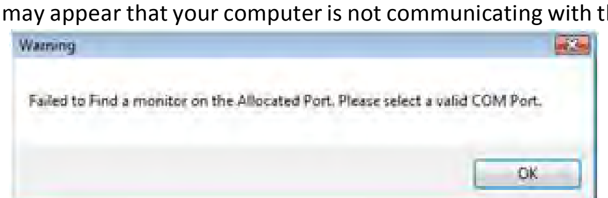


5. Click “Program”. The programming routine will take several minutes. **Do not interrupt the process**. When the programming is complete, you will get a “SUCCESS” message like this:



6. If you have encountered an error while trying to Bootload, **repeat** the Bootload procedure until you get a successful Bootload. However, the SM3x will have written an error log which will save all of the configuration settings in a separate file (as the settings may have got corrupted).

Note: It may appear that your computer is not communicating with the SM3x, and you may get this dialog box:



Click “OK” anyway and re-bootload as the computer will be communicating in spite of this error message.

To re-load the configuration settings, once you have a successful bootload, click the “Load Settings from File”. You will then get a dialog box like this, with possibly more than one BootloadRecovery_xxxx.ini files:

Name	Date modified	Date created	Type
BootloadRecovery_0024_1114320430.ini	7/06/2011 3:06 ...	7/06/2011 3:06 p.m.	Config
BootloadRecovery_0026_1114320430.ini	3/06/2011 5:23 ...	3/06/2011 5:23 p.m.	Config

Choose the file with the **correct serial number & time-stamp** for when the error occurred, and load it (i.e., click “Open”).

The monitor will then be upgraded & good to use.

Relay/Output Logic

Here is where all the conditions are set to trigger the operation of:

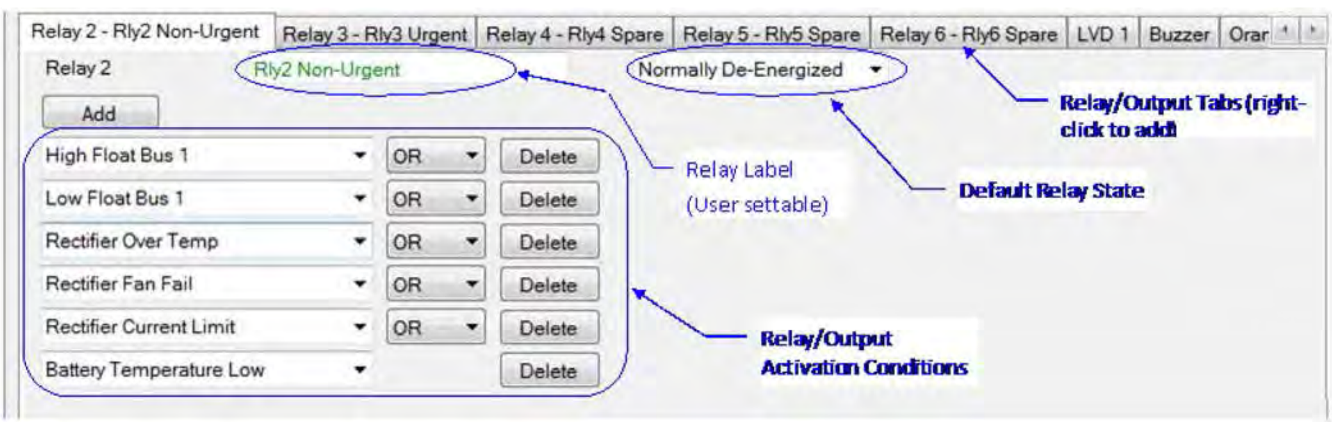
- Alarm Relays
- LVDs (Low Voltage Disconnects)
- SM3x front panel LEDs and
- the SM3x buzzer
- SNMP User Traps 1 thru' 5

These are all considered outputs of the system.

Upon opening this page, you need to click Read Relay Logic to find out what has been pre-loaded in your system. Here is an example of a default SM35/36 setting:

Note that Relay 1 is always absent from this menu. This is because it is hard-wired to the SM3x and is the "Monitor Failed" alarm relay. It is "Normally Energised" so that if the SM3x loses power or other faults occur, it will always change state.

The various areas of this page are shown here:



Adding/Removing Tabs

As shown above, to add a tab for a relay/output, simply right-click while hovering over any tab.

To remove a tab, first select the tab you would like to remove. Then right-click anywhere on the page and you will see an option to remove the tab.

Changing the Relay Label

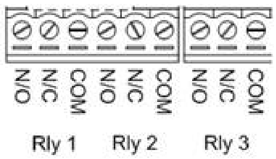
To change the Relay label, simply write in the name you would like.

The label can be up to 25 characters.

It is a good idea to include the abbreviation of the relay number (as shown above – "Rly2") as it is this label that is displayed on the web page.

Changing the Relay State

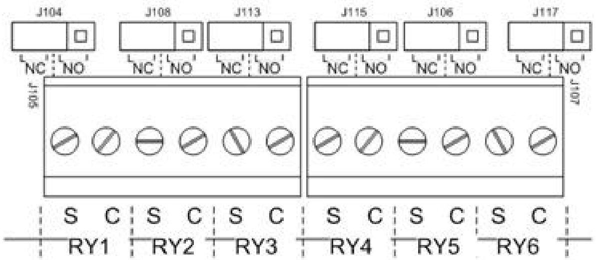
This is the state the relay is in for no alarm active. The encoding on the SM3x terminals is always for the relay in its de-energised state:



If you change the default state of the relay, then of course the Normally Open and Normally Closed contacts will be reversed.

A Normally Energised relay is often used so that if power is lost to the system/monitor, then the relay will change state and an alarm will occur.

The SM36 Relay outputs consist of only two terminals (S=Signal, C=Common) with a header to select whether the Normally Open of Normally Closed contact is extended:



Relay/Output Activation Conditions

These are the conditions that when active, will cause the relay/output to change state.

Adding or deleting the conditions is self-explanatory.

The normal operand will be the "OR" command, however, you also have the choice of AND, NOR & NAND for any special conditions that may be required to cater for.

Note that when you click on the down-arrow to select an alarm condition, you get the choice of:

- Alarms
- Relays

This is so that for Tabs like the Red & Orange LED tabs, you can simply map the Urgent and Non-urgent relays without having to repeat all the conditions for the urgent or non-urgent alarms.

Default Set-up

When the SM3x is supplied as part of a system (as is usually the case), the Alarm/Output page is set-up to reflect typical requirements. Note that the Relay labels and alarm mappings can be changed by the user to suit individual applications (for example, a user may not want summary Urgent and Non-urgent alarms, so can change these if required).

LVD Tabs

For a Low Voltage Disconnect control to operate, it must appear here (note that the other areas for setting up LVD operation are in the LVD & Relay Control section of the Control page, and in mapping the LVD input Voltages in the Input Configuration).

The reason the LVDs are set up here is so that you can map other controls to them, such at temperature.

Here is an example of an LVD controlled by both voltage and high battery temperature:

In this instance LVD 2 will open when the battery temperature exceeds its alarm threshold and will close again when it drops below the hysteresis value (set in Temperature Alarms on the Alarms (Levels) page).

SNMP User Traps 1 thru' 5

5 SNMP Traps are made available for User configuration. It is here that you can add the conditions that cause the Traps to be sent.

Note that it is **not** possible to re-name or re-label a User Trap as the SNMP coding cannot be changed.

See also the SNMP Settings help file.

Table of Contents

Input Configuration

Introduction

If the SM3x Monitor is the "heart" of the Power System, then this section is the "heart" of the SM3x.

It is in this section that the SM3x comes to know which inputs are displayed as what outputs (e.g., Battery Current = Current Shunt Input 1).

For a system that has one Battery Shunt, here is an example of how the SM3x comes to know what the System DC Load Current is:

!!!! The first few lines of the Input Configuration are vital to the operation of the system, as this is where the SM3x is told where the various voltage and current inputs are coming from. Please see the Monitor section of these Help files for an explanation of these items.

The Input Configuration also performs mathematical and/or logic statements to create User Alarms/Variables/Displays (e.g., Door Alarm = General Purpose Input #6 Status).

Complex operations can be performed to suit customer needs. For example, you can access Timers to maybe close a Relay Output that may allow an air-conditioner to run for a specific period of time, regardless of temperature.

Note that the logic is written as:

OUTPUT = INPUT (PROCESS) OTHER INPUT

A "process" can be any one of the following:

+

-

*

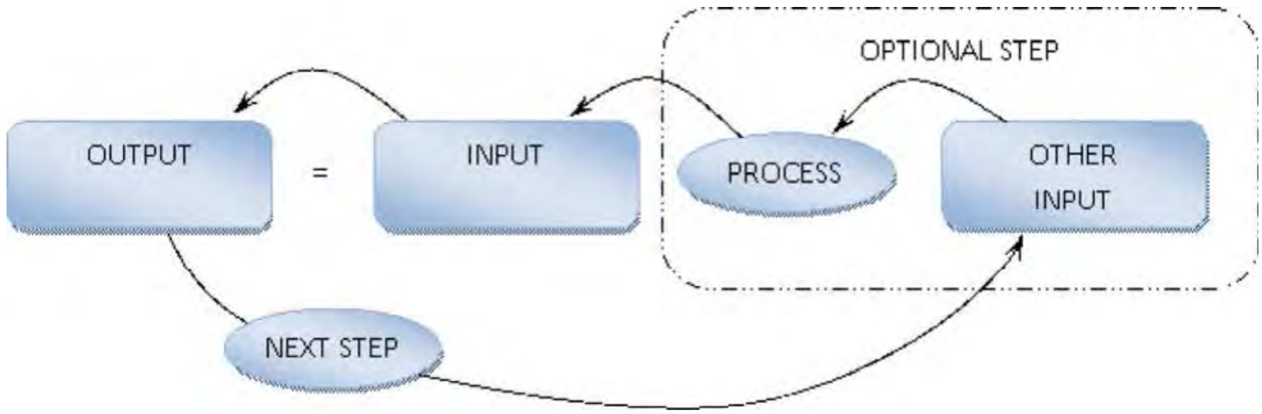
/

>

<
equals
or
and
nor
nand

Note that you can use a combination of mathematical and logic processes **within** the same statement. You just need to be aware that any number 21 is always regarded as "True" and 0 is regarded as "False".

In its simplest form, it is easiest to think of the logic represented in this manner:



What we are also showing here is that an "Output" can be re-used as an Input if required.

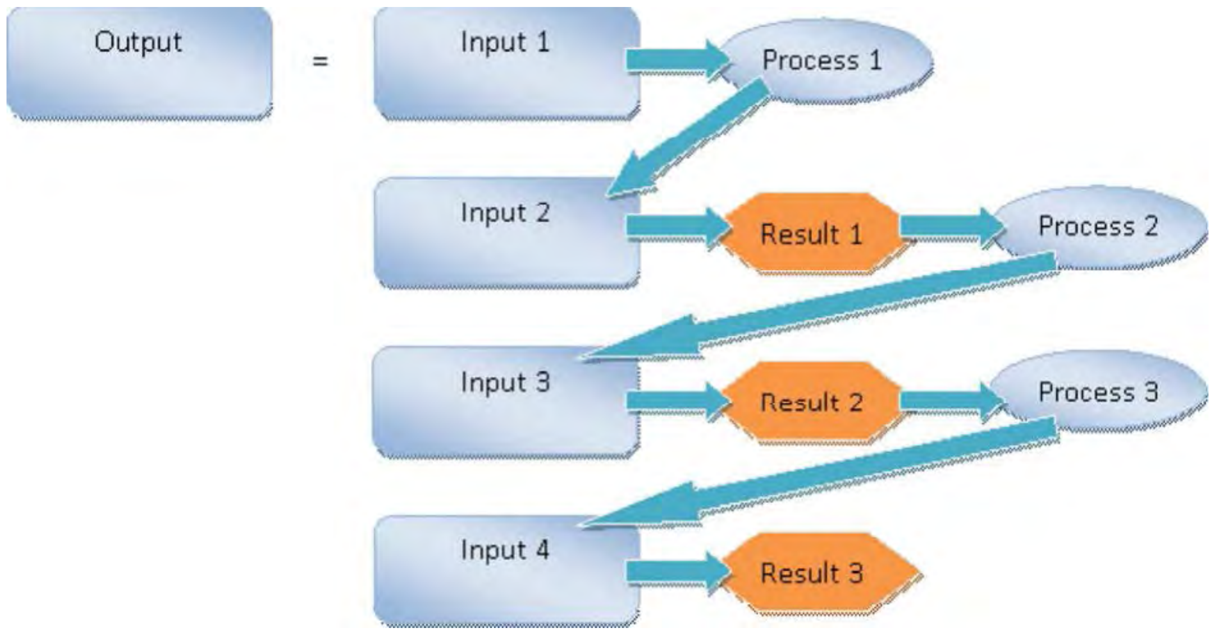
You can check what items are available as Outputs by clicking on the down-arrow in the Output area (to the left). Each is defined later in this document.

Similarly, you can check what items are available as Inputs by clicking in the Input area (to the right).

You will note that there are many items available on **both** the Output **and** Input sides. This is because many of the items (such as System Currents) must be defined as to where the SM3x is getting the information, or can be used in mathematical or conditional statements for the creation of User Alarms/Outputs.

Multiple Lined Statements

Note that the SM3x performs the operations in a **strictly** left-to-right, step, by step manner.



Output = Result 3

Result 1 = Input 1 <Process 1> Input 2

Result 2 = Result 1 <Process 2> Input 3

Result 3 = Result 2 <Process 3> Input 4

SM3x Numeric Processing

The SM3x math processor uses only integers. Therefore a value such as the Bus Voltage is not "seen" as 54.00, but rather 5400 in its raw form. So bear in mind that when using this, you will be processing the number 5400, not 54.

