DEEP SEA ELECTRONICS

Giving you the power to control

P808 For Windows ™

SOFTWARE MANUAL

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TABLE OF CONTENTS

Section **Page**

INTRODUCTION - ALL OPERATING MODES

DESCRIPTION

The DSE **808** Configuration interface allows the 51x, 52x, 53x, 54x and 560 family of modules to be connected to a PC. Once connected the various operating parameters within the module can be viewed or edited as required by the engineer. This software allows easy controlled access to these values and also has diagnostic monitoring facilities.

The Configuration interface should only be used by competent, qualified personnel, as changes to the operation of the module may have safety implications on the panel / generating set to which it is fitted.

The information contained in this manual should be read in conjunction with the information contained in the appropriate module documentation. This manual only details which settings are available and how they may be used. The operation of the module is detailed in its own relevant manual.

Access to critical operational sequences and setting for use by qualified engineers, are barred by a security code. Timers are protected by a separate code allowing operator changes to be made.

The interface is housed in a plastic case terminated in a standard 25 pin D type RS232 connector. It is supplied with an adapter cable to allow connection the 9 pin D type RS232 connectors as required. Connection to the module is via an FCC 68 'Telephone handset' type cable, this allows for easy replacement in the field should the connecting lead be damaged or lost.

CLARIFICATION OF NOTATION USED WITHIN THIS PUBLICATION.

NOTE:	**Highlights an essential element of a procedure to ensure correctness.**
CAUTION!:	**Indicates a procedure or practice which, if not strictly observed, could result in damage or destruction of equipment.**
WARNING!:	**Indicates a procedure or practice which could result in injury to personnel or loss of life if not followed correctly.**
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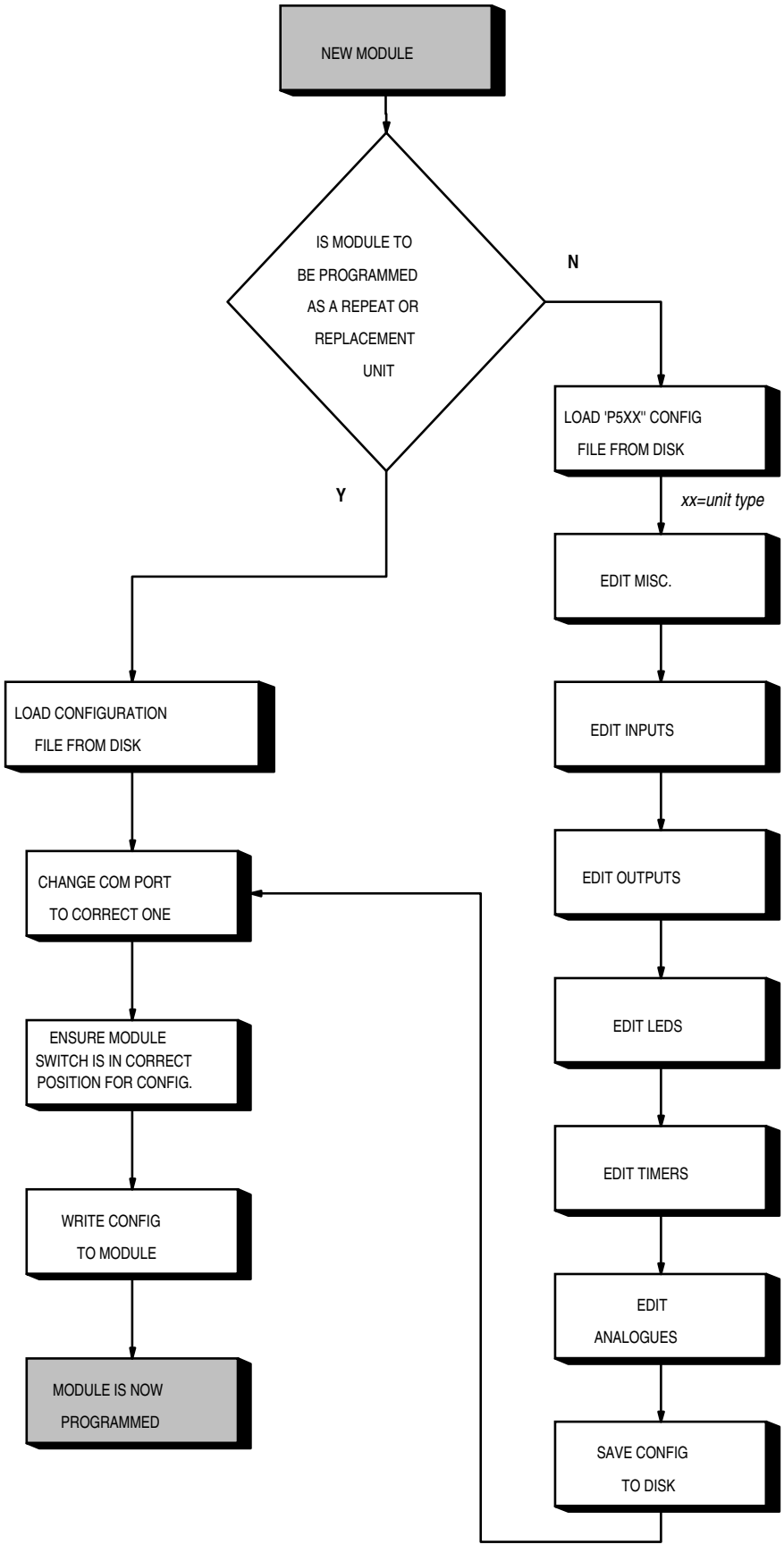
MANUAL STRUCTURE

This manual is designed to assist users of the P808 for Windows software, this is the common configuration software for all modules P51x,P52x, P53x, P54x and 560. All software operations such as file handling (loading and saving to disk, reading from and writing to the module) and printing are identical regardless of the module being configured.

Only when editing the settings for a particular module is the user presented with a screen dedicated to that module type. For this reason the manual has separate 'Edit Menu' sections for each of the module types. Please refer to the appropriate specific section when configuring a given module type. The none specific sections should then be referred to once the actual editing of values is completed.

CONFIGURATION OVERVIEW



XX = Unit Type i.e. 511,512,520,521,530,540, 560, etc

PC INTERFACE MODULE 808

The PC interface **808** kit comprises the following:-

- **808** Interface Module
- 25 to 9 way adapter
- FCC 68 (4 Pin) Connecting Lead
- Floppy disc(s) with configuration software or Software CD

INSTALLATION INSTRUCTIONS

MINIMUM SYSTEM REQUIREMENTS

Processor	*486 66Mhz*
Operating System	*Windows 95/98/2000, Windows NT, XP*
Ram	*16Mb*
Monitor	*14 inch SVGA (640x480 resolution)*
Fixed disk	*10Mb free (80Mb minimum)*
Disk drive	*3 ½ " for software installation or CD-ROM drive*
Communications	*An RS232 comms port is needed to communicate with the 808*

INSTALLING 'P808 FOR WINDOWS™' PROGRAM FROM SOFTWARE CD – (WINDOWS95/98/NT/2000/XP)

NOTE:- As P808 for Windows™ is a 32-Bit application it will not operate on Windows 2.0, 3.0, 3.1 or 3.11.

NOTE:- Exit all other programs before installing the P808 for Windows™ software. It is recommended that any earlier releases of the software are uninstalled prior to installing this version.

Insert the Software CD into the CD-ROM drive on the PC. The CD should then Auto-run.

Alternatively

Double click on **My Computer :**

Then double click on **CD-ROM Drive:**

There will be a short delay while the CD-ROM is accessed, then the install program will run

Click on the '*P808 for Windows* ' button to install the software onto your PC in its own folder (directory). It will also create 'START MENU' items.

NOTE:- As P808 for Windows™ is a 32-Bit application it will not operate on Windows 2.0, 3.0, 3.1 or 3.11.

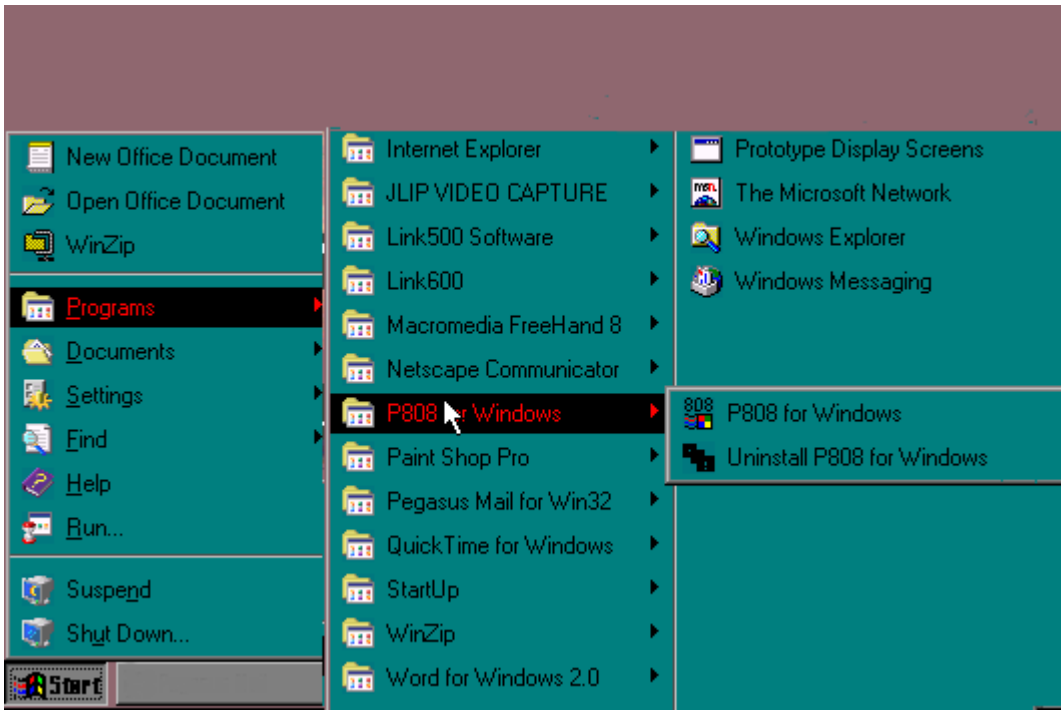
NOTE:- Exit all other programs before installing the P808 for Windows™ software. It is recommended that any earlier releases of the software are uninstalled prior to installing this version.

TO RUN P808 FOR WINDOWS PROGRAM

Press the :

Start

And then select 'Programs' - '*P808 for Windows*' as shown below:-



Note:- Alternatively locate the 'P808 for Windows' Directory on your hard drive and Click on the icon:-

The password page will appear.

The software provides three levels of password protection. The first level is the operator level, if the operator password is entered it will only be possible to Edit the Timers not the module configuration. Also operator level only allows the creation of new configuration files, existing files cannot be over-written. The second level of password protection is the Engineering Level, if this password is entered all of the module functions can be configured and the access passwords can be changed.

It is intended that the engineering password be given to qualified engineers who are responsible for initial configuration of the unit, or modification of settings at a later stage.

The operator password is intended to be given to personnel who will not need to alter the configuration of the module, but may need to visit a controller and modify timer settings, record these changes in a new file and view diagnostic information from the module.

The final level is the Mimic level, if the password '*MIMIC*' is entered the software will display the diagnostic mimic display. None of the module values can be altered and no software settings can be changed. This password is intended for use in situations where the PC is being used for remote monitoring and it is not desirable to allow access to any parameters.

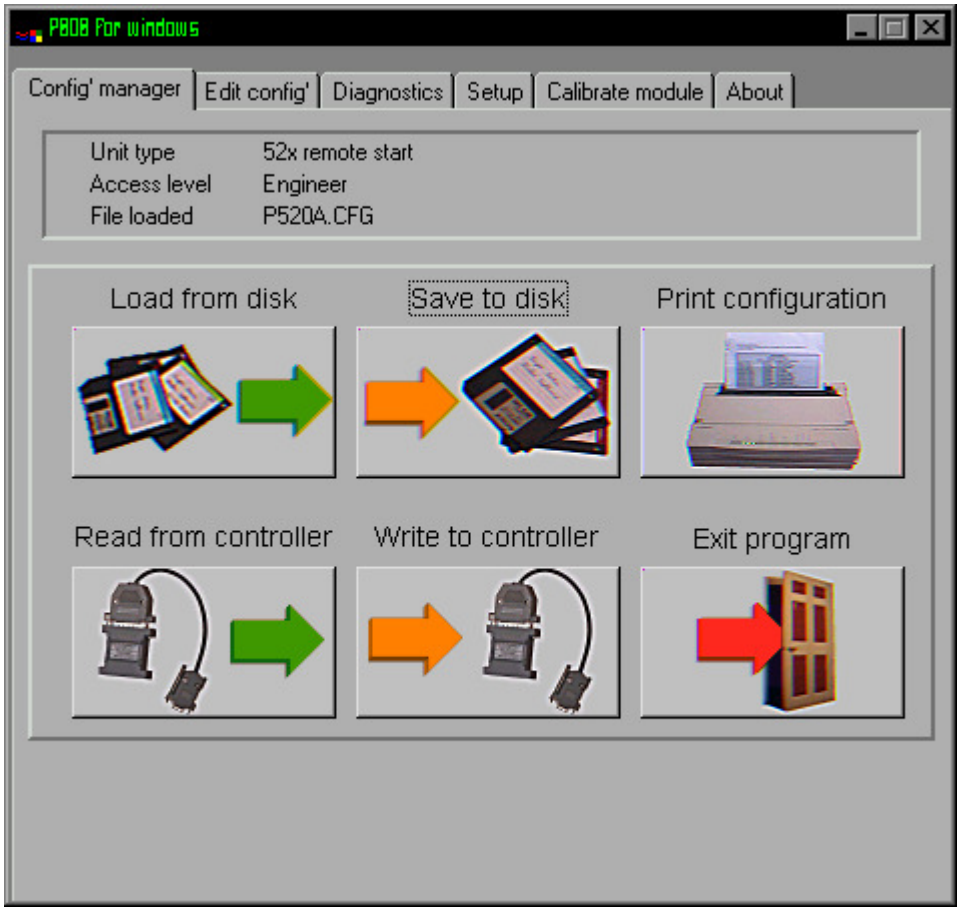
Users without a password will not be able to gain access to the software at all.

Enter the correct password for the required access level then; Click 'OK' or press the ← key.

⚠NOTE:- The default passwords are blank and when a password is requested, Click 'OK' or press the ← button.

The screen will then display:-

Once loading the '***Main***' Menu is now displayed.



Unit Type:- This indicates the type of module for which the P808 for Windows software is currently configured. This will automatically be selected to the correct module when a configuration file is 'Loaded' from disk or 'Read' from the module. It can also be changed from the '*Setup*' menu.

Access Level:- This indicates the level of access gained by the password typed to enter the program.

File Loaded:- This indicates name of the configuration file currently loaded into the P808 for windows program. If the configuration was 'Read' for the module then '*FROM MODULE*' will be displayed.

Load from Disk:- This is used to load an existing configuration from disk into the P808 for windows program. The file could then be edited (if required) and then 'Written' to the module. To load a file; simply click this button and enter the name of the file to be loaded in the dialog box. Then click 'OK'. The '*File Loaded*' will then be indicated.

Save to Disk:- This is used to save the current configuration file to disk. The required filename for the configuration can be typed in the dialog box. Then click 'OK'.

Print Configuration:- This is used to produce a print-out of the current configuration. You will be prompted to enter a title for the print-out (to allow it to be easily identified) and for your name. A list of all the settings will then be produced.

Read from Controller:- This is used to 'Read' the configuration which exists in the module. The module must be connected to the PC via the 808 interface and have a DC supply feeding it. It is possible to read from the module while the generating set is running. Clicking the 'Read' button will transfer the current configuration to the P808 for windows program to allow the setting to be inspected or modified.

Write to Controller:- This is used to write a new configuration to the module. To write to the module it must be connected to the PC via the 808 interface and be fed from a suitable DC supply. Additionally the module must be in the correct operating mode in order for re-configuration to the accepted.

Should the module not be ready to receive data i.e. On 52x & 560 modules; the switch is not in the 'OFF' position or it senses that the engine is running a message at the bottom of the screen will be displayed, steps should then be taken to ensure that the engine is at rest and the switch is in the 'OFF' position before attempting to write to the module. On 51x modules; the switch must be in the 'RUN' position with the engine at rest, if it senses that the engine is running a message will be displayed, steps should then be taken to ensure that the engine is at rest and the switch is returned to the 'RUN' position before attempting to write to the module

NOTE:- On 53x modules the key may be in any position sending a configuring. Care should be taken to ensure that the module is configured only when it is safe to do so. I.e. Mains on load and generator running. This is to prevent the possibility of a corruption during configuration causing the 53x module to drop the generator load.

Exit:- This is used to exit the P808 for windows program and return to windows. If any config files are open which have not been saved, the a software will query if it is OK to continue or if they need to be saved.

EDIT CONFIGURATION TAB

This menu allows the module configuration to be changed, such that the function of Inputs, Outputs and LED's can be altered. System timers and level settings can also be adjusted to suit a particular application.

Access to the various configuration parameters depends on the password entered when the program was started. If the Operator password was entered, then selecting the Edit Configuration option will take the user directly to the Edit Timers page as this is the only editable section with operator level clearance.

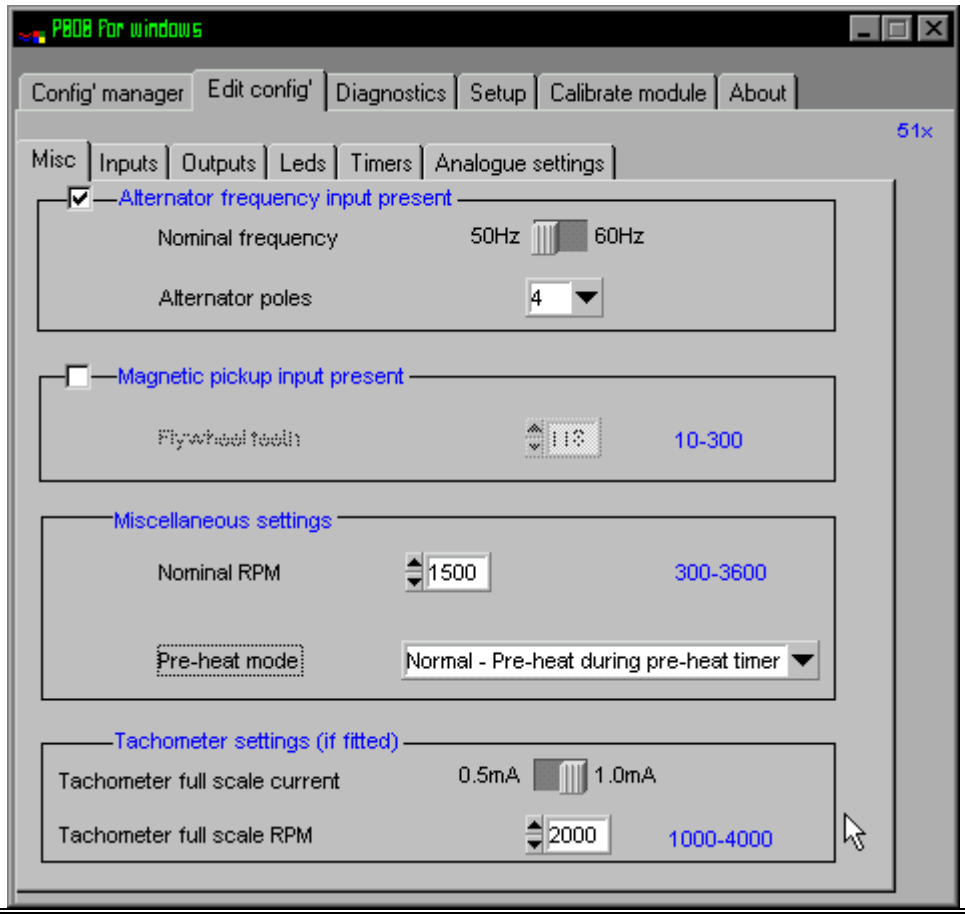
If the Engineering level password was entered then full access to the settings is possible.

NOTE:- The sub-menus are tailored to which-ever module type is selected. Therefore only options applicable to a 51x will be displayed if configuring a Manual-start module, and options applicable to a 52x will be displayed if configuring an Auto-start module, etc.

51X KEY-START MODULE EDIT MENU

EDIT MISCELLANEOUS ITEMS

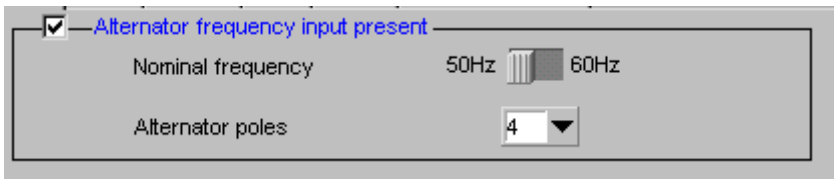
This menu allows the user to change the nominal operating parameters and also select the modules special operating modes, according to individual requirements. The following is displayed:



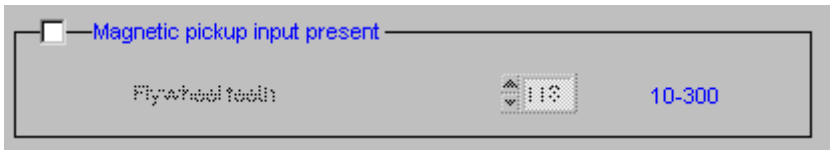
NOTES:-

The 51x modules are built at the factory as either Magnetic Pick-up speed sensing or Alternator Speed sensing; this is indicated on the module case. For correct operation of the module the correct setting must be configured to match this. To aid selection the Alternator sensing/ Magnetic pick-up selector toggles between the two, allowing only one to be selected or both turned off.

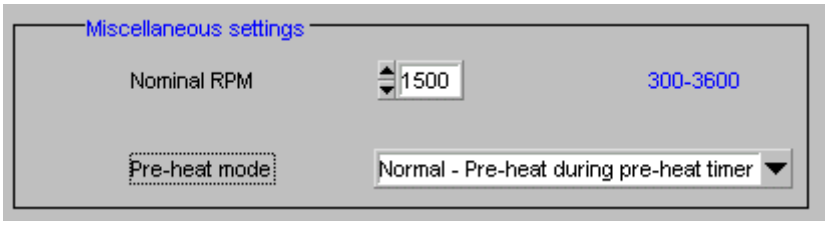
MISCELLANEOUS DESCRIPTION



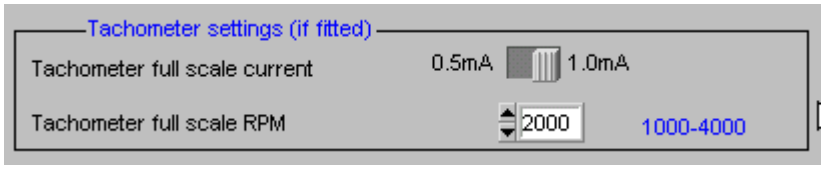
Item	Function
Alternator frequency input present	This selects whether the module is to receive an input from the generator alternator. If ticked then the following settings will also be enabled. If not ticked then the settings will be disabled and appear 'greyed' out.
Nominal Frequency	If alternator frequency sensing is used this setting selects the nominal frequency from the alternator. This may be either 50 or 60 Hz.
Alternator Poles	This is the number of poles on the alternator, the value is only required if the meter option is fitted to the module, as it is required to calculate the RPM of the engine if alternator output sensing only is being used.



Item	Function
Magnetic Pickup input present	This selects whether the module is to receive an input from the magnetic pickup. If ticked then the following setting is enabled. If not ticked the setting is 'greyed' out.
Flywheel teeth	This value is the number of teeth on the flywheel which are detected by the magnetic pickup. This is used to determine the engine RPM and is only required if magnetic pickup input speed sensing is to be used.



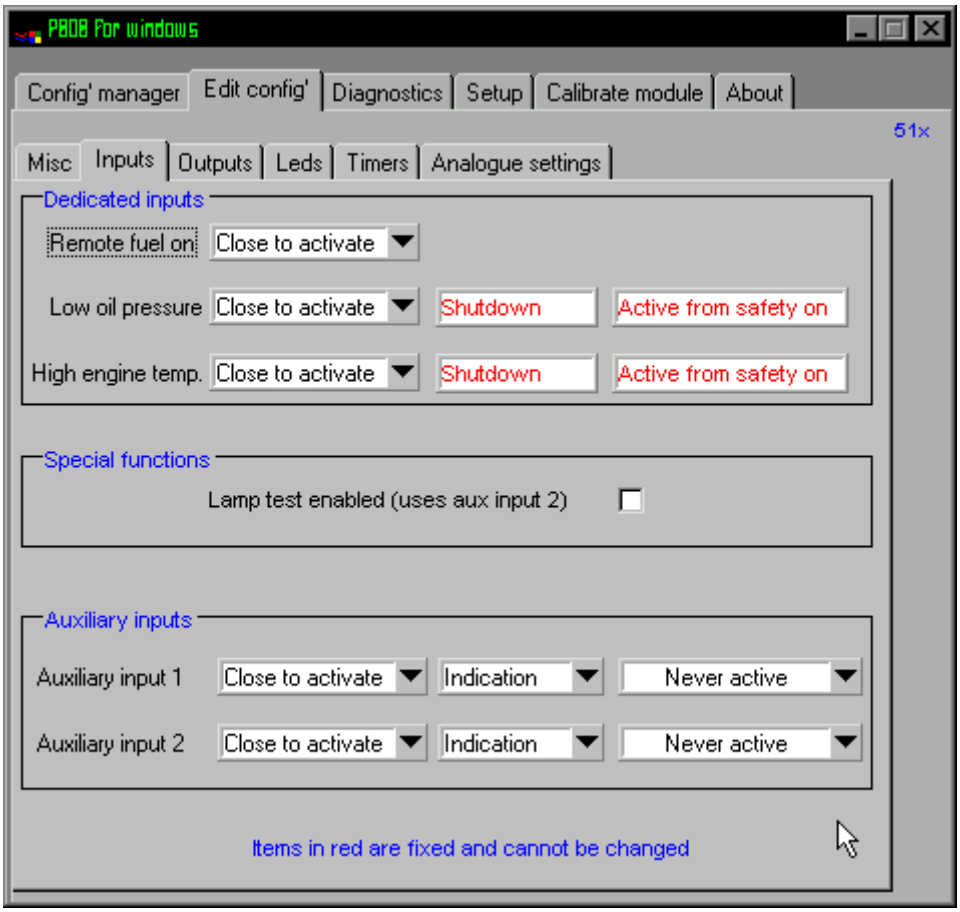
Item	Function
Nominal RPM	This is the nominal engine speed value. It is used when the meter option is fitted to the module to allow the meter to be calibrated at nominal RPM.
Pre-Heat Mode	This setting is used to select how the pre-heat output is to operate as different engines may require different amounts of pre-heat. The modes available are:- **NORMAL** - Pre-heat output is available for the duration on the pre-heat timer which terminates prior to cranking. **MODE 1** - As normal mode but pre-heat is also available during cranking. **MODE 2** - As mode 1 but pre-heat is also available while waiting for the delayed alarms to become active.



Item	Function
Tachometer full scale deflection	This is only used if the meter output option is fitted to the module. The setting selects if the meter is a 0.5mA or 1.0mA full scale deflection tachometer.
Tachometer full scale RPM	This is only used if the meter output option is fitted to the module. The setting indicates what the value the full scale will read, up to a maximum of 4000rpm.

EDIT CONFIGURABLE INPUTS

This menu allows the configurable inputs to be changed to suit the users requirements. The following is displayed:-



NOTE:- The two auxiliary inputs have the same selection choices, allowing flexibility of selection to be made i.e. 2 Indications, 2 Warnings, 2 Shutdowns or any combination. The Remote Fuel on input may be used to provide a second manual start position remote from the module. The operating sequence is described in the appropriate manual.

POLARITY

The polarity of the input switching can be configured to be either **"Close to Activate"**, this is a Normally open switch, and closes to negative when activated. or **"Open to Activate"**, this is a Normally Closed switch to negative, and opens when activated.

TYPE

The auxiliary inputs can be configured to be either **Indication** (annunciation only, no alarm or shutdown), **Warning** (Alarm only, no shutdown), or **Shutdown**. Those items shown in red (Dark grey in this manual, with-out a small ⬣ next to them) are not configurable.

Lamp test enabled
This setting is used to configure one of the inputs to provide a lamp test function. This option configures **input 2** such that providing a signal to the input will cause all LED's to illuminate until the signal is removed.

CAUTION!:- Selecting this option will re-configure Input 2 as 'Lamp Test'. Ensure that Input 2 is not configured for any other required function before selection.

ACTIVATION TIME
The activation time of each auxiliary input can be configured to be any of the following:-

a) Never active
This switches off the input, good practice if the input is not in use.

b) Always active
The input is selected to be always monitored, therefore any alarms occurring would trigger immediately.

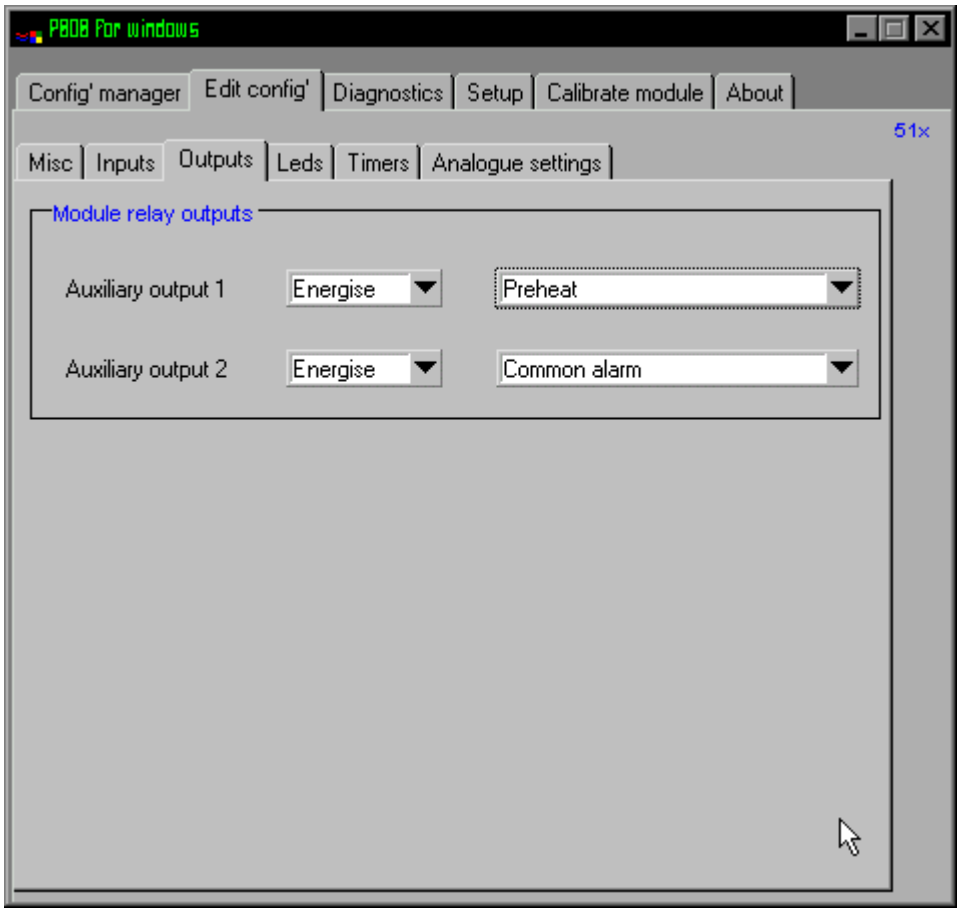
NOTE:- The input is only active when 'Run' is selected from the key-switch.

c) Active from starting
Auxiliary inputs are only active once an attempt to start the generator is made. It will remain active until the generator is at rest again.

d) Active from safety on
Auxiliary inputs are only active once the **Safety On** timer has timed out. This allows a delay on start up for two stage faults, such as Oil Pressure and High Engine Temperature Warnings, or other shutdown conditions which require a delay during start-up, such as Under-voltage.

EDIT RELAY OUTPUTS

This menu allows the configurable output to be changed to suit the users requirements. The following is displayed:-



NOTE:- Each Auxiliary output has the same selection choices, allowing a combination of different uses.

POLARITY

Each of the outputs can be configured as:

a) Energised

Normally open relay contact which closes on activation.

b) De-energised

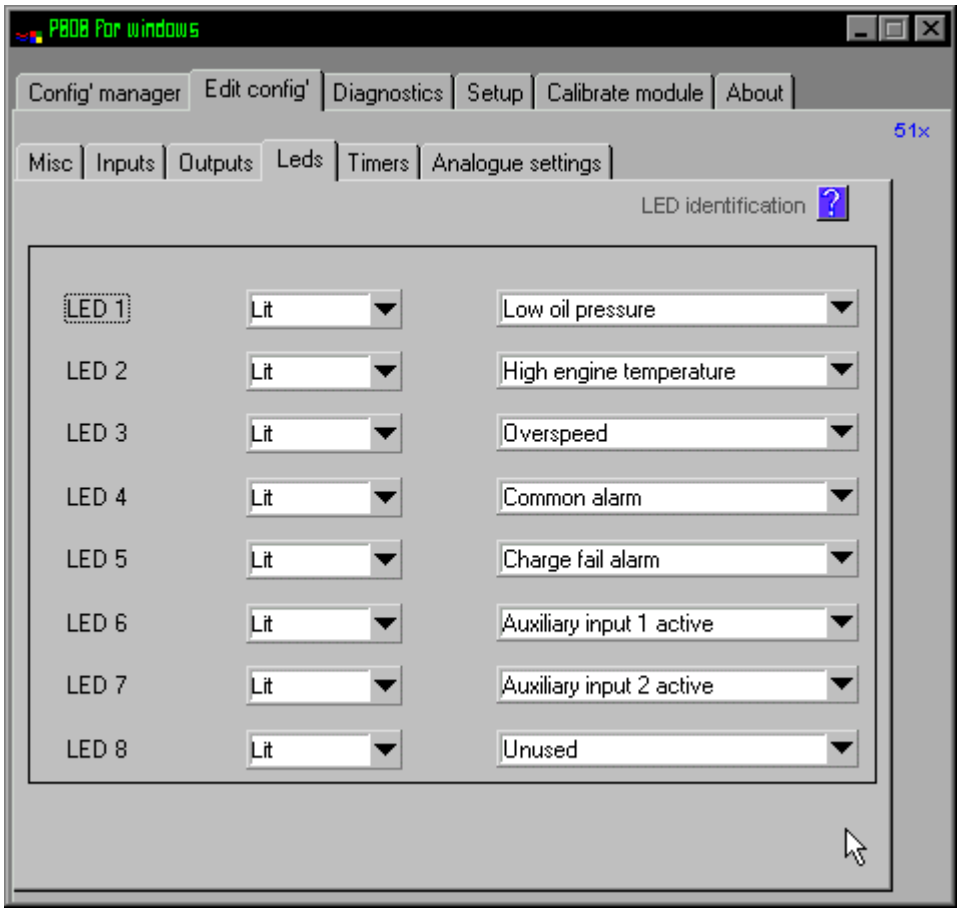
Normally closed relay contact which opens on activation or power loss (including switch to 'OFF').

