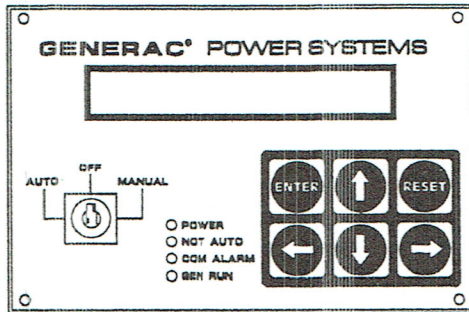


Figure 1.1 – Control Module Layout



◆ KEYPAD

The keypad consists of six keys labeled as follows: ↑ (up), ↓ (down), ← (left), → (right), Enter, and Reset. The left and right arrow keys are used to select the different pages on the display. The up and down arrow keys are used to scroll between options within a page. They also are used for selecting characters when the user is entering messages or parameters for the alarms. The left and right arrow keys move the cursor when the user is entering data. The enter key takes the user into a page on the display to change data (when applicable) and also accepts data that has been entered. It also is used to accept an alarm. The reset key ignores data that has been entered and returns the original value. It also is used to return from the parameter entry mode once the user has finished changing the data, and to reset any latched alarms that have cleared.

◆ DISPLAY

The display is organized into a series of pages, each page displays information about the status of the generator. For example, the "Alarm Status Message Page" displays the highest priority current alarm or status condition. The user will be able to scroll between the pages using the left and right arrow keys. Certain actions also cause the display to change pages, e.g., when an alarm becomes active, the display automatically will go to the alarm status page and display the alarm message.

The back light for the display is normally off. If the user presses any key, the back light will come on automatically and remain on for five minutes after the last key was pressed. It also will come on if any status message is current, which means the display will switch to the alarm status page. The back light will flash when an alarm or shutdown message is active, and the audible alarm will sound.

When the display is showing certain pages, the user is able to scroll between relevant items within the page using the up and down arrow keys. For example, if the display is showing the "Alarm Log Page," the user can use the up and down arrow keys to scroll between the entries on the alarm log. A description of each page is given below.

✧ Software Version Page

This page displays the software revision. Pressing the enter key in this page will perform a display and LED test.

✧ Generator Command Page

This page displays the command sent to the generator. The possible commands are as follows:

- Generator switched off
- Generator in manual mode
- Generator in auto mode – stop command
- Generator in auto mode – remote run command
- Generator in auto mode – serial link run command

✧ Generator Status Page

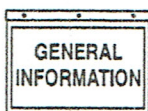
This page displays the current status of the generator. Options will be as follows:

- Stopped – ready to run
- Stopped – start inhibit active
- Pre-heating (with timer counting down)
- Attempting to start (with timer counting down and number of attempts)
- Pausing before start attempt (with timer counting down and number of attempts)
- Started – running up to speed
- Warming up
- Ready to accept load
- All alarms enabled
- Cooling down
- Stopping
- Stopped due to alarm

If the user has not pressed a key for some time, any change in status will cause this page to be displayed provided that there are no active alarms or status messages from other inputs. If an alarm condition occurs, the alarm status page will be displayed automatically.

✧ Alarm Status Message Page

This page displays alarm messages and programmable status messages. Messages are displayed according to priority, with the shutdown alarms having highest priority, and status messages having lowest priority.



If an alarm becomes active, the display will switch to this page and display the highest priority alarm message. The back light and alarm LED will flash, and the audible alarm will be activated. The user must press the enter key to accept the alarm, at which time the back light will be on continuously. If the alarm is non-latching, the alarm message will clear as soon as the condition is cleared. If the alarm is a latching alarm, then the user must press the reset key to clear the message. Once a message has cleared, the display will show the next priority alarm message.

After an alarm has been accepted, the user is able to scroll through other active alarm and message screens using the up and down arrow keys.

✧ Alarm Log Page

This page displays the last 50 alarm messages. When the user selects this page, it displays the latest alarm message. Pressing the up or down arrow keys will allow the user to scroll up and down the list of messages.

✧ Instrumentation Page

This page displays one of the analog signal values. Pressing the up or down arrow keys will scroll to other analog display screens.

✧ Parameter Entry Page

This page allows the user to modify the various set points and programmable options. See the "Programmable Parameters" section of this manual for more specific option information. The user must press the Enter key when this page is displayed and will then be prompted for a password. The password is a six-digit number and the default value is 000000. However, the user will be able to change the password. Digits will be selected using up and down arrow keys, and the cursor will be moved by the left and right arrow keys. When the user presses the Enter key, the password will be checked. If the password is correct, the display will show one of the data entry screens.