Here are the definitions of what the System Input values are measured as:

Voltage Inputs: 0.01V (e.g., 53.89V ≡
5389) Current Input (normal resolution): 1 Amp (e.g., 84.8A ≡ 84)

Current Input (high resolution*): 0.1 Amps (e.g., 84.8A ≡ 848)

Temperature Inputs: 0.1°C (e.g., 24.3°C ≡ 243)

I/O Card Analog Inputs 1-5 (0-75V): 0 ≡ 0000, Full Scale ≡ 8092

I/O Card Analog Input 6 (± 50mV): -50mV ≡ 0000; 0 ≡ 4096; +50mV ≡ 8092

AC Monitor Phase Voltages: 0.1V (e.g., 230.4V ≡ 2304)

AC Monitor Phase Currents: 1 Amp (e.g., 12.8A ≡ 12)

AC Monitor Frequency: 1 Hz (e.g., 50.8Hz ≡ 50)

BCM Card Voltage Inputs: 0.01V (e.g., 53.89V ≡ 5389)

BCM Card Current Inputs: 1 Amp (e.g., 84.8A ≡ 84)

Summed Rectifier Currents: 1 Amp (e.g., 84.8A ≡ 84)

Summed Converter Currents: 1 Amp (e.g., 84.8A ≡ 84)

Converter Output Voltages: 0.01V (e.g., 53.89V ≡ 5389)

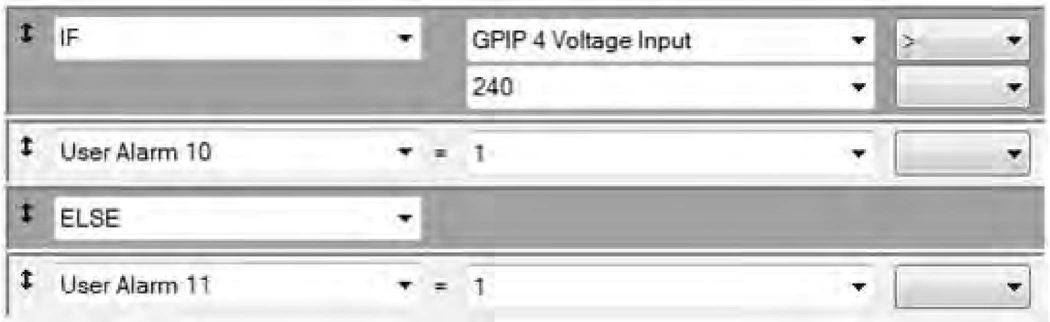
Inverter Output Voltage: 0.1V (e.g., 230.8 ≡ 2308)

Item Definitions

IF If the result of the statement is True, then the next statement is executed. If it is not true, the next statement is skipped.

ELSE This can be optionally used in conjunction with the IF statement. It is used in the **second** statement after the IF statement.

For example:



Alarms

Only User Alarms are available on the Output side of the equations. This is because all other alarms listed are internally generated or pre-defined.

User Alarms

These alarms are available to the user/customer to re-name and/or configure to suit their own applications. They are also use within Newmar systems for alarms that are optional, where some systems may have the alarm, and others do not (e.g., SPD (Surge Suppression) Fail, Load Fuse Fail, Battery Fuse Fail etc.).

There are 32 User alarms available, and they are defined in the User Alarm section.

Rectifier, Converter, Inverter Alarms

These are all alarms generated by those specific devices if they are fitted in a system. They cover such things as the device's fan failing, device over-temperature (non adjustable), EPROM fail etc.

Monitor Generated Device Alarms

These are also alarms associated with the system power modules (rectifiers, converters etc.). However, they are generated from the SM3x itself. Examples of these are:

- Rectifier Non-urgent Fail (active if any rectifier fails)
- Rectifier Urgent Fail (active if the pre-determined (set in the Rectifier Control section) number of rectifiers failed)
- All Rectifiers Failed (active if all rectifiers failed (can be used to assume AC input may have failed)

Voltage Alarms

These are the voltage alarms normally associated with a DC Telecom Power System. Here you will find the classical two high voltage and two low voltage alarms (alarm thresholds are set in the Voltage Alarms settings section on the Alarms (Levels) page).

Note that there are two Bus voltages so that if you have DC/DC converters as well as rectifiers, you can monitor both DC bus voltage levels at once.

The "LVD" (Low Voltage Disconnect) Operate alarms are those set in the Low Voltage Disconnect Alarm voltage thresholds section of the Alarm (Levels) page.

Current/Temperature/MCB Alarms

These are all the alarms associated with the system currents & temperatures.

The MCB alarms are to do with the 4 specific voltage inputs made available on the SM35/36 monitor. For the detail on how to set these up, go to the Battery MCB Settings section of the Control page.

Monitor Alarms

These are pre-defined alarms/process notifications generated by the SM3x.

These alarms can be used in the Input Configuration logic by users/customers to create actions based on systems events. For example, the Battery Test alarm/notification could be used to make sure air-conditioning is always ON during the battery test.

Most of these alarms/notifications are self-explanatory, however, there are some that require some explanation:

Peripheral Missing:

If a peripheral device/card such as an I/O card, Fan Controller or BCM card have been connected to the SM3x, and then it is disconnected, the SM3x will raise a Peripheral Missing alarm. This alarm is also raised if the serial communications to the peripheral device is lost.

LVD Fail

The SM3x utilises electronic drive of LVD contactor coils via a FET bridge circuit. If the current through these FETs exceeds approximately 5 or 6 amps, then the SM3x stops trying to drive the coil, and raises the LVD Fail alarm. This alarm is not adjustable.

Monitor ADC Fail

If the Analogue to Digital Converter fails inside the monitor, then this alarm is raised. The ADC is non-serviceable, and should this alarm occur, the SM3x will need to be replaced.

Logic Error

This alarm is raised if:

- If an incorrect logic statement is made in the Input Configuration section, or
- A statement in the Input configuration calls for (or makes reference to) a peripheral (such as an I/O card or BCM card) that is not connected.

Double-clicking on this alarm in the Monitor page will take you to the Input Configuration and the offending statement will be highlighted in red.

Monitor Fan Fail

This is **not** referencing a rectifier or converter fan. It is referencing the alarm raised when an Newmar Fan Controller is connected to the SM3x, and one of the fans connected to that device had failed.

AC Alarms

These alarms relate to the settings of the AC Alarms on the Alarms (Levels) page.

Note that if two AC Monitor cards are connected, then, for example, the AC High Volts alarm will be raised if **either** card senses the voltage exceeding the high voltage threshold.

Static Bypass Alarms

These alarms are only raised if an inverter suite is fitted to the Newmar Power System, along with its associated static bypass switch.

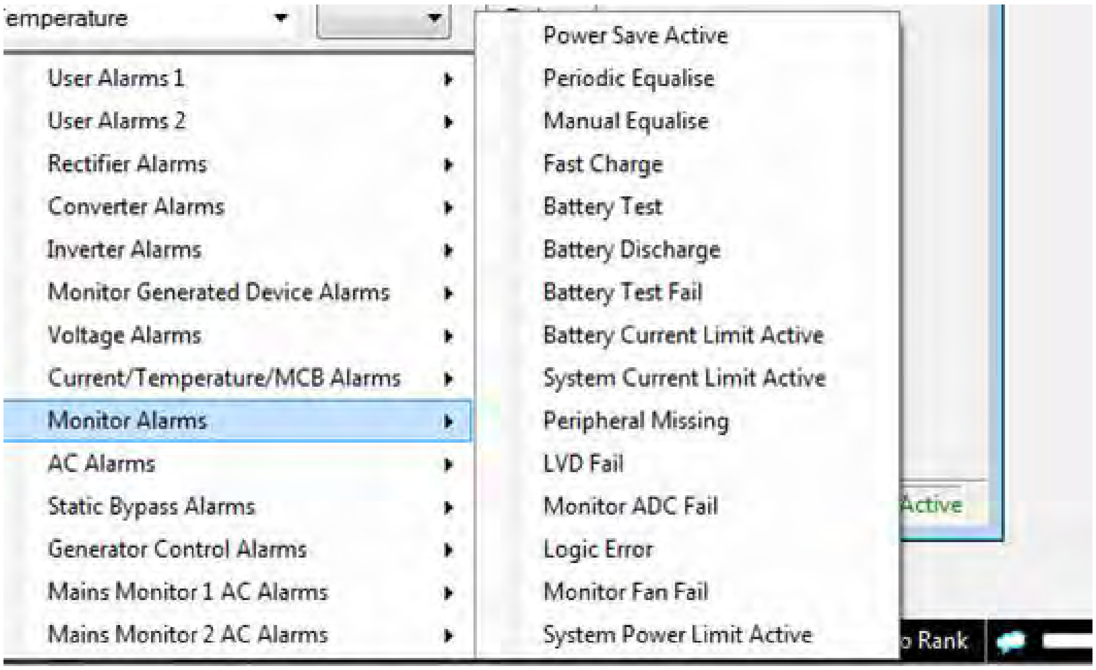
Generator Control Alarms

These alarms are only relevant to systems that have Hybrid/Generator control enabled (optional extra).

Some of these alarms are dependant of having the relevant sensors fitted such as fuel level or fuel contaminant transducers fitted.

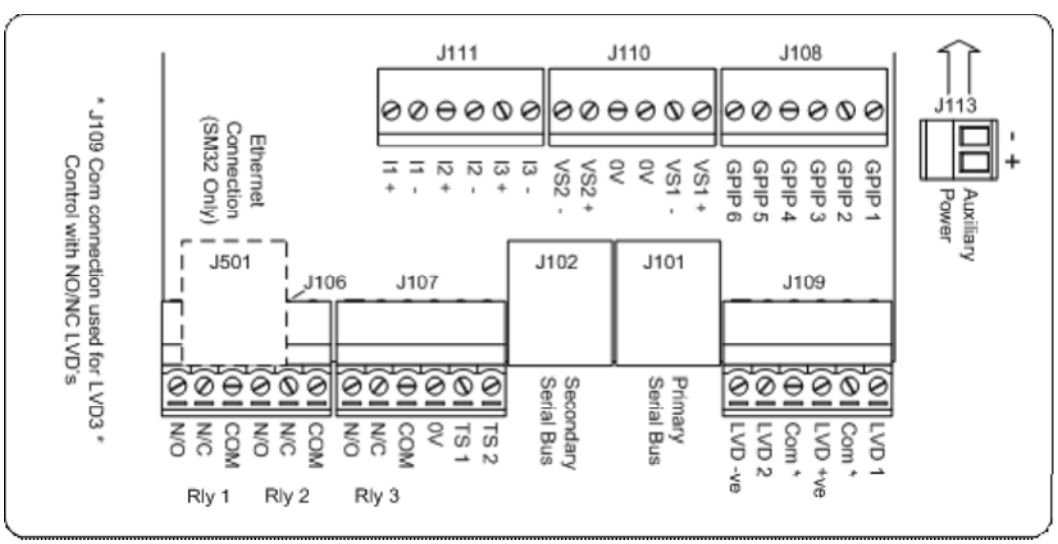
Mains Monitor 1 & 2 AC Alarms

As with the AC Alarms above, these alarms relate to the settings of the AC Alarms on the Alarms (Levels) page. However, these make available for the user/customer the alarms generated from either on or other AC Monitor card.

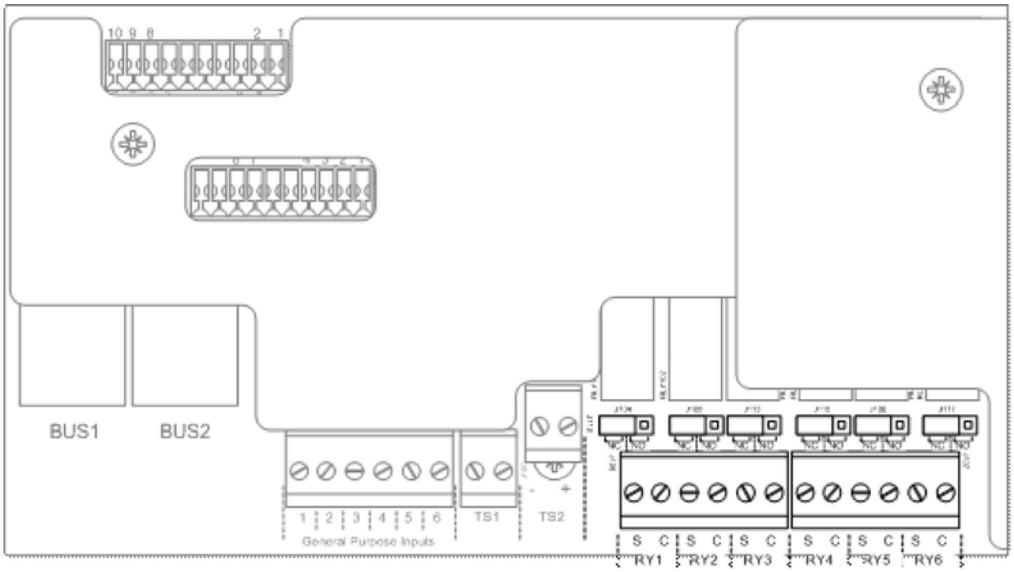


Measurements

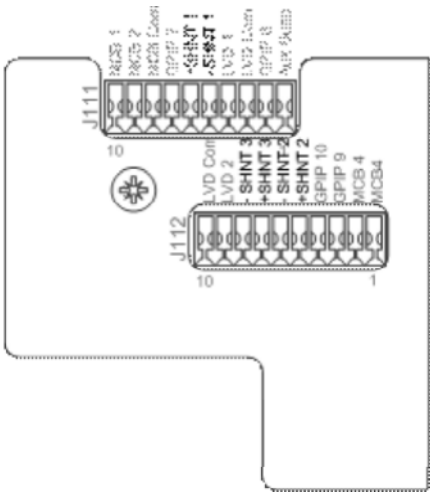
The Measurements drop-down list is only available on the “Inputs” side (right-hand) of the Input Statements definitions. This is because these are **actual** measurements that are available from the power system either from wiring connected to the SM3x circuit boards, or from connected modules via the Newmar Serial Communications Bus. Note that not all measurements listed here are hard-wired on all systems. As a result, the Input Configuration area “tells” the SM3x which inputs are used and are valid. The connector layout for the SM31/32 & SM33/34 circuit board is shown here:



And the connector layout for the SM35/36 is shown here:



Also for the SM35/36 here is the connector layout for the MTA100 connectors that are normally used for internal DC System connection:



Voltage Inputs 1 & 2

The SM31/32 & SM33/34 have two physical analogue voltage inputs, labelled as VS1, and VS2. The SM35/36 has one, labelled VS1.

In both monitors, VS1 is hard-wired to two wires in the Newmar Systems Bus communications cable, via the RJ45 connector, J101 (BUS1) (Pins 5 & 6). On the rectifier backplane this can be linked to use the rectifier output voltage as VS1 (the links connect to the rectifier output bus via a 4k7 resistor in each leg). For more information on the backplane link settings, see the relevant Backplane Manual for the system you are dealing with.

With the SM31-34 monitors, both VS1 & VS2 are also made available for external connection (see connector layout above). This is so that bus voltage sensing can be made closer to where the battery “tees” off rectifier/load bus for more accurate voltage regulation and battery circuit-breaker (MCB) fail monitoring via VS2.

The SM35/36 does not have these available as the MCB fail monitoring is done via dedicated MCB monitoring analogue circuits (MCB1 thru’ 4). Also, the SM35/36 is largely used in micro-compact systems that have DC Distribution circuit boards enabling the use of the internal RJ45 sensing wires to connect to the system near the battery tee-off.

For correct system operation, the Rectifier Bus Voltage and the Bus 1 Voltage must be set equal to either VS1 or VS2. Invariably it is set to VS1 as explained in the DC Metering section of the Monitor Help File.

GPIP Voltage Inputs 1 thru' 6 (SM31-34) & GPIP Voltage Inputs 1 thru' 10 (SM35/36)

GPIP stands for General Purpose Input.

On the SM3x series of monitors they can be used as either digital inputs or analogue inputs (10-bit).