OUTPUT SELECTION

Function	Description
Unused	The output is not used.
Auxiliary input 1 active	The output indicates that auxiliary input 1 is active.
Auxiliary input 2 active	The output indicates that auxiliary input 2 is active.
Charge fail alarm	The output indicates that the voltage output from the **WL** of the Charge Alternator has fallen below the level set in the **Edit Levels Menu**. A charge fail warning alarm has been initiated.
Common alarm	The output indicates that a warning **or** shutdown alarm has been activated. Reset rules as above, depending on whether it is a Warning or a Shutdown fault.
Delayed alarms on	The output indicates that the delayed alarms are now enabled. Can be used to control external logic circuitry.
Emergency stop alarm	The output indicates that an Emergency Stop has been initiated. i.e. removal of the +ve DC Supply from Input 3.
Fail to stop alarm	The output indicates that the generator has failed to stop within the time period selected in the **Edit Timer Menu**. The module monitors that the oil pressure has gone low and that the speed sensing source detects no movement of the generator to establish that the generator has stopped. (*Only applicable to Remote Fuel on running, because if the key-switch is turned to the 'off' position power to the module is removed.*).
Fuel relay energised	The output mimics the operation of the fuel relay. Can be used to control external logic circuitry.
High engine temp alarm	The output indicates that a High Engine Temperature shutdown has been activated.
Loss of speed sensing	The output indicates that the speed sensing signal has been lost.
Low oil pressure alarm	The output indicates that a Low Oil Pressure shutdown alarm has been activated.
Overspeed alarm	The output indicates that the engine has exceeded the level set in **Edit Levels Menu**, and shutdown on Overspeed.
Pre-heat	The output controls the engine pre-heater. See **Edit Miscellaneous Menu** for modes available.
Remote fuel on present	The output indicates that a remote fuel on signal is present on pin 13.
Shutdown alarm	The output indicates that a shutdown alarm has been activated. This output can only be reset by removal of the fault and turning the selector switch to **OFF**.
Start relay energised	The output mimics the operation of the start relay. Can be used to control external logic circuitry.
Starting alarms on	The output indicates that the starting alarms are now enabled. Can be used to control external logic circuitry.
Underspeed alarm	The output indicates that the engine has fallen below the level set in **Edit Levels Menu**, and shutdown on Underspeed.
Warning alarm	The output indicates that a warning alarm has been activated. This output is self resetting on removal of the fault.

EDIT FRONT PANEL LED'S

This menu allows the configurable LED's to be changed to suit the users requirements. The following is displayed:-(*Typical Settings for information only*);



NOTES

1:- Each LED has the same selection of choices as stated in the edit outputs section of this manual.

2:- On the standard 51x module 5 LED's are pre-configured to match the label.

POLARITY

Each of the LED's can be configured as:

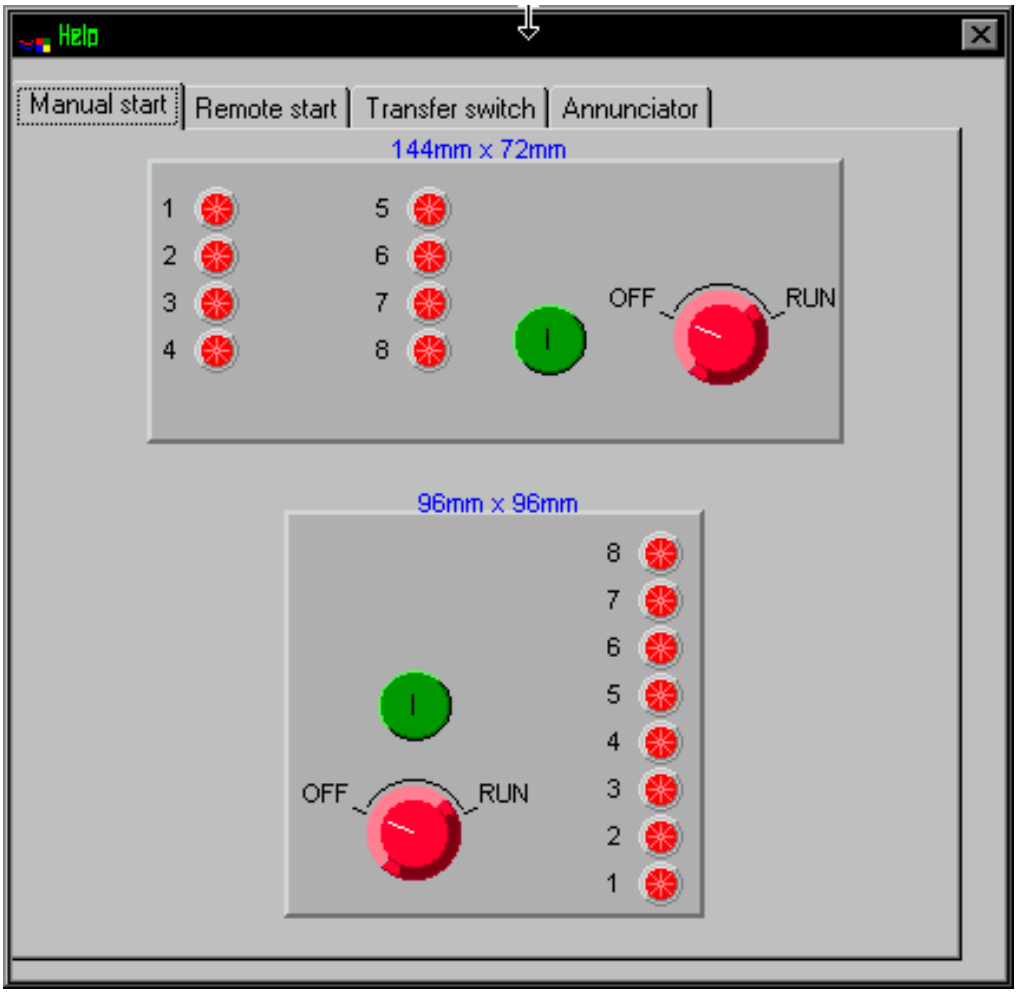
a)Lit - Normally extinguished LED which illuminates on activation.

b)Un-lit - Normally illuminated LED which extinguishes on activation.

CONTROL SOURCE

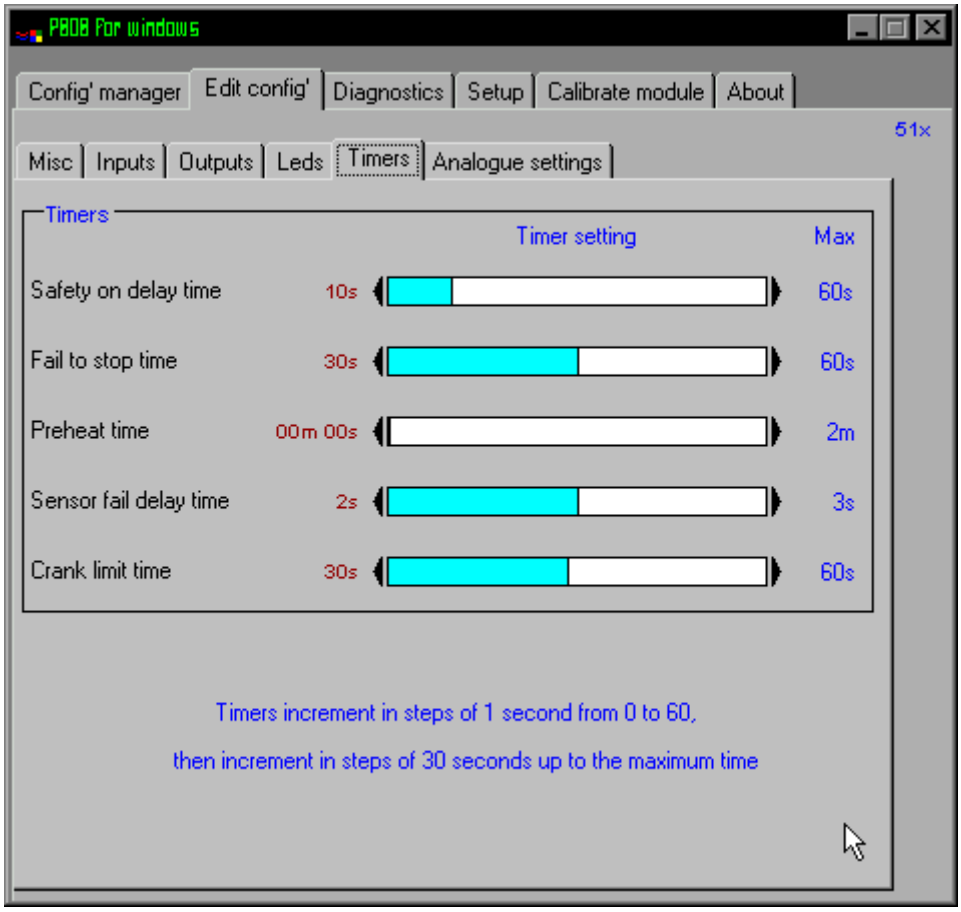
Refer to Output Selection shown in Edit Outputs section of this manual.

LED IDENTIFICATION



EDIT SYSTEM TIMERS

This menu allows the configurable system timers to be changed to suit the users requirements. The following menu is displayed:-



NOTES:-
Timers can be adjusted by clicking on either the up(➡) or Down (⬅) arrow or by clicking on the bar and dragging the bar to the correct time.

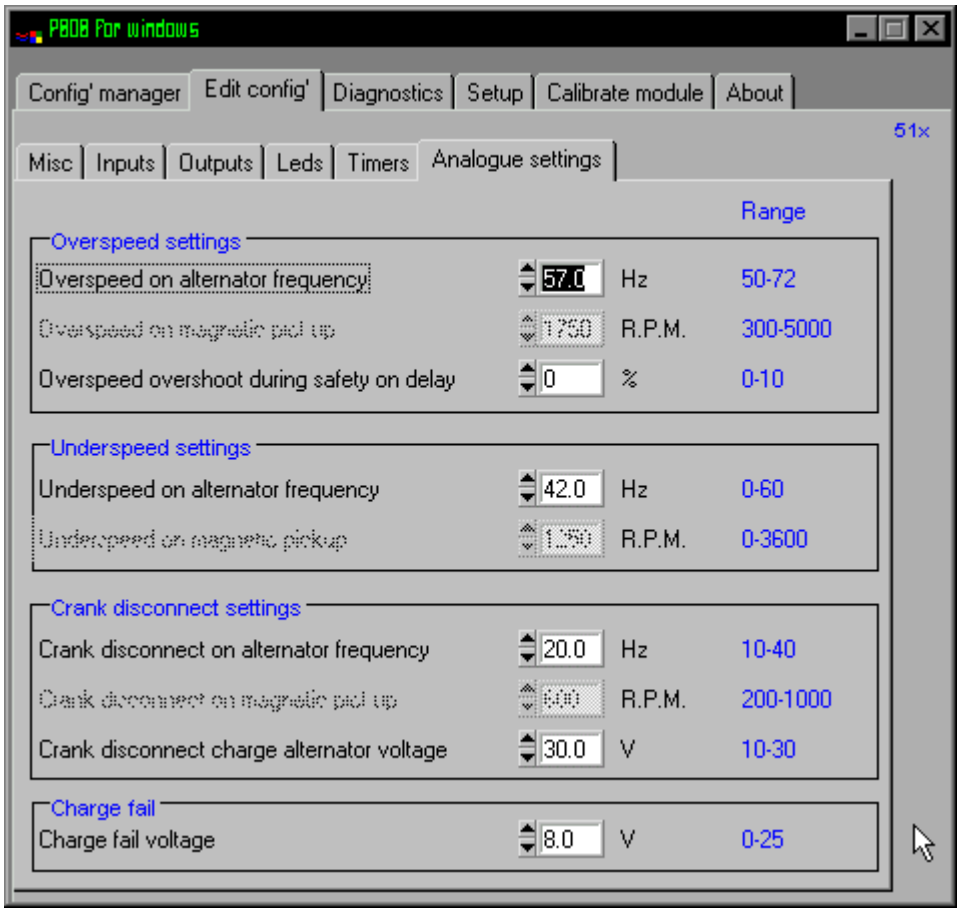
TIMER DESCRIPTIONS

Timer	Function
Safety on delay time	This timer dictates how long the module will ignore the Low oil pressure, High Engine Temperature, Underspeed and any other inputs configured as active from safety on. It allows the values such as oil pressure to rise to their operating values on starting without triggering an alarm. Once the timer has expired all alarm conditions are monitored again.
Fail to stop time	Once the module has given a shutdown signal to the engine it expects the engine to come to rest. It monitors the Oil pressure and speed sensing sources and if engine movement is detected when this timer expires a Fail to stop alarm signal is generated.
Pre-heat time	This timer dictates the duration that the pre-heat output will be active for.
Sensor fail delay time	This is only used if magnetic pick speed sensing is selected. Once cranking has commenced the module must receive a speed signal within this time. If no signal is present the generator will be shutdown and a Loss of Speed Sensing alarm given.
Crank Limit Time	This is the maximum amount of time that the module will energise the starter motor for during starting attempts. This is a protective time limit on the duration that the module is allowed to crank for. It is used to prevent the operator from holding the 'Start' button depressed for an unacceptable length of time. Once the crank limit timer has expired the crank relay will be de-energised.

NOTE:- As the timers can be accurately set to exact times, it is possible to initially configure the module with the timers reduced to allow rapid testing of the finished generating set. Once the set is ready for a final witness test it is just a simple matter of entering the specified timer settings and writing them to the module.

EDIT ANALOGUE LEVELS

This menu allows the configurable trip values to be edited to the users required levels. The following menu is displayed:

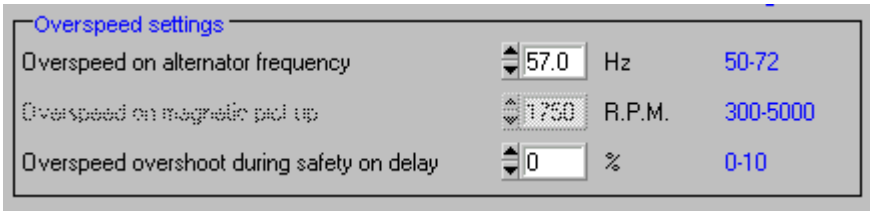


NOTES

On 51x modules only one form of speed sensing is available, this is factory pre-set. The correct settings must be entered for which ever speed sensing source has been installed (see Misc settings). Failure to observe this will result in incorrect operation of the unit. To ensure that only the appropriate setting is entered, non relevant items are 'greyed' out.

It is also possible to use the charge alternator as a form of crank disconnect on the 51x module. This feature allows for a much faster crank disconnect response leading to less wear on the engine and starter components, and provides added safety in case one source is lost, by tripped breakers etc. It is possible to configure the module to use no speed sensing sources and use the charge alternator only for crank disconnect.

LEVELS DESCRIPTION



Level	Function
Overspeed on alternator frequency	This level dictates the overspeed shutdown value if alternator frequency is selected as a speed sensing source.
Overspeed on magnetic pickup	This level dictates the overspeed shutdown value if a magnetic pickup is selected as a speed sensing source.
Overspeed overshoot during safety on delay	This value is used to prevent nuisance tripping on generators where a slow responding governor allows the engine to overspeed slightly during start-up. This setting allows the normal overspeed shutdown level to be exceeded by a percentage (up to a maximum of 10%) for the duration of the safety on delay timer. Should the engine speed exceed this temporarily elevated level it will be shutdown. Once the safety on delay timer has expired the overspeed shutdown value is restored to the normal level. **NOTE:- This is not a delay on overspeed shutdown, only a temporary raising of the overspeed value, therefore overspeed protection is not compromised.**

Level	Function
Underspeed on alternator frequency	This level dictates the underspeed shutdown value if alternator frequency is selected as a speed sensing source.
Underspeed on magnetic frequency	This level dictates the underspeed shutdown value if magnetic pickup speed sensing is selected.

Level	Function
Crank disconnect on alternator frequency	This level dictates the value that has to appear on the alternator frequency input (if used) before the starter motor will be instructed to disengage.
Crank disconnect on magnetic pickup	This level dictates the value that has to be given by the magnetic pickup sensor (if used) before the starter motor will be instructed to disengage.
Crank disconnect on charge alternator voltage	This level dictates the value that has to be generated by the engine charge alternator before the starter motor will be instructed to disengage. This setting can be used to obtain a crank disconnect much earlier than if alternator speed sensing is used, particularly if using alternators fitted with digital voltage regulators as these can take some time to produce an output. Alternatively the charge alternator could be used alone to provide crank disconnect on such as pump sets where no alternative speed sensing source is available. **CAUTION!:- If this input is not to be used ensure that this value is set to maximum.**

Level	Function
Charge fail voltage	This level is the value at which the module will give a charge fail warning. As the input is a true analogue value total failure of the charge alternator is not the only failure that the module will provide protection for. Faults which cause the output voltage to fall, such as worn brushes etc., will cause the alarm to operate. **NOTE:- If this input is not used ensure that this value is set to minimum to prevent the possibility of a spurious Charge Fail Alarm occurring.**

DIAGNOSTICS

A particularly useful feature of the module is it's ability to provide real-time diagnostic information to the PC. This can be used to give on-screen details of the operation of the module and generating set performance.

Two versions of the diagnostic facility are supplied:-

The first Diagnostic is Mimic Display, This is provided to allow at-a-glance monitoring of the system, all non-essential information is hidden. Clear graphical displays of the measured values allow easy performance monitoring. Should an alarm occur this a clearly displayed by a flashing red 'Alarm' legend. Details on the system operation are provided to give more detailed information if required.

The second diagnostic is the Status Display this allows the user to see at a glance the values of all measured inputs and the status of any of the digital inputs. Output state of the relays and LED operation are also displayed. A text display indicates the modules present state of operation, shows time remaining on any system timer that is in operation and will give details on any shutdown alarm which has occurred.

As the diagnostics are real-time the opening and closing of the inputs can be viewed, allowing simple checks to be made on panel wiring by checking input circuits and outputs. It is therefore possible to simulate switching signals by earthing the appropriate input connection in the panel. If the input state displayed on the diagnostic page changes this indicates that the wiring is correct, it is possible that the module configuration is incorrect and further investigation is required using the configuration program.

The module internal software revision details are also given, this is to aid DEEP SEA ELECTRONICS technical staff in the event of a query.

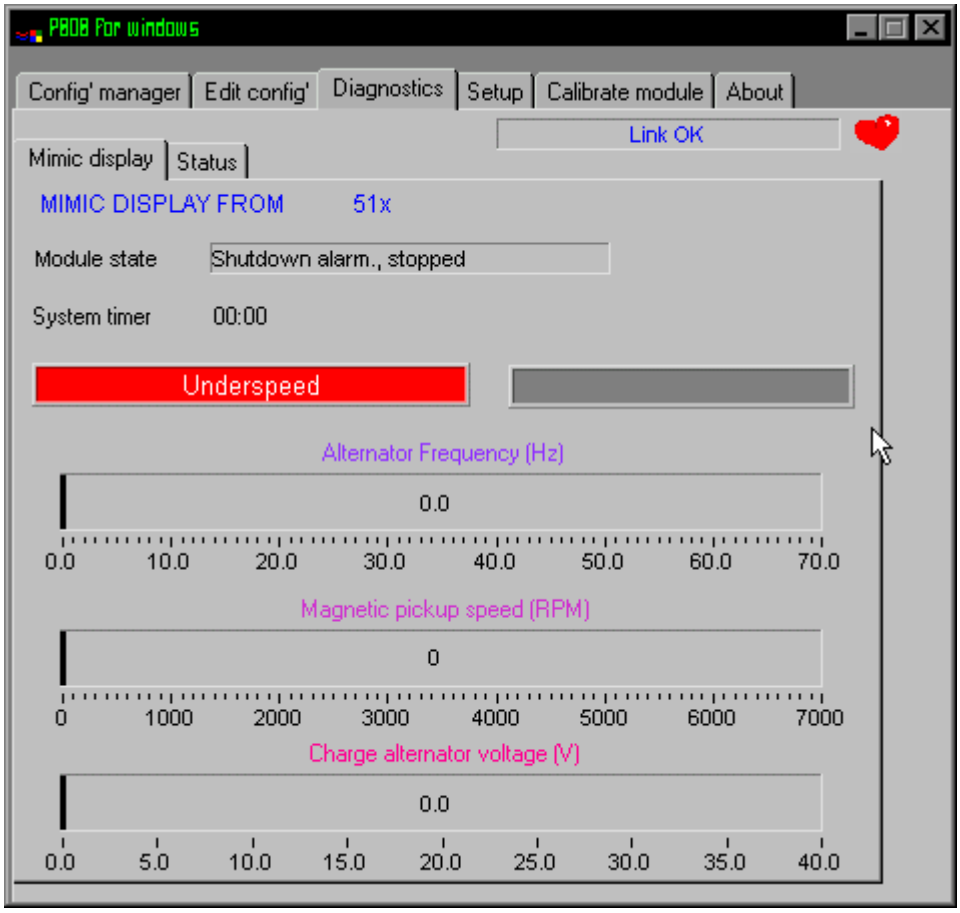
NOTE:- The Diagnostic displays screen are updated by information sent from the module, if the link to the module is lost the information displayed could be incorrect and is therefore 'greyed out'. A small icon in the bottom right of each diagnostic display indicates that the link to the module is healthy.

or

= Communications link is OK.

= No Data available from the Communications link. Check 'Set-up' and ensure module is connected.

If the Mimic Display option is selected the display will show:

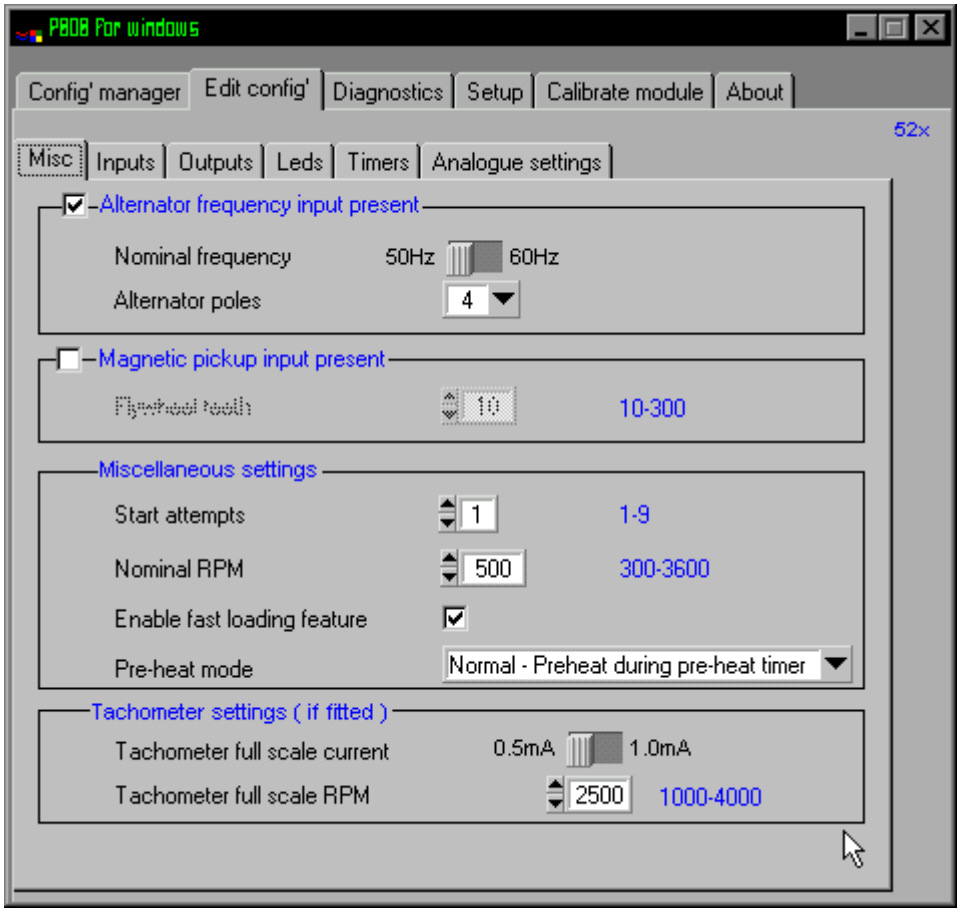


If the Status Display option is selected the display will show:

52X AUTO-START MODULE EDIT MENU

EDIT MISCELLANEOUS ITEMS

This menu allows the user to change the nominal operating parameters and also select the modules special operating modes, according to individual requirements. The following is displayed:



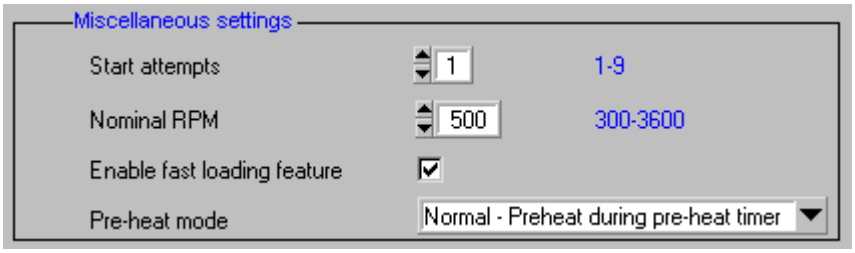
NOTES:-

It is possible to configure the 52x Auto-start module to use either alternator frequency or magnetic pickup speed sensing, both or none. If both sources are used shutdown will occur if either speed sensing source gives an over or under-speed signal.
If a magnetic pickup is not to be used it is important that ☐ is selected for 'Magnetic pickup present'. If the module expects to receive magnetic pickup pulses and none are apparent on starting, it assumes that the pickup is faulty and will shutdown the engine. However, the module will assume that the engine will continue to run for the full duration of the Fail to stop timer, as it has no means of seeing if the engine is at rest, so the operator will be effectively 'locked' out for this time. Once this timer has expired the module will assume that the engine has come to rest, (unless oil pressure is present), and will then reset

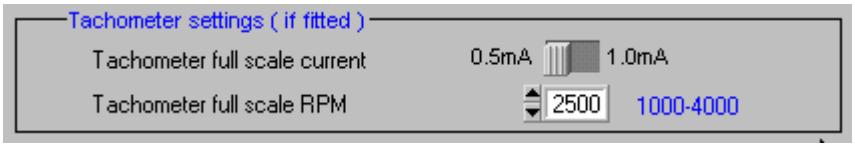
MISCELLANEOUS DESCRIPTION

Level	Function
Alternator frequency input present	This selects whether the module is to receive an input from the generator alternator. If not ticked then the following settings are 'greyed' out.
Nominal Frequency	If alternator frequency sensing is used this setting selects the nominal frequency from the alternator. This may be either 50 or 60 Hz.
Alternator Poles	This value is the number of poles on the alternator, the value is only required if the meter option is fitted to the module as it is required to calculate the RPM of the engine if alternator output sensing only is being used.

Level	Function
Magnetic Pickup input present	This selects whether the module is to receive an input from the magnetic pickup. If not ticked then the following settings will be 'greyed' out.
Flywheel teeth	This value is the number of teeth on the flywheel which are detected by the magnetic pickup. This is used to determine the engine RPM and is only required if magnetic pickup input speed sensing is to be used.



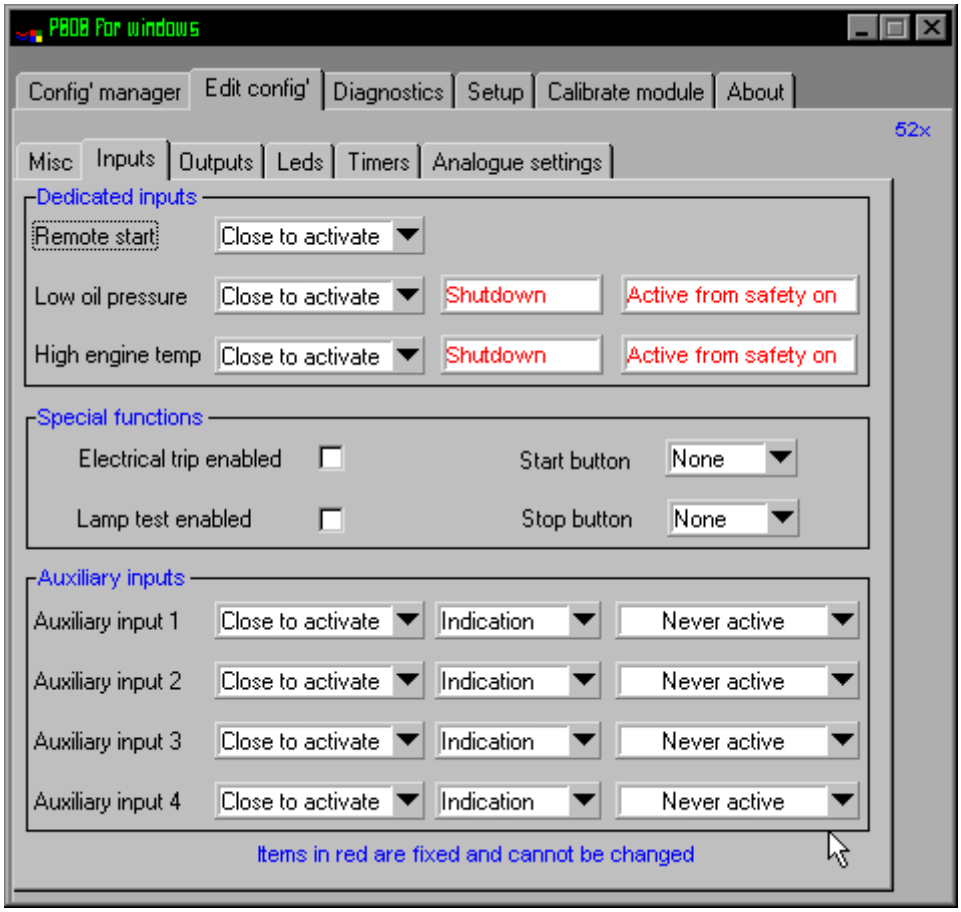
Level	Function
Start attempts	This value is the number of times the module will attempt to start the generator. Should the generator start the module will not attempt further starts. If the generator does not start after the final attempt, the module will give a 'Fail to start' alarm.
Nominal RPM	This is the nominal engine speed value. It is used when the meter option is fitted to the module to allow the meter to be calibrated at nominal RPM.
Enable Fast Loading	The module will normally terminate the safety on timer once all monitored parameters have reached their normal settings (Fast Loading). It is possible however to force the module to make the safety on timer to run full term. This is useful if the module is to be used with some small engines where pre-mature termination of the delay timer can lead to overspeed alarms on start up. ☐ = Full Safety On Delay Time is observed by module. ☑ = Safety On Delay Timers is cancelled pre-maturely if all conditions are normal.
Pre-Heat Mode	This setting is used to select how the pre-heat output is to operate. Different engines may require different amounts of pre-heat. The modes available are:- **NORMAL** - Pre-heat output is available for the duration on the pre-heat timer which terminates prior to cranking. **MODE 1** - As normal mode but pre-heat is also available during cranking. **MODE 2** - As mode 1 but pre-heat is also available while waiting for the delayed alarms to become active. **MODE 3** - As mode 2 but pre-heat continues to be available until the warm-up timer has elapsed.



Level	Function
Tachometer full scale deflection	This is only used if the meter output option is fitted to the module. The setting selects if the meter is a 0.5mA or 1.0mA full scale deflection tachometer.
Tachometer full scale RPM	This is only used if the meter output option is fitted to the module. The setting indicates what the value the full scale will read, up to a maximum of 4000rpm.

EDIT CONFIGURABLE INPUTS

This menu allows the configurable inputs to be changed to suit the users requirements. The following is displayed:-



NOTE:- Each of the four auxiliary inputs has the same selection choices, allowing flexibility of selection to be made i.e. 4 Indications, 4 Warnings, 4 Shutdowns or a combination of all 3.

POLARITY

The polarity of the input switching can be configured to be either **"Close to Activate"**, this is a Normally open switch, and closes to negative when activated, or **"Open to Activate"**, this is a Normally Closed switch to negative, and opens when activated.

Electrical Trip enabled

This setting is used to configure one of the inputs to provide an electrical trip function. This option configures input 1 such that when a signal is received from an electrical trip device (such as an overload unit), rather than shutdown a generating set with a hot engine the module will remove the load transfer signal (if selected) and give an electrical trip output to operate a shunt trip or to open a contactor. This will isolate the load from the generator. The engine will then be allowed to cool off-load before being shutdown.

CAUTION!:- Selecting this option will re-configure input 1 as 'Electrical Trip'. Ensure that input 1 is not selected for any other required function before selection.

