KnowzNet™

CONTROL PANEL USER GUIDE

Version 1.0.1 – May 2002

Firmware Version. 3.0b and higher

TABLE OF CONTENTS

INTRODUCTION

SCOPE

This manual describes direct (non-PC) interaction with the *KnowNet*™ control panel.

The text describes how to interpret the *KnowNet*™ system status via the LCD display and indicator lamps, as well as how to access the various functions available through the panel's menu system.

For information on how to access the *KnowNet*™ system via a PC or the Internet, please refer to the *NeoPort*™ User Guide.

For information on upgrading the panel firmware, please refer to the *NeoBoost*™ utility documentation.

For technical information such as operating parameters and specifications, please refer to the *KnowNet*™ Product Data Sheet.

GENERAL DESCRIPTION

KnowNet™ is a control panel-based networked monitoring system. Each panel supports up to 8 sensors.

Sensor heads connect to the panel using telephony-style jacks and cables and may be removed up to three hundred feet (100 meters) from the panel.

The panel supports a variety of sensors. Supported functions include:

- Gas sensors (toxic, combustible, oxygen, etc.),
- Environmental sensors (temperature, pressure, humidity, etc.), and
- Security sensors (motion detectors, smoke alarms, flooding sensors, etc.).

Sensor reading and status information is provided in real-time via an LCD display, indicator lamps, an alarm beeper, and relay contacts. Additionally, alarms data may be stored to memory for later recall.

Each sensor can activate up to four independently programmable alarm or warning levels. Each alarm level may exercise independent control over alarm output devices such as the indicator lamp, panel beeper, its zone relay, or the panel's master relay.

Each panel has a serial as well as a USB port for interfacing to a Personal Computer or master monitoring system. *NeoPort*™ PC application software is available for simplified panel configuration, and remote monitoring and control. *NeoPort*™ also facilitates advanced *KnowNet*™ functions such as charting, data logging, dial out and modem/Internet access.

The panel firmware is user-upgradeable via code/sensor driver updates and utility programs downloadable from **NeoSafe.com**.

The system is DC-powered and operates on 12VDC. Battery back-up capability is optional. AC adapters are provided for mains-powered applications.

DOCUMENT CONVENTIONS

Generally **bold** text or Capitalized Phrases denote topics with a dedicated section in this document, or that are described in the **GLOSSARY OF TERMS** (Appendix 1).

Items in [square brackets] are a description of the item displayed rather than the actual text that appears on the panel display.

To "**Select**" an option or function means to modify a display choice using the **UP** and **DOWN** keys until the selection is as desired, and then pressing **ENTER** to confirm the selection and move on.

Items in tables that describe Menu System functions or sub-menus are shown with a white background if available in both Standard and Extended menu modes. Items with gray backgrounds refer to Extended-only menu items.

PANEL LAYOUT

Figure 1 indicates the location of the various *KnowNet*™ panel resources that are referenced in this text.
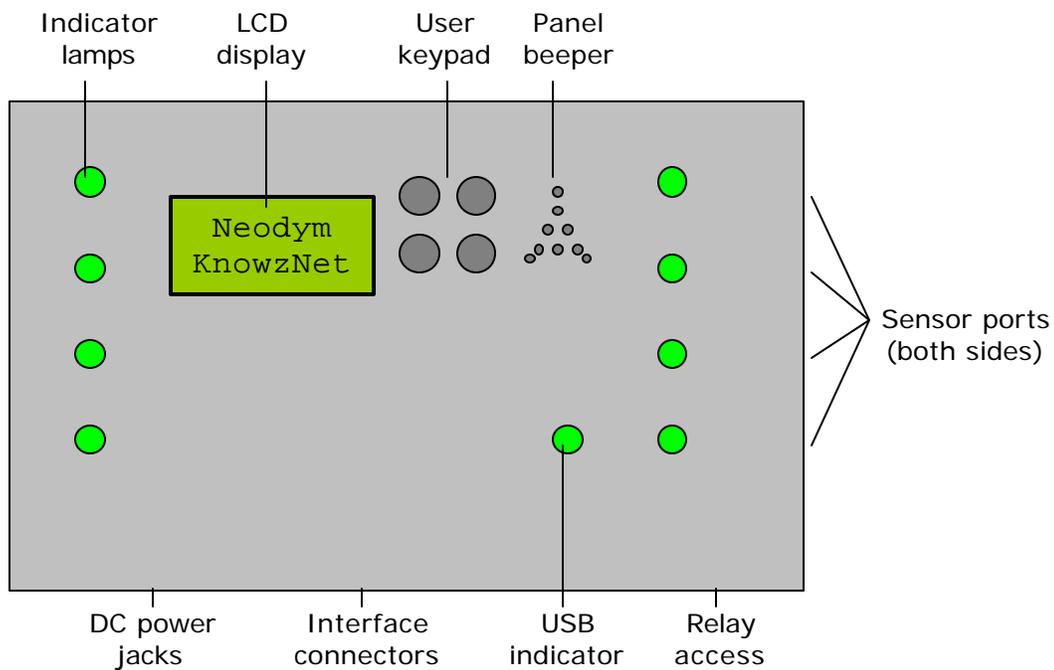
Fig. 1 – Panel layout