This is the section where you can access the GPIP data as analogue data.

All GPIPs are configured for 75V full scale, referenced to the –ve bus of the system as zero.

Note that on the SM35/36 GPIPs 1 thru' 6 are made available via screw terminals (see layout above), and GPIPs 7 thru' 10 are on the MTA100 connectors. These inputs are used for internal system connections (e.g., Fuse/Breaker Fail alarm on GPIP7).

On the SM31 thru' SM34, there are only a total of 6 GPIPs (made available via screw terminals). This means that things like the Fuse/Breaker Fail alarms will use one or more of these GPIPs. More inputs can be added by adding the optional I/O PCB.

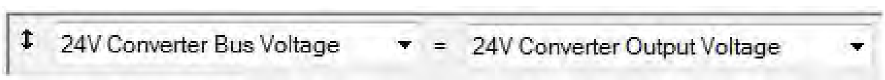
These can be assigned as a User Variable or a Custom Screen Variable. A Custom Screen Variable can be displayed as an analogue value on the Monitor screen and also logged in the Logging section.

Converter Output Voltages

These are the voltages serially communicated to the SM3x via the Newmar serial communications bus from the various banks of converter modules.

When an Newmar Converter Module is plugged into the Serial Communications bus, the SM3x will automatically pick these voltages up.

What has to be done is that the SM3x needs to be told which of these voltages is to be used as the respective Bus voltage. This is best seen in an example. Here you can see that with the 48V to 24V converter fitted, then the 24V Bus is being read from the 24V output converter:



This may appear trivial; however, this gives the user the option to perhaps be monitoring a different 24V bus, one that is perhaps **not** generated from an Newmar Converter. This example shows that the 24V Converter Bus Voltage is actually measured from GPIP6:

Inverter Output Voltage

The Inverter Output Voltage is similar to the Converter Output Voltage except that you do **not** need to declare an "Inverter Bus Voltage". The SM3x automatically knows the Newmar Inverter Output Voltage is to be used solely as the Inverter Output Voltage.

The Inverter Output Voltage is made available here so that users can access that information and create User Alarms or functions based on this value.

Current Inputs 1 thru' 3

All SM3x series of monitors have 3 separate high-accuracy ±50mV current measuring inputs available. Obviously, these are for connection to standard industry 50mV current shunts.

You can see the current input labels on the connector layouts above (J111 (& J112 on the SM35/36)).

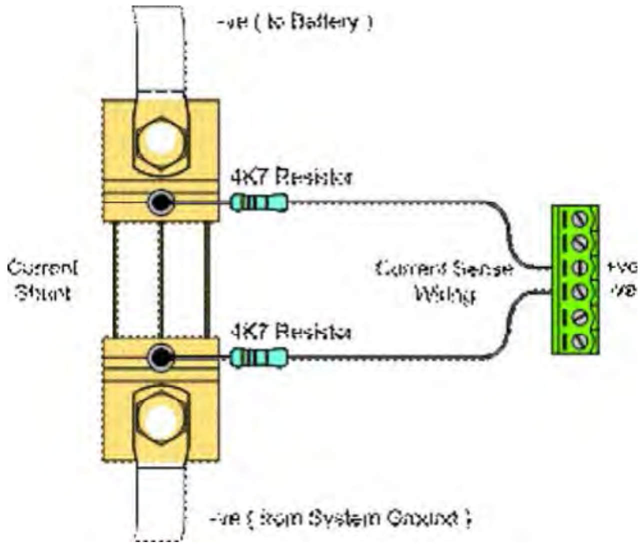
See the Monitor help file to see how these inputs are usually declared/assigned.

The Current Measurements help file shows how to set up the shunt values.

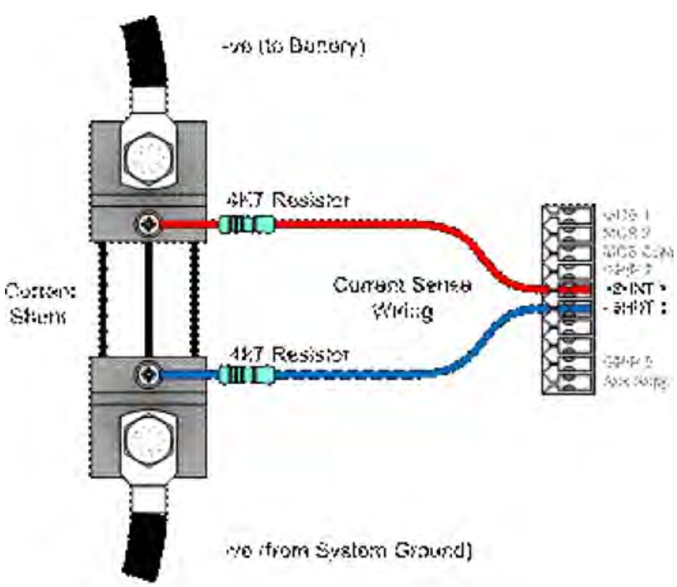
More information is available in the SM3x Monitor Manual, but is repeated here for the sake of ease of access.

The current sensors must be placed in the negative of the DC system. When the current sensors are wired to a monitor, a 4k7 resistor should be placed in series with each sense wire at source. The main reason for this is to protect the sense wire, however it also provides the required input resistance to a monitor to maintain the calibration. Current shunts are available from Newmar which already have these resistors fitted.

SM31-SM34 Shunt Connections:

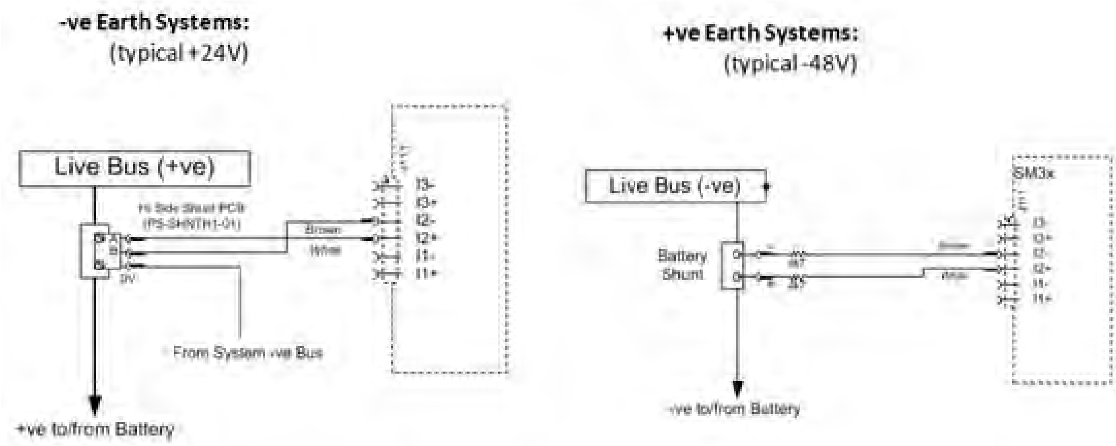


SM53/36 Shunt Connections:



Note that these standard connections are in the –ve polarity of the system. The SM3x monitors reference all of their electronics to the –ve of the system. In a 48V system this is normally the Live side so monitoring is as it should be.

However, in a 24V system, Live is normally the +ve polarity, and good practice dictates that the monitoring and protection elements must be placed in the live side of the circuit. As a result, you will see that in these +ve Live (-ve Earth) systems, a level shifting PCB is fitted to the shunt. Hence the following connection detail should be observed:

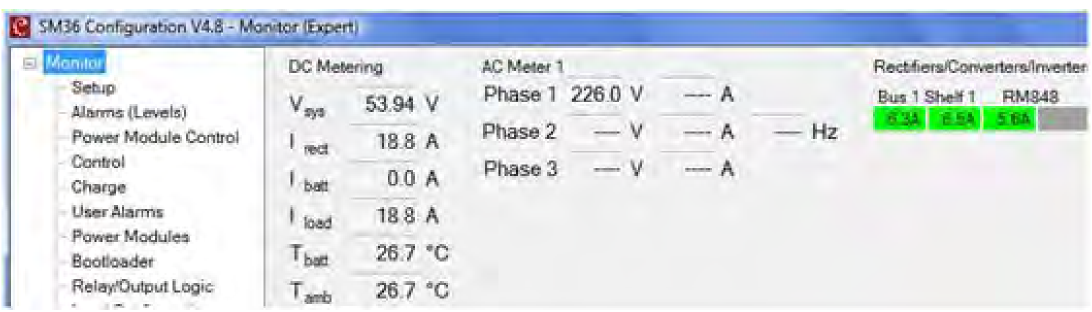


Summed Rectifier/ Converter/Inverter Currents

These currents are serially communicated to the SM3x via the Newmar serial communications bus from the various banks of rectifier and/or converter modules.

When an Newmar Converter Module is plugged into the Serial Communications bus, the SM3x will automatically pick these currents up.

It is the Summed Rectifier Current that is automatically displayed in the on the Monitor Display page as I_{rect}, as shown here:



There is no need to assign these further as the Monitor has these values internally pre-assigned.

Temperature Sensor Inputs

The SM3x series has up to two dedicated temperature sensor inputs (see connector layouts above).

The sensors are LM335 based sensors, and have been trimmed in the Newmar factory for accuracy.

A battery temperature sensor is normally provided as standard with Newmar systems to provide thermal voltage compensation when float charging sealed lead-acid batteries.

A second (often mapped as an Ambient sensor) is optional.

If both sensors are fitted, the Input Configuration might look like this for the assigning/mapping the sensor inputs to their respective functions:

Voltages

These are all "system" voltages that can typically be found in a DC power system, and specifically an Newmar DC power system.

None of these voltages are directly measured or linked/assigned to/from any particular input (unlike "Measurements" described above). This is done to enhance the flexibility & capability of the SM3x device in applications well beyond the scope of "conventional" DC Telecom's Power.

However, this means a slightly more complex system set-up/configuration. Fortunately, most Newmar Systems are pre-assembled at the Newmar factory. As a result, these assignments/configurations are done in the factory, so the customer does not need to concern themselves with the detail.

Bus 1 Voltage

This is one of the most essential Input Configuration settings for the SM3x, and should always appear near the top of the Input Statements list.

In nearly all systems Bus 1 Voltage will be mapped to Voltage Input 1 (note the SM3x can monitor two DC Bus voltages at the same time, hence "Bus 1" and "Bus 2" voltages). This is because Voltage Input 1 in the SM3x is physically connected to the voltage sense wires in the "RJ45" internal communications cable. This comm's cable is usually connected directly to the Rectifier/Converter backplane PCB, where links and series 4k7 resistors connect to the rectifier DC output. The mapping statement looks like this:

Bus 1 Voltage is normally referred to as the "System Voltage" or Vsys on the SM3x LCD display.

Consequently, **Bus 1 Voltage is always V_{sys} on the SM3x display**.

If Bus 1 Voltage is **not assigned** at all in Input Configuration, then V_{sys} will always be displayed as 0V.

Bus 2 Voltage

If, for example, DC/DC converters are fitted to a system, then being able to assign a voltage to this second Bus voltage is convenient.

The mapping/assignment statement may look like this:

Once this is set, everything in the SM3x that refers to Bus 2 will be referenced to this.

For the example above, all the Bus 2 Alarms are now referenced against the 24V output DC/DC Converters.

Rectifier Bus Voltage

The other essential voltage that needs to be set in the Input Configuration is the Rectifier Bus Voltage. This is the voltage that the SM3x uses to control the DC bus when the Rectifier Voltage Control is enabled. This is set in the Input Configuration like this:

Converter Bus Voltages

When you install DC/DC Converters into a system, you must tell the SM3x where the voltages are coming from, therefore you need to assign/map the Converter **Output** Voltage (reported to the SM3x via the serial comm's bus) to the Converter **Bus** Voltage.

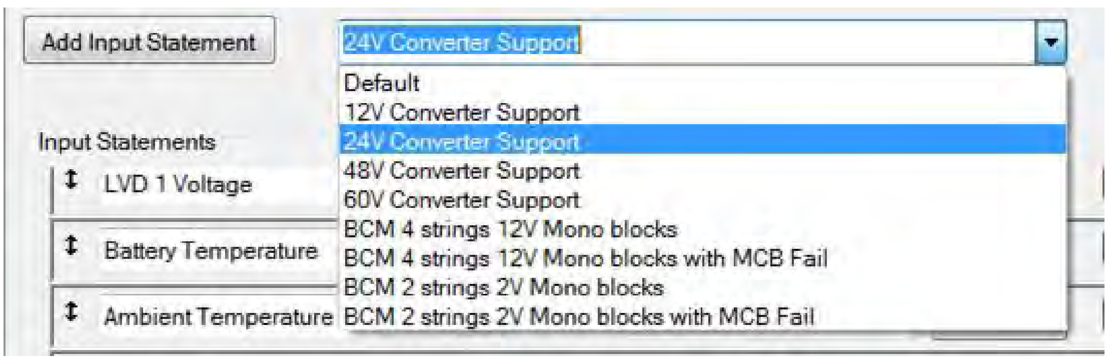
For example, with 24V output DC/DC converters, you will need to insert this statement:

This statement can also be added by using the "Insert Block" command.

"Insert Block" Command

A number of frequently used Input Configuration statements (or statement sets) have been pre-loaded in the SM3x Configuration Utility.

These can be viewed by clicking the down-arrow beside the Add Input Statement button:



To insert a block, simply click on the relevant one and then click "Insert Block":

Then click "Write Input Configuration" at the bottom of the page to write these commands into the SM3x memory.

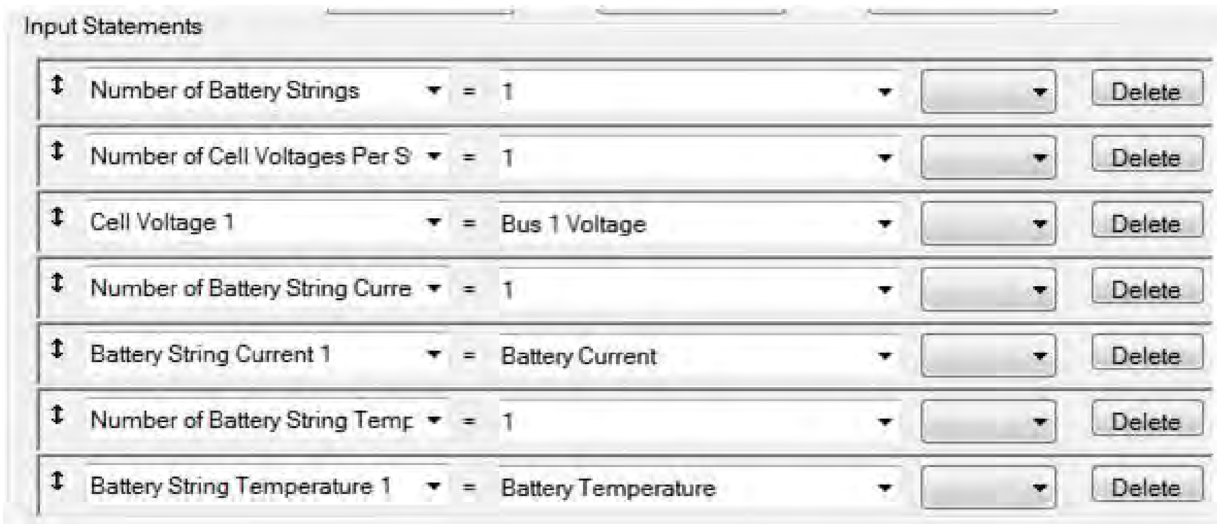
Warning: before you do this, ensure you have first clicked the "Read Input Configuration" button. If you do not and you "Write Input Configuration" you will write **only** the visible commands into the SM3x and thus lose **all** other Input Configuration settings.