Lamp test enabled
This setting is used to configure one of the inputs to provide a lamp test function. This option configures input 2 such that providing a signal to the input will cause all LED's to illuminate until the signal is removed.

⚠CAUTION!:- Selecting this option will re-configure Input 2 as 'Lamp Test'. Ensure that Input 2 is not configured for any other required function before selection.

Start button
This setting is used to select if a start button is connected to the module. Normally this should be left as NONE. If an external start button is required then EXTERNAL should be selected. This will configure input 3 such that when a signal is received the module will initiate a start sequence.

⚠CAUTION!:- Selecting this option will re-configure Input 3 as 'Start Push-button'. Ensure that input 3 is not configured for any other required function before selection. The INTERNAL mode is used for a special build option and should not be used on standard units.

Stop button
This setting is used to select if a stop button is connected to the module. Normally this should be left as NONE. If an external stop button is required then EXTERNAL should be selected. This will configure input 4 such that when a signal is received the module will initiate a stop sequence.

⚠CAUTION!:- Selecting this option will re-configure Input 4 as 'Stop Push-button'. Ensure that input 4 is not configured for any other required function before selection. The INTERNAL mode is used for a special build option and should not be used on standard units.

TYPE
The auxiliary inputs can be configured to be either **Indication** (annunciation only, no alarm or shutdown), **Warning** (Alarm only, no shutdown), or **Shutdown**. Those shown in red (Dark grey above) are not configurable.

ACTIVATION TIME
The activation time of each auxiliary input can be configured to be any of the following:-

a) Never active
This switches off the input if not in use.

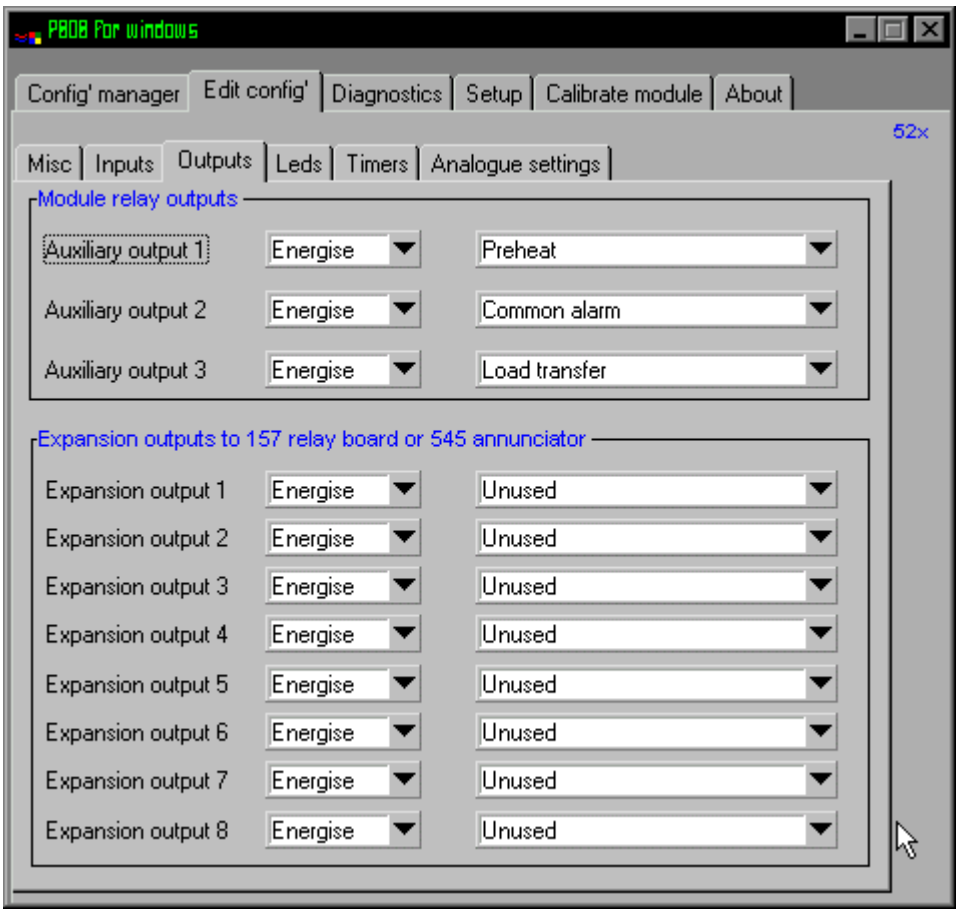
b) Always active
With a 52x module, the input selected to be an indication is active even when the selector switch (key) is in the **OFF** position. When Warning or Shutdown is selected, then the input is only active when **Auto or Manual** is selected.

c) Active from starting
Auxiliary inputs are only active once an attempt to start the generator is made. It will remain active until the generator is at rest again.

d) Active from safety on
Auxiliary inputs are only active once the **Safety On** timer has timed out. This allows a delay on start up for two stage faults, such as Oil Pressure and High Engine Temperature Warnings, or other shutdown conditions which require a delay during start-up, such as Under-voltage.

EDIT RELAY OUTPUTS

This menu allows the configurable output to be changed to suit the users requirements. The following is displayed:-



NOTE:- Each Auxiliary output has the same selection choices, allowing a combination of different uses.

The Expansion outputs are available for 52x type modules on a plug in Expansion module type 157, this provides volt free contacts.

POLARITY

Each of the outputs can be configured as:

a) Energised

Normally open relay contact which closes on activation.

b) De-energised

Normally closed relay contact which opens on activation.

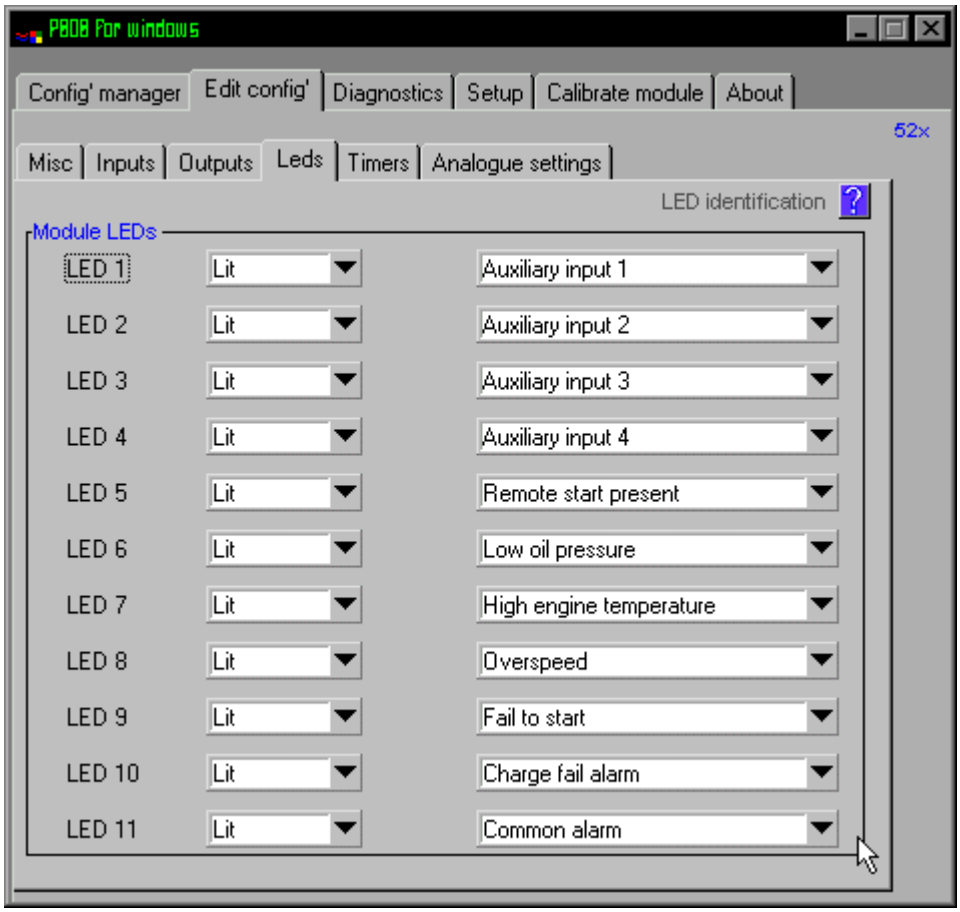
OUTPUT SELECTION

Function	Description
Unused	The output in not used.
Air flap	The output controls the closing of the air-flaps in an Emergency Stop or Over-speed situation.
Auxiliary input 1 active	The output indicates that auxiliary input 1 is active.
Auxiliary input 2 active	The output indicates that auxiliary input 2 is active.
Auxiliary input 3 active	The output indicates that auxiliary input 3 is active.
Auxiliary input 4 active	The output indicates that auxiliary input 4 is active.
Charge fail alarm	The output indicates that the voltage output from the **WL** of the Charge Alternator has fallen below the level set in the **Edit Levels Menu**. A charge fail warning alarm has been initiated.
Common alarm	The output indicates that a warning **or** shutdown alarm has been activated. Reset rules as above, depending on whether it is a Warning or a Shutdown fault.
Delayed alarms active	The output indicates that the delayed alarms are now enabled. Can be used to control external logic circuitry.
Electrical trip	The output indicates that an electrical trip shutdown alarm has been activated on Auxiliary Input 1.
Emergency stop alarm	The output indicates that an Emergency Stop has been initiated. i.e. removal of the +ve DC Supply from Input 3.
Energise to stop	The output controls the fuel solenoid on an ETS generator, energising for the time period selected in the **Edit Timer Menu**. The normal fuel output (pin 4) should not be connected to the fuel solenoid, however it can be used for controlling panel instruments and other functions required whilst the engine is running.
Engine running	The output indicates that the engine is running.
Fail to start alarm	The output indicates that the engine has not started after the specified number of attempts, selected in the **Edit Miscellaneous Menu**.
Fail to stop alarm	The output indicates that the generator has failed to stop within the time period selected in the **Edit Timer Menu**. The module monitors that the oil pressure has gone low and that the speed sensing source detects no movement of the generator to establish that the generator has stopped.
Fuel relay energised	The output mimics the operation of the fuel relay. Can be used to control external logic circuitry.
High engine temp alarm	The output indicates that a High Engine Temperature shutdown has been activated.
Loss of speed sensing	The output indicates that the speed sensing signal has been lost.
Load transfer	When the generator is ready to accept load, i.e. after safety on and warm up timers have timed out. See **Edit Miscellaneous Menu** for modes available.
Louvre control	The output controls the opening of the louvres on engine starting and closure when engine has stopped.
Low oil over-ride	This output is used in conjunction with Smoke limiting. When the set is held in smoke limit mode the controller is unable to give full protection to the engine as speed and voltage conditions cannot be met at idle. The exception to this is low oil pressure protection which is available once the safety on timer has expired. When smoke limiting is removed and the engine is allowed to ramp up to normal running speed full protection is then implemented. This output will then become active.
Low oil pressure alarm	The output indicates that a Low Oil Pressure shutdown alarm has been activated.
Overspeed alarm	The output indicates that the engine has exceeded the level set in **Edit Levels Menu**, and shutdown on Overspeed.

Function	Description
Pre-heat	The output controls the pre-heater. See **Edit Miscellaneous Menu** for modes available.
Remote start present	The output indicates that a remote start signal is present on pin 13, but does not indicate that it has been accepted.
Shutdown alarm	The output indicates that a shutdown alarm has been activated. This output can only be reset by removal of the fault and turning the selector switch to **Stop Reset**.
Smoke Limit	This is used to supply a smoke limiting signal to an Electronic Governor to limit smoke emissions on start-up. It is used in conjunction with the Smoke limit timer settings. Once the Timer has expired the Smoke limit output will cease to operate allowing the engine to accelerate to normal running speed.
Start relay energised	The output mimics the operation of the start relay. Can be used to control external logic circuitry.
Starting alarms on	The output indicates that the starting alarms are now enabled. Can be used to control external logic circuitry.
System in auto	The output indicates that the selector switch is in the **Auto** position.
System in stop	The output indicates that the selector switch is in the **Stop** position.
Underspeed alarm	The output indicates that the engine has fallen below the level set in **Edit Levels Menu**, and shutdown on Underspeed.
Warning alarm	The output indicates that a warning alarm has been activated. This output is self resetting on removal of the fault.

EDIT FRONT PANEL LED'S

This menu allows the configurable LED's to be changed to suit the users requirements. The following is displayed:-(Typical Settings for information only);



NOTES

1:- Each LED has the same selection of choices as stated in the edit outputs section of this manual. The exception to this is the 'Power On' LED fitted to the 521 module, this LED's function is fixed and cannot be re-configured.

2:- Each LED can be configured to any function, but on the standard 52x module six LED's are pre-configured to match the label, this does not prevent them from being re-configured for another purpose.

POLARITY

Each of the LED's can be configured as:

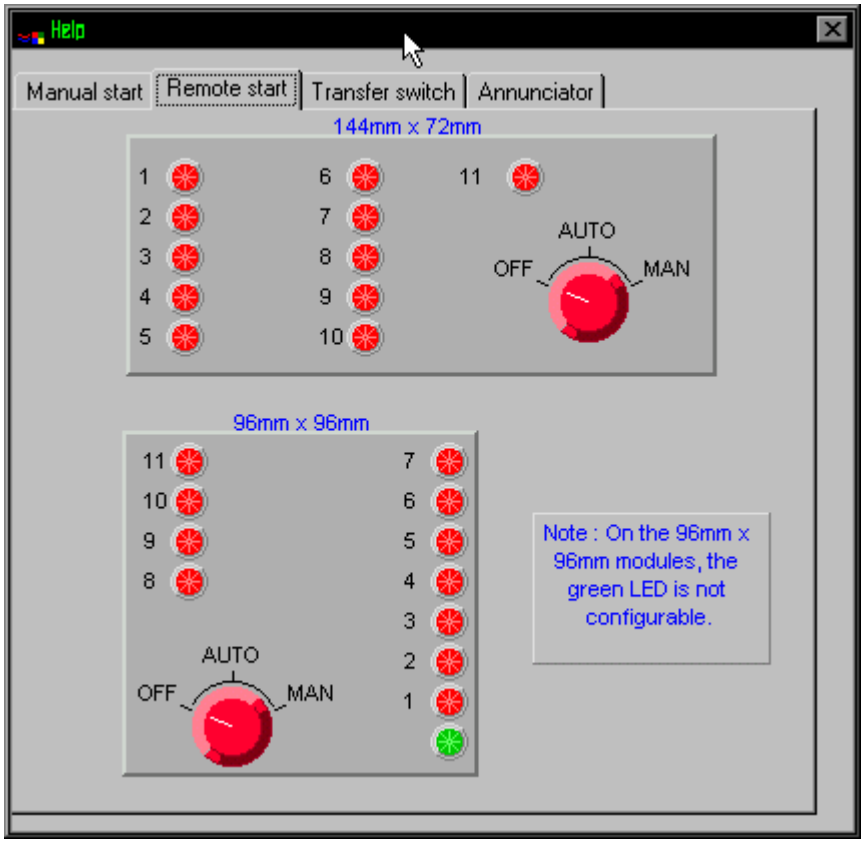
a)Lit - Normally extinguished LED which illuminates on activation.

b)Un-lit - Normally illuminated LED which extinguishes on activation.

CONTROL SOURCE

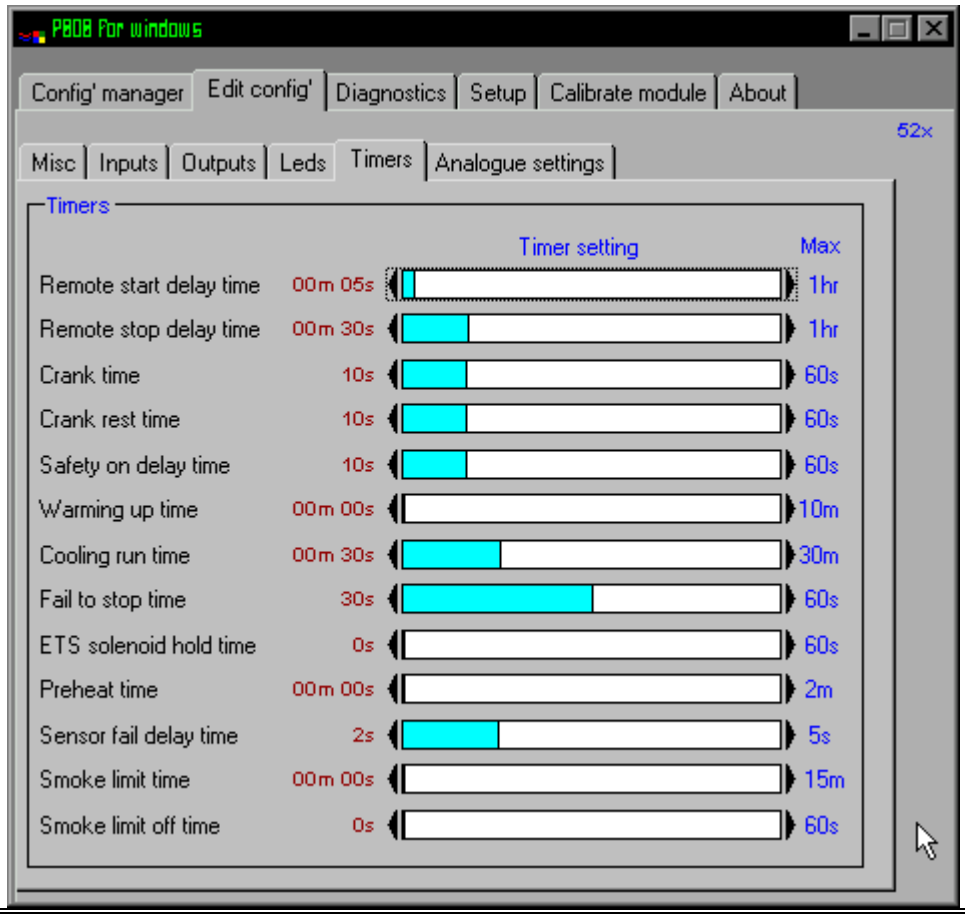
Refer to Output Selection shown in Edit Outputs section of this manual.

LED IDENTIFICATION



EDIT SYSTEM TIMERS

This menu allows the configurable system timers to be changed to suit the users requirements. The following menu is displayed:-



NOTES:-

The smoke limit timers are only required if the Smoke limit output is connected to a suitable electronic fuel control unit fitted with this feature. Smoke Limiting is only available on modules fitted with version 3.0 software onwards, (this can be checked using the Status Diagnostics page). If Smoke limit settings are sent to an earlier version they are ignored and smoke limiting is not available.

Timers can be adjusted by clicking on either the up(➡) or Down (⬅) arrow or by clicking on the bar and dragging the bar to the correct time.

TIMER DESCRIPTIONS

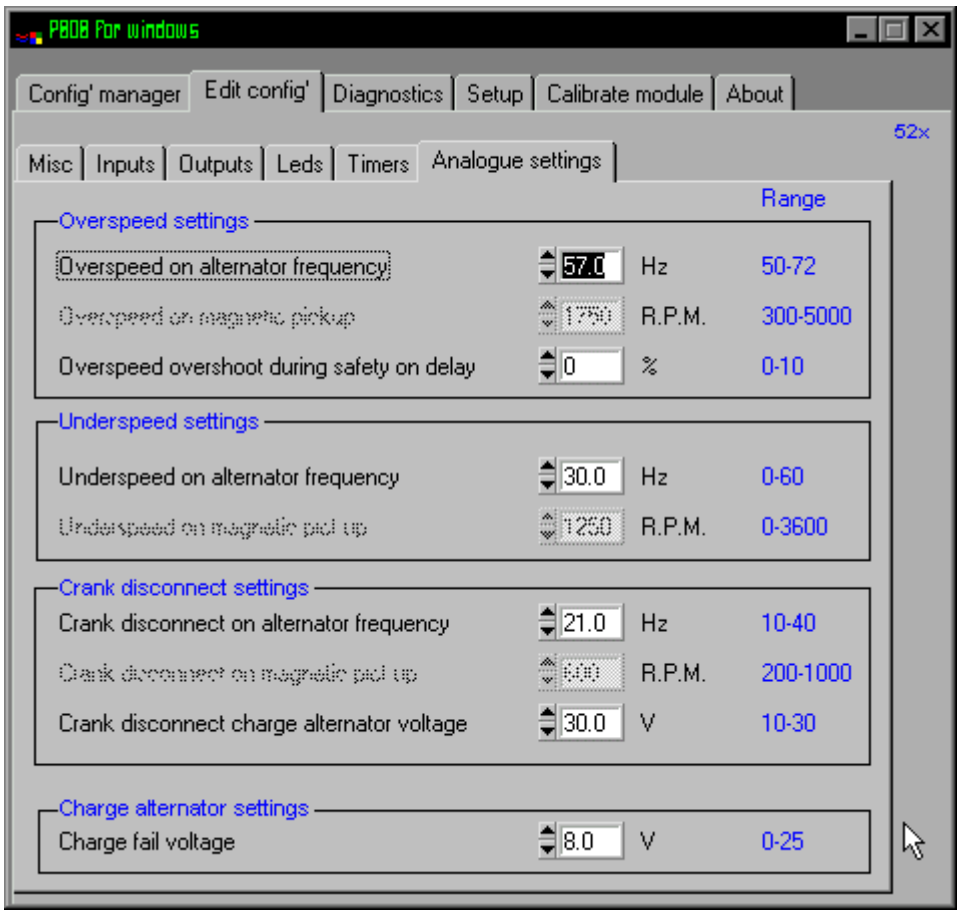
Timer	Function
Remote start delay time	This timer dictates how long the module will wait after it has received a remote start signal before it will attempt to start. This prevents un-necessary starting on a fluctuating mains supply.
Remote stop delay time	This timer dictates how long the module will wait before it will un-load the generator back to the mains supply and initialise it's run-on and shutdown cycle. This is to ensure that the mains supply has stabilised before transferring the load back to mains.
Cranking time	This is the maximum amount of time that the module will energise the starter motor for during starting attempts.
Crank rest time	This is the amount of time the module will wait for between start attempts. This is to allow the starter motor to cool and the starter batteries to recover.

Timer	Function
Safety on delay time	This timer dictates how long the module will ignore the Low oil pressure, High Engine Temperature, Underspeed and any other inputs configured as active from safety on. It allows the values such as oil pressure to rise to their operating values on starting without triggering an alarm. Once the timer has expired all alarm conditions are monitored again. On 52x Auto-start modules only; should all the monitored conditions, such as oil pressure, come to the expected state prior to the end of the safety on timer, the timer will be terminated prematurely ensuring maximum protection as soon as possible.
Warm up timer	This timer is initiated once the engine is up and running. It delays loading the generator until it has stabilised. Once this timer has expired the Load Transfer signal will be given.
Cooling Time	This is the time the generator is to run off-load once the load transfer signal has ceased. This gives the engine time to cool down before shutdown.
Fail to stop time	Once the module has given a shutdown signal to the engine it expects the engine to come to rest. It monitors the Oil pressure and speed sensing sources and if they still indicate engine movement when this timer expires a Fail to stop alarm signal is generated.
ETS hold time	This timer is used if the unit is configured to operate an Energise to stop engine. It dictates the duration that the ETS output will remain active after the module has detected the engine has come to rest. If the ETS output is not configured, this timer will still operate, preventing an immediate restart.
Pre-heat time	This timer dictates the duration that the pre-heat output will be active before an attempt is made to start the engine. Once this timer has expired cranking will commence.
Sensor fail delay time	This is only used if magnetic pick speed sensing is selected. Once cranking has commenced the module must receive a speed signal within this time. If no signal is present the generator will be shutdown and a Loss of Speed Sensing alarm given.
Smoke limiting time+	This is the amount of time that the smoke limiting output will remain active for once the engine has started. While the smoke limiting output is active the engine will be held at a reduced speed to minimise smoke emissions on start-up. (Only if fitted with an appropriate Electronic Fuel Control module). Once the timer has expired the engine will be allowed to accelerate up to it's normal operating speed.
Smoke limiting off time+	This is the amount of time that the underspeed protection is held inactive for following termination of the Smoke Limit mode. This is to allow the engine to accelerate to it's normal running speed without triggering an underspeed alarm. The Low Oil Pressure Alarm is not delayed by this timer.

NOTE:- As the timers can be accurately set to exact times, it is possible to initially configure the module with the timers reduced to allow rapid testing of the finished generating set. Once the set is ready for a final witness test it is just a simple matter of entering the specified timer settings and writing them to the module.

EDIT ANALOGUE LEVELS

This menu allows the configurable trip values to be edited to the users required levels. The following menu is displayed:



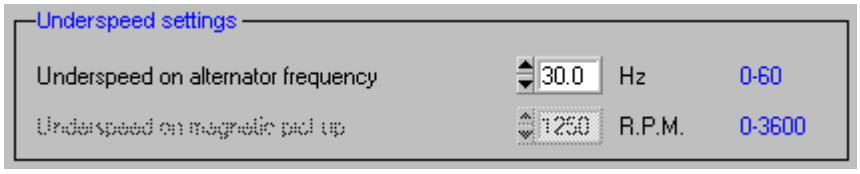
NOTES

1:- The 52x Auto-start module is capable of sensing engine speed from either a magnetic pickup or from the alternator frequency. Values need only be entered for the required speed sensing source. To ensure that only the appropriate setting is entered, non relevant items are 'greyed' out.
Alternatively the module can be used with no speed sensing source if required, provided charge alternator output is available for crank disconnect.

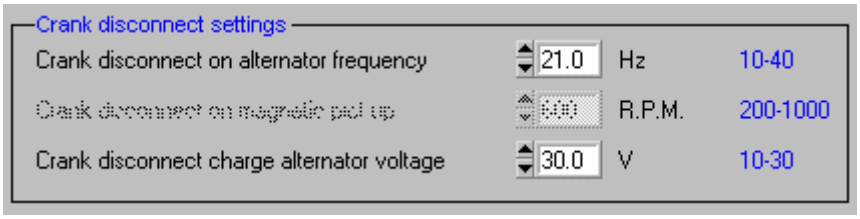
2:- The 52x module has three possible sources of crank disconnect, namely magnetic pickup, alternator frequency or engine charge alternator voltage. Any of these sources may be used individually, but it is also possible to use multiple sources or even all three. The source which reaches it's crank disconnect level first will cause the starter motor to disengage regardless of the state of the remaining monitored sources. This feature allows for a much faster crank disconnect response leading to less wear on the engine and starter components, and provides added safety in case one source is lost, by a broken fan belt for example.

LEVELS DESCRIPTION

Level	Function
Overspeed on alternator frequency	This level dictates the overspeed shutdown value if alternator frequency is selected as a speed sensing source.
Overspeed on magnetic pickup	This level dictates the overspeed shutdown value if a magnetic pickup is selected as a speed sensing source.
Overspeed overshoot during safety on delay	This value is used to prevent nuisance tripping on generators where a slow response governor allows the engine to overspeed slightly during start-up. This setting allows the normal overspeed shutdown level to be exceeded by a percentage (up to a maximum of 10%) for the duration of the safety on delay timer. Should the engine speed exceed this temporarily elevated level it will be shutdown. Once the safety on delay timer has expired the overspeed shutdown value is restored to the normal level.
	NOTE:- This is not a delay on overspeed shutdown, only a temporary raising of the overspeed value, therefore overspeed protection is not compromised.



Level	Function
Underspeed on alternator frequency	This level dictates the underspeed shutdown value if alternator frequency is selected as a speed sensing source.
Underspeed on magnetic frequency	This level dictates the underspeed shutdown value if magnetic pickup speed sensing is selected.



Level	Function
Crank disconnect on alternator frequency	This level dictates the value that has to appear on the alternator frequency input (if used) before the starter motor will be instructed to disengage.
Crank disconnect on magnetic pickup	This level dictates the value that has to be given by the magnetic pickup sensor (if used) before the starter motor will be instructed to disengage.
Crank disconnect on charge alternator voltage	This level dictates the value that has to be generated by the engine charge alternator before the starter motor will be instructed to disengage. This setting can be used to obtain a crank disconnect much earlier than if alternator speed sensing is used, particularly if using alternators fitted with digital voltage regulators as these can take some time to produce an output. Alternatively the charge alternator could be used alone to provide crank disconnect on such as pump sets where no alternative speed sensing source is available.
	CAUTION!:- If this input is not to be used ensure that this value is set to maximum to prevent premature crank disconnect. If unsure as to the required setting always set to maximum, else starting difficulties may be experienced.

Level	Function
Charge fail voltage	This level is the value at which the module will give a charge fail warning. As the input is a true analogue value total failure of the charge alternator is not the only failure that the module will provide protection for. Faults which cause the output voltage to fall, such as worn brushes etc., will cause the alarm to operate.
	NOTE:- If this input is not used ensure that this value is set to minimum to prevent the possibility of a spurious Charge Fail Alarm occurring.

DIAGNOSTICS

A particularly useful feature of the module is it's ability to provide real-time diagnostic information to the PC. This can be used to give on-screen details of the operation of the module and generating set performance.

Two versions of the diagnostic facility are supplied:-

The first Diagnostic is Mimic Display, This is provided to allow at-a-glance monitoring of the system, all non-essential information is hidden. Clear graphical displays of the measured values allow easy performance monitoring. Should an alarm occur this a clearly displayed by a flashing red 'Alarm' legend. Details on the system operation are provided to give more detailed information if required.

The second diagnostic is the Status Display this allows the user to see at a glance the values of all measured inputs and the status of any of the digital inputs. Output state of the relays and LED operation are also displayed. A text display indicates the modules present state of operation, shows time remaining on any system timer that is in operation and will give details on any shutdown alarm which has occurred.

As the diagnostics are real-time the opening and closing of the inputs can be viewed allowing simple checks to be made on panel wiring if this thought to be at fault. It is therefore possible to simulate switching signal by earthing the appropriate input connection in the panel. If the input state displayed on the diagnostic page changes this indicates that the wiring is correct, it is possible that the module configuration is incorrect and further investigation is required using the configuration program.

The module internal software revision details are also given, this is to aid DEEP SEA ELECTRONICS technical staff in the event of a query.

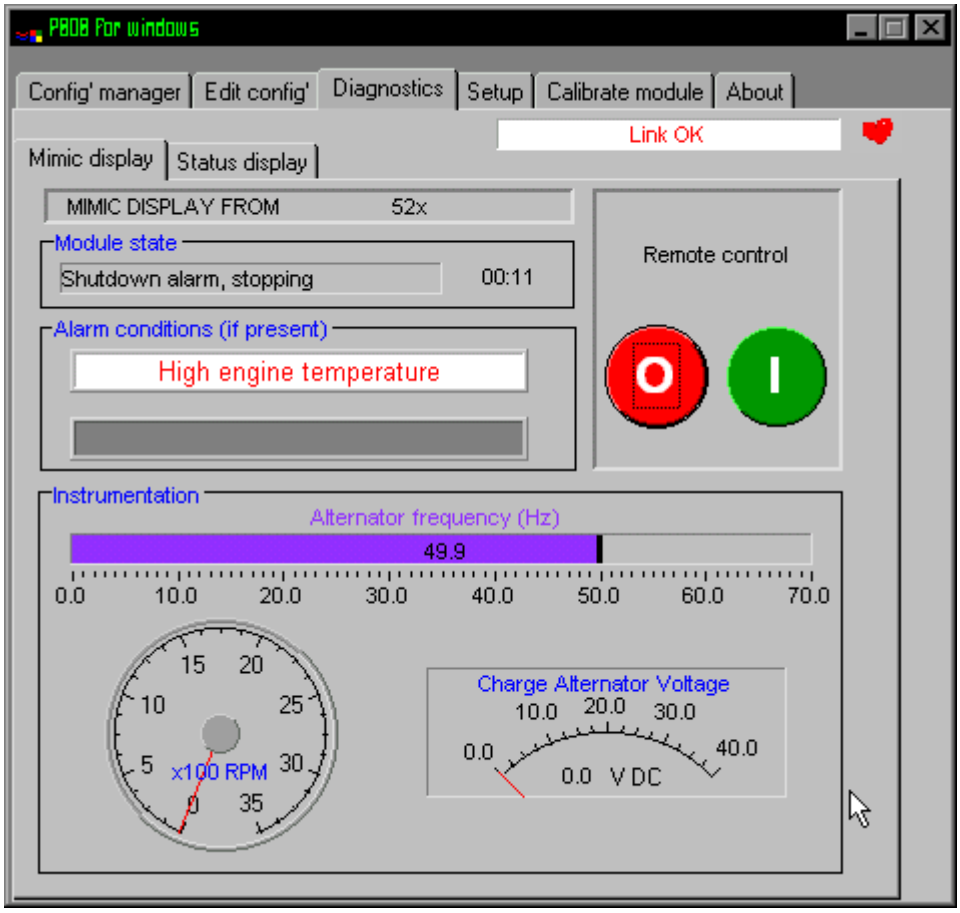
NOTE:- The Diagnostic displays screen are updated by information sent from the module, if the link to the module is lost the information displayed could be incorrect and is therefore 'greyed out'. A small icon in the bottom right of each diagnostic display indicates that the link to the module is healthy.

or

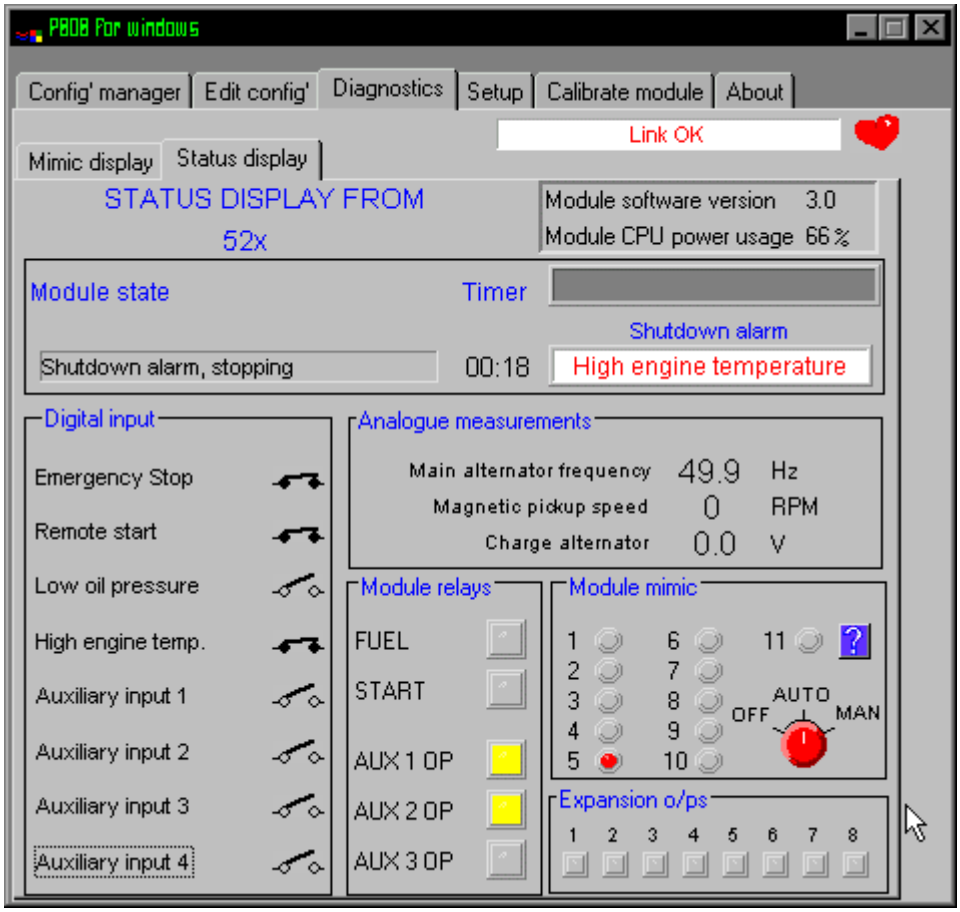
= Communications link is OK.