The panel Keypad layout is as follows:

CLEAR Key – Generally used to cancel operations

UP Key   –   Generally used to navigate the menus or change parameter values

DOWN Key – Generally used to navigate the menus or change parameter values

ENTER Key – Generally used to confirm selections
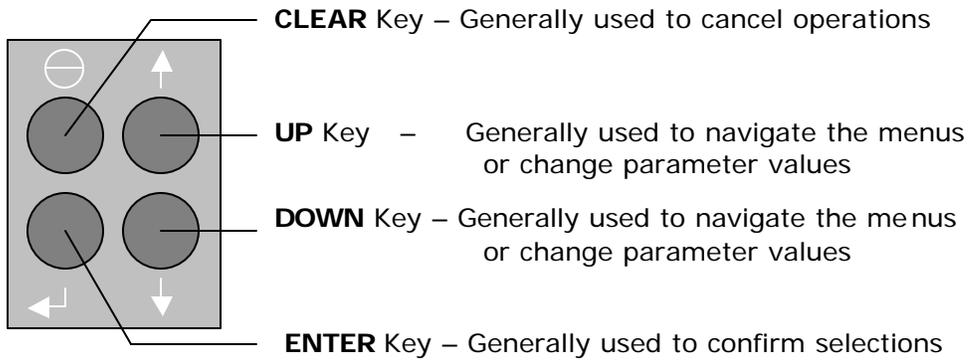
Normally a key must be pressed and released. Quick taps are ignored. In some instances (identified later), holding a key down permits rapid changing of parameter values.

For more information on Keypad operation, please see **APPENDIX 3 – MODIFYING PARAMETERS**.

In this text keys are referenced as follows:

or "**CLEAR**" – Clear key   or "**UP**" – Up key

or "**ENTER**" – Enter key   or "**DOWN**" – Down key

PANEL OPERATION

This section covers all aspects of panel operation, including display modes and the Menu System.

OPERATING MODES

At any given time, the panel will be in one of four operating modes. A more detailed description of the various operating modes will be provided later in this section.

1. **WARM UP**

   The panel starts in Warm Up mode when power is applied to allow sensors to stabilize.

2. **STATUS DISPLAY**

   The Status Display is the window to sensor readings and status, and is the default operating mode of the panel. All other functions eventually lead (back) to Status Display, E.G. the completion of Warm Up or exiting the Menu system.

3. **MENU SYSTEM**

   The Menu System facilitates the inspection and control of various panel functions such as viewing peaks, setting alarms points, calibrating sensors, resetting alarm relays, etc.

4. **REMOTE ACCESS**

   When accessed by an authorized host via a modem or PC connection, the panel relinquishes control over its systems and resources to the remote agent. The *NeoPort*™ program uses this remote access method to facilitate configuration of panel parameters or upgrading of the panel's capabilities, and furthermore provides advanced capabilities such as charting, data logging, dial-out and Internet monitoring.

SOFTWARE IDENTIFICATION & SELF TEST

Immediately upon being powered, the panel displays a start-up message consisting of its NeoPort™ system identity and software revision as follows:
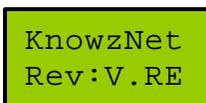
```
KnowzNet
Rev:V.RE
```

The revision information specifies the version ("V"), revision level ("R") and edit level ("E")

Please record your software's revision information as it may be required when you seek technical support or consider downloading an upgrade package in the future.

While displaying the start-up information, the panel performs a quick audio-visual self-test consisting of turning all the sensor indicator lamps first red, then green, and then off. A beeper "chirp" accompanies each lamp color change. Use this opportunity to verify that the beeper and all the sensor indicator lamps are operational.

WARM UP

A 60-second warm up interval is counted down each time that the panel is powered-on. This allows sensors that require some time to reach their proper operating temperature to do so without generating false alarms.

```
Warm up
   59
```

If desired, press **CLEAR** to skip the Warm Up.

STATUS DISPLAY

This operating mode is where the panel normally spends most of its time. All other modes (Warm Up, Menu System, etc.) lead back to Status Display.

Status Display provides continuous real-time indication of the following:

- Sensor readings from all active zones
- Alarm and error messages
- Stored alarm status

Line #1 identifies the sensor **Zone** (location)

Zone **blinks** if alarm is **Stored**

```
ZoneX
READING
```

Line #2 displays sensor **Reading**

Reading **blinks** if on **Hold**
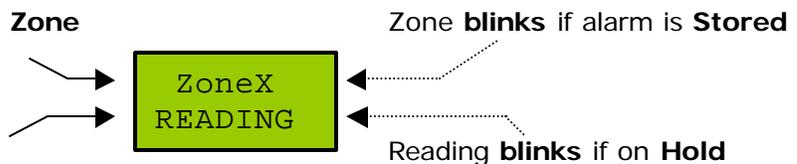
The panel **Scrolls** through the readings of all active (enabled) sensors successively.