Creating your own Input Configuration Blocks

You can create your own sets of Input Configuration Commands using the "Save as Block" command.

To do this, you should start with a **blank** Input Configuration page (i.e., do **not** click the "Read Input Configuration" button). This is because when you click the "Save As Block" you will save **all** of the Input Configuration statements visible on that page as that "Block".

1. Enter the statements as required. For example, below you can see a set of statements that allow you to "trick" the SM3x into thinking that a Battery Condition Monitor is fitted that is monitoring 1 string of batteries, with 1 "cell" measurement. This may be useful as when BCM is enabled, the Battery Discharge Log operates and you can log any battery discharge separately to the other event or periodic logs.



2. Once you have written the statements as shown above (be sure not to have any blank statements), then enter an appropriate name as shown here:

Then click "Save As Block".

The block is saved in your local version of SM3x Config. Note that at the time of writing, when you upgrade to a new version of SM3x Config., you will have to re-define any blocks you have written.

LVD Voltages

The standard SM3x units can control up to 2 magnetically latching LVD contactors, and 3 normally energised (or normally de-energised) contactors.

Each contactor can be controlled separately, and if need be, from the separate Bus Voltages.

In most normal systems that have, say, two LVDs, they are usually configured as priority and non-priority disconnects. The non-priority is always a load disconnect, and the priority is usually the battery disconnect (as a battery disconnect is usually fitted anyway).

In that instance, the actual voltage used to control the LVDs will be the same, so the Input Configuration will look like this:

It is also correct to write this as:

For more about setting up LVDs, see the LVD help file.

Currents

These are the typical **Load** and **Battery** currents associated with a DC system.

This area allows the user to define where the SM3x is to get these currents from.

The set-up of these is best described in the DC Metering section of the Monitor help file.

Temperatures

This area of Input Configuration allows the user to tell the SM3x which Temperatures are mapped to the sensors/physical inputs.

Two temperatures (Battery & Ambient) are made available as standard in the SM3x.

A Battery Temperature is supplied as standard and is usually connected to the SM3x Temperature Sensor Input 1. It is typically assigned/mapped as follows:

The Ambient sensor is optional, and is usually connected to Temperature Sensor Input 2. If fitted it is mapped as follows:

The set-up of these is also described in the DC Metering section of the Monitor help file.

Note that is a sensor is not fitted, then the mapping statement should not appear in the Input Configuration. In this way the SM3x will not make active any of the alarms associated with that Temperature.

Alarm Thresholds

All of the alarm thresholds mentioned here are made available for programming logic or mathematical statements.

Digital Inputs

As mentioned in the section above “GPIP Voltage Inputs”, the General Purpose Inputs (GPIPs) may be used as analogue or digital inputs.

This is the area where the GPIPs as digital inputs are set up/assigned.

A GPIP **must** be assigned/mapped to a User Alarm before a change in its state will be displayed as an alarm. It is usual (but not essential) to use the first User Alarms as the GPIPs (e.g., User Alarm 1 = GPIP 1 through to User Alarm 6 = GPIP 6 etc.). See the User Alarms section for a more detailed explanation of how the User Alarms are set up.

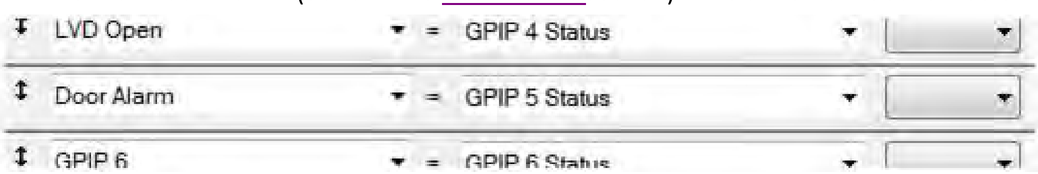
Note that on the SM35/36 GPIPs 1 thru’ 6 are made available via screw terminals (see layout above) for easy user access, and GPIPs 7 thru’ 10 are on the MTA100 connectors (for connections usually made at the Newmar factory). These inputs are used for internal system connections (e.g., Fuse/Breaker Fail alarm on GPIP7).

On the SM31 thru' SM34 there are only a total of 6 GPIPs (made available via screw terminals). This means that things like the Fuse/Breaker Fail alarms will use one or more of these GPIPs. More inputs can be added by adding the optional I/O PCB.

Here is an example of the Input Configuration mapping/assigning of the 6 GPIPs for an SM31/32 based system:

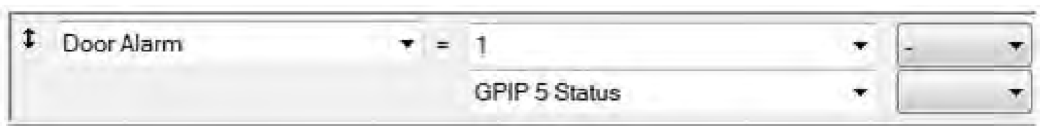
Note here that two User Alarms, GPIP 5 & 6 are assigned to the status of GPIP 5 & 6 to make it easy for the customer to use then as something else.

For example, if a door alarm was connected to GPIP 5, then the User may choose to re-name the User Alarm called "GPIP 5" to "Door Alarm" (done in the User Alarms section). The statement above would then look like this:



Note that a GPIP (as a digital input) is considered "on" (logic state 1) when it is taken to the positive rail (in telecom -48V systems this would be the system Common).

If an alarm is connected via normally closed contacts (i.e., contacts open when there is an alarm), then you can invert the alarm state in Input Configuration by inserting a "1-" line in the logic as shown here:



Do this by right-clicking on the relevant statement and choosing "Add to Expression".

Battery Monitoring Cell Voltages, String Currents & Temperatures

These are the items that require set-up when Battery Condition Monitoring (BCM) is enabled, and will typically be mapped to physical BCM card inputs (see the Battery Monitor 1, 2, 3 or 4 section).

This is required when a BCM card is fitted, or when mid-point monitoring is enabled from a standard SM3x controller.

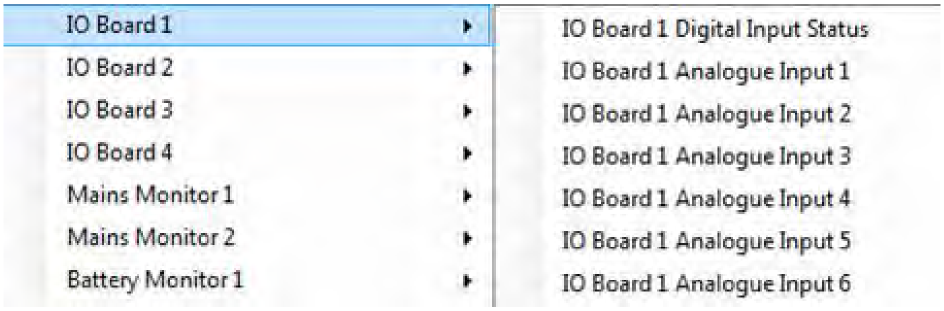
Please refer to the Battery Condition Monitor Manual, Section 3, for detailed set-up instructions.

IO Boards 1 thru' 4

These are the physical inputs from the Input/Output cards. A maximum of 4 cards may be fitted to a single SM3x.

Note that the SM33/34 that are dedicated to $120V_{dc}$ output systems. The I/O cards do not operate at that voltage and therefore cannot be used with the SM33/34.

Upon clicking the card you require, you will see:



The I/O card has 6 physical Analogue Inputs.

As analogue inputs require some sort of hardware definition, the default configuration of them is as follows:

Analogue Inputs 1 through 5 are single ended 75V inputs, and referenced with “0” at the system negative.

Analogue Input 6 is bipolar and usually used for current shunts. Its “0” is also the system negative.

The actual values the SM3x receives from that I/O cards are:

I/O Card Analog Inputs 1-5 (0-75V): 0 ≡ 0000, Full Scale ≡ 8092

I/O Card Analog Input 6 (± 50mV): -50mV ≡ 0000; 0 ≡ 4096; +50mV ≡ 8092

The “**IO Board Digital Input Status**” is a little more complex, and is related to User Variable 1 (see section on User Variables)

The 6 digital inputs of the I/O PCB are passed through to the SM as one word made up of 10 bits – the first 6 being the states of the I/O Digital Inputs.

So we make User Variable 1 equal to the I/O Board Digital Input Status. Thus each bit of User Variable 1 is equal to the state of the respective Digital Input.

As a digital input has no particular name, and will be named by the customer (e.g., Door Open), when Newmar first sends out a system with an I/O PCB in it, we declare these as User Alarms that look like this:

The customer can then choose to re-name those User Alarms with their own names.

Mains Monitor 1 & 2

Up to two AC Mains Monitor cards (ACMs) can be connected to any one SM3x controller (excepting SM33/34).

When connected, the values they measure are made available here for use in logic/mathematical expressions.

The measurements presented here are self-evident and do not require further explanation, except to note that the numbers come through as:

AC Monitor Phase Voltages: 0.1V (e.g., 230.4V ≡ 2304)

AC Monitor Phase Currents: 1 Amp (e.g., 12.8A ≡ 12)

AC Monitor Frequency: 1 Hz (e.g., 50.8Hz ≡ 50)

Note that the phase currents will only be measured if Current Transformers are used in conjunction with the ACM card.

Battery Monitors 1 thru' 4

These are the inputs measured from the Battery Condition Monitor cards (BCMs).

Up to 4 cards can be connected to any one SM3x controller (excepting SM33/34).

A single BCM card can measure up to:

25x Voltage Inputs (0-75V)

8x Current Shunt Inputs (±50mV with respect to system negative bus - for setting the size of the shunts attached, see the Current Measurements section).

4x Temperature Sensor Inputs (using the standard Newmar LM335 based sensor)

Please refer to the Battery Condition Monitor Manual, Section 3, for detailed set-up instructions.

Note that although the BCM was primarily designed as for battery monitoring applications, it can actually be used as an I/O card using this section of the Input Configuration to get the values.

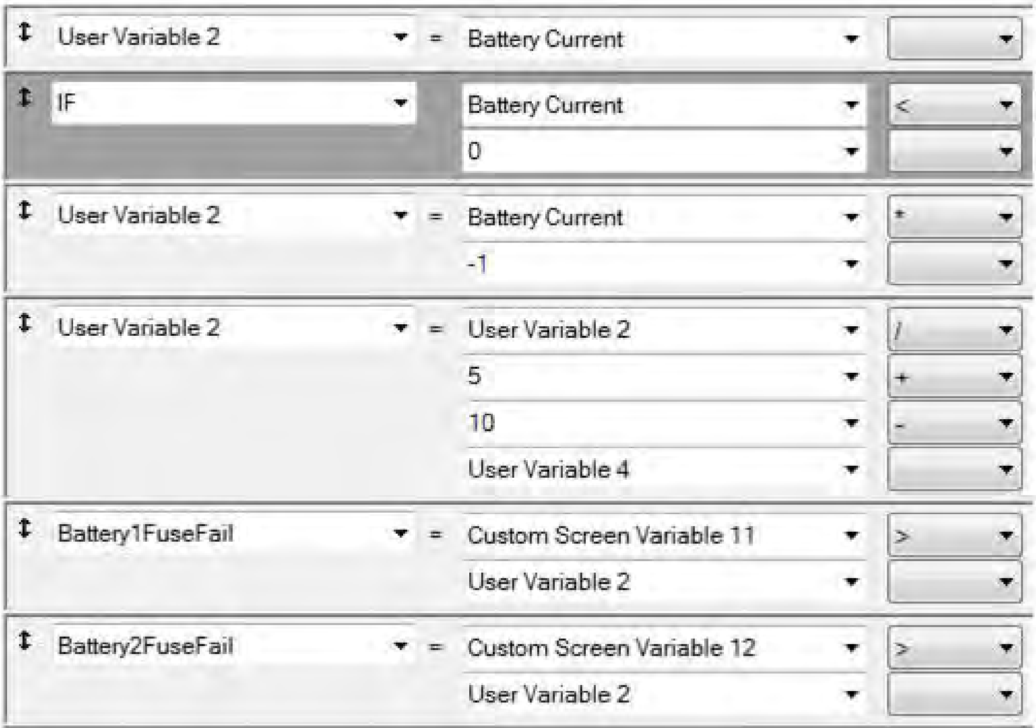
Note that the Battery Monitors notification on the bottom-right of the Monitor page automatically detects a BCM card attached (whether it is used as a BCM or an extended I/O card).

User Variables

User variables are made available for use within logic and/or mathematical statements within Input Configuration.

Due to the strict serial nature that the SM3x processes the Input Configuration statements by (see "Multiple Lined Statements" above), User Variables may be re-used if that value is not required further on in the logic.

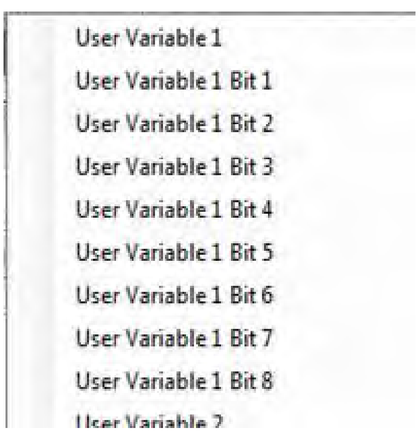
Here is an example of this in logic used to set up electronic battery fuse fail (i.e., detecting battery fuse failure by detecting a small voltage over the battery fuse, but increasing this small voltage as more battery current is drawn):



The special case of User Variable 1

The 6 digital inputs of the I/O PCB are passed through to the SM as one word made up of 10 bits – the first 6 being the states of the I/O Digital Inputs.

So we make User Variable 1 equal to the I/O Board Digital Input Status. Thus each bit of User Variable 1 is equal to the state of the respective Digital Input, and this information can be extracted here from the "User Variables" drop-down menu:



As a digital input has no particular name, and will be named by the customer (e.g., Door Open), when Newmar first sends out a system with an I/O PCB in it, we declare these as User Alarms that look like this:

The customer can then choose to re-name those User Alarms with their own names.