= No Data available from the Communications link. Check 'Set-up' and ensure module is connected.

If the Mimic Display option is selected the display will show:



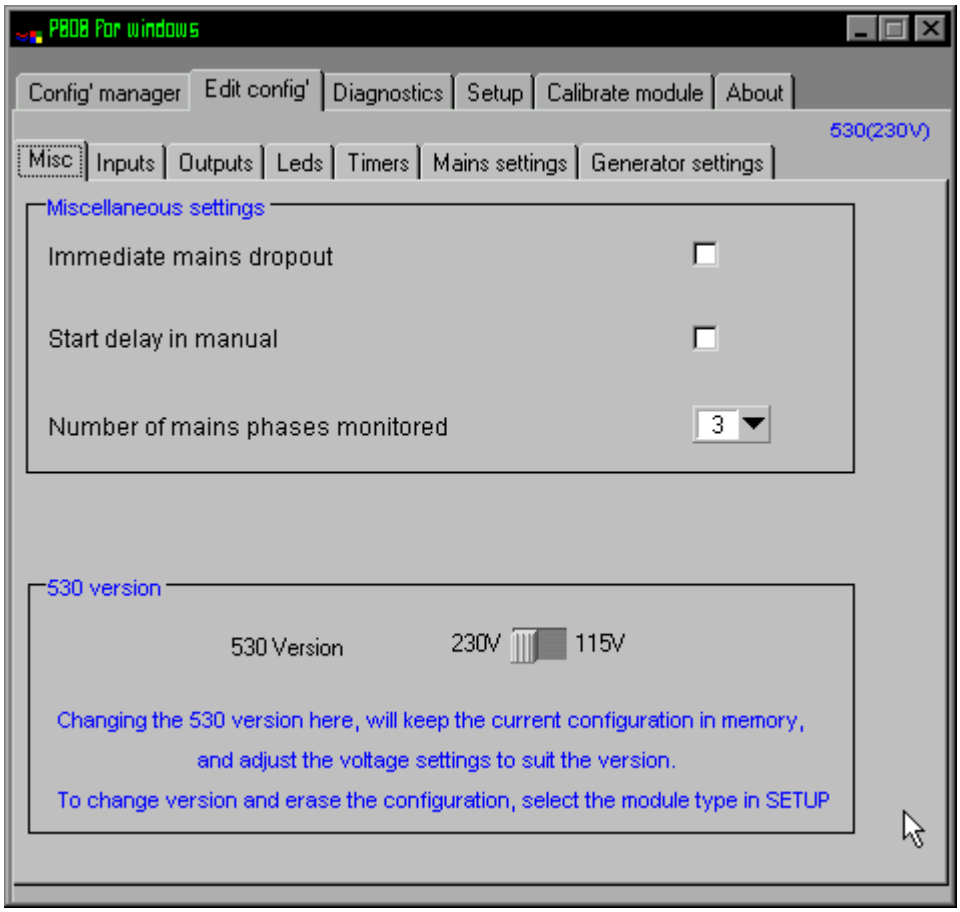
If the Status Display option is selected the display will show:



53X AUTO-START MODULE EDIT MENU

EDIT MISCELLANEOUS ITEMS

This menu allows the user to change the nominal operating parameters and also select the modules special operating modes, according to individual requirements. The following is displayed:



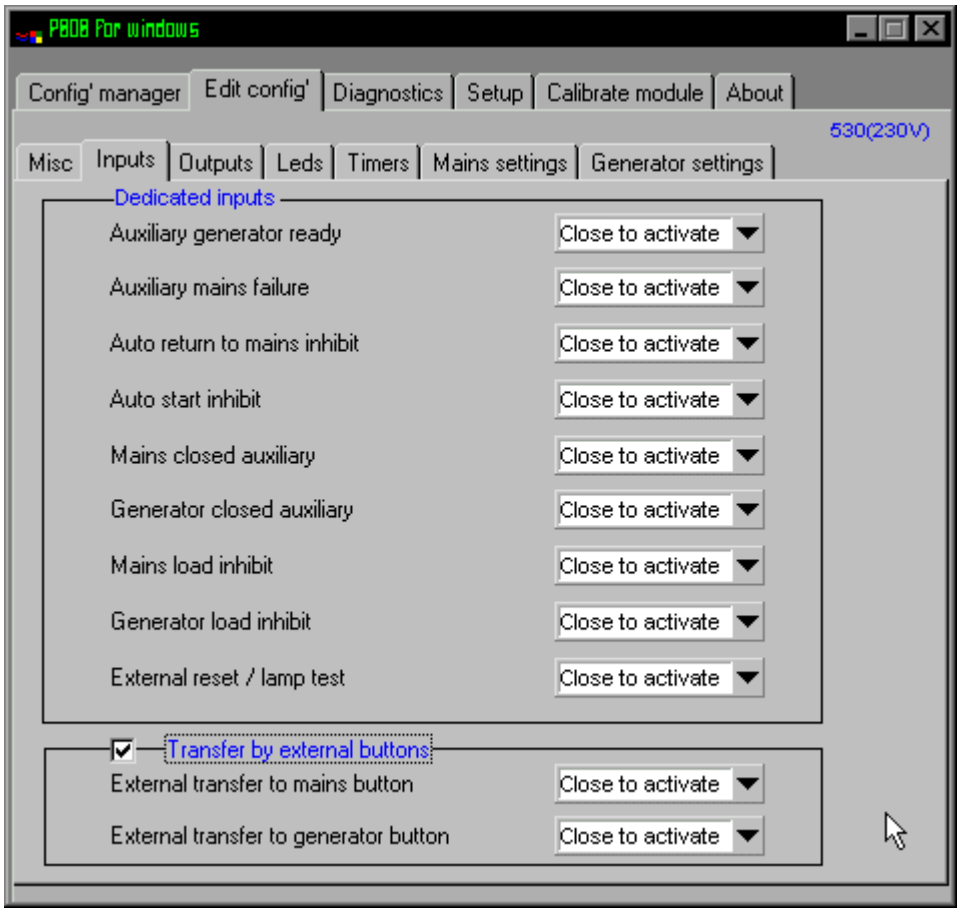
MISCELLANEOUS DESCRIPTION

Level	Function
Immediate Mains Dropout	☐ - The 530 will leave the mains contactor close signal active until it is ready to transfer to the generator. Therefore in the event of a brown out the load is continued to be supplied at a reduced level until the generator is ready to take over. ☑ - The 530 will remove the mains contactor close signal as soon as it detects that the mains supply has gone out of limits. This function can be used to protect loads such a three phase motors etc.
	⚠NOTE:- To use the immediate mains drop-out function the optional DC supply is required.
Start delay in manual	This is used to select if the start delay timer is to be observed when using the 'Start and Run generator' position on the 530 key switch. Normally the timers are bypassed and the start command given to the set once the switch position has been selected. However, if a full system test with timers function is required then this function can be enabled.

Level	Function
Transfer by button enable	The key switch is normally used to transfer the load manually. If however it is required for pushbutton control to be used it will need to be enabled by selecting this option. The key switch control will not then give full manual transfer control.
Number of mains phases monitored	This selects whether the 530 module monitors all three mains phases or just L1. This allows the module to be used in single phase applications without the need to link the mains sensing inputs together.
230 or 115 Volt Module.	The 530 module is available in two different voltage ratings. This switch allows the configuration to be used with which-ever type is selected.

EDIT CONFIGURABLE INPUTS

This menu allows the configurable inputs to be changed to suit the users requirements. The following is displayed:-



FUNCTIONS

Item	Description
AUXILIARY GENERATOR READY	This is a normally open (default) +ve signal. It is used to provide a confirmation signal that the generator is ready to load. The **530** will monitor the generator voltage and frequency to ensure that they are within limits, this input then provides confirmation from the generator start controller (On a **520** module the **'Load Transfer'** output can be connected to this input). If this signal is not present the generator will not take load even though the output voltage and frequency are acceptable. This may be useful if other sequences occur on the generator before it is ready to load, such as smoke limiting, etc.
AUXILIARY MAINS FAILURE	This is a normally open (default) -ve signal. The **530** module will monitor the incoming single or three phase supply for Over voltage, Under Voltage, Over Frequency or Under frequency. It may be required to monitor a different mains supply or some aspect of the incoming mains not monitored by the **530** (such as phase rotation). If the devices providing this additional monitoring are connected to operate this input, the **530** will operate as if the incoming mains supply has fallen outside of limits, the generator will be instructed to start and take the load. Removal of the input signal will cause the module to act if the mains has returned to within limits.

Item	Description
AUTO RETURN TO MAINS INHIBIT	This is a normally open (default) -ve signal. If this input is active the **530** with operate in a similar manner to the **MANUAL RESTORE** selector switch mode. To use this function the **530** selector switch should be placed in the **AUTO** mode. In the event of a mains failure the generator will be instructed to start and take load. On main return the module will continue to run the generator on load until this **AUTO RETURN TO MAINS INHIBIT** input is removed. Once the input is removed the module will transfer the load back to the mains supply and follow a normal generator stop sequence. This input allows the **530** to be fitted as part of a system where the manual restoration to mains is controlled remotely or by an automated system.
AUTO START INHIBIT	This is a normally open (default) -ve signal. It is used to provide an over-ride function to prevent the **530** from calling for the generator in the event of a mains out of limits condition occuring. If this input is active and a mains failure occurs the **530** will continue to operate with the mains on load, it will not give a start command to the generator. If this input signal is then removed the **530** will operate as if a mains failure has occurred, starting and loading the generator. This function can be used to give an '**AND**' function so that a generator will only be called to start if the mains fails and another condition exists which requires the generator to run.
MAINS CLOSED AUXILIARY INPUT	This is a normally open (default) -ve signal. It is used to provide feedback to allow the **530** to give true indication of the contactor or circuit breaker switching status. It should be connected to the mains load switching device auxiliary contact. To use true indication via the **MAINS ON LOAD LED** the **530** will need to be reconfigured to use the **MAINS CLOSED AUXILIARY INPUT ACTIVE** state to drive this LED.
GENERATOR CLOSED AUXILIARY INPUT	This is a normally open (default) -ve signal. It is used to provide feedback to allow the **530** to give true indication of the contactor or circuit breaker switching status. It should be connected to the mains load switching device auxiliary contact. To use true indication via the **GENERATOR ON LOAD LED** the **530** will need to be reconfigured to use the **GENERATOR CLOSED AUXILIARY INPUT ACTIVE** state to drive this LED.
MAINS LOAD INHIBIT	This is a normally open (default) -ve signal. It is used to prevent the **530** from loading the mains supply. If the mains supply is already on load activating this input will cause the **530** to unload the mains supply. Removing the input will allow the mains to be loaded again. **NOTE:-This input only operates to control the mains switching device if the 530 load switching logic is attempting to load the mains. It will not control the mains switching device when the generator is on load.**
GENERATOR LOAD INHIBIT	This is a normally open (default) -ve signal. It is used to prevent the **530** from loading the generator. If the generator is already on load activating this input will cause the **530** to unload the generator. Removing the input will allow the generator to be loaded again. **NOTE:-This input only operates to control the generator switching device if the 530 load switching logic is attempting to load the generator. It will not control the generator switching device when the mains is on load.**

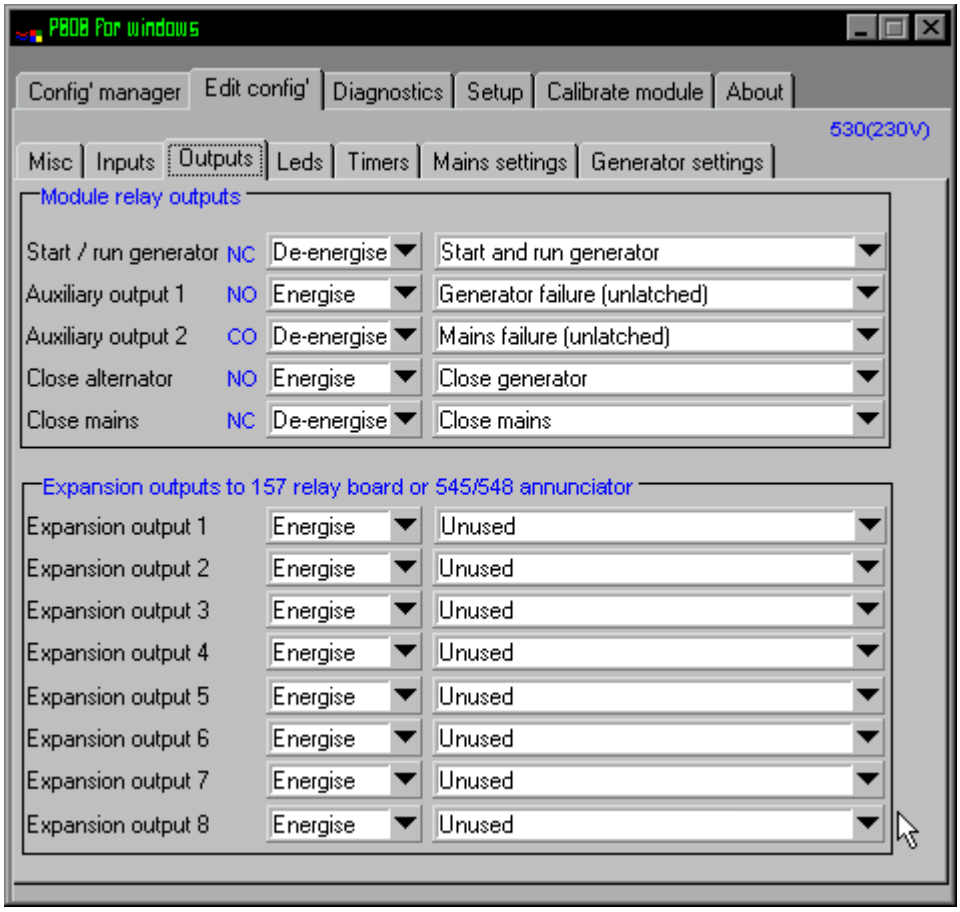
Item	Description
EXTERNAL RESET/LAMP TEST	This is a normally open (default) -ve signal. It is used to provide a test facility for the front panel indicators fitted to the **530** module. When the input is activated all LED's should illuminate. The input also serves a second function, in that it also provides a reset signal to clear any latched alarms. The **530** has facility to provide a latched alarm on **Generator Failure** or **Mains Failure**, these latched alarms must be manually cleared if set. This is achieved by activating the reset input. **NOTE:-The default configuration does not use the latched alarms and if required they need to be set using the 808 PC software.**
TRANSFER TO MAINS BUTTON	This is a normally open (default) -ve signal. It is used to transfer the load to the mains supply when running in **START AND RUN GENERATOR OFF LOAD MODE**. **NOTE:-The default configuration has transfer by pushbutton disabled. If this function is required the 530 module must be reconfigured using the 808 PC software.**
TRANSFER TO GENERATOR BUTTON	This is a normally open (default) -ve signal. It is used to transfer the load to the generator when running in **START AND RUN GENERATOR OFF LOAD MODE.** **NOTE:-The default configuration has transfer by pushbutton disabled. If this function is required the 530 module must be reconfigured using the 808 PC software.**

POLARITY

The polarity of the input switching can be configured to be either **"Close to Activate"**, this is a Normally open switch, and closes to negative when activated . or **"Open to Activate"**, this is a Normally Closed switch to negative, and opens when activated.

EDIT RELAY OUTPUTS

This menu allows the configurable output to be changed to suit the users requirements. The following is displayed:-



NOTE:- Each Auxiliary output has the same selection choices, allowing a combination of different uses.
The Expansion outputs are available for 53x type modules on a plug in Expansion module type 157, this provides volt free contacts.
NO,NC, CO = Type of contact available NO - Normally open Contact, NC - Normally closed contact, CO - Changeover contact.

POLARITY

Each of the outputs can be configured as:

a) Energised

Normally open relay contact which closes on activation.

b) De-energised

Normally closed relay contact which opens on activation.

Output selection

OUTPUT SELECTION

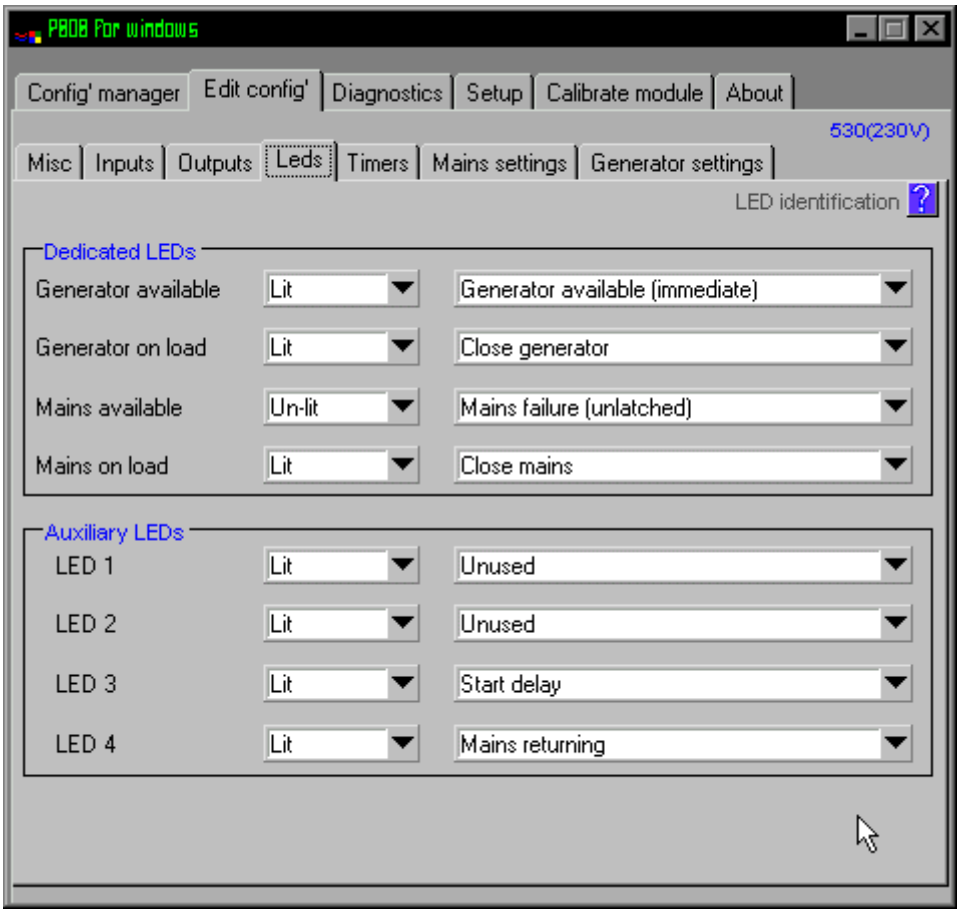
Function	Description
Unused	The output in not used.
Auto return to mains inhibit IP	This output source indicates that the Auto return to mains inhibit input is active.
Auto start inhibit IP	This output source indicates that the Auto start inhibit input is active.
Auxiliary Generator ready IP	This output source indicates that the Auxiliary generator ready input is active.
Auxiliary mains failure IP	This output source indicates that the Auxiliary mains failure input is active.
Close Generator	This output source is intended to be used to control the load switching device. Whenever the 530 module selects the generator to be on load this control source will be active.
Close Gen Pulse	This output source is intended to be used to control the load switching device. Whenever the 530 module selects the mains to be on load this control source will be active for the duration of the 'Breaker Close Pulse Timer'. Once this timer has expired the output source will once again become in-active.
Close Mains	This output source is intended to be used to control the load switching device. Whenever the 530 module selects the mains to be on load this control source will be active.
Close Mains Pulse	This output source is intended to be used to control the load switching device. Whenever the 530 module selects the mains to be on load this control source will be active for the duration of the 'Breaker Close Pulse Timer'. Once this timer has expired the output source will once again become in-active.
Cooling down	This output source will be active when the cooling off-load timer is running.
External Reset / Lamp test	This output source indicates that the External reset / lamp test input is active.
Gen Available (Immediate)	This output source will become active once the generator is within the pre-set voltage and frequency limits and the '**Auxiliary generator ready**' input is active. Should the generator go out of limits then the control source will become inactive.
Generator closed auxiliary IP	This output source indicates that the generator closed auxiliary input is active. This is used for true feedback of the switching device status.
Generator in limits	This output source will be active to indicate that the generator is within the limits set in the 530. Should the generator go out of limits then this output source will become inactive. Once the generator returns to within limits the source will again become active. **NOTE:- This operates independently of the Auxiliary generator ready input - unlike the 'Generator available' control source.**
Generator Failure (Latch)	This output source will be activated if the generator does not become available before expiry of the generator failure timer. Should the generator become available later the source will remain active until a signal is received from the external reset input to clear the condition.
Generator Failure (unlatched)	This output source will be activated if the generator does not become available before expiry of the generator failure timer. Should the generator become available later the source will become inactive again (unlatched).
Generator load inhibit IP	This output source indicates that the generator load inhibit input is active.

Function	Description
Generator Load Inhibited	The output source indicates that the 530 has selected the generator to be on load, but the generator load inhibit signal is present, preventing a generator loading from taking place.
Generator ready	This output source will be active when the 530 module detects that the generator voltage and frequency is within limits, and the 'Aux Generator ready input is active and the Warming timer has expired.
Mains closed auxiliary IP	This output source indicates that the Mains closed auxiliary input is active. This is used for true feedback of the switching device status.
Mains in Limits	This output source will be active to indicate that the incoming AC mains supply is within the limits set in the 530. Should the mains supply go out of limits then this output source will become inactive. Once the mains returns to within limits the source will again become active. **NOTE:- This operates independently of the Auxiliary Mains failure input - unlike the 'mains failure' control sources.**
Mains Failure (Latch)	The 530 module has detected that the mains is out of limits or an auxiliary mains failure signal has been received. Should the mains supply be restored then the output source will not automatically reset, but will require a signal from the External reset input to clear the condition. This gives a latching mains failure indication.
Mains Failure (Unlatched)	The 530 module has detected that the mains is out of limits or an auxiliary mains failure signal has been received. Should the mains supply be restored then the output source will automatically reset. This gives real-time mains failure indication.
Mains load inhibit IP	This output source indicates that the mains load inhibit input is active.
Mains Load Inhibited	The output source indicates that the 530 has selected the mains supply to be on load, but the mains load inhibit signal is present, preventing a mains loading from taking place.
Mains over freq. (Immediate)	The 530 module has detected that the mains is over frequency, this output source in not delayed in any way and gives real time indication of over frequency. Should the mains frequency be restored to within limits then the output source will automatically reset.
Mains over volts (Immediate)	The 530 module has detected that the mains is over voltage, this output source in not delayed in any way and gives real time indication of over voltage. Should the mains voltage be restored to within limits then the output source will automatically reset.
Mains returning	This output source will be active to indicate that the mains return timer is running.
Mains under freq. (Immediate)	The 530 module has detected that the mains is under frequency, this output source in not delayed in any way and gives real time indication of under frequency. Should the mains frequency be restored to within limits then the output source will automatically reset.
Mains under volts (Immediate)	The 530 module has detected that the mains is under voltage, this output source in not delayed in any way and gives real time indication of under voltage. Should the mains frequency be restored to within limits then the output source will automatically reset.
Start and run generator	This output source will be active when ever the 530 module requests that the generator should be started.

Function	Description
Start delay	This outpurt source will be active to indicate that the 530 modules internal start delay timer is running
Auto Mode (Key)	This output source will be active to indicate that the 530 control key switch is in the 'Auto' position.
Manual Restore Mode (Key)	This output source will be active to indicate that the 530 control key switch is in the 'Manual restore to mains' position.
Run off Load Mode (Key)	This output source will be active to indicate that the 530 control key switch is in the 'Run off load' position.
Run on load mode (Key)	This output source will be active to indicate that the 530 control key switch is in the 'run on load' position.
Transfer to gen button IP	This output source indicates that the Transfer to mains push button input is active.
Transfer to generator request	This output will be active when the 530 module has detected that a transfer to the generator is required. It will become active before any timing sequences involved in the transfer have expired. It can be used to indicate that the 530 module is going to load the generator.
Transfer to mains button IP	This output source indicates that the Transfer to mains push button input is active.
Trip Generator	This output source is intended to be used to control the load switching device. Whenever the 530 module selects the mains to be on load this control source will be active shortly before the 'close mains' signal is given.
Trip Generator Pulse	This output source is intended to be used to control the load switching device. Whenever the 530 module selects the mains to be on load this control source will be active for the duration of the 'Breaker open Pulse Timer'. Once this timer has expired the output source will once again become in-active and the 530 will issue commands to load the mains supply.
Trip Mains	This output source is intended to be used to control the load switching device. Whenever the 530 module selects the generator to be on load this control source will be active shortly before the 'close generator' signal is given.
Trip Mains Pulse	This output source is intended to be used to control the load switching device. Whenever the 530 module selects the generator to be on load this control source will be active for the duration of the 'Breaker open Pulse Timer'. Once this timer has expired the output source will once again become in-active and the 530 will issue commands to load the generator.
Waiting for generator	This output source will become active once the 530 has requested the generator to start and run. It will remain active until either the generator becomes available or the generator failure timer expires.
Waiting for manual restore	The 530 has detected that the mains supply has returned to within limits and is now available to take the load. However, it is operating in 'Manual restore' mode or is receiving a 'return to mains inhibit' signal. Until these are removed it will continue to run on the generator.
Warming up	This output source will be active when the warming off-load timer is running.

EDIT FRONT PANEL LED'S

This menu allows the configurable LED's to be changed to suit the users requirements. The following is displayed:-(Typical Settings for information only);



NOTES

1:- Each LED has the same selection of choices as stated in the edit outputs section of this manual.

2:- Each LED can be configured to any function, but on the standard 53x module six LED's are pre-configured to match the label, this does not prevent them from being re-configured for another purpose.

POLARITY

Each of the LED's can be configured as:

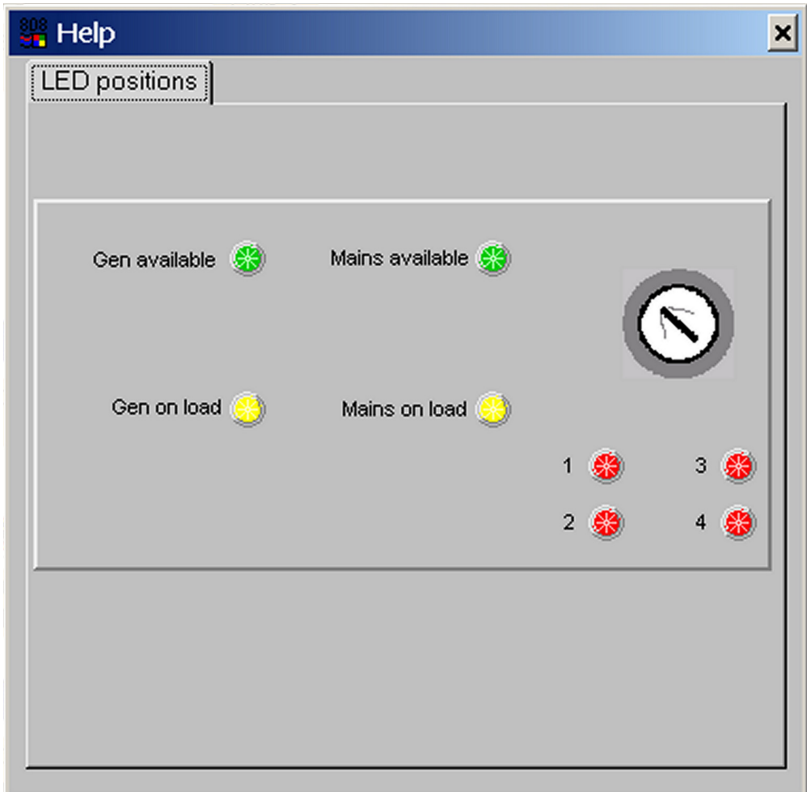
a)Lit - Normally extinguished LED which illuminates on activation.

b)Un-lit - Normally illuminated LED which extinguishes on activation.

CONTROL SOURCE

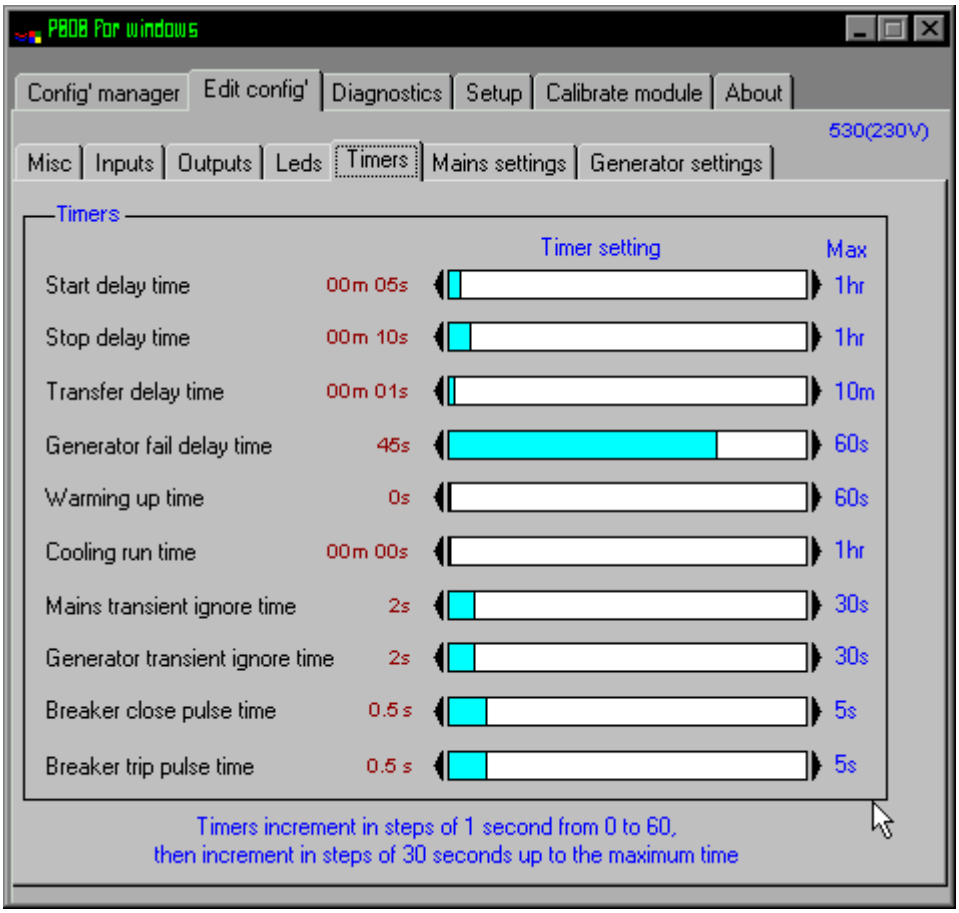
Refer to Output Selection shown in Edit Outputs section of this manual.

LED IDENTIFICATION



EDIT SYSTEM TIMERS

This menu allows the configurable system timers to be changed to suit the users requirements. The following menu is displayed:-



NOTES:-
Timers can be adjusted by clicking on either the up(➡) or Down (⬅) arrow or by clicking on the bar and dragging the bar to the correct time.
The start delay timer is only used if the module is connected to an optional DC supply.