There are four parameter entry menus: "Engine Parameter," "System Alarm," "Digital I/O" and "Analog Input." The user will be able to scroll through the various parameters in each menu using the up and down arrow keys. The left and right arrow keys are used to switch between the four menus. When a parameter that requires changing is displayed, the user presses the Enter key to enable data entry. A cursor will appear at the first character that can be altered. The user can then change the character using the up and down arrow keys. The user can move to the next character or previous character using the left and right arrow keys. Pressing the Enter key will accept the new setting. Pressing the Reset key will ignore the new setting.

If an alarm condition occurs when the user is entering data, the data will be ignored, and the display will show the alarm screen. If a status condition occurs when data is being entered, the display will not change.

Once the user has finished entering data by pressing the Enter key, pressing the Reset key will allow the user to select other pages using the left and right arrow keys.

ALARMS

All analog channels have alarms associated with them. There is also a coolant level alarm, an emergency stop alarm and eight user definable inputs that can be used to generate alarms. Alarms can be status messages, non-latching alarms, latching alarms or shutdown alarms. When a new alarm condition occurs, the alarm LED and the display back light will flash. Also, the alarm relay contacts will close (operating the audible alarm), and the display will show the alarm message. The user will be able to accept the alarm (turn off the audible alarm) from the keypad, and if the alarm condition has cleared, he or she also will be able to clear the alarm. Non-latching alarms will clear themselves if the alarm condition is no longer present. Latching alarms require the user to clear the alarm from the keypad even if the alarm condition is no longer present. Shutdown alarms are similar to latched alarms, but they also cause the generator to stop and will not allow it to start again until the key-switch has been turned to the OFF position to reset the alarm. Status messages are similar to non-latching alarms except that they do not activate the alarm relay or the alarm LED and are not recorded on the alarm log.

Alarms can be always active, immediately active when the generator is commanded to run, or active after the hold off timer has expired. This timer delays the operation of certain alarms until a programmable time after the engine has started. Some alarms allow the user to define the type of alarm and when it is active.

The following chart is a summary of the alarms and the programmable options:

Alarm Message	Alarm Active Options	Alarm Type Options
Pre-Low Oil Pressure Warning	Hold Off	Non-Latch
Low Oil Pressure Shutdown Alarm	Hold Off	Shutdown
Pre-High Coolant Temp. Warning	Hold Off	Non-Latch
High Coolant Temp. Shutdown Alarm	Hold Off	Shutdown
Low Coolant Temp. Warning	Always	Non-Latch
Pre-High Oil Temp. Warning	Immediate, Hold Off, Disabled	Non-Latch
High Oil Temp. Shutdown Alarm	Immediate, Hold Off, Disabled	Shutdown
Low Battery Voltage Warning*	Always	Non-Latch
Overspeed Alarm	Immediate	Shutdown
Underspeed	Hold Off	Status, Non-Latch, Latch, or Shutdown
Overcrank Alarm	Immediate	Shutdown
Over Voltage	Hold Off	Status, Non-Latch, Latch, or Shutdown
Under Voltage	Hold Off	Status, Non-Latch, Latch, or Shutdown
Over Frequency	Hold Off	Status, Non-Latch, Latch, or Shutdown
Under Frequency	Hold Off	Status, Non-Latch, Latch, or Shutdown
High Fuel Warning	Always, Disabled	Non-Latch
Low Fuel Warning	Always, Disabled	Non-Latch
Low Fuel Shutdown Alarm	Always, Disabled	Shutdown
User Analog Alarms**	All Options Available	All Options Available
Low Coolant Level Alarm	Hold Off	Shutdown
Emergency Stop	Always	Shutdown
RPM Sensor Failure Alarm	Always	Shutdown
Start Inhibit – Oil Pressure	Immediate	Shutdown
Oil Pressure Sensor Failure	Always	Shutdown
Oil Temp. Sensor Failure	Always, Disabled	Shutdown
Coolant Temp. Sensor Failure	Always	Shutdown
User Digital Input Alarms***	All Options Available	All Options Available
High Battery Voltage Warning	Always	Non-Latch

* Battery voltage must be below alarm limit for 5 minutes to trigger alarm.

** Each user analog input channel has a high and low alarm.

*** Each user digital input can be programmed to trigger an alarm on high or low level.

ALARM PROCESSING

◆ INPUT ALARM FUNCTIONS

The E option panel will monitor the status of the analog and digital inputs, and generate alarm messages as required. Digital alarms and user-defined analog alarms are fully programmable. The user is able to select the type of alarm, the state of the input that will trigger the alarm, and the alarm message when it is active. The configurations are defined as follows:

✦ Alarm Active

The user is able to select when the alarm is active. The options will be as follows:

- **Disabled:** If this option is selected, the alarm is disabled and has no effect.
- **Always:** With this option selected, the alarm is active regardless of the state of the generator.
- **Immediate:** In this mode, the alarm is not active when the generator is stationary. It becomes active as soon as the generator starts to crank and remains active until the generator stops.
- **Hold Off:** This option waits until a preset time after the generator is running before becoming active. The hold off time can be set by the user. Note that the hold off time is common to all alarms.