Differences in SM3x Configuration Utility V5.0

Previous versions of SM3x Configuration had 20 User Variables available plus a "Custom Screen Variable". As applications have increased, it has become evident that there needs to be a way of displaying more than one User analogue variable.

This is now done by making 16 User Variables available called "Customer Screen Variables" 1 thru' 16.

As a result you will find that Version 5.0 or greater of the Configuration Utility has 10 User Alarms, plus 16 Customer Screen Variables.

These Custom Screen Variables can now be logged in the event/periodic system logs, whereas previously it was not possible to log any User Variables or I/O Card, or BCM card values (excepting the actual BCM log).

For more information about the Custom Screen Variables, please see the Custom Variables help file.

Timers

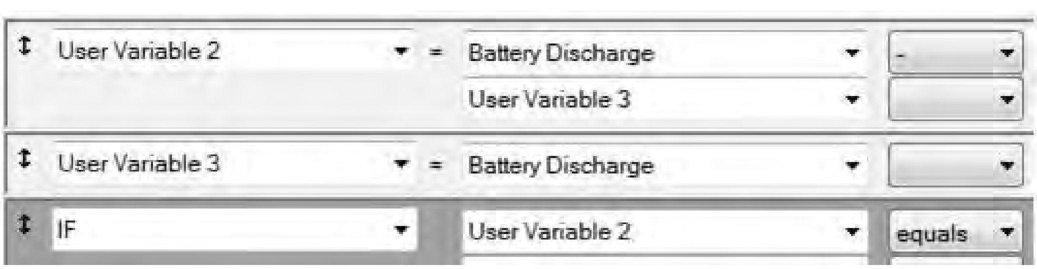
Up to 5 Timers are made available for users for use in the Input Configuration logic.

These timers are limited to use in units of minutes.

A timer will start immediately when the statement is processed. For example User Time 1 will start a 5 minutes as soon as this statement is processed:

Note that unless this statement is started within the bounds of an IF statement, the timer will re-start every process cycle (which is about 0.5 seconds). The best way to see this is by use in an example.

In this example we will activate an output relay that can be used to inhibit the start-up of the site generator during short (say, < 30 minutes) AC mains outages (i.e., the system will run off batteries during this time, thus saving generator running costs and wear & tear).



User Variable 2 will only equal 1 during the one process cycle when the Battery Discharge alarm changes state from 0 to 1 (i.e., when the AC turns off and the battery starts to discharge). In all other cases User Variable 2 will either be equal to 0 or -1.

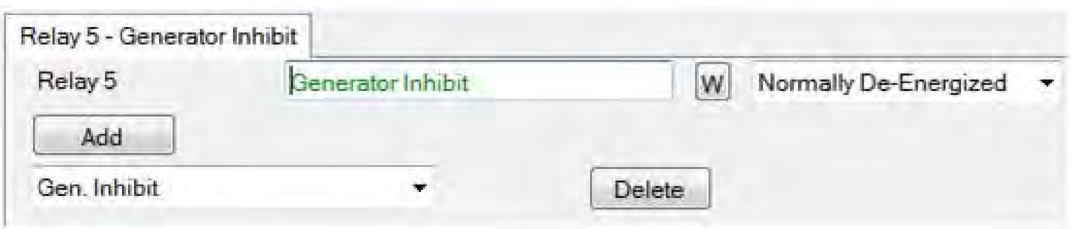
In these next two statements we start the timer to count down from 30 minutes from when the Battery Discharge starts.

In the User Alarms section we have labelled one of the alarms “Gen. Inhibit”. So these two statements will activate the “Gen. Inhibit” alarm if the Timer is >1 minute and the bus voltage is > 47.0V.

Note the use of parenthesis is necessary to group the Rectifier Bus Voltage > 47V equation.

This states that for all other cases the Generator Inhibit alarm will be inactive.

Note that now we have created a Generator Inhibit alarm, it will need to be mapped to an output relay in the Relay/Output Logic section. An example is shown here where the activation of the Generator Inhibit alarm will cause Relay out #5 to change state:



Note here that the Relay label can also be customised and has been re-labelled “Generator Inhibit”.

Real Time Clock

This area makes available the:

- minutes,
- hours,
- day,
- month and
- year

of the internal Real Time Clock in the SM3x.

These can then be used to create periodic events/processes.

Note that a number of internal periodic settings are already available such as Periodic Equalise and Periodic Battery Discharge testing.

Control

The following Control functions are made available here for the purposes of customising extra control processes to suit your specific application:

- Float Voltage

  Alters the "Rectifier Float Voltage Setpoint" on the Power Module Control page.

  Units are in 100ths of volts (i.e., to set 57.6V, enter the number 5760)

- Manual Equalise Enable

  Value is "1" (to enable) or "0" (to disable) the Manual Equalise function.

- Battery Test

  Value is "1" (to enable) or "0" (to disable) the Battery Test function.

- Battery Capacity Remaining

  Not a settable item.

  The Battery Capacity Remaining is made available for use in control statements.

- Battery Current Limit

  Alters the Battery Current Limit setting found on the Control page.

  Units are a percentage of the C_{10} value entered in the Battery Capacity field on the Charge page.

- System Current Limit

  Alters the System Current Limit value found on the System Current Limit section of the Control page.

  Units are in amps (i.e., enter "112" for 112A).

- System Power Limit

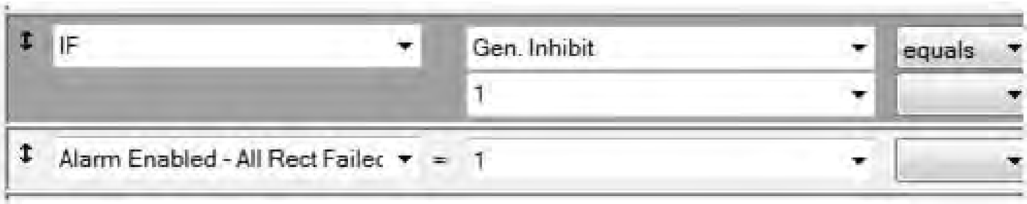
  Alters the System Power Limit value found on the System Current Limit section of the Control page.

  Units are in kW x100 (i.e., 10s of watts). For example, enter "850" for 8.5kW.

Alarm Masking

This area makes it possible to mask certain alarms when certain processes are active.

Using the example above in the Timers section where you are deliberately preventing the Generator starting for a preset period, you may wish to mask the Rectifier Fail alarm as follows:



Note that the value "1" means the alarm is disabled.

Fan Controller

Note – this is only relevant when the external Newmar Fan Controller card is fitted.

This area allows the mapping/assigning of which temperature sensor is being used as the reference temperature for the Fan Controller (up to two fan controllers can be connected to one SM3x).

For example, a system has two fan controller cards, one controlling the Battery Cabinet ventilation, and one controlling the Power Cabinet ventilation. The temperature sensors are connected to TS1 and TS2 respectively on the SM3x, so the statements will look like this:

Note that if Temperature Sensor Input 1 has been assigned to Battery Temperature and Temperature Sensor Input 2 has been assigned to Ambient Temperature, then the statements can equally be written as follows:

Generator

Note – this is only relevant when the SM3x is being used to control a Hybrid system (an off-grid application where the battery is being continually cycled and recharged from a generator).

This is where the SM3x is being told which AC Monitor the generator frequency if being measured from (as there can be 2 AC Monitor cards fitted to an SM3x). Usually the frequency is being monitored from AC Monitor 1, and this statement will look like this:

Network Connection Details

Network Connection Details

IP Address	192.168.1.220
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
Primary DNS Server	192.168.1.1
Secondary DNS Server	192.168.1.1
MAC Address	00.50.C2.D3.67.36

These are the network settings of the SM3x device, as well as the MAC Address of the SM3x.

To change these settings, go to the Network Settings section immediately below it.

After changing any settings in the Network Settings area you must click “Reset Network Microcontroller” before the changes take place and are visible here.

Network Settings

Note that the SM3x part numbering is such that network enabled versions are even-numbered (i.e., SM32, SM34 & SM36). The only difference between these and the non-network monitors is the addition of a piggy-back PCB that attaches to the main monitor PCB.

The Network Settings area is found on the Network page as shown here:

The Network Settings will need to be set up in consultation with your Network/IT Administrator.

Note that after making any changes to the Network Settings, you must click Reset Network Microcontroller for the changes to take effect. Any changes you have made should then be visible in the Network Connection Details frame.

DHCP Enable

Enabling DHCP (Dynamic Host Configuration Protocol) means that your SM3x device will be assigned an IP address automatically by the network server.

The default setting for this is disabled.

However, if you want to find a spare IP address without consultation with your IT Administrator, you can have DHCP enabled the first time you connect the SM3x to the network.

Then click “Refresh this Page” to see what IP address appears in the Default IP Address field. Click on Reset Network Microcontroller and you should see the IP address in the IP address field.

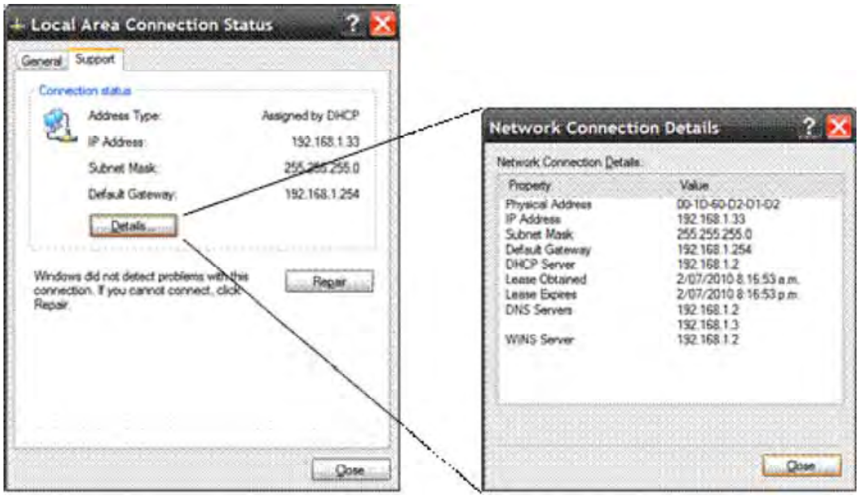
You can then un-check DHCP Enable to retain the IP address, however be aware that if you disconnect & reconnect the SM3x from/to the network, you may end up with an IP Address conflict as the server may have re-allocated the IP address to another device.

Default IP Address, Subnet Mask etc.

This is the IP address of the SM3x device. Normally it needs to be assigned by your network administrator.

SM3x network settings should match network settings of the connected network. This information is available from the local

PC, network settings.



After making all applicable changes, click the reset Network Microcontroller button to ensure all changes are set to the supervisory monitor.

Notes:

- IP address needs to be set to the same subnet as the network. When connected to a real LAN (i.e., not directly to your computer), the IP address should be given to you by your network administrator.

xxx . xxx . xxx . XXX

Same as network Unique

- Subnet mask, DNS server and default gateway should all be the same as the connected network.
- Connection to the network switch should be by a standard patch cable (not crossover) and connect to J501 of the Network PCB (this is the “piggy-back” PCB on top of the SM3x Main PCB)..
- Direct connection to a PC should use a crossover network cable or adapter (Windows Vista or Windows 7 or later users should not need the cross-over).

Domain Name

Location

This is the location that appears on the web page header. For example, this is entered as “Test Bench”, so appears like this:

Web Administrator Username & Password

Administrator access allows the ability to view and change any setting via the web page.

Default Username: Admin
Default Password: Admin1

Web User Level Username & Password

User level access allows the ability to view settings and values only via the web page (no changes can be made).
Default Username: User
Default Password: User1

RS232 Port Baud Rate

If using the RS232 port, set this value to the baud rate of the network you are connected to.

Trap Mode

If you are **not** connected to an SNMP monitoring system, leave this as “Disabled”. In this case no Traps will be sent.
If you are connected to and SNMP monitoring system, then set this to “SNMP”.

SNMP Settings

Initial setup

The SNMP setup should initially be setup by connection to the SM32/6 monitor from a PC via the front panel USB.

SNMP settings are available from SM3x Configuration software, Network page. The following is a screen•shot of a typical set•up:

Note that after making changes to the "Network Settings" area, you must then click "Reset Network Microcontroller" to fully implement the changes.

It is imperative that the **SNMP Communities** match on **both** the **SM3x device** and the **SNMP Manager** you are communicating with.

Under Network Settings ensure you have selected the **Trap Mode** as SNMP.

Hint:

Set the SNMP Generic Trap IP Address as the computer that you are setting the system up from.
This will ensure that whilst setting up your network you will receive valuable fault•finding information such as if you are using incompatible SNMP versions, or the Trap Communities are incompatible.

SNMP SETTINGS TAB

SNMP Trap (1 thru' 5) IP Address:

These are individual IP address that the **User Traps** can be sent to.

They are **not** (or do not have to be) the same as the "SNMP Alarm Trap IP Address x" settings. The section at the end of this document provides information on how to set up a User Trap (a User Trap is a Trap that can be assigned to a User created alarm, for example, a Door or Intruder Alarm, or perhaps a Flood Alarm – something that may be generated by an external input to the SM3x).

SNMP Generic Trap IP:

A “generic” trap is a pre•defined industry standard trap. If different than 0.0.0.0 then the SM32 will send generic traps (SNMP version error, Authentication error etc.) to this address (mainly used for commissioning).

If set to 0.0.0.0, then the SM3x does not send any generic Traps.

SNMP Alarm Trap IP Addresses 1 thru’ 5:

These are the IP addresses the SM3x will send the pre•defined (hardcoded) alarm Traps (low float, urgent low volt, rectifier fault....) to.

If set to 0.0.0.0, then the SM3x does not send alarm Traps.

SNMP Trap Resend timeout:

Sets the re•send time of any Trap when that Trap is “Active”. Setting is in seconds.

Set to “0” for no resend (i.e., send only once).

Site Location 1, 2 & 3

These are free•form fields that can be used to denote anything from a physical address to map coordinates.

String length is limited to 16 characters (including spaces) in each line.

An example might be:

SNMP Site Location 1	Plant #539, Chch
SNMP Site Location 2	43d29'43" South
SNMP Site Location 3	172d35'12" East

SECURITY SETTINGS TAB

Clicking on the Security Settings will yield this:

The **Port** settings are normally left at 161 & 162. However, if you have any difficulty in receiving Traps when all other settings are correct, choose a different Port on your host computer as sometimes it can be tied up in use by other applications.

SNMP Communities

Communities are used to limit or privatise access to/from the device (SM3x) in 3 functional groups.

The Communities entered in these fields of the SM3x **MUST** match those of you SNMP Manager/Viewer.

SNMP Trap Community

Sets the Community that the alarm Traps can be viewed within.

SNMP Read Community

Sets the Community that the SNMP "Get" values (typically analogue values such as Float Voltage, Load Current etc.) can be viewed within.

SNMP Write Community

Sets the Community that the SNMP "Set" values (analogue values such as Float Voltage, Alarm thresholds, and control items such as enabling Battery Temperature Compensation or perform a Battery Test, etc.) can be altered within.