TIMER DESCRIPTIONS

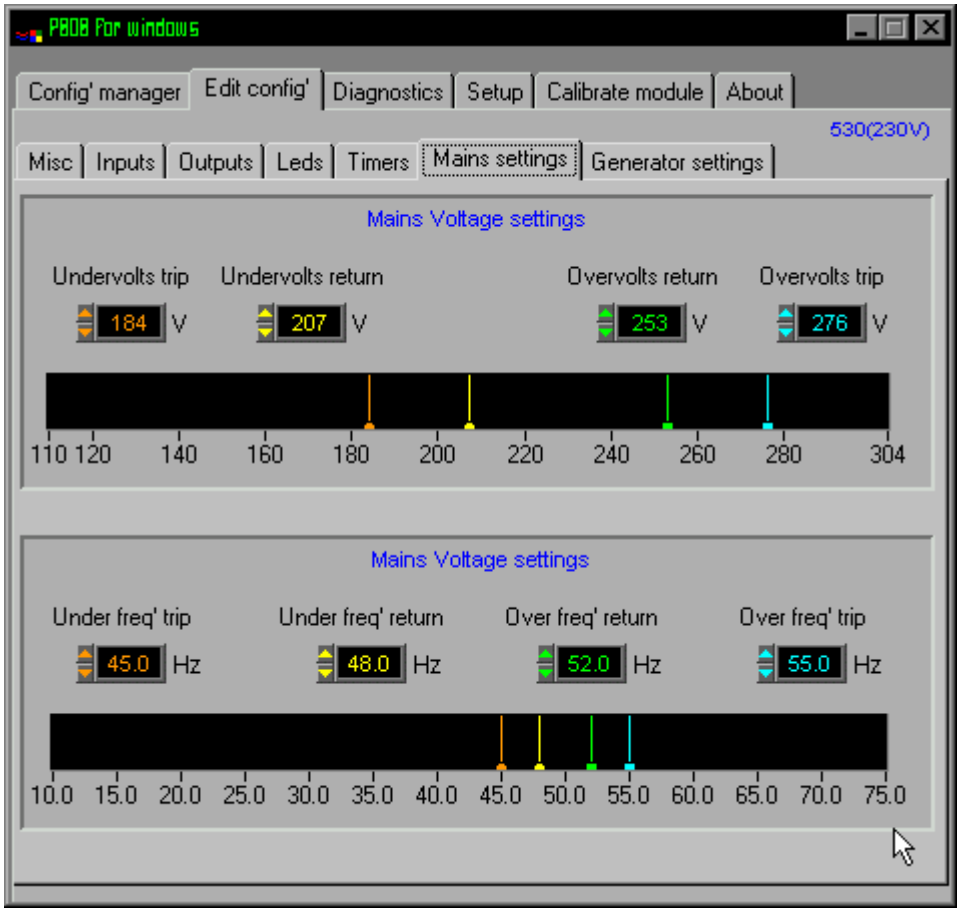
Timer	Function
Start delay time	This timer dictates how long the module will wait after it has detected a mains failure before it will attempt to call for the generator to start. This prevents un-necessary starting on a fluctuating mains supply.
Stop Delay Timer	This timer dictates how long the module will wait before it will un-load the generator back to the mains supply and initialise it's run-on and shutdown cycle. This is to ensure that the mains supply has stabilised before transferring the load back to mains.
Transfer Delay time	This is used to allow for fixed duration transfer breaks when switching from mains to generator and back. It can be used to ensure that the supply is removed from the load for a fixed period of time to allow pumps/motors to come to rest etc.
Generator Fail delay time	This is the amount of time the module will wait for the generator to become available before giving a generator failure alarm.
Warm up timer	This timer is initiated once the generator is available. It delays loading the generator until it has stabilised. Once this timer has expired the generator loading signal will be given.

Timer	Function
Cooling Time	This is the time the generator is to run off-load once the load has been transferred back to the mains supply. This gives the engine time to cool down before shutdown.
Mains transient ignore time	This timer dictates how long a mains anomaly must be present before the module will respond to it. This can be used to prevent nuisance tripping when switching loads etc.
Generator transient ignore time	This timer dictates how long a generator output anomaly must be present before the module will respond to it. This can be used to prevent nuisance tripping when switching loads etc.
Breaker Close Pulse Time	This is used to determine the duration of the Mains and Generator close signals. This timer is only used if Pulsed outputs are configured to be used.
Breaker Open Pulse Time	This is used to determine the duration of the Mains and Generator open signals. This timer is only used if Pulsed outputs are configured to be used.

NOTE:- As the timers can be accurately set to exact times, it is possible to initially configure the module with the timers reduced to allow rapid testing of the finished system. Once the set is ready for a final witness test it is just a simple matter of entering the specified timer settings and writing them to the module.

EDIT MAINS VALUES

This menu allows the configurable trip values to be edited to the users required levels. The following menu is displayed:



LEVELS DESCRIPTION

Level	Function
Mains over voltage trip	This is the maximum voltage that the 530 will consider the incoming AC mains supply to be within limits. Should this value be exceeded the module will indicate a mains failure and function accordingly.
Mains over voltage return	This is the voltage that the incoming mains supply must return to before the 530 module will consider that the supply is back with in limits. (i.e. With a OV trip of 276.0V and a OV return of 253.0V, the mains voltage must return to 253.0V following an over voltage event to be considered within limits.)
Mains under voltage trip	This is the minimum voltage that the 530 will consider the incoming AC mains supply to be within limits. Should the input fall below this value the module will indicate a mains failure and function accordingly.
Mains under voltage return	This is the voltage above the under voltage trip that the incoming mains supply must return to before the 530 module will consider that the supply is back with in limits. (i.e. With a UV trip of 184.0V and a UV return of 207.0V, the mains voltage must return to 207.0V following an under voltage event to be considered within limits.)

Level	Function
Mains over frequency trip	This is the maximum frequency that the 530 will consider the incoming AC mains supply to be within limits. Should this value be exceeded the module will indicate a mains failure and function accordingly.
Mains over frequency return	This is the frequency below the over frequency trip that the incoming mains supply must return to before the 530 module will consider that the supply is back with in limits. (i.e. With a OF trip of 55.0Hz and a OF return of 50.0Hz, the mains frequency must return to 50.0Hz following an over frequency event to be considered within limits.)
Mains under frequency trip	This is the minimum frequency that the 530 will consider the incoming AC mains supply to be within limits. Should the input fall below this value the module will indicate a mains failure and function accordingly.
Mains under frequency return	This is the frequency above the under frequency trip that the incoming mains supply must return to before the 530 module will consider that the supply is back with in limits. (i.e. With a UF trip of 45.0Hz and a UF return of 48.0Hz, the mains frequency must return to 48.0Hz following an under frequency event to be considered within limits.)

EDIT GENERATOR VALUES

This menu allows the configurable trip values to be edited to the users required levels. The following menu is displayed:

LEVELS DESCRIPTION

Level	Function
Generator under frequency trip	This is the minimum frequency that the 530 will consider the generator output to be within limits. Should the output fall below this value the module will indicate a generator failure and function accordingly.
Generator loading frequency	This is the minimum frequency the generator must be operating at before the 530 module will consider it available to take the load.
Generator under Voltage trip	This is the minimum voltage that the 530 will consider the generator output to be within limits. Should the output fall below this value the module will indicate a generator failure and function accordingly.
Generator loading voltage	This is the minimum voltage the generator must be operating at before the 530 module will consider it available to take the load.

DIAGNOSTICS

A particularly useful feature of the module is it's ability to provide real-time diagnostic information to the PC. This can be used to give on-screen details of the operation of the module and generating set performance.

Two versions of the diagnostic facility are supplied:-

The first Diagnostic is Mimic Display, This is provided to allow at-a-glance monitoring of the system, all non-essential information is hidden. Clear graphical displays of the measured values allow easy performance monitoring. Should an alarm occur this a clearly displayed by a flashing red 'Alarm' legend. Details on the system operation are provided to give more detailed information if required.

The second diagnostic is the Status Display this allows the user to see at a glance the values of all measured inputs and the status of any of the digital inputs. Output state of the relays and LED operation are also displayed. A text display indicates the modules present state of operation, shows time remaining on any system timer that is in operation and will give details on any shutdown alarm which has occurred.

As the diagnostics are real-time the opening and closing of the inputs can be viewed allowing simple checks to be made on panel wiring by checking input circuits and output relays. It is therefore possible to simulate switching signal by earthing the appropriate input connection in the panel. If the input state displayed on the diagnostic page changes this indicates that the wiring is correct, it is possible that the module configuration is incorrect and further investigation is required using the configuration program.

The module internal software revision details are also given, this is to aid DEEP SEA ELECTRONICS technical staff in the event of a query.

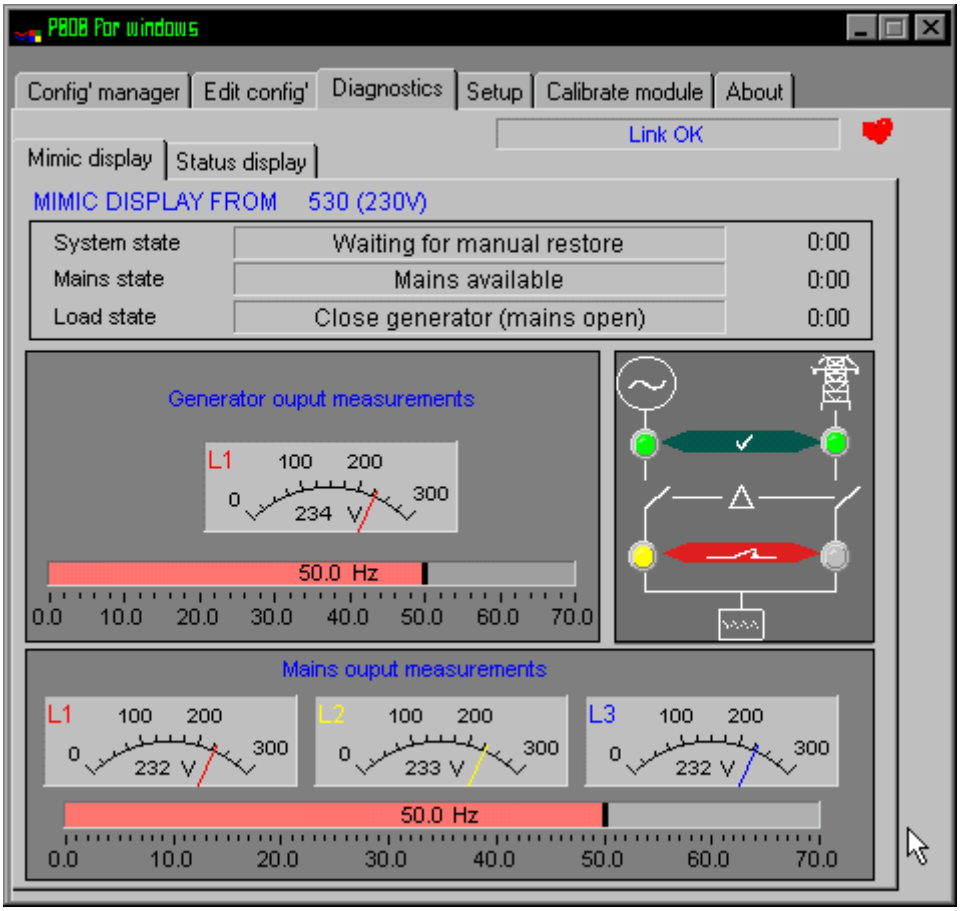
NOTE:- The Diagnostic displays screen are updated by information sent from the module, if the link to the module is lost the information displayed could be incorrect and is therefore 'greyed out'. A small icon in the bottom right of each diagnostic display indicates that the link to the module is healthy.

or

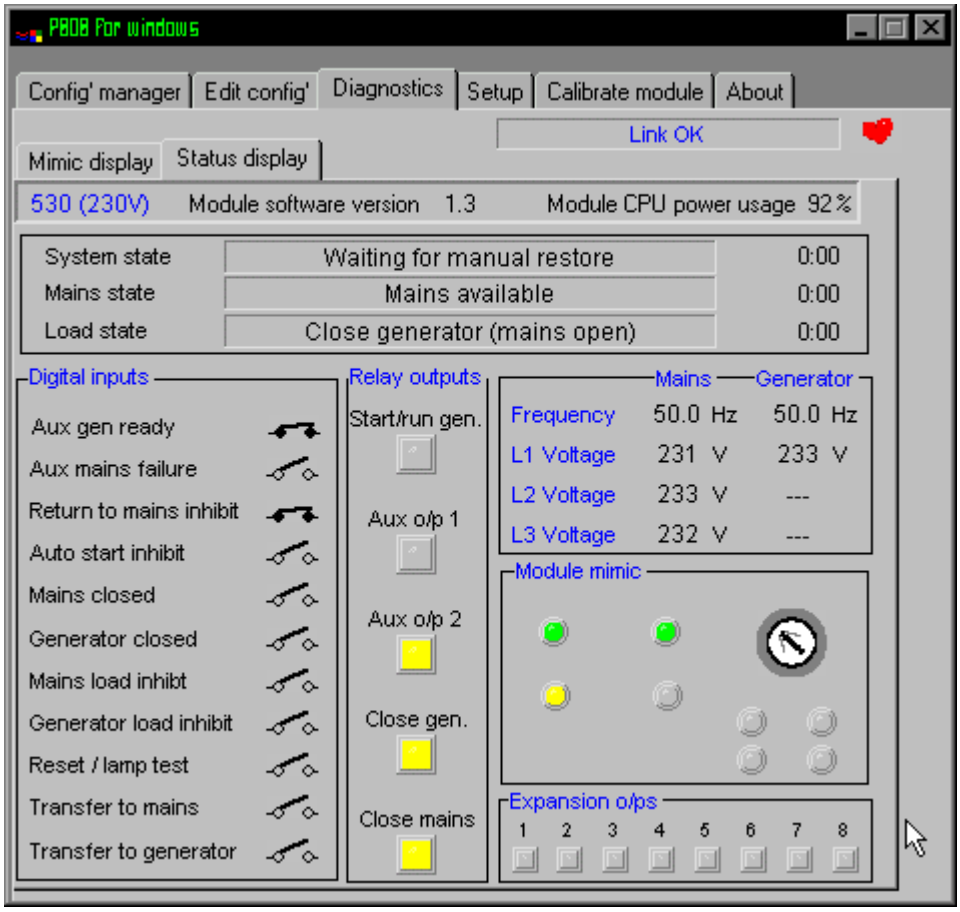
= Communications link is OK.

= No Data available from the Communications link. Check 'Set-up' and ensure module is connected.

If the Mimic Display option is selected the display will show:



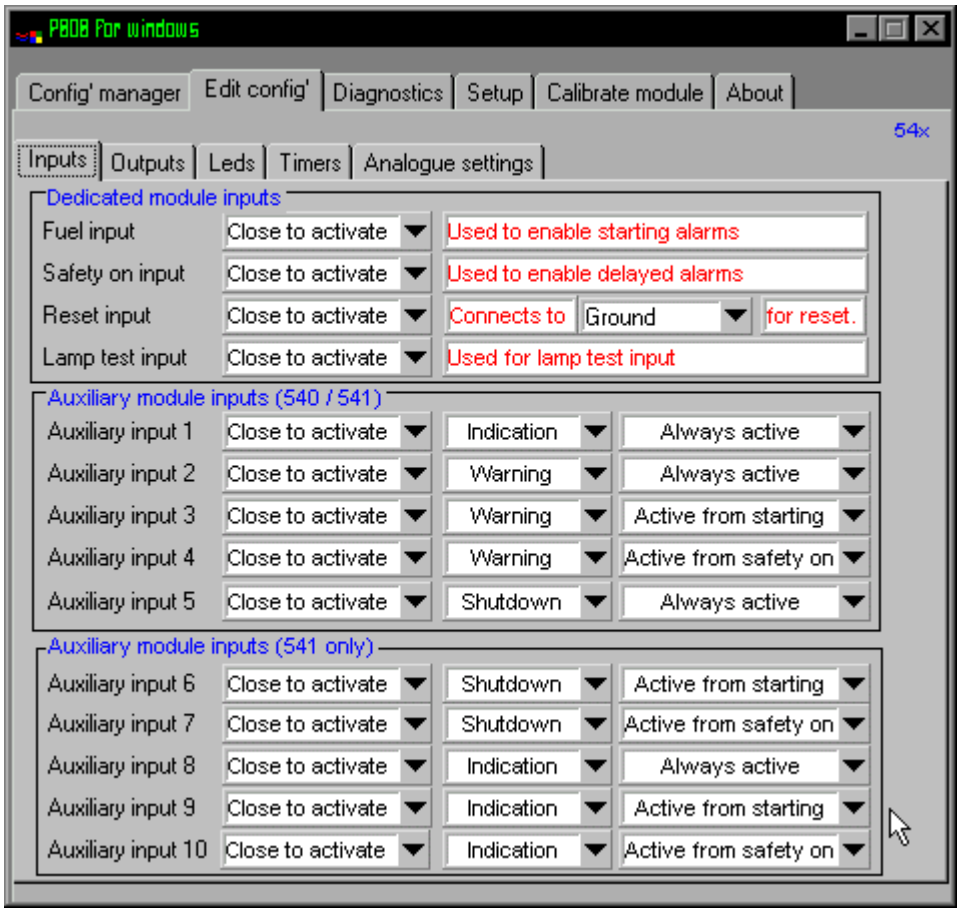
If the Status Display option is selected the display will show:



54X ANNUNCIATOR/PROTECTION EXPANSION MODULE - EDIT MENU

EDIT CONFIGURABLE INPUTS

This menu allows the configurable inputs to be changed to suit the users requirements. The following is displayed:-



NOTE:- Each of the auxiliary inputs has the same selection choices, allowing flexibility of selection to be made i.e. Indications, Warnings, Shutdowns, electrical trip or a combination of all 4.
Only five inputs are available on the P540 modules, Aux. 6 to 10 are therefore not used. The P541 module has ten inputs available and therefore uses inputs 1 to 10.

The internal safety on timer is active from fuel on signal. It is overridden if an external safety on signal is received.

Incorrect setting of the reset input connection may result in incorrect operation of the reset input. Ensure that the reset input connects to the correct polarity.

POLARITY

The polarity of the input switching can be configured to be either **"Close to Activate"**, this is a Normally open switch, and closes to negative when activated, or **"Open to Activate"**, this is a Normally Closed switch to negative, and opens when activated.

NOTE:- Voltage Polarity
The modules require inputs to have the following voltage polarity to function:-
Fuel Input: +Ve input
Safety on Input: +Ve supply
Reset Input: Determined by configuration setting either +Ve or –Ve supply
Lamp Test input: -Ve input
Auxiliary inputs: -Ve input

TYPE

The auxiliary inputs can be configured to be either **Indication** (annunciation only, no alarm or shutdown, non-latching), **Warning** (Alarm only, no shutdown, non-latching), or **Shutdown** (Alarm, shutdown and latching) or **Electrical trip** (Alarm, Electrical trip and latching). Those shown in red (Dark grey above) are not configurable.

NOTE:- Electrical trip is used to provide a second shutdown alarm channel. This allows alarms to be grouped to provide a different output for electrical type faults requiring a controlled shutdown rather than an immediate shutdown. Alternatively it could be used just to provide two shutdown alarm channels allowing shutdowns to be sensibly grouped.

ACTIVATION TIME

The activation time of each auxiliary input can be configured to be any of the following:-

a) Never active

This switches off the input if not in use.

b) Always active

The input will always be monitored and the relative indication or alarms given if the input becomes active.

c) Active from fuel on

Auxiliary inputs are only active once the fuel input is active. They will remain active until the fuel input becomes inactive again.

d) Active from safety on

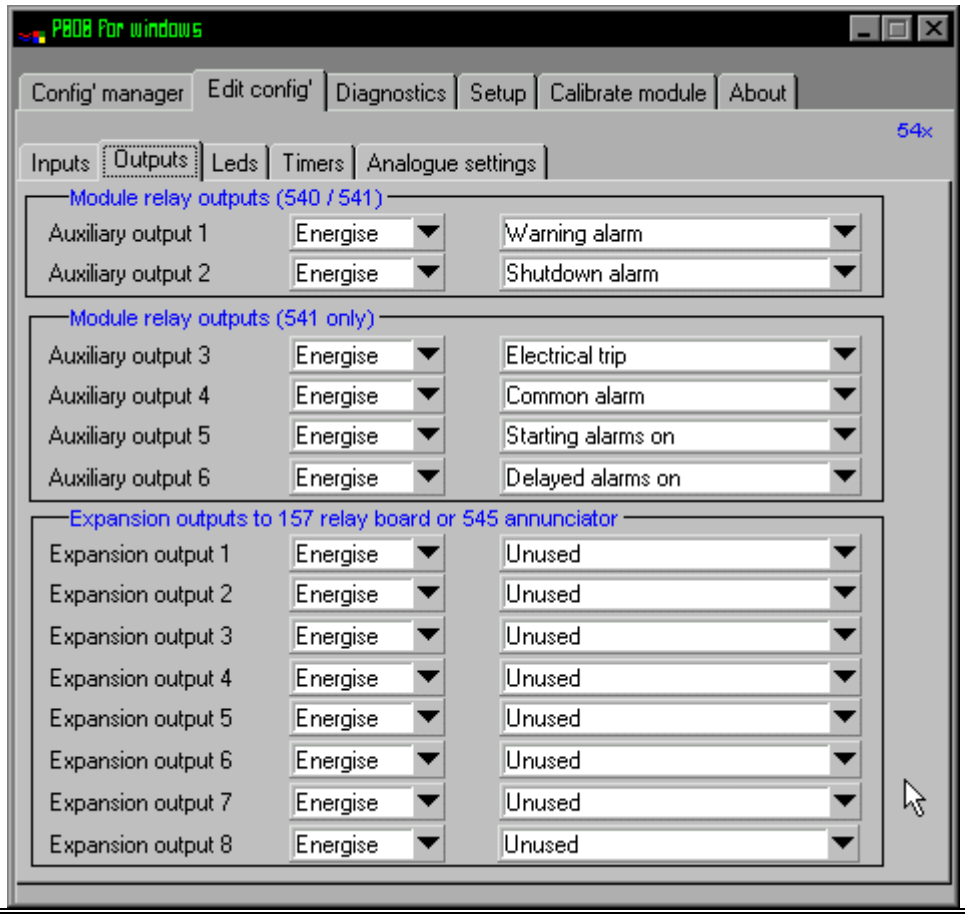
Auxiliary inputs are only active once the **Safety On** timer has timed (if enabled) out or the **Safety on input** is active. This allows a delay on start up for two stage faults, such as Oil Pressure and High Engine Temperature Warnings, or other shutdown conditions which require a delay during start-up, such as Under-voltage.

INPUT FUNCTIONS

Fuel On	**This input instructs the P54x module that the engine is starting. On receipt of the 'fuel on' signal the 540 will enable starting alarms (active from fuel on) and will initiate the safety on timer (if enabled).**
Safety On	**This input instructs the P54x module that the delayed alarms are to be enabled. This would normally be fed from the 'Delayed alarms active' output state from the P52x, the whole system would then be instructed that delayed alarms are active. It need not be connected if the 540 internal safety on timer is enabled.**
Lamp Test	**This will instruct the P54x module to perform a lamp test function. This allows the operator to verify that all the indicator LED's are functioning.** **NOTE:- The LED's will illuminate amber when lamp test is operated, regardless of the colour selection made while configuring the module.**
Reset	**This input instructs the P54x module to clear any 'Shutdown' or 'Electrical trip' type alarms. When the reset signal is present the module should clear any displayed alarms of this type. If the module fails to clear the alarm, this indicates that the alarm signal is still present and further investigation is necessary.** **NOTE:- The 'RESET INPUT' can be configured to be switched to either plant -Ve or plant +Ve. By configuring to plant +Ve it is possible to connect the reset input to the P52x module 'System in stop' output state. Thus resetting the P52x module will issue a reset signal to the P54x module(s). The P54x needs to receive a 'Reset' signal to clear any shutdown or electrical trip type alarms. It can be configured such that the reset input connects to either a plant supply negative signal or a plant supply positive to suit the application. The positive plant supply input is particularly suited to receiving a reset signal from the 520 module '*System in stop*' output.**

EDIT RELAY OUTPUTS

This menu allows the configurable output to be changed to suit the users requirements. The following is displayed:-



NOTE:- Each Auxiliary output has the same selection choices, allowing a combination of different uses.
On P540 modules only two auxiliary relays are available, therefore Aux. 3 to 6 are not available. On the P541 modules 6 relays are available, therefore Aux. 1 to 6 can be used.
The Expansion outputs are available for P54x type modules on a plug in Expansion module type 157, this provides volt free contacts.

POLARITY

Each of the outputs can be configured as:

a) Energised

Normally open relay contact which closes on activation.

b) De-energised

Normally closed relay contact which opens on activation.

OUTPUT SELECTION

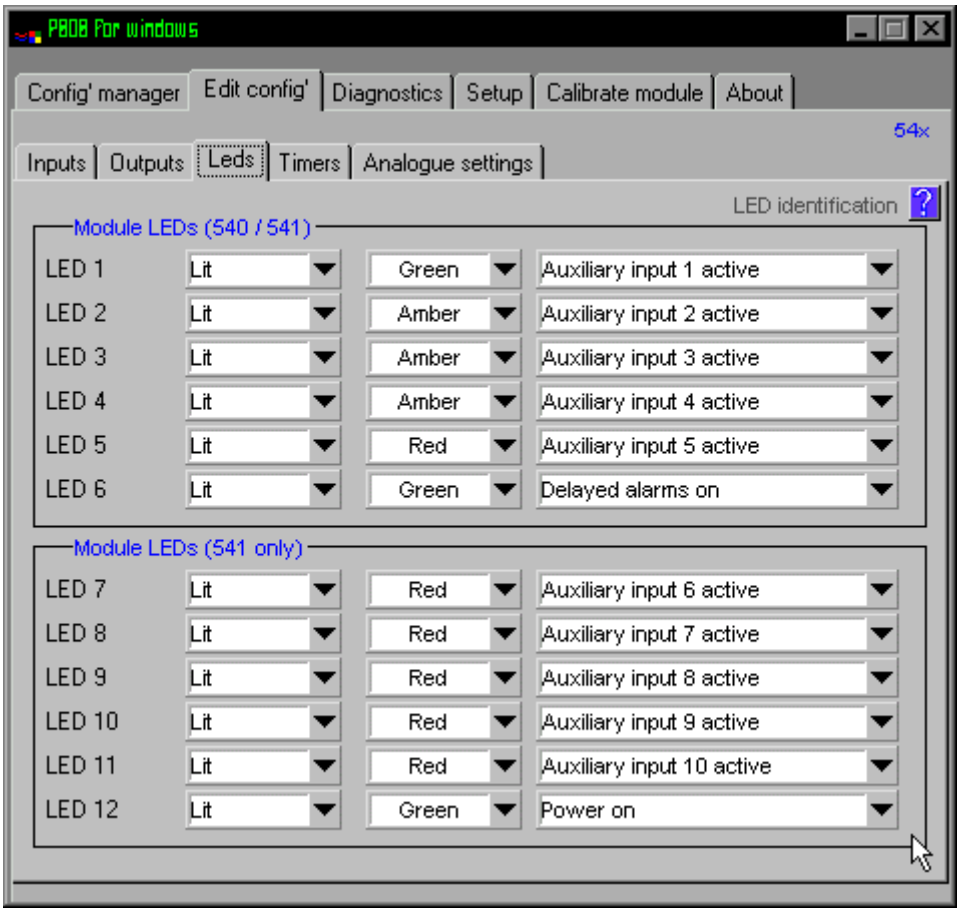
Function	Description
Unused	The output in not used.
At Rest	This output indicates that the module is in its at rest mode. The module is powered up but the **fuel** and **safety on inputs** are inactive.
Auxiliary IP 1 Active	The output indicates that **auxiliary input 1** is active.
Auxiliary IP 2 Active	The output indicates that **auxiliary input 2** is active.
Auxiliary IP 3 Active	The output indicates that **auxiliary input 3** is active.
Auxiliary IP 4 Active	The output indicates that **auxiliary input 4** is active.
Auxiliary IP 5 Active	The output indicates that **auxiliary input 5** is active.
Auxiliary IP 6 Active	The output indicates that **auxiliary input 6** is active.
Auxiliary IP 7 Active	The output indicates that **auxiliary input 7** is active.
Auxiliary IP 8 Active	The output indicates that **auxiliary input 8** is active.
Auxiliary IP 9 Active	The output indicates that **auxiliary input 9** is active.
Auxiliary IP 10 Active	The output indicates that **auxiliary input 10** is active.
Common Alarm	The output indicates that a **warning** or **shutdown** or **electrical trip alarm** has been activated. Reset rules as above, depending on whether it is a Warning or a Shutdown or an electrical trip alarm.
Delayed Alarms On	This output indicates that the module has enabled any alarms that are configured to be '**active from safety on**'. Delayed alarms on will become active once the safety on timer has expired (if enabled) or the **safety on input** becomes active. The output will then remain active until the fuel signal is removed.
Electrical Trip	The output indicates that an **electrical trip alarm** has been activated. This output can only be reset by removal of the **fault input** and **fuel input** signals and then activation of the **reset input**.
Fuel IP Active	This output indicates that the **Fuel IP** is active.
Lamp Test IP Active	This output indicates that the **Lamp test Input** is active
High Plant Voltage	This output indicates that the high plant voltage monitoring function (if enabled) has detected that the voltage has risen above the pre-set level (set by the **EDIT ANALOGUE MENU**) and any appropriate time delays have expired. Should the voltage return to within limits this output will reset.
Low Plant Voltage	This output indicates that the low plant voltage monitoring function (if enabled) has detected that the voltage has fallen below the pre-set level (set by the **EDIT ANALOGUE MENU**) and any appropriate time delays have expired. Should the voltage return to within limits this output will reset.
Plant Voltage in Limits	This output indicates that the plant voltage monitoring functions (if enabled) have detected that the voltage is within pre-set limits Should the voltage go outside of these limits this output will reset.
Power On	This output state will become active whenever a suitable DC power supply is applied to the module
Reset IP Active	This output indicates that the **Reset input** is active.
Safety On Delay	This output indicates that the module is in its safety on delay mode. The **fuel input** is active but the safety on timer has not yet expired (if enabled) and the **safety on input** is not active.
Safety On IP Active	This output indicates that the **Safety on input** is active.

Function	Description
Shutdown Alarm	The output indicates that a **shutdown alarm** has been activated. This output can only be reset by removal of the **fault input** and **fuel input** signals and then activation of the **reset input**.
Starting Alarm On	This output indicates that the module has enabled any alarms that are configured to be '**active from fuel on**'. Starting alarms on will become active once the **fuel input** is active. The output will remain active until the fuel signal is removed.
Warning Alarm	The output indicates that a **warning alarm** has been activated. This output is self-resetting on removal of the **fault input**.

NOTES:-
*** = These inputs can only be used if module is a P541 module. On a P540 these outputs will not function.**

EDIT FRONT PANEL LED'S

This menu allows the configurable LED's to be changed to suit the users requirements. The following is displayed:-*(Typical Settings for information only)*;



NOTES

1:- Each LED has the same selection of choices as stated in the edit outputs section of this manual.

2:- Each LED can be configured to any function and colour

Only six LED's are fitted to the P540 module, therefore LED's 7-12 cannot be used when configuring one of these units.

POLARITY

Each of the LED's can be configured as:
a)Lit - Normally extinguished LED which illuminates on activation.
b)Un-lit - Normally illuminated LED which extinguishes on activation.

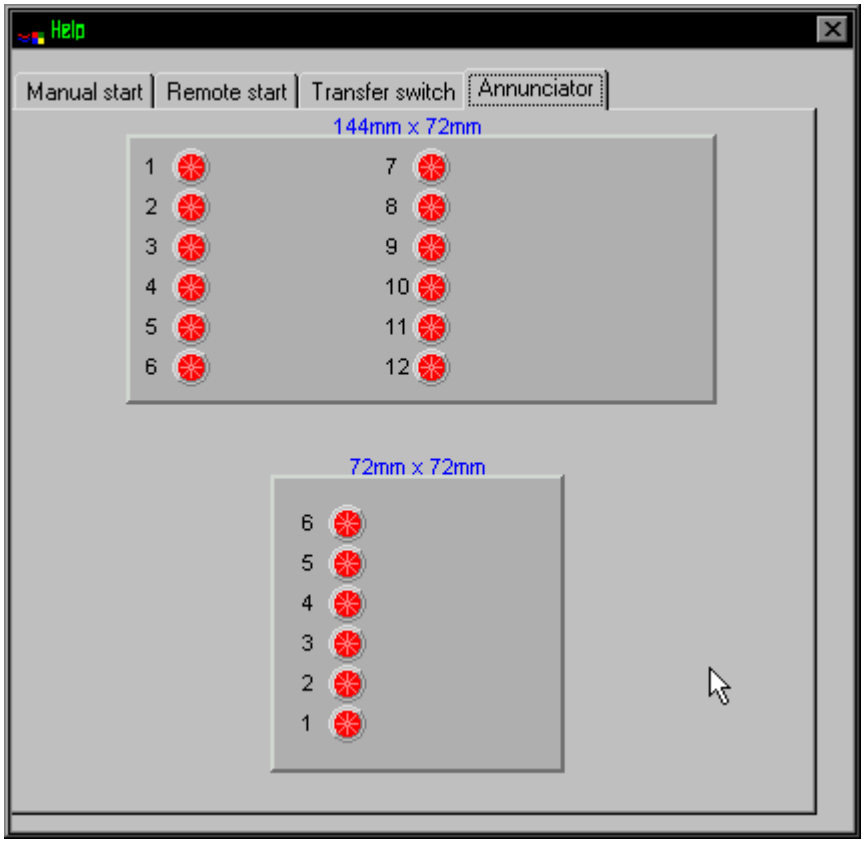
COLOUR

Each of the LED's can be configured as:
a)Red - LED which illuminates RED on activation.
b)Green - LED which illuminates GREEN on activation.
c)Amber - LED which illuminates AMBER on activation.

CONTROL SOURCE

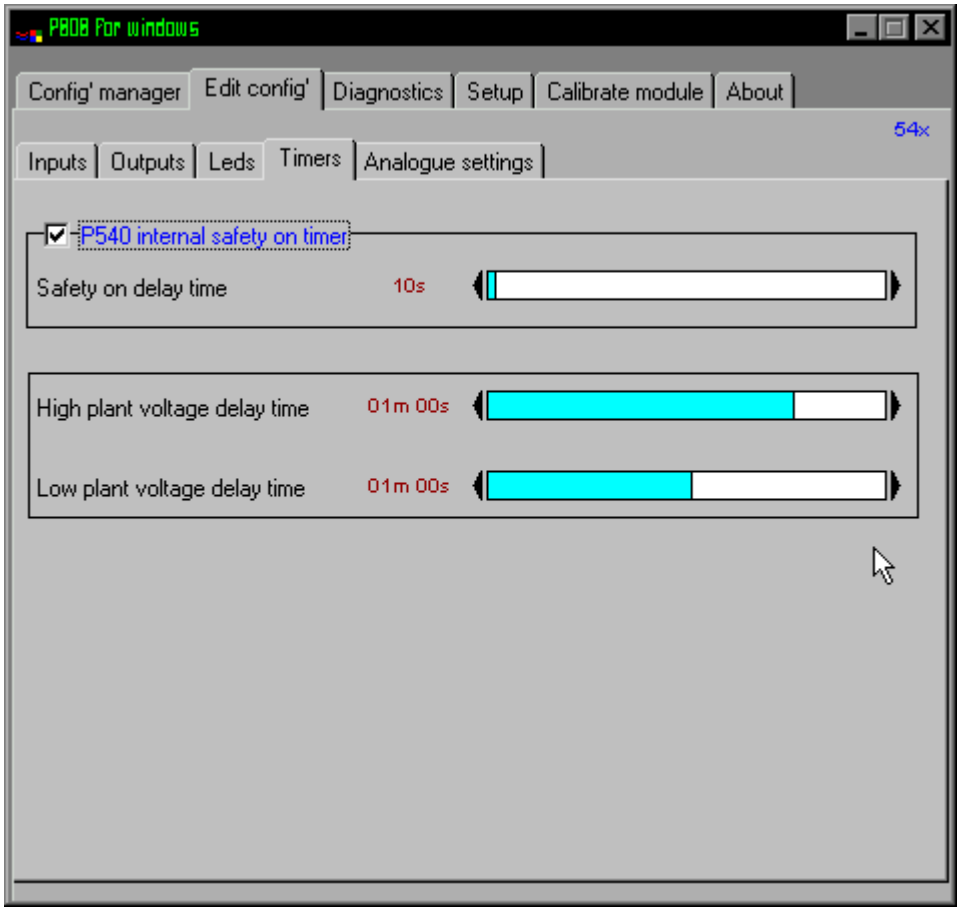
Refer to Output Selection shown in Edit Outputs section of this manual.

LED IDENTIFICATION



EDIT SYSTEM TIMERS

This menu allows the configurable system timers to be changed to suit the users requirements. The following menu is displayed:-



NOTES:-

Timers can be adjusted by clicking on either the up(➡) or Down (⬅) arrow or by clicking on the bar and dragging the bar to the correct time.

The plant voltage timers are only applicable if the plant voltage monitoring functions are enabled in the 'Analogue' settings.

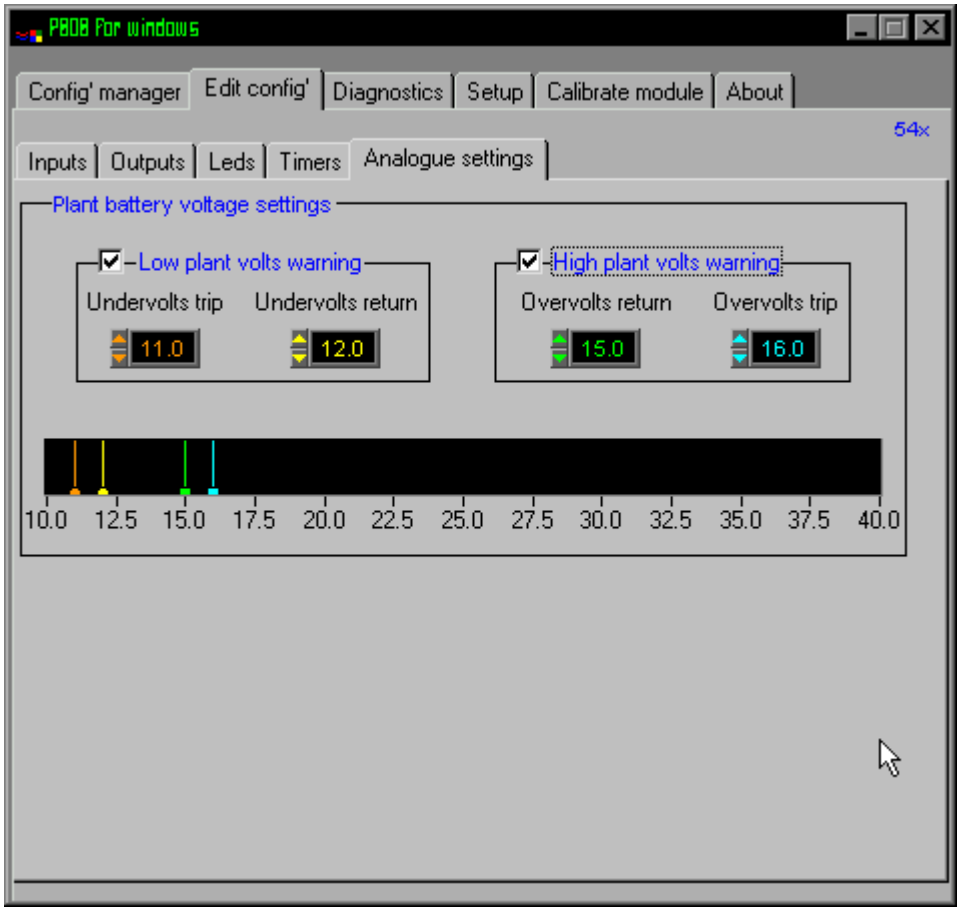
TIMER DESCRIPTIONS

Timer	Function
Safety on delay time	This timer dictates how long the module will ignore any inputs configured as 'active from safety on'. It allows the values such as oil pressure or voltage to rise to their operating values on starting without triggering an alarm. Once the timer has expired all alarm conditions are monitored again. ☐ = In the event of the 'fuel on' input becoming active the P54x module will enter 'waiting for safety on' state and remain there until an external safety on signal is received. It will then enter 'safety on' state and enable any delayed alarms. ☑ =In the event of the 'fuel on' input becoming active the P54x will initialise it's 'safety on' timer. Once this timer has expired or the external safety on input is received, which ever occurs sooner, the module will then enter 'safety on' state and enable any delayed alarms.
High plant voltage delay time	This timer dictates how long the module will wait before it will give a high plant voltage alarm in the event of the high voltage trip level being exceeded. This can be used to prevent nuisance alarms when using poorly regulated power supplies and battery chargers.
Low plant voltage delay time	This timer dictates how long the module will wait before it will give a low plant voltage alarm in the event of the plant voltage falling below low voltage trip level. This can be used to prevent nuisance alarms when using poorly regulated power supplies and battery chargers, and during engine cranking.

NOTE:- As the timers can be accurately set to exact times, it is possible to initially configure the module with the timers reduced to allow rapid testing of the finished generating set. Once the set is ready for a final witness test it is just a simple matter of entering the specified timer settings and writing them to the module.

EDIT ANALOGUE LEVELS

This menu allows the configurable trip values to be edited to the users required levels. The following menu is displayed:



LEVELS DESCRIPTION

Level	Function
High plant voltage trip	This is the maximum voltage that the module will consider the incoming DC plant supply to be within limits. Should this value be exceeded the module will initiate the high voltage trip delay timer, if the voltage remains high and the timer expires, a high voltage warning will be given.
High plant voltage return	This is the voltage below the high voltage trip that the incoming DC plant supply must return to before the module will consider that the supply is back with in limits. (i.e. With a HV trip of 27.0V and a HV return of 25.0V, the plant voltage must return to 25.0V following an high voltage event to be considered within limits.)
Low plant voltage trip	This is the minimum voltage that the module will consider the incoming DC plant supply to be within limits. Should the input fall below this value the module will initiate the low voltage trip delay timer, if the voltage remains low and the timer expires, a low voltage warning will be given.
Low plant voltage return	This is the voltage above the low voltage trip that the incoming DC plant supply must return to before the module will consider that the supply is back with in limits. (i.e. With a LV trip of 10.0V and a LV return of 12.0V, the plant voltage must return to 12.0V following a low voltage event to be considered within limits.)

DIAGNOSTICS

A particularly useful feature of the module is it's ability to provide real-time diagnostic information to the PC. This can be used to give on-screen details of the operation of the module and generating set performance.

Two versions of the diagnostic facility are supplied:-

The first Diagnostic is Mimic Display, This is provided to allow at-a-glance monitoring of the system, all non-essential information is hidden. Clear graphical displays of the measured values allow easy performance monitoring. Should an alarm occur this a clearly displayed by a flashing red 'Alarm' legend. Details on the system operation are provided to give more detailed information if required.

The second diagnostic is the Status Display this allows the user to see at a glance the values of all measured inputs and the status of any of the digital inputs. Output state of the relays and LED operation are also displayed. A text display indicates the modules present state of operation, shows time remaining on any system timer that is in operation and will give details on any shutdown alarm which has occurred.

As the diagnostics are real-time the opening and closing of the inputs can be viewed allowing simple checks to be made on panel wiring if this thought to be at fault. It is therefore possible to simulate switching signal by earthing the appropriate input connection in the panel. If the input state displayed on the diagnostic page changes this indicates that the wiring is correct, it is possible that the module configuration is incorrect and further investigation is required using the configuration program.

The module internal software revision details are also given, this is to aid DEEP SEA ELECTRONICS technical staff in the event of a query.

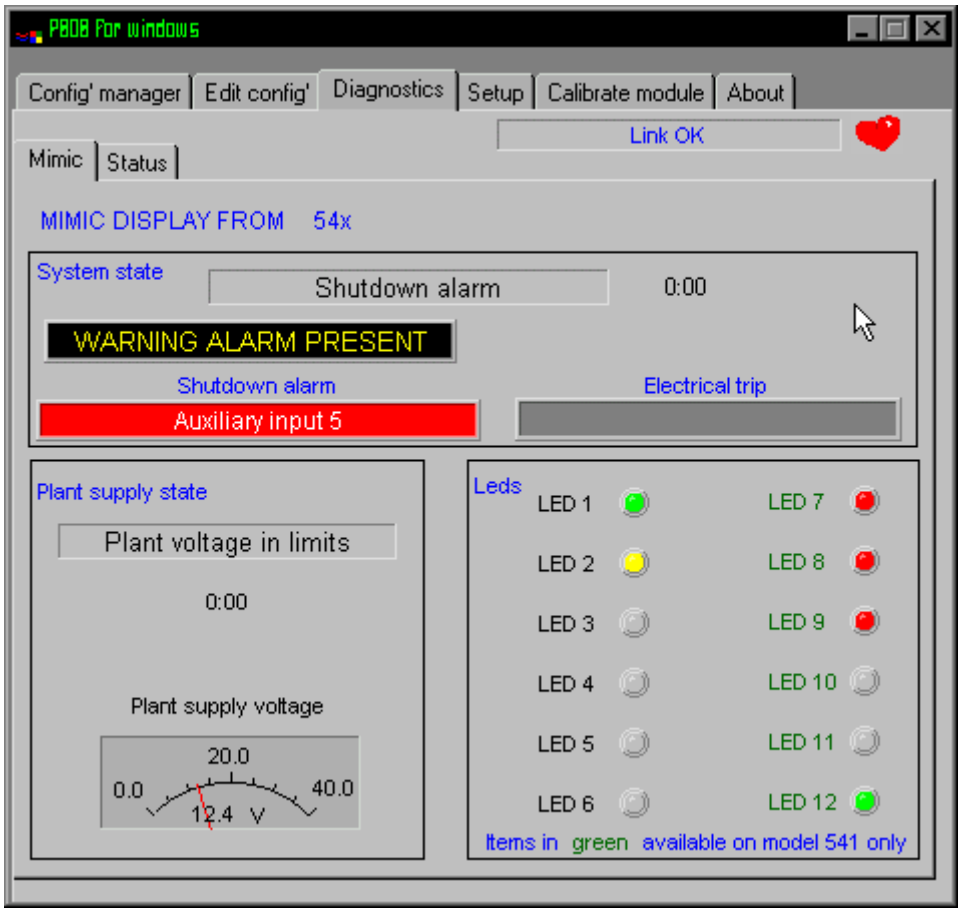
NOTE:- The Diagnostic displays screen are updated by information sent from the module, if the link to the module is lost the information displayed could be incorrect and is therefore 'greyed out'. A small icon in the bottom right of each diagnostic display indicates that the link to the module is healthy.

or

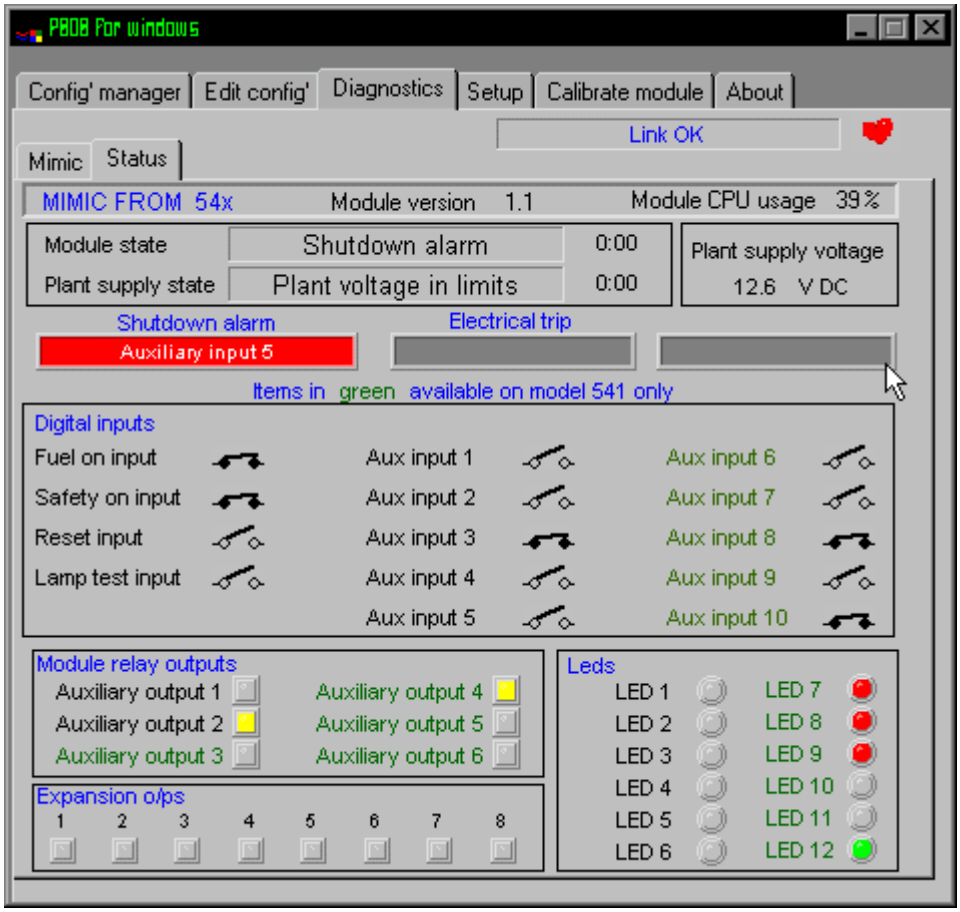
= Communications link is OK.

= No Data available from the Communications link. Check 'Set-up' and ensure module is connected.

If the Mimic Display option is selected the display will show:



If the Status Display option is selected the display will show:

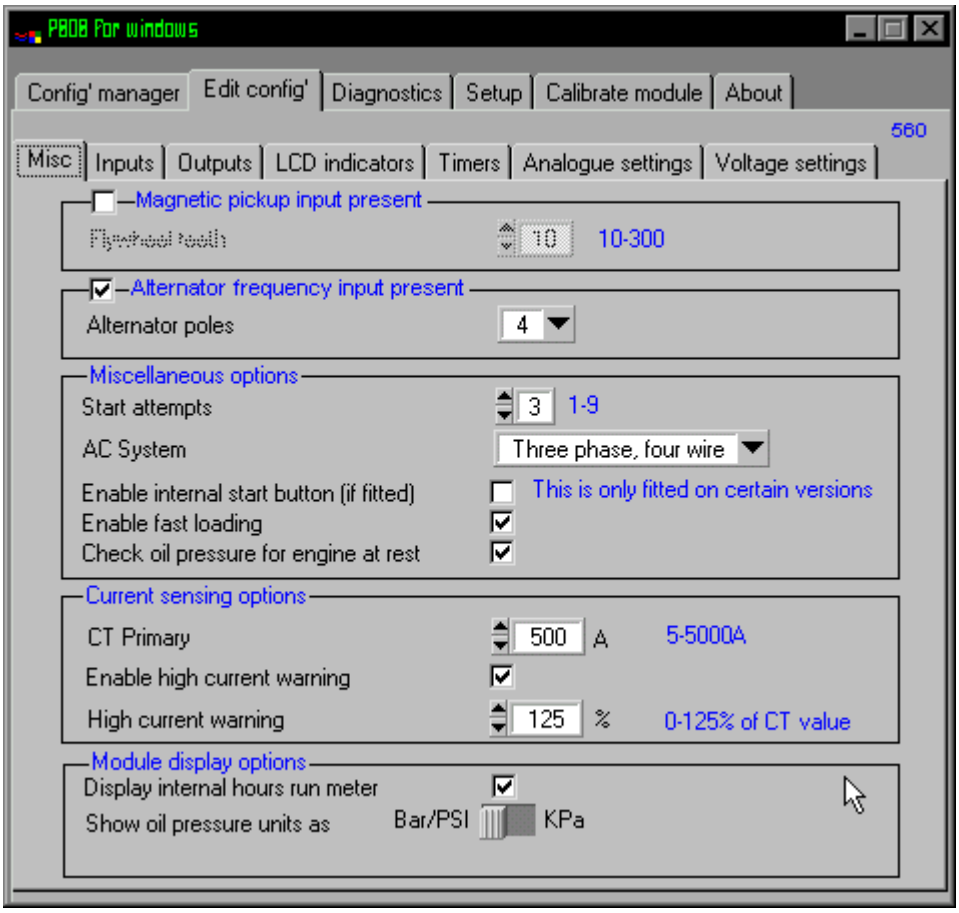


NOTE:- If a 540 module is connected then Auxiliary Inputs 6-10 and Auxiliary outputs 3-6 are not applicable.

560 AUTO-START / INSTRUMENTATION MODULE EDIT MENU

EDIT MISCELLANEOUS ITEMS

This menu allows the user to change the nominal operating parameters and also select the modules special operating modes, according to individual requirements. The following is displayed:



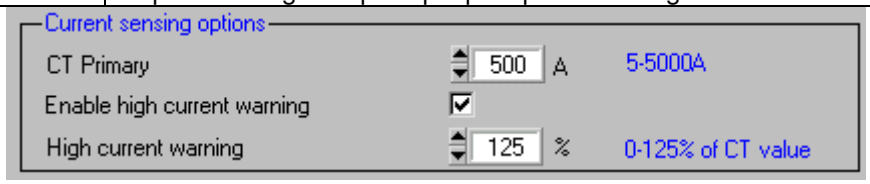
NOTES:-

It is possible to configure the 560 Auto-start module to use either alternator frequency or magnetic pickup speed sensing, both or none. If both sources are used shutdown will occur if either speed sensing source gives an over or under-speed(frequency) signal. If a magnetic pickup is not to be used it is important that ☐ is selected for 'Magnetic pickup present'. If the module expects to receive magnetic pickup pulses and none are apparent on starting, it assumes that the pickup is faulty and will shutdown the engine. However, the module will assume that the engine will not stop until the Fail to stop timer has expired, as it has no means of seeing if the engine is at rest, so the operator will be effectively 'locked' out for this time. Once this timer has expired the module will assume that the engine has come to rest, (unless oil pressure is present), and will then reset

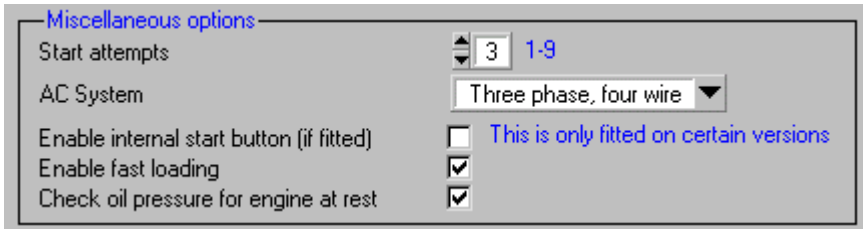
MISCELLANEOUS DESCRIPTION

Level	Function
Alternator frequency input present	This selects whether the module is to receive an input from the generator alternator. If not ticked then the following settings are 'greyed' out.
Alternator Poles	This value is the number of poles on the alternator, the value is only required if the meter option is fitted to the module as it is required to calculate the RPM of the engine if alternator output sensing only is being used.

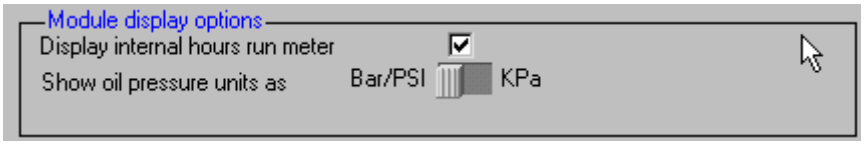
Level	Function
Magnetic Pickup input present	This selects whether the module is to receive an input from the magnetic pickup. If not ticked then the following settings will be 'greyed' out.
Flywheel teeth	This value is the number of teeth on the fly-wheel which are detected by the magnetic pickup. This is used to determine the engine RPM and is only required if magnetic pickup input speed sensing is to be used.



Level	Function
CT Primary	This setting is used to set the primary current rating of the phase monitoring current transformers. The secondary of the CT's should be rated at 5 amps.
Enable High current warning	The module is capable of giving a warning alarm if the load current exceeds a certain value. This feature could be used to provide a warning alarm for monitoring purposes, be fed back to the module to provide an electrical trip function, or to give a signal to start a second generator, etc. ☐ = Generator High current warning alarm is disabled. ☑ = Generator High current warning alarm will operate if high current warning trip level is exceeded.
High current warning trip	This value is the percentage value of the CT primary rating at which the high current warning alarm will operate. (e.g With a CT primary of 300 Amps and a High Current warning trip of 125% = Trip at 375 Amps)



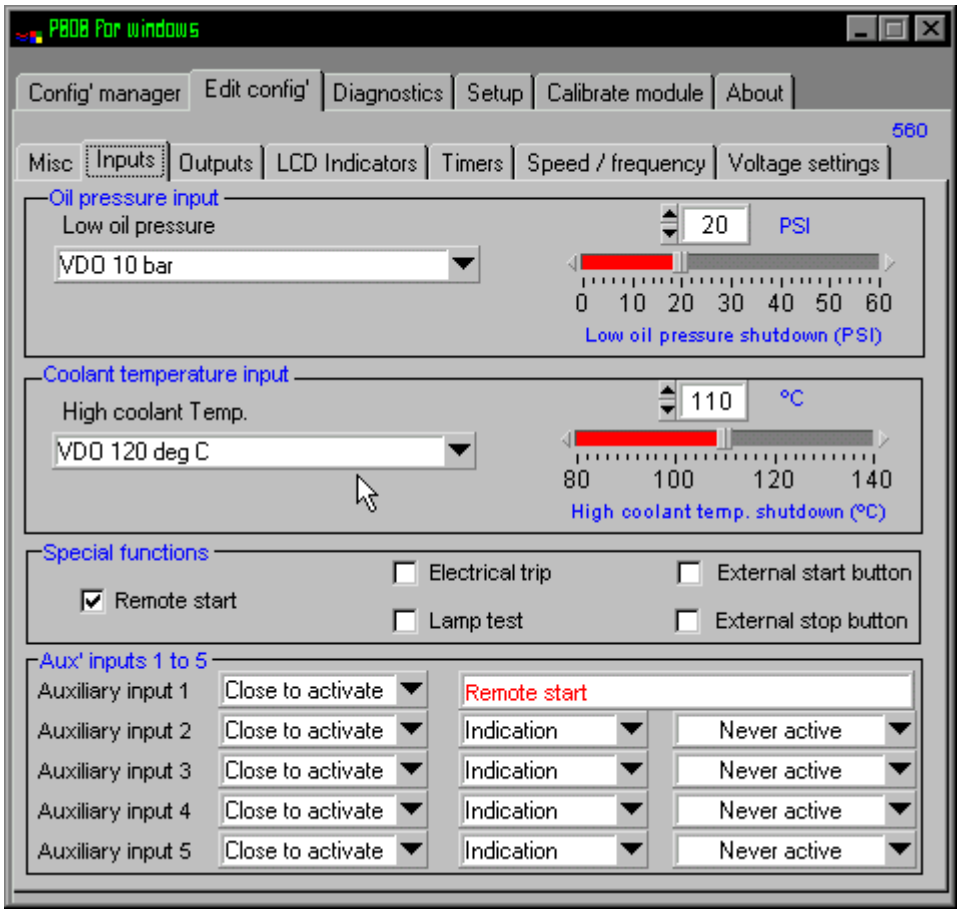
Level	Function
Start attempts	This value is the number of times the module will attempt to start the generator. Should the generator start the module will not attempt further starts. If the generator does not start after the final attempt, the module will give a 'Fail to start' alarm.
AC System	AC System ***3phase 4 wire*** ***3phase 3 wire**** (Requires special version of 560 Module) ***1phase 2 wire*** This setting is used to select the AC wiring topography used. **NOTE:- A special version of the 560 should be ordered if it is required to connect to a 3 phase 3 wire (Delta) system.**
Enable internal Start button	A special version of the module is available with a start push-button fitted to the fascia. ☐ = Module will operate normally and will commence starting when switch is turned to the 'Manual' position. ☑ = Module will not commence starting when switch is turned to the 'Manual' position until the start pushbutton on the fascia is operated. **CAUTION!:-ONLY USE THIS OPTION IF START PUSHBUTTON VERSION OF MODULE IS USED. If Set incorrectly it will not be possible to start the module in manual mode.**
Enable Fast Loading	The module will normally terminate the safety on timer once all monitored parameters have reached their normal settings (Fast Loading). It is possible however to force the module to make the safety on timer to run full term. This is useful if the module is to be used with some small engines where pre-mature termination of the delay timer can lead to overspeed alarms on start up. ☐ = Full Safety On Delay Time is observed by module. ☑ = Safety On Delay Timers is cancelled pre-maturely if all conditions are normal.
Check oil pressure for engine at rest	The module will normally use oil pressure as an indication that the engine is at rest. This is used to prevent accidental crank engagement on a running engine. There are however occasions when it is necessary to have oil pressure present before cranking the engine (such as pre-lubrication systems). In such cases it will be necessary to turn off the oil pressure check. ☐ = Module will not perform a check on oil pressure prior to starting. ☑ = Module will ensure oil pressure is low prior to attempting cranking.



Level	Function
Display internal Hours Run Counter	One of the module instruments is an hours run counter which logs the time the engine is running. If this instrument is not required it can be disabled;- ☐ = Hours Run counter will not appear in the instrument display. ☑ = Hours Run counter will appear in the instrument display. **NOTE:- This feature will only work on modules with V1.4 or later internal software. The setting will be ignored on earlier software versions.**
Show Oil Pressure Units As	The module can display the Oil pressure in either Bar and PSI or alternatively as a measurement in KPa. ***Bar/PSI*** ***KPa*** **NOTE:- This feature will only work on modules with V1.4 or later internal software.**

EDIT CONFIGURABLE INPUTS

This menu allows the configurable inputs to be changed to suit the users requirements. The following is displayed:-



Function	Description
Oil Pressure settings	This section is used to configure the Oil Pressure sender input. **Input Type:-** ***Digital Switch, Close for low oil pressure -*** The Oil Pressure input is fed from an engine mounted digital pressure switch. This switch returns a closed signal during low oil pressure conditions (and engine at rest), once oil pressure is established the switch will open. ***Digital Switch, Open for low oil pressure -*** The Oil Pressure input is fed from an engine mounted digital pressure switch. This switch returns an open signal during low oil pressure conditions (and engine at rest), once oil pressure is established the switch will close. ***VDO 5bar -*** The Oil Pressure input is connected to a resistive type engine mounted oil pressure transducer. The output of this transducer matches that of a VDO type sender with an operating range of 0-5bar. ***VDO 10bar* -*** The Oil Pressure input is connected to a resistive type engine mounted oil pressure transducer. The output of this transducer matches that of a VDO type sender with an operating range of 0-10bar. ***Datcon 5bar -*** The Oil Pressure input is connected to a resistive type engine mounted oil pressure transducer. The output of this transducer matches that of a Datcon type sender with an operating range of 0-5bar. ***Datcon 10bar -*** The Oil Pressure input is connected to a resistive type engine mounted oil pressure transducer. The output of this transducer matches that of a Datcon type sender with an operating range of 0-10bar. ***Datcon 7bar -*** The Oil Pressure input is connected to a resistive type engine mounted oil pressure transducer. The output of this transducer matches that of a Datcon type sender with an operating range of 0-7bar. ***Murphy 7bar -*** The Oil Pressure input is connected to a resistive type engine mounted oil pressure transducer. The output of this transducer matches that of a Murphy type sender with an operating range of 0-7bar. ***CMB 812 –*** DO NOT USE. Special option only, not for customer use. **Low Oil Pressure Shutdown (PSI)-** Engine oil pressure will give a shutdown alarm in the event of the engine oil pressure falling below the displayed '*oil pressure trip*' value. The '*oil pressure trip*' value can be adjusted to suit user requirements.

NOTE:- *Deep Sea Electronics recommended sender. (Part No. 024-006)

Function	Description
High Coolant Temperature settings	This section is used to configure the Coolant Temperature sender input. **Input Type:-** ***Digital Switch, Closed for high temperature -*** The Coolant Temperature input is fed from an engine mounted digital temperature switch. This switch returns a closed signal during low temperature conditions, should the temperature rise above the switch manufacturers trip point the switch contacts will open. ***Digital Switch, Open for high temperature-*** The Coolant Temperature input is fed from an engine mounted digital temperature switch. This switch returns an open signal during low temperature conditions, should the temperature rise above the switch manufacturers trip point the switch contacts will close. ***VDO 120°C* -*** The Coolant Temperature input is connected to a resistive type engine mounted temperature transducer. The output of this transducer matches that of a VDO type sender with an operating range of up to 120°C. ***Datcon HIGH -*** The Coolant Temperature input is connected to a resistive type engine mounted temperature transducer. The output of this transducer matches that of a Datcon HIGH type sender. ***Datcon LOW -*** The Coolant Temperature input is connected to a resistive type engine mounted temperature transducer. The output of this transducer matches that of a Datcon LOW type sender. ***Murphy -*** The Coolant Temperature input is connected to a resistive type engine mounted temperature transducer. The output of this transducer matches that of a Murphy type sender. ***Cummins –*** The Coolant Temperature input is connected to a resistive type engine mounted temperature transducer. The output of this transducer matches that of a Cummins type sender. **High Coolant Temp. Shutdown (°C) -** Coolant temperature will give a shutdown alarm in the event of the engine coolant temperature rising above the displayed '*coolant temperature trip*' value. The '*coolant temperature trip*' value can be adjusted to suit user requirements.

NOTE:- *Deep Sea Electronics recommended sender. (Part No: 024-007)

NOTE:- Each of the four auxiliary inputs has the same selection choices, allowing flexibility of selection to be made i.e. 5 Indications, 5 Warnings, 5 Shutdowns or a combination of all 3. In addition each input has it's own dedicated special function as detailed below.

POLARITY

The polarity of the input switching can be configured to be either **"Close to Activate"**, this is a Normally open switch, and closes to negative when activated . or **"Open to Activate"**, this is a Normally Closed switch to negative, and opens when activated.

TYPE

The auxiliary inputs can be configured to be either **Indication** (annunciation only, no alarm or shutdown), **Warning** (Alarm only, no shutdown), or **Shutdown**. (Or to perform it's Special dedicated function - see below)

ACTIVATION TIME

The activation time of each auxiliary input can be configured to be any of the following:-

a) Never active

This switches off the input if not in use.

b) Always active

With a 560 module, the input selected to be an indication is active even when the selector switch (key) is in the **OFF** position. When Warning or Shutdown is selected, then the input is only active when **Auto or Manual** is selected.

c) Active from starting

Auxiliary inputs are only active once an attempt to start the generator is made. It will remain active until the generator is at rest again.

d) Active from safety on

Auxiliary inputs are only active once the **Safety On** timer has timed out. This allows a delay on start up for two stage faults, such as Oil Pressure and High Engine Temperature Warnings, or other shutdown conditions which require a delay during start-up, such as Under-voltage.