It is important to note that anyone within this Community will be able to Set critical power system parameters (such as the Float Voltage). For further security, set the SNMP Authorised IP Address as shown below.

SNMP Authorised IP Address

Setting this will only allow the IP address listed here to make Get requests or Set requests based on whether the next two check boxes are enabled.

Leaving as 0.0.0.0 will enable anyone within the Read & Write Communities to perform those functions.

SNMP Authorised IP Address:

Only the IP address entered here will be allowed to Read or Write from/to the device (SM3x) depending on whether the next two check•boxes are ticked.

SNMP IP Restrict Write Enabled:

If this is checked, only the IP address entered in the "SNMP Authorised IP Address" field will be allowed to Write (Set) values to the device (such as alarm thresholds, float voltage etc.).

SNMP IP Restrict Read Enabled:

If this is checked, only the IP address entered in the "SNMP Authorised IP Address" field will be allowed to Read values from the device (such as alarm thresholds, float voltage etc.).

ICMP Ping reply Enabled:

Check this box if you want to be able to "ping" the SM3x.

If this box is NOT checked, then the device will NOT be able to be Pinged (or polled).

SNMP Set Request Enabled:

The agent (SM3x) will accept "Set" requests.

SNMP Agent Enabled:

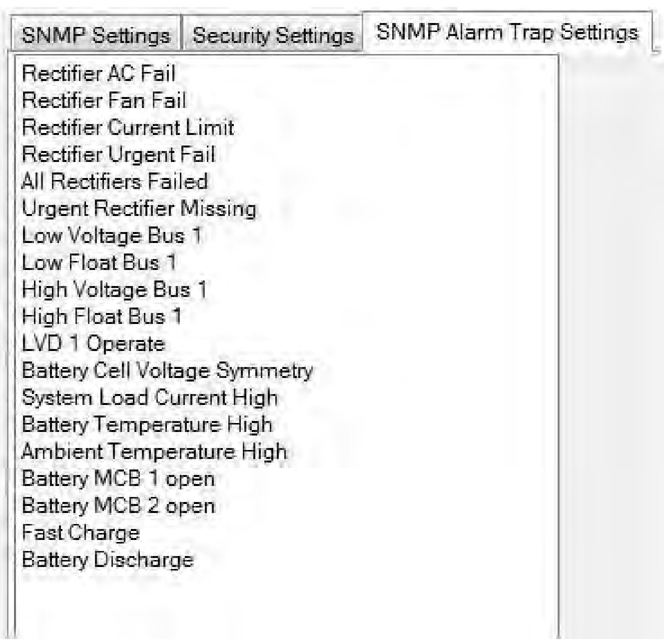
If this box is **NOT** checked, then you will **NOT** be able to access the device via SNMP.

Web Server Enabled:

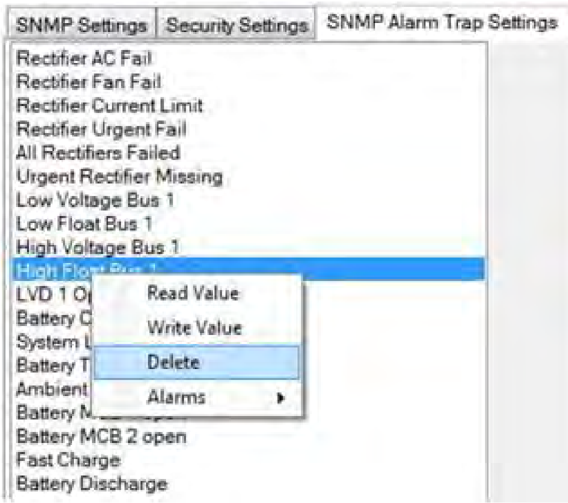
If this box is **NOT** checked, then you will **NOT** be able to access the devices web page server from a Web Browser.

SNMP ALARM TRAP SETTINGS

This tab allows the settings of which internally generated SNMP Traps you would like to be sent to your SNMP Manager. To view the pre•loaded Traps, right•click anywhere in the blank area and click "Read Value" to display the following:



Should you want to **delete** an alarm, right•click on the desired alarm and chose "Delete":



Then right•click and choose “Write Value” to complete the setting.

To **add** an alarm from the Alarm List, right•click on any blank area and choose the desired alarm from the Alarm list.

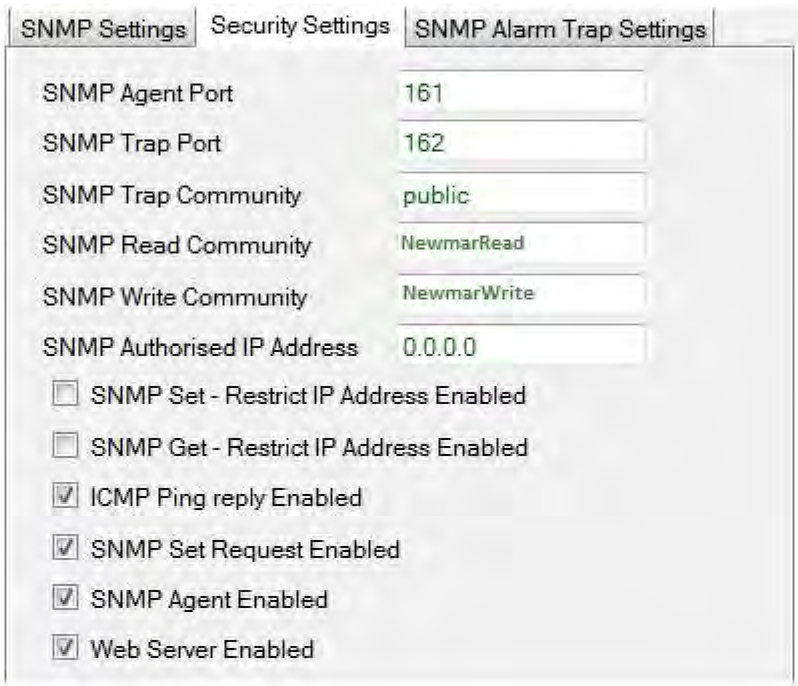
Then right•click and choose “Write Value” to complete the setting.

User Alarms (sent as Traps) and User Traps

Note that in the Alarm list there are two sets of User Alarms. These are **not** the same as the SNMP Traps 1 thru’ 5 under the SNMP Settings tab.

The ability to choose which Traps are sent in this “SNMP Alarm Trap Settings” area was added in SM3x Configuration Utility Version 5.0. Also added was the ability to effectively set up to 32 more User Traps (not just the 5 in the SNMP Settings tab). The “User Traps” set in here will be labelled as “useralarm9”, or “useralarm10” etc. when sent as a Trap, whereas User Traps 1 through 5 will be labelled as a User Trap (1 thru’ 5) when sent.

Security Settings



These are the security settings relevant when SNMP monitoring is enabled.

SNMP Ports

The Agent and Trap Ports are the UDP ports used by the SM3x device for SNMP communications (UDP = User Datagram Protocol, as opposed to TCP = Transmission Control Protocol).

The Agent Port is the Port the SM3x listens for Gets/Sets on, and is the Port the PC (e.g., your computer) transmits on.

The Trap Port is the Port the PC listens on to receive Traps, and is the Port the SM3x transmits the Trap on. It is important that the PC does not have this Port tied up with other applications.

Ports 161 & 162 are part of the standard UDP Ports assigned by the Internet Assigned Numbers Authority (IANA) and are specifically assigned to SNMP and SNMP Traps respectively.

The Ports must be the same at both the Agent (SM3x) and the computer you are communicating from.

It can sometimes occur that the Trap Port on your computer may already be in use by other applications (for example, by default Windows7 appears to use Port 162 for its own SNMP applications), in which case SNMP Traps will not be received. That being the case, you can try changing the Ports, but you must change the Ports at both ends (i.e., the SM3x and your computer).

SNMP Trap Community

This is the community (computer group) connected to the same network as the SM3x that will be able to receive the Traps that are sent by the SM3x device.

The receiving device/computer must also have its IP address entered correctly in the SNMP Settings page.

The computer within this community will use some form of SNMP Manager or Trap receiver to communicate to receive the Traps from the SM3x. Within the SNMP Manager you will be able to set the Trap Community. It is important that you have the same Community within the SNMP Manager and the SM3x. By default, it is set to “public” as there is very little security risk with respect to Traps (i.e., no information is received back to the SM3x from any remote Trap receiver).

SNMP Read Community

This is the community (computer group) connected to the same network as the SM3x that will be able to read SNMP analogue values/settings in the SM3x device.

The computer within this community will use some form of SNMP Manager to communicate to the SM3x using the IP address of the SM3x as the target. Within the SNMP Manager you will be able to set the Read Community. It is important that you have the same Community within the SNMP Manager and the SM3x.

SNMP Write Community

This is the community (computer group) connected to the same network as the SM3x that will be able to write analogue settings to the SM3x device.

The computer within this community will use some form of SNMP Manager to communicate to the SM3x using the IP address of the SM3x as the target. Within the SNMP Manager you will be able to set the Write Community. It is important that you have the same Community within the SNMP Manager and the SM3x.

SNMP Authorised IP Address

See next section paragraph.

SNMP Get & Set Restrict IP Address Enabled

Any computer within the Read & Write Communities specified above is able to Read or Write from/to the SM3x device.

However if an **SNMP Authorised IP Address** is entered, and the check-box ticked, then the Read & Write activities can only be performed from the computer with that IP address.

ICMP Ping Reply Enabled

Tick this check-box to enable the SM3x to reply to a Ping (referred to as a Poll in some SNMP Managers) query.

NOTE: This is turned off by default for security reasons (DoS attacks etc.). So be aware that you cannot Ping the SM3x by default.

SNMP Set Request Enabled

If this is not enabled, then the SM3x will not respond to any Set requests from any remote computer.

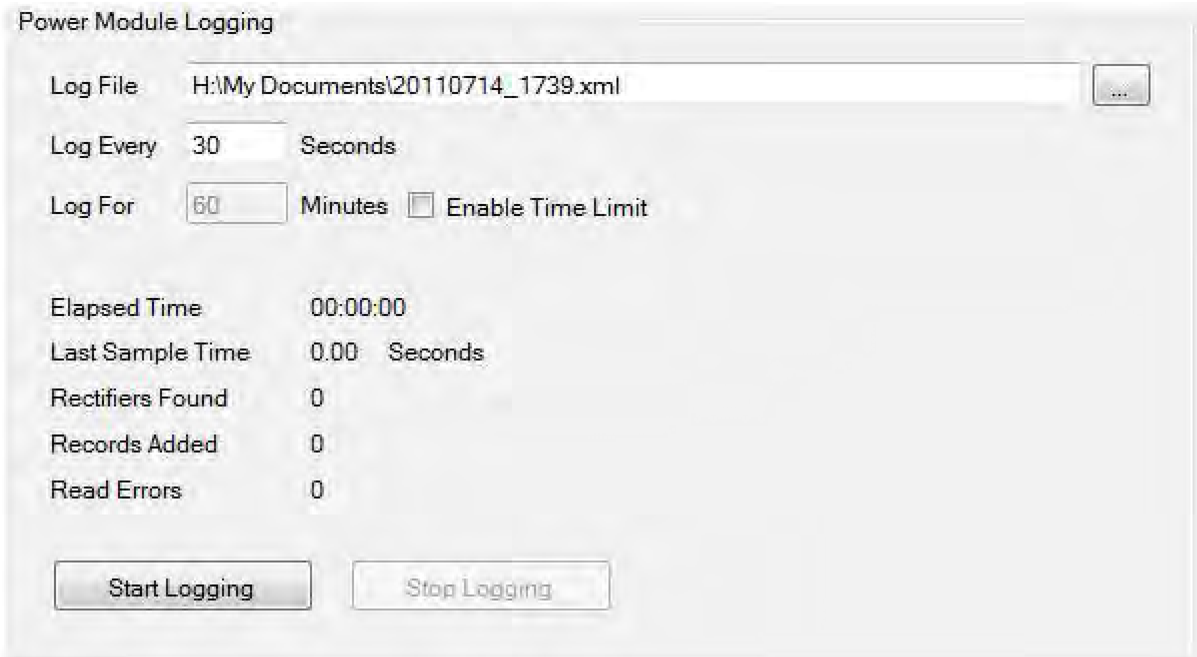
SNMP Agent Enabled

This enables the SM3x to act as an SNMP Agent. This must be enabled for the SM3x to communicate via SNMP.

Web Server Enabled

This enables the SM3x to act as a web server. This must be enabled for the SM3x to communicate via a web browser.

Power Module Logging



This is principally used as a factory application as a method of logging the individual rectifier parameters (voltage, current, temperatures etc.). The individual rectifier parameters are not made available in the other Monitor Logs due to the amount of memory that would be required (especially for large systems).

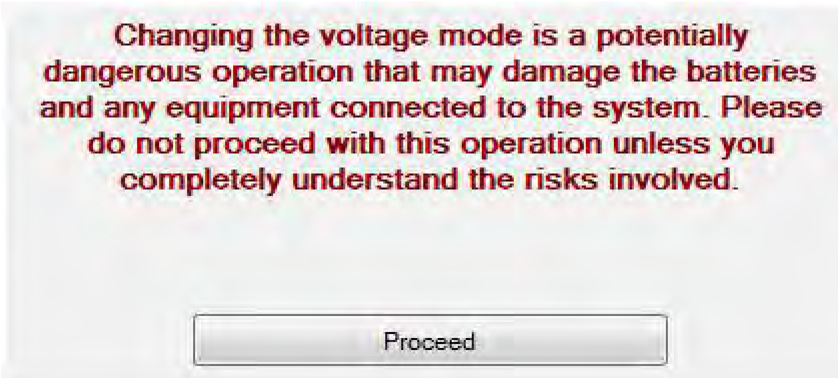
This log stores the rectifier data directly to the connected PC. Hence you must have a computer connected via the USB at all times during this logging process for it to work.

The log is self explanatory, and you can choose the log interval and optionally have a time limit.

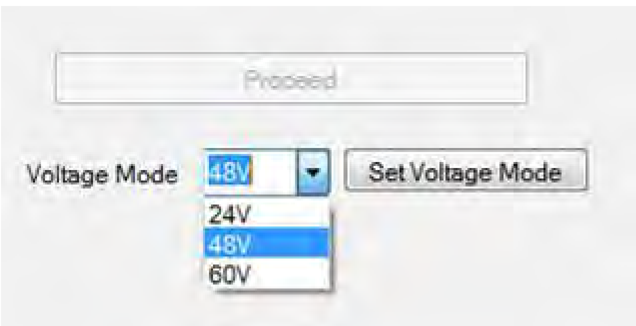
Note that it can take between 0.3 and 0.8 seconds per rectifier to upload its data. So if you have, for example, 18 rectifiers, but have a 10 second log interval, you will lose data. The "Read Errors" are an indication of that lost data. If you are losing data, then simply lengthen the Log interval, however, leaving 1 second per module should cover most situations.

Voltage Mode Switching

Some series of Newmar Rectifier modules are soft-switchable from 60V to 48V or 48V to 24V output, or vice-versa. Of course if this change is made unintentionally, the consequences could disastrous. Hence the following warning appears when you enter this area.



If you choose to proceed you will get the following option choice:



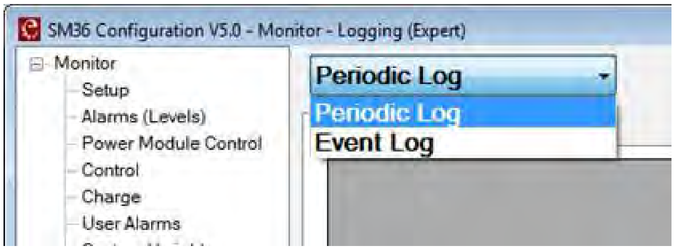
Simply choose the desired output voltage that you require and click “Set Voltage Mode”.

Note that this only changes the Rectifier Module output voltage, it does not change the voltage and alarm settings in the SM3x. So once you have set the rectifier output voltage, you must then set **all** of the SM3x voltage settings. This is easily done by loading in a pre-configured .sm3x file from the Save & Restore section of the Setup page.

Logging

There are three sets of logs available in the SM3x, each with their own memory space.

The Event and Periodic logs are set up and viewed here. The log you would like to view/setup is chosen from the drop-down box as shown here:

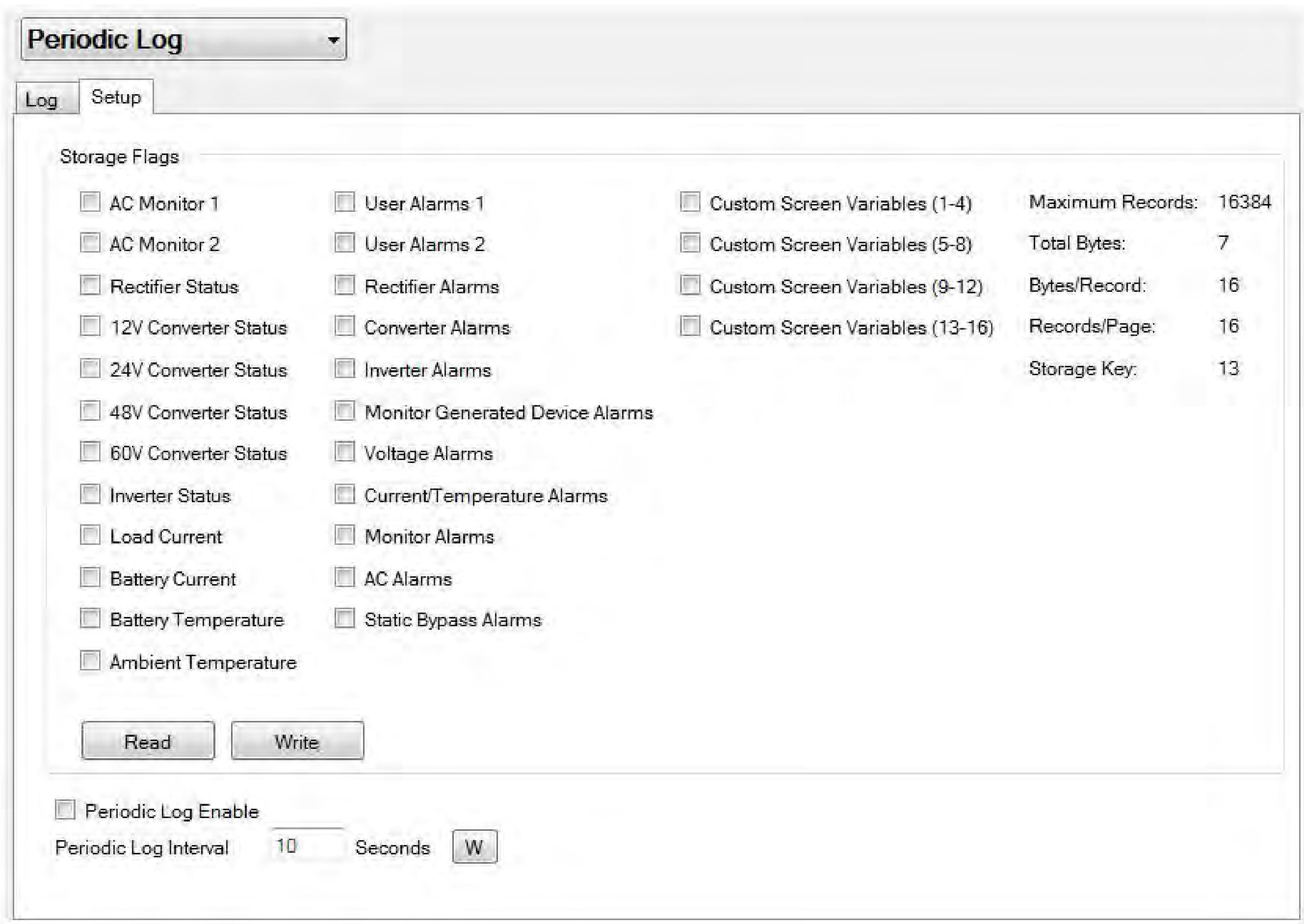


The third log area is the Battery Log. It is set up in the Battery Monitoring area.

Each log can store up to 16,384 records. However, the actual number of events/logs stored depends on how many parameters are monitored for each log event.

Periodic Log

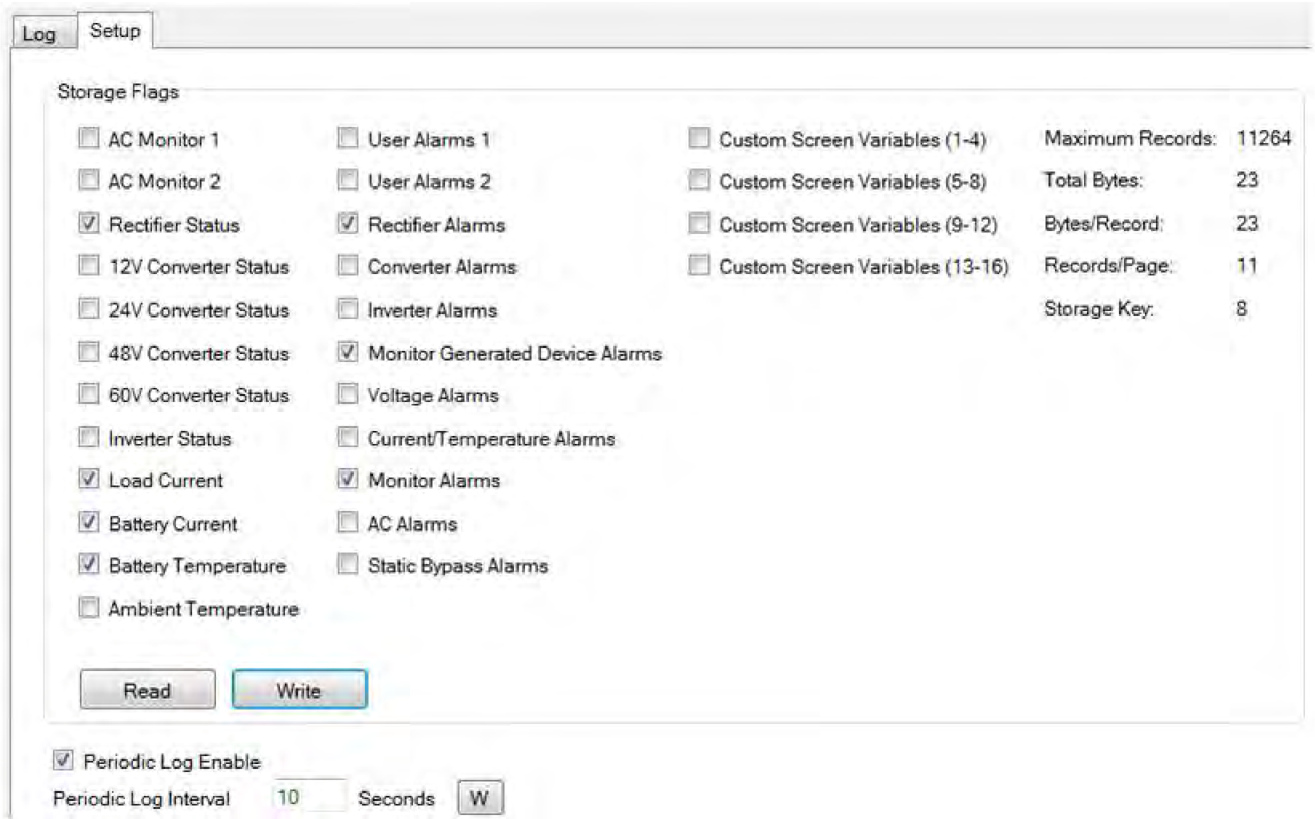
The periodic log will log certain parameters every certain number of seconds as defined in the Setup area. A screenshot of the Setup area is shown here:



Note the maximum number of records shown here is 16,384. To view the pre-set log Setup, click the Read button.

It is normal to set up a Periodic Log to log the system voltage, temperature and currents. It may also be desired to log if there are any alarms present at the time.

A typical setup might look like this:



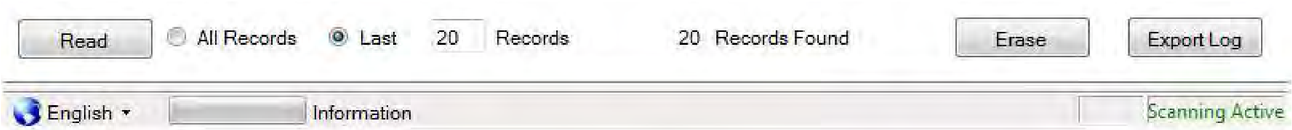
Note that the number of records is now 11,264.

That would give 31.29 hours of data at 10 second intervals.

If the Log Interval is set to 4 per day (interval = 21,600 seconds; perhaps a more realistic long-term setting), then the 11,264 logs equates to 7.7 years.

A very short log interval is often used temporarily to examine system parameters for the purposes of fault finding or initial system characterisation.

To view the log, click on the "Log" tab and at the bottom of the page you will see the following:



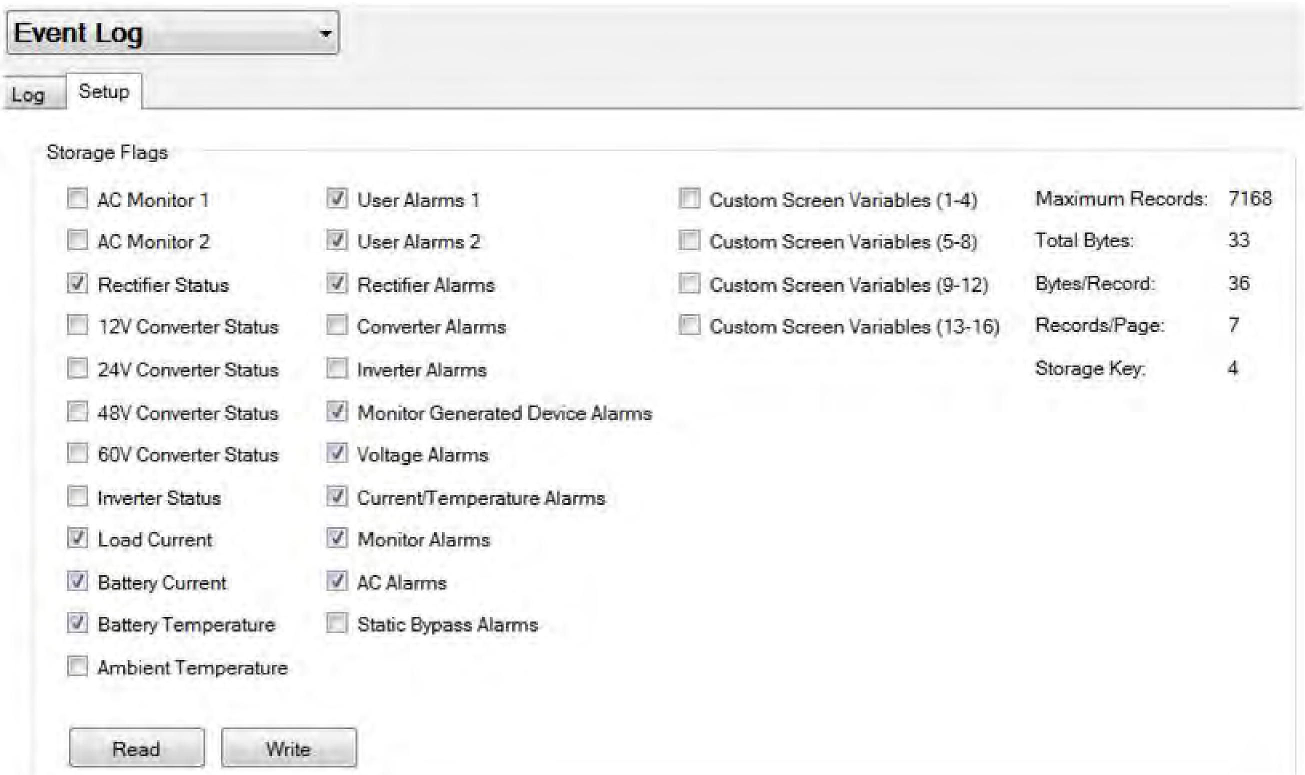
Either click on All Records or the Last number of records (enter how many you would like).

You can Export the log from here too. The log will be exported in .xml form. Note that you must first "Read" the records you would like to export, before you click the Export Log button.

Event Log

The setup for the Event Log is very similar, except that the log entry is triggered only when an event occurs that you would like logged.

So an Event Log setup page might look like this:



Note that with an Event Log you will typically be monitoring many more Alarms than in the Periodic Log. You will probably want to see the system voltage and current etc. levels at the time the alarms occur, hence you see here the Rectifier Status, Load & Battery Current and Battery Temperature.

AC Monitor

Only applicable if the AC Monitor cards are installed (up to two cards maximum).

Logs the AC Input Phase Voltages, Currents (if CTs are installed) and AC frequency.

Rectifier Status

Logs the Rectifier output voltage (labelled System Voltage as this is what the system voltage actually is) and current.

Converter Status'

Logs the relevant Converter (if fitted) output voltage and current.

Inverter Status

Logs the Inverter (if fitted) output voltage and current

Load Current

Logs the Load Current as measured by the SM3x.

In most systems, the load current is often a calculation of the Summed Rectifier Current minus the Battery Current (which is measured from a shunt).

That being the case, you may sometimes see a negative load current as the SM3x monitors the rectifier current by adding all the individual rectifier currents, and then subtracting the measured battery current. As these measurements can have a small time delay between them, if a system's current is changing rapidly, then there may be a small period where the logged rectifier current is not correct. Alternatively, at close to zero values on a large system, you may see a small negative load current.