SPECIAL FUNCTIONS

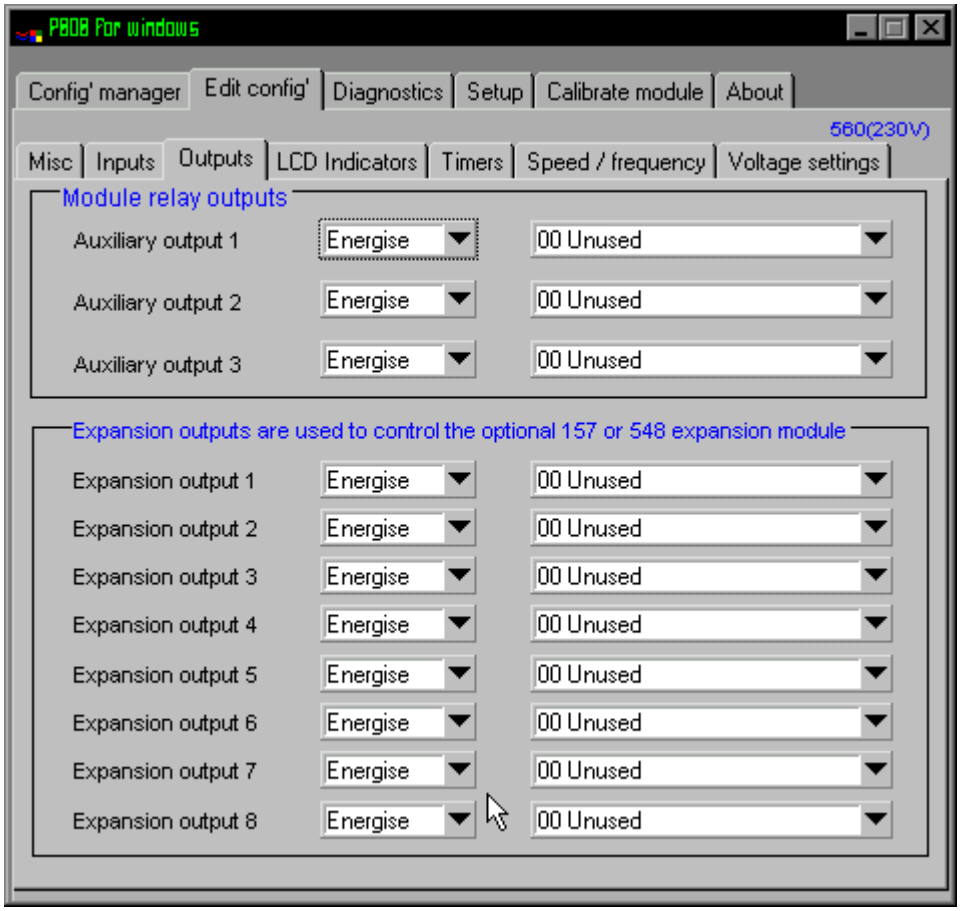
Special functions are used to give a dedicated function to the selected input. This replaces any previous input function that was selected such as a warning or shutdown alarm.

Remote Start	This setting is used to configure one of the inputs to provide a remote start function. This option uses input 1 such that when a signal is received, and the module is in the 'Auto' mode, the module will perform an auto start as described earlier in this manual. **⚠ CAUTION!:- Selecting this option will re-configure input 1 as 'Remote Start'. Ensure that input 1 is not selected for any other required function before selection.**
Electrical Trip enabled	This setting is used to configure one of the inputs to provide an electrical trip function. This option configures input 2 such that when a signal is received, from an electrical trip device (such as an overload unit), rather than shutdown a generating set with a hot engine, the module will remove the load transfer signal (if selected) and give an electrical trip output to operate a shunt trip or to open a contactor. This will isolate the load from the generator. The engine will then be allowed to cool off-load before being shutdown. **⚠ CAUTION!:- Selecting this option will re-configure input 2 as 'Electrical Trip'. Ensure that input 2 is not selected for any other required function before selection.**
Lamp test enabled	This setting is used to configure one of the inputs to provide a lamp test function. This option configures input 3 such that providing a signal to the input will cause all LED's to illuminate until the signal is removed. **⚠ CAUTION!:- Selecting this option will re-configure Input 3 as 'Lamp Test'. Ensure that Input 3 is not configured for any other required function before selection.**
Start button	This setting is used to select if a start button is connected to the module. Normally this is not necessary as the module will perform a start if the switch is turned to the 'Manual'. If an external start button is required then this inputs special option should be selected. This will configure input 4 such that when a signal is received the module will initiate a start sequence. **⚠ CAUTION!:- Selecting this option will re-configure Input 4 as 'Start Push-button'. Ensure that input 4 is not configured for any other required function before selection.**
Stop button	This setting is used to select if a stop button is connected to the module. Normally this is not required as the module will stop the engine if the switch is turned to the 'Stop/Reset' position. If an external stop button is required then this inputs special option should be selected. This will configure input 5 such that when a signal is received the module will initiate a stop sequence. **⚠ CAUTION!:- Selecting this option will re-configure Input 5 as 'Stop Push-button'. Ensure that input 5 is not configured for any other required function before selection.**

⚠ NOTE:- Each of the four auxiliary inputs has the same selection choices, allowing flexibility of selection to be made i.e. 5 Indications, 5 Warnings, 5 Shutdowns or a combination of all 3. In addition each input has it's own dedicated special function as detailed below.

EDIT RELAY OUTPUTS

This menu allows the configurable output to be changed to suit the users requirements. The following is displayed:-



NOTE:- Each Auxiliary output has the same selection choices, allowing a combination of different uses.

Expansion outputs are available for 560 type modules on a plug in Expansion module type 157, this provides volt free contacts. The 157 modules are fitted with a switch labelled 'A' and 'B'. The switch must be in the 'A' position to function with the 560 module. The 157 module will respond to signals for expansion relays 1 - 8.

If expansion outputs are required to be fitted for indication purposes only, a plug in LED Expansion module type 548 is available.(Also giving Power On and Link Lost indicators). The 548 modules are fitted with switch labelled 'A' and 'B'. The switch must be in the 'A' position for the 560 module to function with the 548 module. The 548 module will respond to signals for expansion relays 1 - 8 and illuminate the appropriate LED's.

CAUTION!:- The 157 relay status is updated a minimum of twice a second. While this makes the response of the relays fast enough for annunciation, remote monitoring and normal system control it is not considered suitable for use in time critical applications such as high speed breaker tripping etc. If this type of function is intended, we would recommend using the 560 modules own internal relay outputs to control such systems.

POLARITY

Each of the outputs can be configured as:

a) Energised

Normally open relay contact which closes on activation.

b) De-energised

Normally closed relay contact which opens on activation.

OUTPUT SELECTION

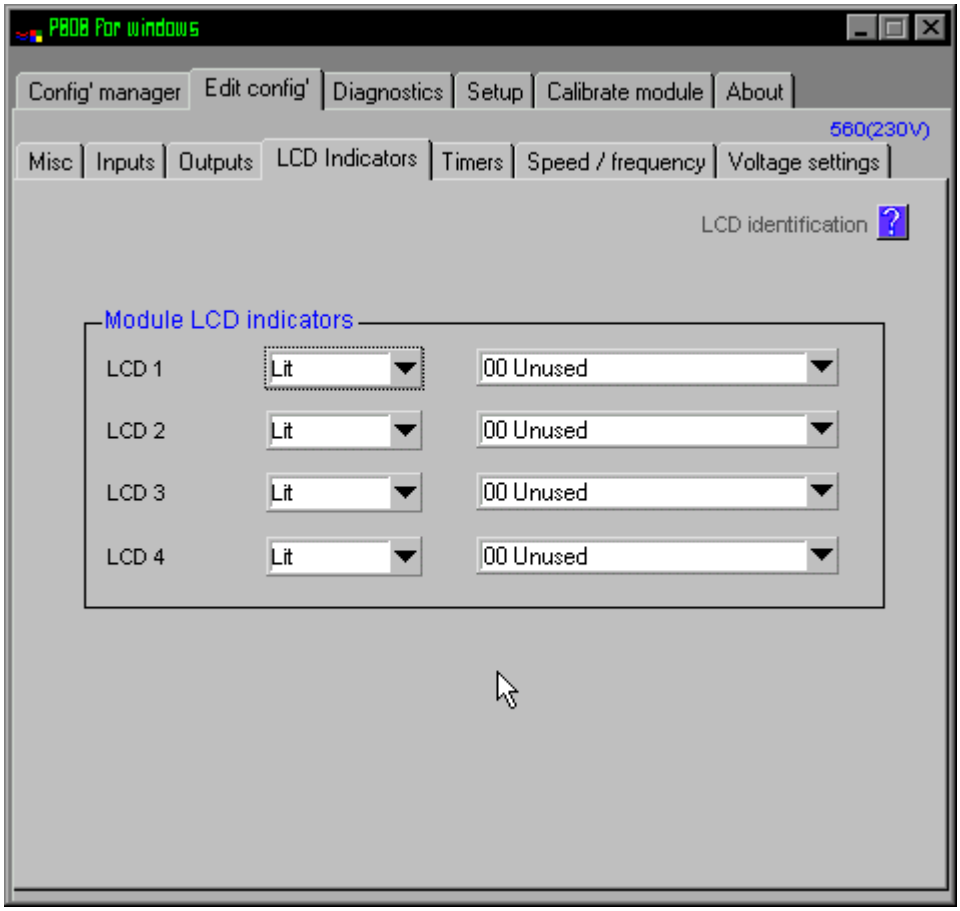
Function	Description
Unused	The output in not used.
Air flap	The output controls the closing of the air-flaps in an Emergency Stop or Over-speed situation.
High Alternator Voltage	The output indicates that the generator output voltage has exceeded the level set in **Edit Voltages Menu**, and shutdown on Over Voltage.
Low Alternator Voltage	The output indicates that the generator output voltage has fallen below the level set in **Edit Voltages Menu**, and shutdown on Under Voltage.
Auxiliary input 1 active	The output indicates that auxiliary input 1 is active.
Auxiliary input 2 active	The output indicates that auxiliary input 2 is active.
Auxiliary input 3 active	The output indicates that auxiliary input 3 is active.
Auxiliary input 4 active	The output indicates that auxiliary input 4 is active.
Auxiliary input 5 active	The output indicates that auxiliary input 5 is active.
Charge fail alarm	The output indicates that the voltage output from the **WL** of the Charge Alternator has fallen below the level set in the **Edit Voltages Menu**. A charge fail warning alarm has been initiated.
Common alarm	The output indicates that a warning, electrical trip **or** shutdown alarm has been activated. Reset rules as above, depending on whether it is a Warning, electrical trip or a Shutdown fault.
Common Electrical trip	The output indicates that an electrical trip shutdown alarm has been activated on Auxiliary Input 2.
Crank disconnect detected	The output indicates that the module has sensed a suitable engine speed from one of it's crank disconnect sources. (Refer to **Edit Speed/Frequency Menu**.)
Delayed alarms on	The output indicates that the delayed alarms are now enabled. Can be used to control external logic circuitry.
Emergency stop alarm	The output indicates that an Emergency Stop has been initiated. i.e. removal of the +ve DC Supply from the Emergency stop input.
Energise to stop	The output controls the fuel solenoid on an Energise to stop(ETS) generator, energising for the time period selected in the **Edit Timer Menu** when the engine is called to stop. The normal fuel output (pin 4) should not be connected to the fuel solenoid, however it can be used for controlling panel instruments and other functions required whilst the engine is running.
Engine running	The output indicates that the engine is running.
Fail to start alarm	The output indicates that the engine has not started after the specified number of attempts, selected in the **Edit Miscellaneous Menu**.
Fail to stop alarm	The output indicates that the generator has failed to stop within the time period selected in the **Edit Timer Menu**. The module monitors that the oil pressure has gone low and that the speed sensing source detects no movement of the generator to establish that the generator has stopped.
Fuel relay energised	The output mimics the operation of the fuel relay. Can be used to control external logic circuitry.

Function	Description
High Current Warning	The output indicates that the Load current from the generator has exceeded the level set in the **Edit Misc Menu**. A High Current warning alarm has been initiated.
High engine temp alarm	The output indicates that a High Engine Temperature shutdown has been activated.
Load transfer	This output becomes active when the generator is ready to accept load, i.e. after safety on and warm up timers have timed out. It can be used to control load contactors on the generator output or to provide signals to ATS control systems, etc. This output will become active if the generator is operating in the 'Auto' modes. In Manual the output will become active only if the remote start input is active – this makes the 'Manual' position on the switch a Manual off load run position. If a Manual/test on load position is required then option 32 is used instead.
Load Transfer (Always)	This output becomes active when the generator is ready to accept load, i.e. after safety on and warm up timers have timed out. It can be used to control load contactors on the generator output or to provide signals to ATS control systems, etc. This output will become active if the generator is operating in either the 'Auto' or 'Manual' modes. In Manual the output will become active regardless of the remote start input being active – this makes the 'Manual' position on the switch a Manual test on load position rather than the normal Manual off load run if option 4 is used.
Loss of speed sensing	The output indicates that the speed sensing signal from the Magnetic Pick-up has been lost.
Louvre control	The output controls the opening of the louvres on engine starting and closure when engine has stopped.
Low oil over-ride *(…of safety on timer)*	This output is used in conjunction with Smoke limiting. When the set is held in smoke limit mode the controller is unable to give full protection to the engine as speed and voltage conditions cannot be met at idle. The exception to this is low oil pressure protection which is available once the safety on timer has expired. When smoke limiting is removed and the engine is allowed to ramp up to normal running speed full protection is then implemented. This output will then become active.
Low oil pressure alarm	The output indicates that a Low Oil Pressure shutdown alarm has been activated.
Oil Pressure sender O/C	The output indicates that the module has sensed that the Oil pressure sender selected is open circuit. (Refer to **Edit Inputs Menu**.)
Over Frequency alarm	The output indicates that the generator output frequency has exceeded the level set in **Edit Speed/Frequency Menu**, and shutdown on Over frequency.
Overspeed alarm	The output indicates that the engine has exceeded the level set in **Edit Speed/Frequency Menu**, and shutdown on Overspeed.
High DC Voltage	The output indicates that the DC input voltage has exceeded the level set in **Edit Voltages Menu**.
Low DC Voltage	The output indicates that the module DC input voltage has fallen below the level set in **Edit Voltages Menu**.

Function	Description
Pre-heat during timer	The output controls the pre-heater. Pre-heat output is available for the duration of the pre-heat timer, which terminates prior to cranking. Other modes of pre-heat are possible – see below.
Pre-heat until end of cranking	The output controls the pre-heater. As 'Pre-heat (during preheat timer)' mode but pre-heat is also available during cranking.
Pre-heat until safety on	The output controls the pre-heater. As 'Pre-heat (until end of cranking)' but pre-heat is also available while waiting for the delayed alarms to become active.
Pre-heat until end of warming	The output controls the pre-heater. As 'Pre-heat (until safety on)' but pre-heat continues to be available until the warm-up timer has elapsed.
Remote start present	The output indicates that a remote start signal is present on Auxiliary input 1, but does not indicate that it has been accepted.
Shutdown alarm	The output indicates that a shutdown alarm has been activated. This output can only be reset by removal of the fault and turning the selector switch to **Stop Reset**.
Starting alarms on	The output indicates that the starting alarms are now enabled. It can be used to control external logic circuitry. Starting alarms are armed as soon as the module commences starting of the engine and remains armed until the engine is at rest.
Start relay energised	The output mimics the operation of the start relay. Can be used to control external logic circuitry.
System in auto	The output indicates that the selector switch is in the **Auto** position.
System in Manual	The output indicates that the selector switch is in the **Manual** position.
System in stop	The output indicates that the selector switch is in the **Stop** position.
Smoke Limit	This is used to supply a smoke limiting signal to an Electronic Governor to limit smoke emissions on start-up. It is used in conjunction with the Smoke limit timer settings. Once the Timer has expired the Smoke limit output will cease to operate allowing the engine to accelerate to normal running speed.
Under Frequency alarm	The output indicates that the generator output frequency has fallen below the level set in **Edit Speed/Frequency Menu**, and shutdown on Under frequency.
Underspeed alarm	The output indicates that the engine has fallen below the level set in **Edit Speed/Frequency Menu**, and shutdown on Underspeed.
Warning alarm	The output indicates that a warning alarm has been activated. This output is self resetting on removal of the fault.

EDIT FRONT PANEL CONFIGURABLE LCD SEGMENTS

This menu allows the user configurable LCD segments to be changed to suit the users requirements. The following is displayed:-



NOTES

1:- Each LCD segment has the same selection of choices as stated in the edit outputs section of this manual.

POLARITY

Each of the LCD segment can be configured as:

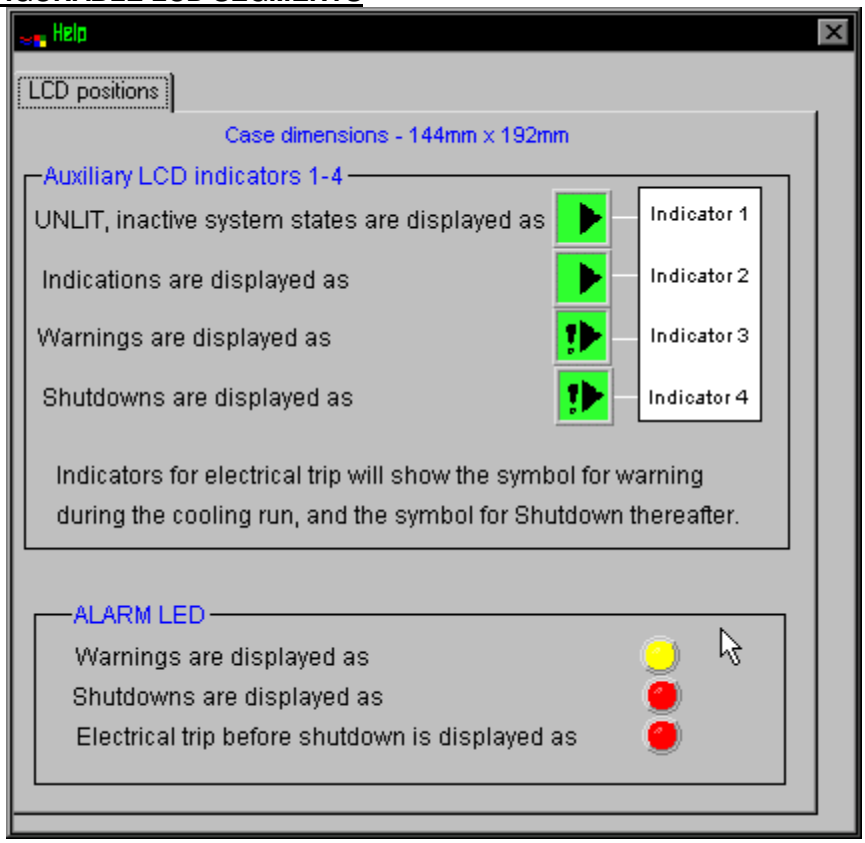
a)Lit - Normally extinguished LCD segment which illuminates on activation.

b)Un-lit - Normally illuminated LCD segment which extinguishes on activation.

CONTROL SOURCE

Refer to Output Selection shown in Edit Outputs section of this manual.

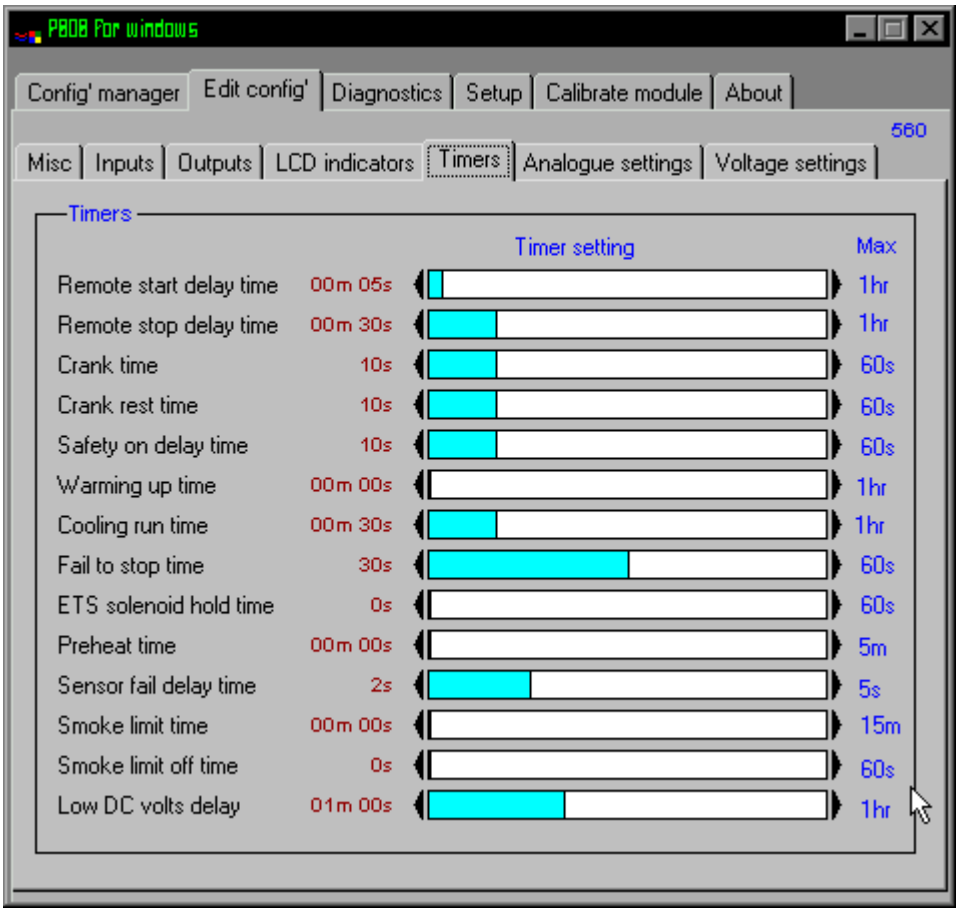
USER CONFIGURABLE LCD SEGMENTS



NOTE:-
Warning alarms will be displayed as steady LCD indications and will be accompanied by a Steady Amber LED.
First up shutdown alarms will be displayed as flashing LCD indications accompanied by a Flashed Red LED.
Subsequent shutdown alarms will be displayed as Steady LCD indications. Electrical trip alarms will be displayed as Steady LCD indications accompanied by a Steady Red LED, until shutdown occurs, at which point the indications will flash.

EDIT SYSTEM TIMERS

This menu allows the configurable system timers to be changed to suit the users requirements. The following menu is displayed:-



NOTES:-
Timers can be adjusted by clicking on either the up(➡) or Down (⬅) arrow or by clicking on the bar and dragging the bar to the correct time.

TIMER DESCRIPTIONS

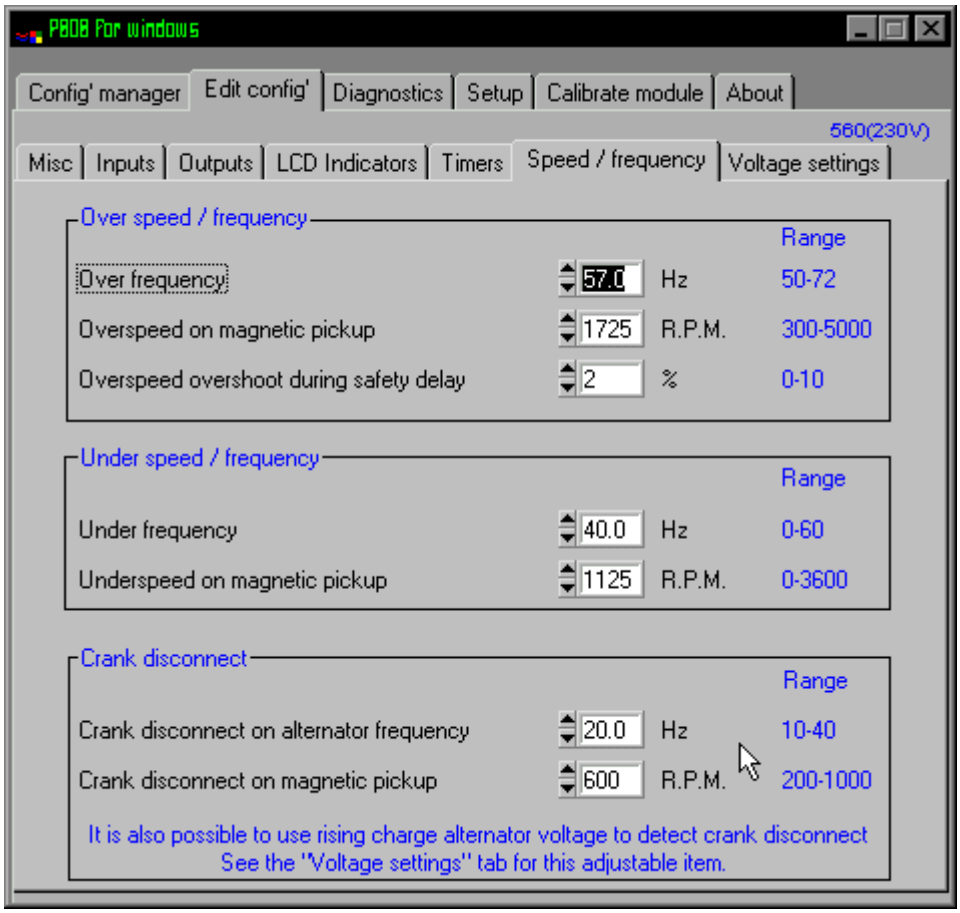
Timer	Function
Remote start delay time	This timer dictates how long the module will wait after it has received a remote start signal before it will attempt to start. (e.g. This prevents un-necessary starting on a fluctuating mains supply.)
Remote stop delay time	This timer dictates how long the module will wait before it will un-load the generator back to the mains supply and initialise it's run-on and shutdown cycle. (e.g. This is to ensure that the mains supply has stabilised before transferring the load back to mains.)
Cranking time	This is the maximum amount of time that the module will energise the starter motor for during starting attempts.
Crank rest time	This is the amount of time the module will wait for between start attempts. This is to allow the starter motor to cool and the starter batteries to recover.

Timer	Function
Safety on delay time	This timer dictates how long the module will ignore the Low oil pressure, High Engine Temperature, Underspeed and any other inputs configured as active from safety on. It allows the values such as oil pressure to rise to their operating values on starting without triggering an alarm. Once the timer has expired all alarm conditions are monitored again. Should all the monitored conditions, such as oil pressure, come to the expected state prior to the end of the safety on timer, the timer will be terminated prematurely ensuring maximum protection as soon as possible. (*If fast loading option is selected*)
Warm up timer	This timer is initiated once the engine is up and running. It delays loading the generator until it has stabilised. Once this timer has expired the Load Transfer signal will be given.
Cooling Time	This is the time the generator is to run off-load once the load transfer signal has ceased. This gives the engine time to cool down before shutdown.
Fail to stop time	Once the module has given a shutdown signal to the engine it expects the engine to come to rest. It monitors the Oil pressure and speed sensing sources and if they still indicate engine movement when this timer expires a Fail to stop alarm signal is generated.
ETS hold time	This timer is used if the unit is configured to operate an Energise to stop engine. It dictates the duration that the ETS output will remain active after the module has detected the engine has come to rest. If the ETS output is not configured, this timer will still operate, preventing an immediate restart.
Pre-heat time	This timer dictates the duration that the pre-heat output will be active before an attempt is made to start the engine. Once this timer has expired cranking will commence.
Sensor fail delay time	This is only used if magnetic pick speed sensing is selected. Once cranking has commenced the module must receive a speed signal within this time. If no signal is present the generator will be shutdown and a Loss of Speed Sensing alarm given.
Smoke limiting time	This is the amount of time that the smoke limiting output will remain active for once the engine has started. While the smoke limiting output is active the engine will be held at a reduced speed to minimise smoke emissions on start-up. (Only if fitted with an appropriate Electronic Fuel Control module). Once the timer has expired the engine will be allowed to accelerate up to it's normal operating speed.
Smoke limiting off time	This is the amount of time that the underspeed protection is held inactive for following termination of the Smoke Limit mode. This is to allow the engine to accelerate to it's normal running speed without triggering an underspeed alarm. The Low Oil Pressure Alarm is not delayed by this timer.
Low DC Volts Delay	This is the amount of time that the module will ignore a low DC voltage alarm condition. This is to prevent nuisance tripping during cranking, etc.

NOTE:- As the timers can be accurately set to exact times, it is possible to initially configure the module with the timers reduced to allow rapid testing of the finished generating set. Once the set is ready for a final witness test it is just a simple matter of entering the specified timer settings and writing them to the module.

EDIT SPEED/FREQUENCY LEVELS

This menu allows the configurable Speed/Frequency trip values to be edited to the users required levels. The following menu is displayed:

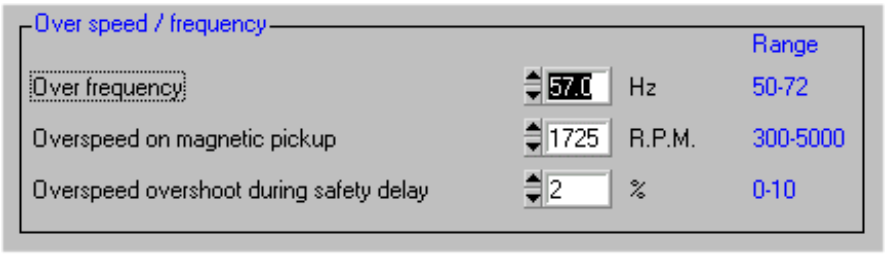


NOTES

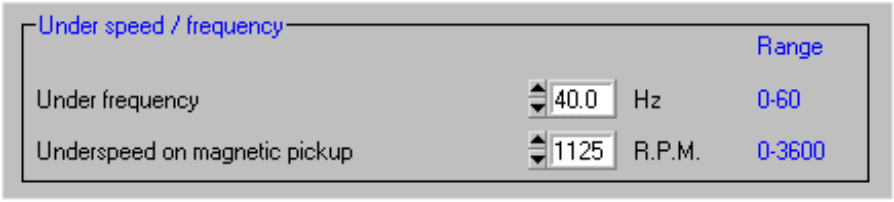
1:- The 560 module is capable of sensing engine speed from either a magnetic pickup or from the alternator frequency. Values need only be entered for the required speed sensing source. To ensure that only the appropriate setting is entered, non relevant items are 'greyed' out.
Alternatively the module can be used with no speed sensing source if required, provided charge alternator output is available for crank disconnect.

2:- The 560 module has three possible sources of crank disconnect, namely magnetic pickup, alternator frequency or engine charge alternator voltage. Any of these sources may be used individually, but it is also possible to use multiple sources or even all three. If this is the case the source which reaches it's crank disconnect level first will cause the starter motor to disengage regardless of the state of the remaining monitored sources. This feature allows for a much faster crank disconnect response leading to less wear on the engine and starter components, and provides added safety in case one source is lost, by a broken fan belt for example.

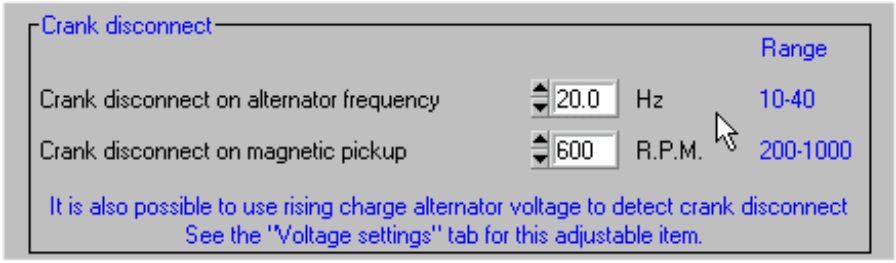
SPEED/FREQUENCY LEVELS DESCRIPTION



Level	Function
Over frequency	This level dictates the over frequency shutdown value if alternator frequency is selected as a speed sensing source.
Overspeed on magnetic pickup	This level dictates the overspeed shutdown value if a magnetic pickup is selected as a speed sensing source.
Overspeed overshoot during safety on delay	This value is used to prevent nuisance tripping on generators where a slow response governor allows the engine to overspeed slightly during start-up. This setting allows the normal overspeed shutdown level to be exceeded by a percentage (up to a maximum of 10%) for the duration of the safety on delay timer. Should the engine speed exceed this temporarily elevated level it will be shutdown. Once the safety on delay timer has expired the overspeed shutdown value is restored to the normal level.
	NOTE:- This is not a delay on overspeed shutdown, only a temporary raising of the overspeed value, therefore overspeed protection is not compromised.



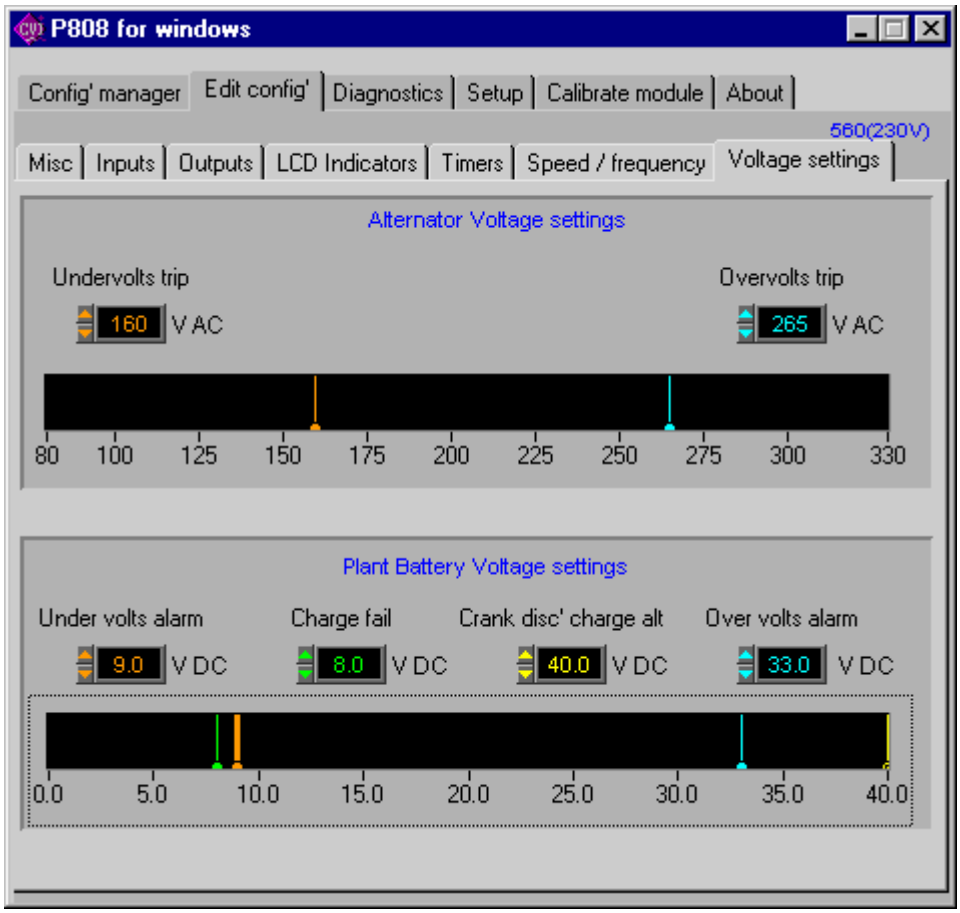
Level	Function
Under frequency	This level dictates the under frequency shutdown value if alternator frequency is selected as a speed sensing source.
Underspeed on magnetic frequency	This level dictates the underspeed shutdown value if magnetic pickup speed sensing is selected.