Battery Current

Logs the Battery Current as measured by the SM3x (usually from a 50mV shunt).

Battery Temperature

Logs the Battery Temperature.

This will only occur if the Battery Temperature is mapped in the Input Configuration to an actual Temperature Sensor input.

Ambient Temperature

Logs the Ambient Temperature.

This will only occur if the Ambient Temperature is mapped in the Input Configuration to an actual Temperature Sensor input.

User Alarms 1

Logs the first 16 User Alarms.

User Alarms 2

Logs the second 16 User Alarms (User Alarms 17 thru' 32).

The User Alarm logging is split in two so that you do not have to log all 32 alarms if you only use a few of them.

Rectifier, Converter Alarms

This will log any of the 14 internal module alarms as shown on the Power Module Status page, if they are active.

Inverter Alarms

This logs any Inverter alarms as they occur. These alarms are:

- Inverter Comms Fail
- Inverter Fail
- Inverter Over Temp
- Inverter Fan Fail
- Inverter Power Limit
- Inverter Input Volts High
- Inverter Input Volts Low
- Inverter Emergency Power Off
- Inverter Output Voltage High
- Inverter Output Voltage Low
- Inverter Negative Power Protection
- Inverter Output Volts Abnormal
- Inverter Sync Pulse Fault
- Inverter Shutdown
- Inverter EEPROM Fail
- Inverter Soft Start Fail

Note that these alarms will show up on the Module Status page when an inverter is fitted to a system and is being addressed.

Monitor Generated Device Alarms

These are all the alarms the SM3x creates that are to do with the power modules attached to it.

For example, the following alarms are considered Monitor Generated Device Alarms:

- Rectifier Non-Urgent Fail
- Rectifier Urgent Fail
- All Rectifiers Failed
- Urgent Rectifier Missing
- Non-Urgent Rectifier Missing
- Converter Non-Urgent Fail
- Converter Urgent Fail
- All Converters Failed
- Converter Missing
- Inverter Non-Urgent Fail
- Inverter Urgent Fail
- All Inverters Fail
- Inverter Missing

Voltage Alarms

These are the alarms as defined in the Voltage Alarms section.

Current/Temperature Alarms

These are the alarms as defined in the Current Alarms and Temperature Alarms section.

Monitor Alarms

These are all the alarms the SM3x creates that are to do with system parameters that are **not** covered by the Voltage/Current/Temperature alarms etc. Examples of these alarms are:

- Power Save Active
- Periodic Equalise
- Manual Equalise
- Fast Charge
- Battery Test
- Battery Discharge
- Battery Test Fail
- Battery Current Limit Active
- System Current Limit Active
- Peripheral Missing
- LVD Fail
- Monitor ADC Fail
- Logic Error
- Monitor Fan Fail
- System Power Limit Active

AC Alarms

These are the alarms as defined in the AC Alarms section.

Static Bypass Alarms

This will log any of the 14 internal module alarms as shown on the Static Bypass Module Status page, if they are active.

Custom Screen Variables

See the Custom Screen Variables section.

You can choose to log the Custom Variables in groups of 4 so that if you are not using all of them you do not take up unnecessary memory space.

Battery Monitoring Logging

Battery Monitor Logging		
☑ Logging Enabled		
Status Log Sampling Interval	60	Days
Discharge Log Sampling Interval	1	Minutes
Discharge Log Continuation Time	30	Minutes

Battery Monitoring Logging can only be activated when some level of Battery Condition Monitoring has been set up.

Note that this **does not** necessarily require an actual BCM card to be fitted. See the section entitled "Creating your own Input Configuration Blocks" in the Input Configuration help file for an example of how to set up the BCM function when there is no BCM card fitted.

Status Log Sampling Interval

This is a Periodic log for the batteries. At every time interval entered here the SM3x will log key values of the battery monitor. An example of the log is here:

Time	Minimum Charging Current	Maximum Charging Current	Average Charging Current	Minimum Discharging Current	Maximum Discharging Current	Average Discharging Current	Minimum Temperature	Maximum Temperature	Average Temperature	Time Above 25°C
30/06/2011 5:11:29 p.m.	0.1A	0.5A	0A	0.5A	5.8A	0A	22.9°C	27.4°C	25.9°C	4hours
5/05/2011 12:44:39 p.m.	0.4A	0.4A	0A	7.1A	7.1A	0A	23.9°C	24.3°C	23.8°C	0hours

Discharge Log Sampling Interval

The Discharge Log is automatically triggered every time a battery discharge occurs.

The SM3x recognises a battery is in discharge when the Battery Discharge Threshold in the Current Alarms on the Alarms (Levels) page is exceeded:

Current Alarms		
Load Current High Alarm Setpoint	40	A
Charge Current High Alarm Setpoint	40	A
Battery String Current High Alarm Setpoint	25	A
Battery String Current Imbalance Threshold	10	A
Battery Discharge Threshold	-5	A

The example shown here has the threshold set to -5A.

Discharge Log Continuation Time

This is the amount of time the Discharge Log will continue logging the battery parameters **after** the AC power has been restored.

This allows the user to log the recharge characteristics of the batteries.

Relating Log Size to Number of Discharges Recorded

The amount of data recorded will depend on the configuration of the battery monitor inputs. Below is a table listing the total number discharges that can be logged for various system configurations. For systems without individual current and temperature readings the maximum number of records stored will increase.

Strings	Measure-ments per String	Total # Volt Measure-ments	# Current Measure ments	# Temp. Measure-ments	Total # Measure-ments	# Bytes required per Line (record)	Total # Records		Dis harge Length (hours)	Log Interval (minutes)	Total # Discharges Recorded
2	4	8	2	2	12	24	20833		1	1	347.2
2	4	8	2	2	12	24	20833		2	1	173.6
2	4	8	2	2	12	24	20833		4	1	86.8
2	4	8	2	2	12	24	20833		2	2	347.2
2	4	8	2	2	12	24	20833		4	2	173.6
2	4	8	2	2	12	24	20833		2	3	520.8
2	4	8	2	2	12	24	20833		4	3	260.4
2	4	8	2	2	12	24	20833		2	5	868.0
2	4	8	2	2	12	24	20833		4	5	434.0
4	4	16	4	4	24	48	10416		1	1	173.6
4	4	16	4	4	24	48	10416		2	1	86.8
4	4	16	4	4	24	48	10416		4	1	43.4
4	4	16	4	4	24	48	10416		2	2	173.6
4	4	16	4	4	24	48	10416		4	2	86.8
4	4	16	4	4	24	48	10416		2	3	260.4
4	4	16	4	4	24	48	10416		4	3	130.2
4	4	16	4	4	24	48	10416		2	5	434.0
4	4	16	4	4	24	48	10416		4	5	217.0
8	4	32	8	8	48	96	5208		1	1	86.8
8	4	32	8	8	48	96	5208		2	1	43.4
8	4	32	8	8	48	96	5208		4	1	21.7
8	4	32	8	8	48	96	5208		2	2	86.8
8	4	32	8	8	48	96	5208		4	2	43.4
8	4	32	8	8	48	96	5208		2	3	130.2
8	4	32	8	8	48	96	5208		4	3	65.1
8	4	32	8	8	48	96	5208		2	5	217.0
8	4	32	8	8	48	96	5208		4	5	108.5
8	4	32	8	8	48	96	5208		8	1	10.9
8	4	32	8	8	48	96	5208		8	5	54.3
2	24	48	2	2	52	104	4807		1	1	80.1
2	24	48	2	2	52	104	4807		2	1	40.1
2	24	48	2	2	52	104	4807		4	1	20.0
2	24	48	2	2	52	104	4807		1	2	160.2
2	24	48	2	2	52	104	4807		2	2	80.1
2	24	48	2	2	52	104	4807		4	2	40.1
2	24	48	2	2	52	104	4807		1	3	240.4
2	24	48	2	2	52	104	4807		2	3	120.2
2	24	48	2	2	52	104	4807		4	3	60.1
2	24	48	2	2	52	104	4807		1	5	400.6
2	24	48	2	2	52	104	4807		2	5	200.3
2	24	48	2	2	52	104	4807		4	5	100.1
4	24	96	4	4	104	208	2403		1	1	40.1
4	24	96	4	4	104	208	2403		2	1	20.0
4	24	96	4	4	104	208	2403		4	1	10.0
4	24	96	4	4	104	208	2403		1	2	80.1
4	24	96	4	4	104	208	2403		2	2	40.1
4	24	96	4	4	104	208	2403		4	2	20.0
4	24	96	4	4	104	208	2403		1	3	120.2
4	24	96	4	4	104	208	2403		2	3	60.1
4	24	96	4	4	104	208	2403		4	3	30.0
4	24	96	4	4	104	208	2403		1	5	200.3
4	24	96	4	4	104	208	2403		2	5	100.1
4	24	96	4	4	104	208	2403		4	5	50.1

Note: BCM Log is separate memory space in the SM3x to the Event & Periodic Logs. The Event Log is a separate memory space to the Periodic Log. Hence, each log can be utilised to the maximum, independently of each other.

Retrieving Log Data

Discharge data is available from the “Battery Discharge Log” webpage or from the “Battery Monitoring Logs” page of SM3x Configurati Utility.

When you “Save Discharge Log to File”, make sure you first “”Read Discharge Log”. The file format the log is saved in is .html.

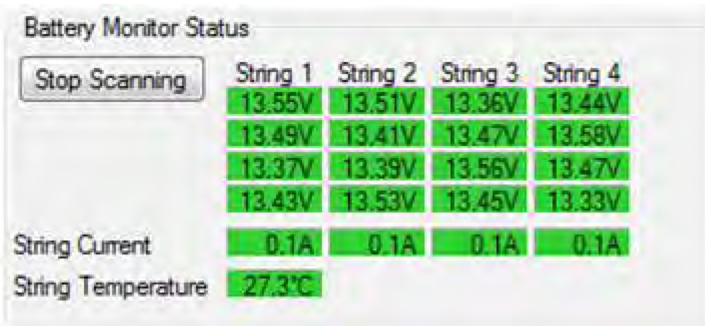
The data can also be retrieved using either of the access options to enable the creation of a visual representation of the batteries cond in any basic data analysis package, or simply on Microsoft Excel. Newmar has written a Visual Basic Macro to make plotting the data sim This is explained in the flowing section.

Battery Monitor Status

This screen displays the voltages and currents of the batteries when Battery Monitoring is set up (see the Battery Condition Monitor manual for details on setting up the BCM function).

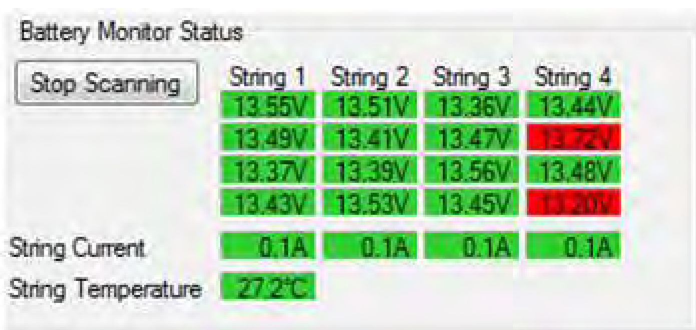
This screen is also displayed on the Monitor page when you hover of the I_{batt} field.

Below is a typical example for a 48V system set up with 4 strings of 12V monoblocs, one current shunt in each string, and one temperature sensor:



A Battery Cell Voltage Symmetry alarm is raised if any two cells (in this case monoblocs) in a string differ in voltage by the amount entered in the Battery Symmetry Threshold voltage alarm.

An example of a voltage symmetry alarm being displayed on this screen is shown here:



In this example the symmetry alarm was set to 0.5V, and blocs 2 & 4 of String 4 differ by 0.52V.

Static Bypass Module Status

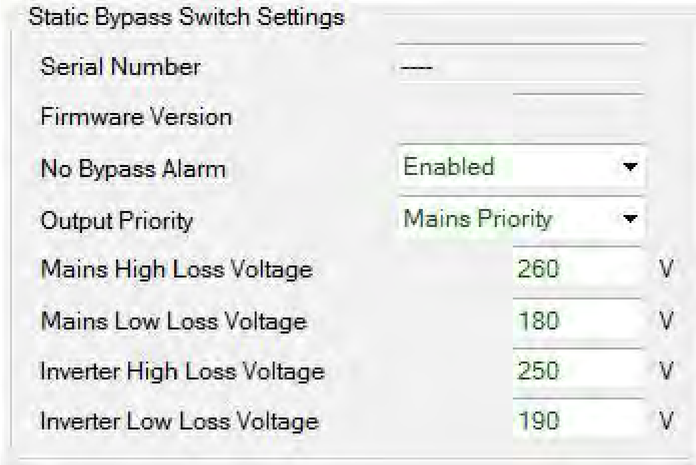
This section is only relevant when you have the Newmar Inverter and Static Bypass modules as part of your power system.

If the Status screen does not fill out when you first view this page, click on the Start Scanning button.

The items displayed on the Status page are all reasonably self-explanatory. See the Inverter Manual (entitled "Newmar Modular Inverter System") for more detailed information about the Static Bypass module (connection details etc.).

See also the Static Bypass Switch Settings help file.

Static Bypass Switch Settings



The Static Bypass Module (SBM) Serial Number and Firmware version are displayed by default when the SBM is connected to the system (note that the Inverter systems communicate to the SM3x via a communications converter card, Newmar part “AIPC”).

Note that settings on this page are **not** saved in the .sm3x Configuration File as these are settings stored in the bypass module itself.

No Bypass Alarm

The SBM raises an alarm if it detects that no AC input to it is available. With this No Bypass Alarm Enabled, the SBM will not issue this alarm. This is used when you do not want to “double-up” on an “AC Fail” alarm that may already be issued by the SM3x.

Output Priority

This selects the AC Input that is used during “normal” operation (i.e., when AC input is present to the whole system). The choices are Mains or Inverter Priority.

On Mains Priority the AC output from the Inverter System will be the AC grid. This is usually the case.

On Inverter Priority, the Inverter System AC output will be derived from the Inverters. This is usually used if the AC input is of poor quality and requires conditioning/filtering. This mode is less efficient as you will incur the efficiency losses of the rectifiers and the inverters (totalling 15% to 20%).

Mains High/Low Loss Voltage

These are the thresholds at which that the SBM will switch over to the Inverter output.

Inverter High/Low Loss Voltage

These are the thresholds at which the SBM will switch over to Mains output (if AC mains is present).

Generator Control

Newmar Generator Control is unique and involves proprietary feedback and control routines that give it competitive benefits to our opposition in terms of dynamic generator load control.
As such, detailed help for the Generator Control is only available by special request.
Additional to this, it should be noted that from the Generator Control screen the other features are:

- 2x Start/Stop periods programmable per day
- Start/Stop based on Bus voltage
- Start/Stop based on Battery (Capacity) Ahrs
- Extended charge capability
- Generator run hours logged