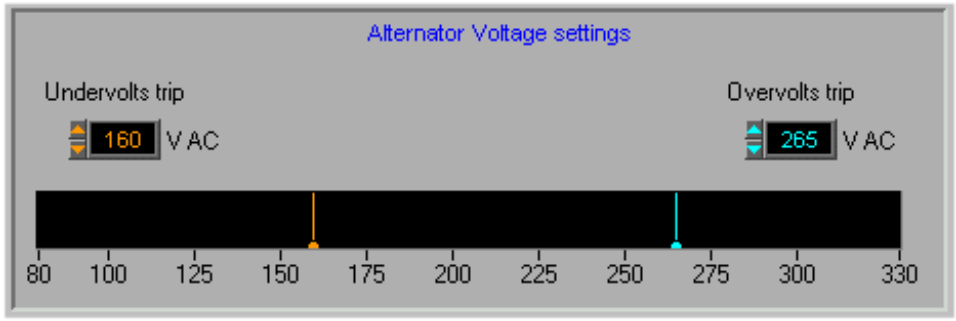
Level	Function
Crank disconnect on alternator frequency	This level dictates the value that has to appear on the alternator frequency input (if used) before the starter motor will be instructed to disengage.
Crank disconnect on magnetic pickup	This level dictates the value that has to be given by the magnetic pickup sensor (if used) before the starter motor will be instructed to disengage.

EDIT VOLTAGE LEVELS

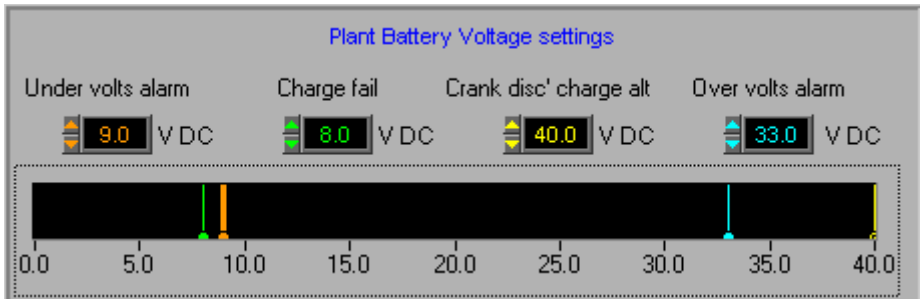
This menu allows the configurable voltage trip values to be edited to the users required levels. The following menu is displayed:



VOLTAGE LEVELS DESCRIPTION



Level	Function
Over Volts Trip	This level dictates the generator AC over voltage shutdown value.
Under Volts Trip	This level dictates the generator AC under voltage shutdown value.



Level	Function
Under Volts	This level dictates the DC under volts warning alarm level.
Over Volts	This level dictates the DC over volts warning alarm level.
Charge fail voltage	This level is the value at which the module will give a charge fail warning. As the input is a true analogue value total failure of the charge alternator is not the only failure that the module will provide protection for. Faults which cause the output voltage to fall, such as worn brushes etc., will cause the alarm to operate. **NOTE:- If this input is not used ensure that this value is set to minimum to prevent the possibility of a spurious Charge Fail Alarm occurring.**
Crank disconnect on charge alternator voltage	This level dictates the value that has to be generated by the engine charge alternator before the starter motor will be instructed to disengage. This setting can be used to obtain a crank disconnect much earlier than if alternator speed sensing is used, particularly if using alternators fitted with digital voltage regulators as these can take some time to produce an output. Alternatively the charge alternator could be used alone to provide crank disconnect on such as pump sets where no alternative speed sensing source is available. **CAUTION!:- If this input is not to be used ensure that this value is set to maximum to prevent premature crank disconnect.**

DIAGNOSTICS

A particularly useful feature of the module is it's ability to provide real-time diagnostic information to the PC. This can be used to give on-screen details of the operation of the module and generating set performance.

There are three different diagnostic facilities are supplied:-

The first Diagnostic is Engine Display, This is provided to allow at-a-glance monitoring of the engine system; Clear graphical displays of the measured values allow easy performance monitoring. Should an alarm occur this a clearly displayed by a flashing 'Alarm' legend. Details on the system operation are provided to give more detailed information if required.

The second diagnostic is the Generator Display this allows the user to see at a glance the values of all measured voltages and Currents.

The Third diagnostic is the Status Display this allows the user to see at a glance the values of all measured inputs and the status of any of the digital inputs. Output state of the relays are also displayed. A text display indicates the modules present state of operation, shows time remaining on any system timer that is in operation and will give details on any shutdown alarm which has occurred.

As the diagnostics are real-time the opening and closing of the inputs can be viewed allowing simple checks to be made on panel wiring if this thought to be at fault. It is therefore possible to simulate switching signal by earthing the appropriate input connection in the panel. If the input state displayed on the diagnostic page changes this indicates that the wiring is correct, it is possible that the module configuration is incorrect and further investigation is required using the configuration program.

The module internal software revision details are also given, this is to aid DEEP SEA ELECTRONICS technical staff in the event of a query.

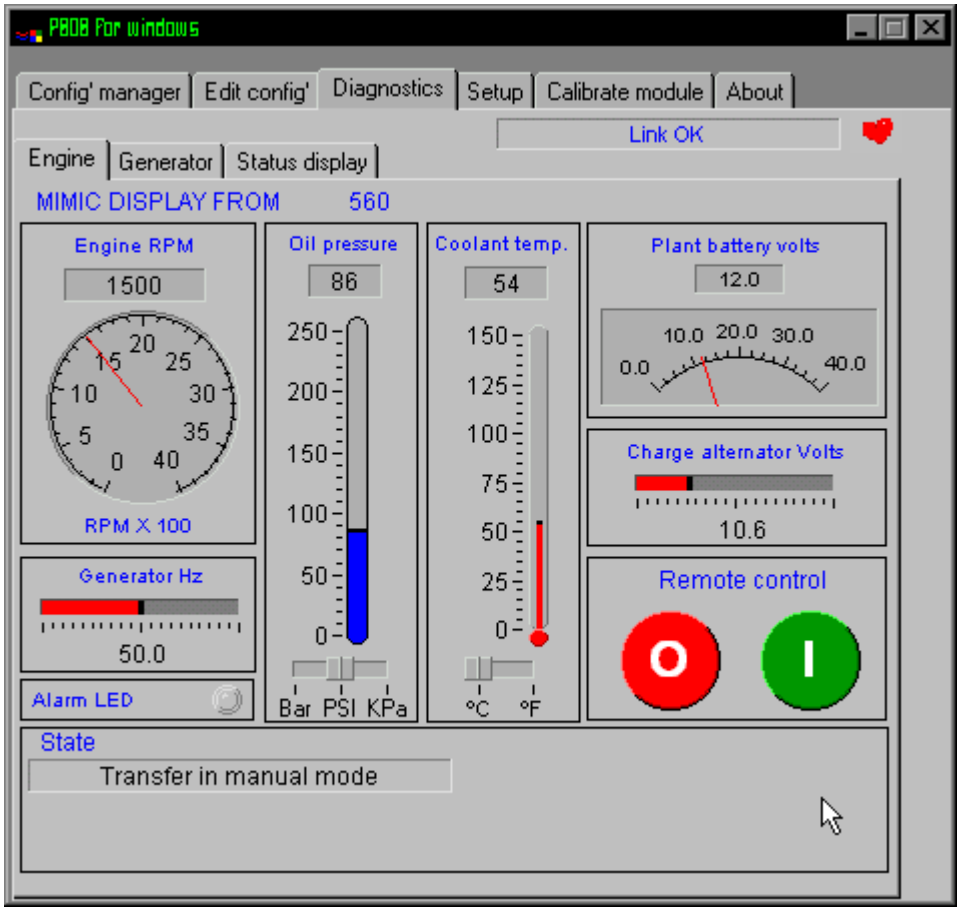
NOTE:- The Diagnostic displays screen are updated by information sent from the module, if the link to the module is lost the information displayed could be incorrect and is therefore 'greyed out'. A small icon in the bottom right of each diagnostic display indicates that the link to the module is healthy.

or

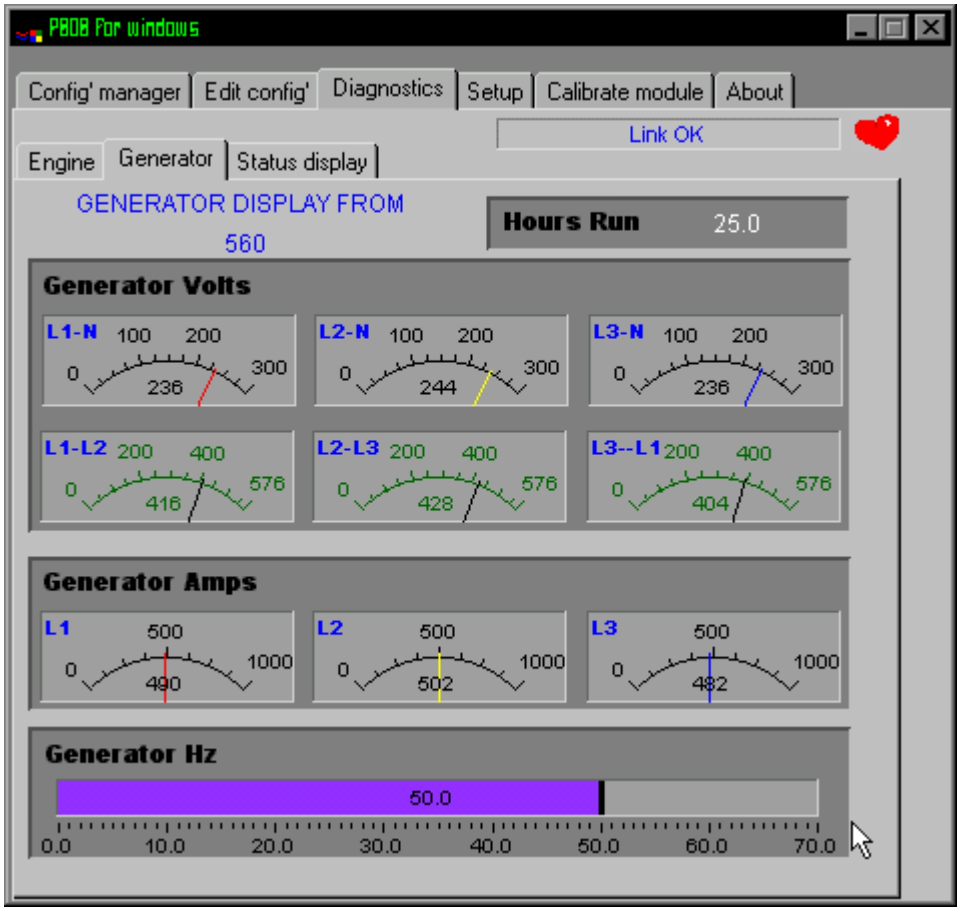
= Communications link is OK.

= No Data available from the Communications link. Check 'Set-up' and ensure module is connected.

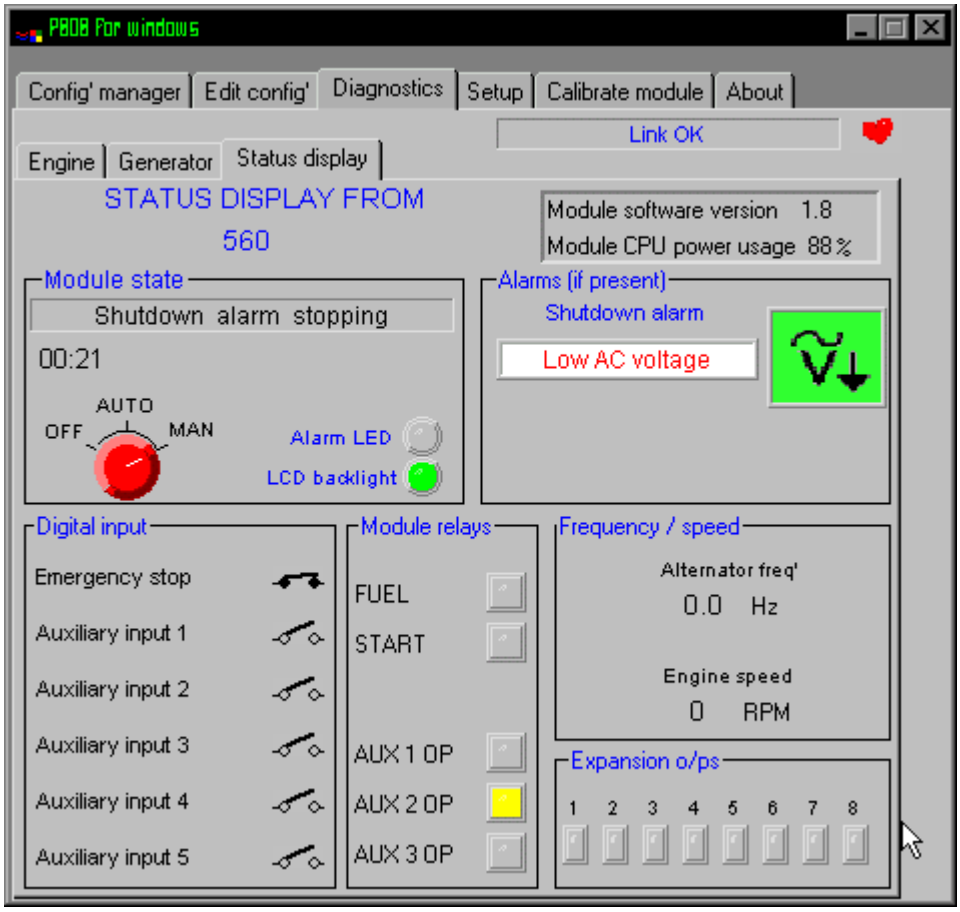
If the Engine Display option is selected the display will show:



If the Generator Display option is selected the display will show:



If the Status Display option is selected the display will show:



CALIBRATION MENU - P51X, P52X AND 560 MODULES ONLY

CALIBRATE CONTROLLER

This menu is only used if the meter option is fitted to the module. When selected the following is displayed:-

CALIBRATE TACHOMETER OP AT FULL SCALE

This option will allow the user to calibrate the tachometer so that it will read full scale.

Using the + or − buttons will adjust the reading displayed on the tachometer, adjust until a full scale reading is displayed.

CALIBRATE TACHOMETER OP AT NOMINAL RPM

This option will allow the user to calibrate the tachometer so that it will read correctly at nominal RPM.

Using the + or − buttons will adjust the reading displayed on the tachometer, adjust until the engines nominal RPM reading is displayed.

CALIBRATE TACHOMETER OP AT CURRENT RPM

This option will allow the user to calibrate the tachometer so that it will read correctly at the current RPM. This can be used to ensure that the module tachometer output corresponds to a separate panel mounted tachometer, etc. It can only be used with the generator running and producing the required nominal frequency.

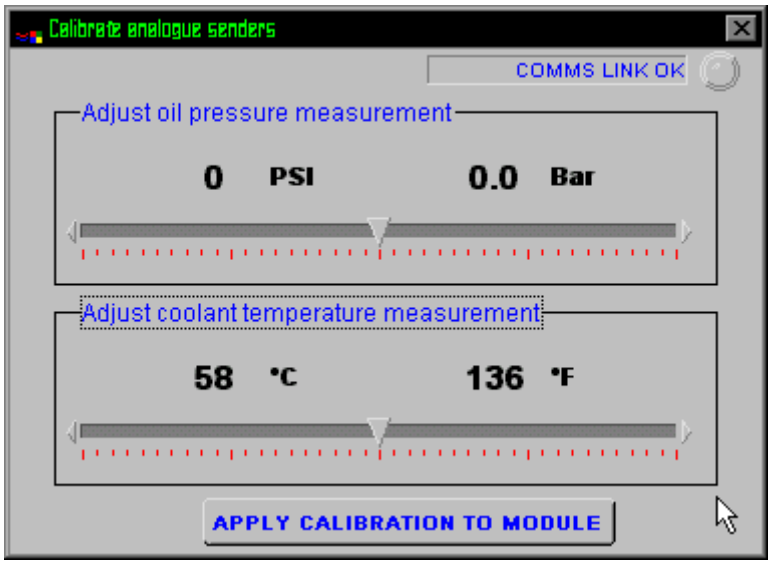
Using the + or — buttons will adjust the reading displayed on the tachometer, adjust until the required RPM reading is displayed.

ADJUST ANALOGUE SENDER CURVES (560 ONLY)

This option will allow the user to re-calibrate the analogue oil pressure and coolant temperature sender readings displayed on the 560 module. This can be used to ensure that the module display corresponds to a separate panel mounted instruments, etc.

⚠CAUTION!:- Sender Re-calibration should only be performed on a fully configured module (after the configuration has been written to the module). If a new configuration is written to module after calibration, the calibration will be 'lost' and must be repeated.

To re-calibrate it is necessary to first establish a running condition the press the 'Calibrate 560' button. The follow screen is then displayed:-



This option will allow the engineer to re-calibrate the module to the transducers such that the module will correctly display the oil pressure and coolant temperature values. This action may be necessary as the senders used for sensing the pressure and temperature are electro/mechanical devices and as such suffer from a degree of inaccuracy. (The ability to re-calibrate the senders is akin to turning the pointer adjustment screw on a conventional engine gauge.)

CAUTION!:- To re-calibrate the senders a known good, accurate sensing device must be used and the module reading adjusted to match.

OIL PRESSURE

The reading shown below the adjustable slider is the current module reading. Read the actual Oil pressure off the accurate sensing device and then by moving the slider up or down adjust the value displayed to match that of the accurate sensing device. Once matched release the slider, the new value will be stored in the module.

COOLANT TEMPERATURE

The reading shown below the adjustable slider is the current module reading. Read the actual coolant temperature off the accurate sensing device and then by moving the slider up or down adjust the value displayed to match that of the accurate sensing device. Once matched release the slider, the new value will be stored in the module.

NOTE:-If at any time you wish to return the settings to standard and remove the calibration applied to the senders simply return to the EDIT INPUTS PAGE and re-select the required sender type. This could be used for example if the sender calibration appeared inaccurate and was modified, then a panel wiring fault was traced as being the cause of the inaccuracy.

Once the user is satisfied with the revised readings the 'Apply calibration to Module' button should be operated. The Screen with then display a the following message:-

CAUTION!:- It is essential that the module is in the correct mode to receive the revised calibration or else the calibration will not be successful. Therefore the module must be in the STOP/RESET mode with the engine at rest BEFORE pressing the 'OK' button to continue.

Once the 'OK' button is clicked the screen will then display a progress bar as the calibration is applied to the module:-

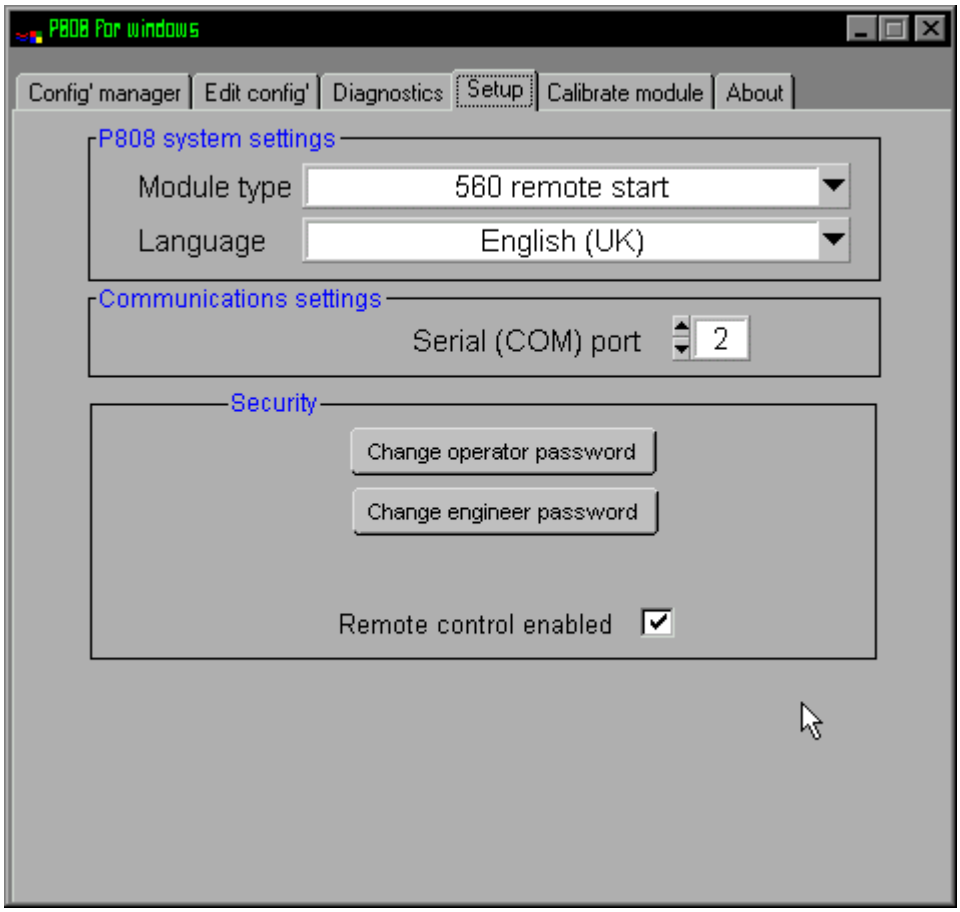
If any errors occur during calibration then the software will display an appropriate message. If calibration is successful the following message is displayed:-

CAUTION!:- The configuration file in the module now contains additional calibration information. To retain this information it is important that the configuration file be saved.

MAIN MENU OPTIONS - ALL MODULES

SETUP

This menu is used to access the software configuration file, to customise the way the software operates with the PC system. When selected the following is displayed :



CONTROLLER TYPE (P52X)

This menu option is used to configure the software to either:-

- *P51x Manual Start Module*
- *P52x Auto start Module*
- *P530 Automatic Transfer Switch (115V)*
- *P530 Automatic Transfer Switch (230V)*
- *P54x Expansion/Annunciator Module.*
- *P560 Auto start / Instrumentation*

This manual selection of module type is only necessary when configuring a new unit without pre-loading in a default configuration. Should a configuration be loaded from disk or read from a module the Controller type will be automatically selected to match the configuration.

NOTE:-
51x Manual Start Module = 511 or 512
52x Auto start Module = 520 or 521
54x Expansion Module = 540 or 541

CHANGE COM PORT (COM2)

This menu option is used to configure the software to use the appropriate COM port on the PC. Possible ports are COM1, COM2, COM3 or COM4. The COM ports are the RS232 interface terminals located on the rear of the PC, the module configuration software can use any one of these ports. A check should be made to ensure that the ports are not already in use by other sources such as mouse drivers or modems.

Normally COM2 is the spare port with COM1 being used by a mouse. This can vary from PC to PC, so it is recommended that you check your configuration by referring to the documentation supplied with your PC or by contacting your PC support personnel. Should you still experience problems contact DEEP SEA ELECTRONICS for assistance.

NOTE:- A quick check of correct communication with the module can be made by selecting the diagnostics mode (see below), if no diagnostic data is displayed this indicated that a communications link has not been established. Check the COM port setting as described above.

REMOTE CONTROL -(P52X AND P560 MODULES ONLY)

This option is used to toggle the software remote control feature from enabled or disabled. When enabled the remote control feature allows the operator to start and stop the generator using the 'Mimic' diagnostic option. The module must be first placed into the 'Auto' mode then clicking on the Start ('I') button will send a remote start signal to the controller. Clicking on the stop ('0') button will remove the remote start signal.

If the remote control facility is disabled then the facility is removed from the 'Mimic' diagnostic.

NOTE:- Remove control via the 'Mimic' diagnostic is only possible on 52x modules fitted with version 3.0 or later software. All 560 module support remote control.

ENGINEERING PASSWORD

This option is used to change the engineering level password used to access the software. There are two password levels. The first level is the operator level, if the software is accessed by entering the operator password only limited changes can be made to the module configuration (Timer settings only), existing config files cannot be overwritten only new ones created.

The second level is the engineering level, if the software is accessed using the engineering password, all values are available for modification.

NOTE:- The passwords are only to give access to the software for configuring the module, not for access to the module itself. The default passwords are blank and when a password is requested press the ← button.

When the option is selected the following will be displayed:

Type in the NEW password, this password is limited to 8 characters maximum, any combination of numbers and letters can be used. The software is not case sensitive.

Re-enter the NEW password, press the '*Save New Password*' button.

The passwords will be verified and if they do not match the screen will display:

OPERATOR PASSWORD

This option is used to change the operator level password used to access the software. In operator only limited changes can be made to the module configuration (Timer settings only), existing config files cannot be overwritten only new ones created.

The operator level password can only be changed if the Engineering level password is known, this is to prevent unauthorised password changes being made.

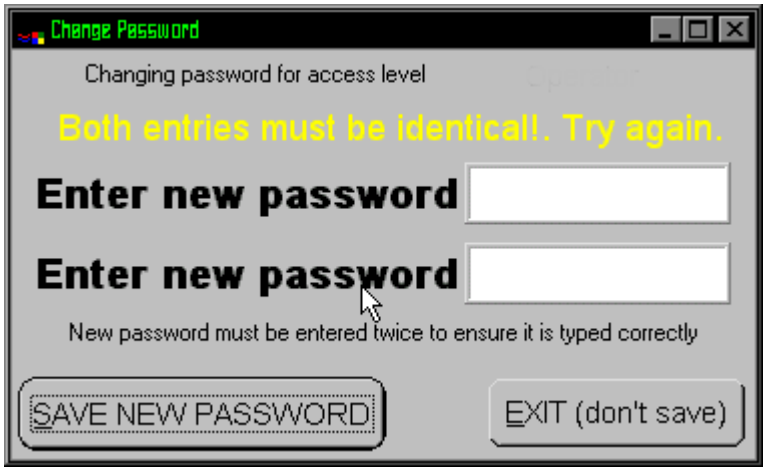
NOTE:- The passwords are only to give access to the software for configuring the module, not for access to the module itself.

When the option is selected the following will be displayed:

Type in the NEW password, this password is limited to 8 characters maximum, any combination of numbers and letters can be used. The software is not case sensitive.

Re-enter the NEW password, press the '*Save New Password*' button.

The passwords will be verified and if they do not match the screen will display:



NOTE:- A third password level exists for use where the module is being used to provide a remote monitoring display on a PC. If the password 'MIMIC' is entered on start-up the software will enter the diagnostic Mimic display. No changes to any of the module settings or software configuration can be made without the correct operator or engineering password being entered. Refer to the 'Diagnostics' section of this manual.

APPENDIX

OUTPUT RELAY EXPANSION

An expansion module is available which connects to the configuration socket and enables the 52x, 53x, 54x or 560 modules to control up to eight additional relays, providing Volt-free contacts for customer connection up to 50m away.

Expansion facility is not available on the 51x type modules.

Refer to technical data sheet on the 157 relay module for further details.

OUTPUT LED EXPANSION

An expansion module is available which connects to the configuration socket and enables the 52x, 53x, 54x or 560 modules providing 8 remote LED's for remote indication up to 50m away.

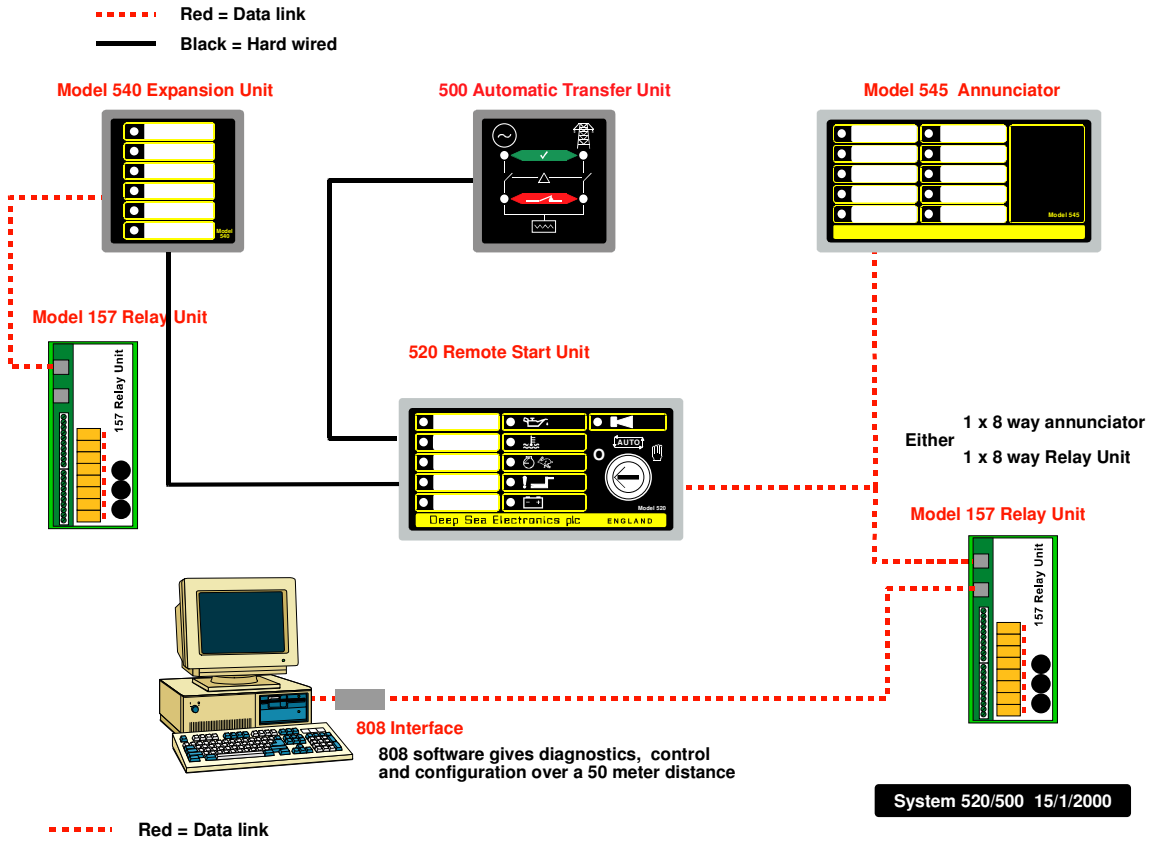
Expansion facility is not available on the 51x type modules.

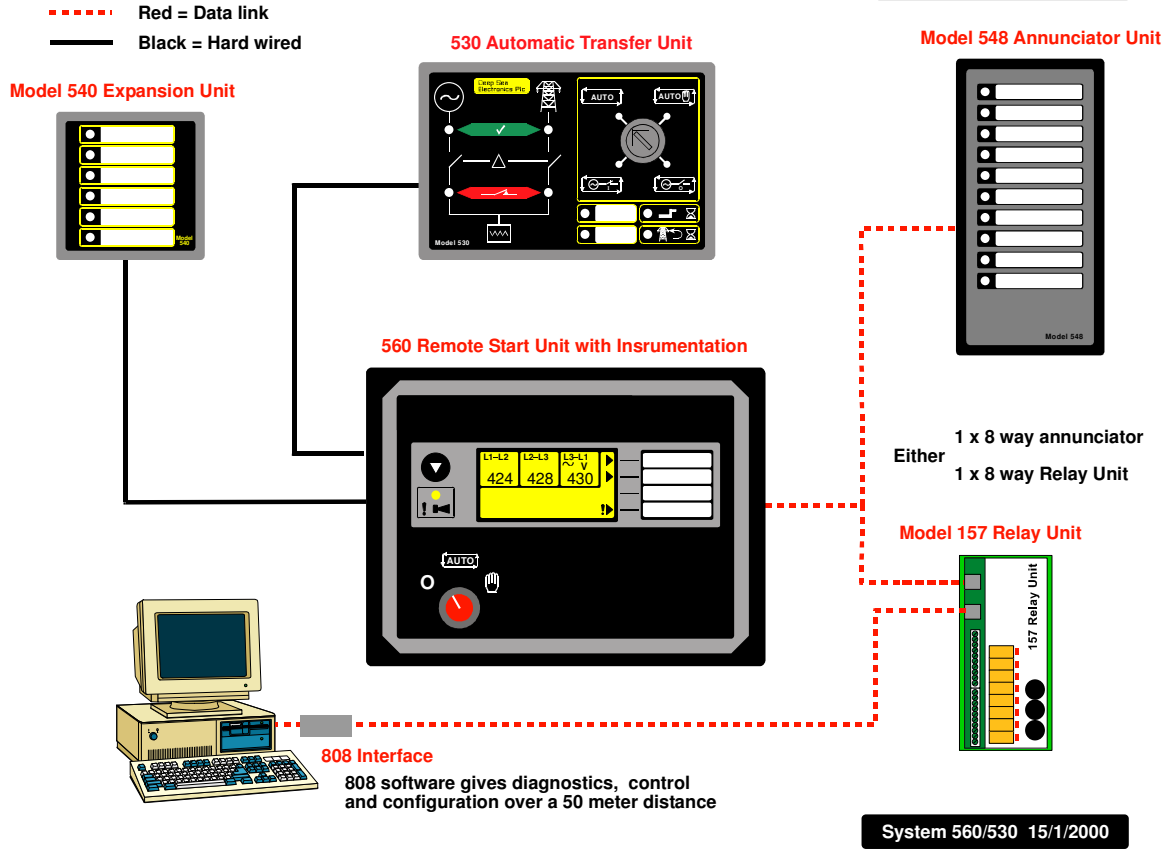
Refer to technical data sheet on the 545 LED module for further details (P52x, P53x and P54x) or the 548 LED module (P560) data sheet.

INPUT EXPANSION

It is possible to increase the number of monitored inputs available by utilising a DSE 54x Protection Expansion/Annunciator. Please refer to our Technical department for details.

TYPICAL CONTROL PANEL BLOCK DIAGRAMS





HELP PAGE