Tip: To enable/disable sensors, see **SETTINGS – Panel - Sensors**

The length of time that each reading is displayed is determined by the **Message** Delay time and can range between 1 and 25 seconds.

Tip: To change the message delay time, see **SETTINGS – Panel - MsgDelay**

You may **Skip** to the next reading faster by pressing the **DOWN** key.

Tip: The **UP** key has no effect in Status Display Mode.

To lock onto the reading of one sensor (stop scrolling), activate the **HOLD** function. Use the **DOWN** key to manually advance to the next reading. To remove HOLD, press **CLEAR**

Tip: To activate HOLD, see **HOLD FUNCTION**

To enter the **Menu System**, press **ENTER**

Note: If you wish to access the parameters of a specific sensor, you must enter the Menu System when <u>that</u> sensor is being displayed.

Tip: Whenever you enter the Menu System, the **Addressed** (selected) sensor's indicator lamp will blink green.

MENU SYSTEM OVERVIEW

BACKGROUND

The Menu System permits the inspection and modification of sensor and panel parameters, as well as the activation and deactivation of various panel functions.

Activate the Menu System by pressing **ENTER** while the panel is in Status Display Mode.

There are two menu access modes: **STANDARD** and **EXTENDED**. The Standard mode menu items are a subset of the Extended functions.

Standard mode permits quick access to heavily used functions such as display Hold, Peak viewing, alarm Recall, etc.

Extended mode enables advanced functions such as Calibration and alteration of Settings.

> Tip: Generally, users are encouraged to perform their set-up operations using the Extended mode and then switch to Standard mode for subsequent access. That will help to prevent inadvertent modification of critical panel settings by novice operators.

For a detailed description of menu navigation techniques, please refer to **APPENDIX 2 – MENU NAVIGATION**.

For a detailed description of parameter alteration methods, please refer to **APPENDIX 3 – MODIFYING PARAMETERS**.

SENSOR ADDRESSING

When entering the Menu System to perform general panel operations (E.G. Mute Sound), it is not important at what point and time the menu system is activated.

However, if you wish to access the parameters of a particular sensor (E.G. Calibrate or view Peak), then you must first properly **Address** (select) the sensor of interest. Do this by pressing **ENTER** to activate the Menu System while the reading for the correct sensor is being displayed.
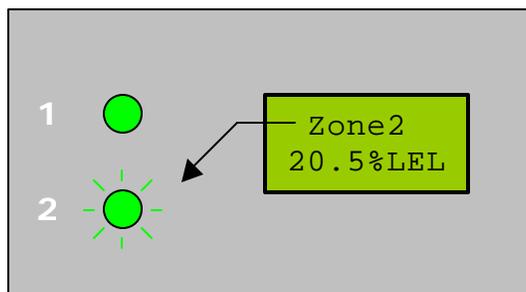
While in the Menu System, the indicator lamp of the **addressed sensor blinks green.**

Any sensor parameters that are accessed in the Menu System will be those belonging to the addressed sensor. When modifying sensor-specific parameters, always make sure that the correct sensor has been addressed.

> Tip: If you will be performing several operations on the same sensor using the Menu System, lock that sensor's reading with the **HOLD** function until you are done.

MENU FUNCTIONS

MAIN MENU SUMMARY

The following table summarizes the main menu functions. A detailed description of each function (or sub-menu) follows later in this section.

The **bold** menu items with white backgrounds refer to functions that are available in both **Standard** and **Extended** menu modes. The grayed functions are only accessible via Extended menu mode.

MAIN MENU ITEM	BRIEF DESCRIPTION
RESET	Reset latch-mode relay(s). Appears only if an alarm latched a relay.
PEAKS	View (and optionally clear) Peak history.
HOLD	Lock on present sensor reading (stop scrolling).
SOUND	Mute or un-mute alarm beeper.
SETTINGS	Inspect and/or modify sensor and panel parameters.
CAL	Calibrate sensor (display only in Standard mode).
INFO	Display sensor / panel Settings and miscellaneous status information.
RECALL	Display Stored Alarm history.
MODE	Switch between Standard and Extended menu modes.

RESET RELAY FUNCTION

This item appears in the Main Menu only if:

- One or more relays are configured for Latch-mode operation, and
- An alarm has activated one or more Latch-mode relays.

```
RESET
Master?Y
```
If this option is presented, the Master relay has been latched.
Select **YES** to reset (deactivate) the Master relay or **NO** to leave it activated.

```
RESET
Zone? Y
```
Option presented if the addressed sensor's Zone relay has been latched.
Select **YES** to reset (deactivate) the Zone relay or **NO** to leave it activated.

Note: The default for both options is always **YES**.

PEAKS FUNCTION

Use this function to view (and optionally clear) the Peak history of the addressed sensor.

Depending on the sensor type, you may be presented with Low and/or High peak history.

Tip: For an explanation of Low peaks, please see **APPENDIX 1 – GLOSSARY OF TERMS**.

If the sensor produces only one type of peak (either Low or High), the Peaks function will not term it "low" or "high" – it will simply be the peak for that sensor.

Peak history is reset when the panel is powered on. The displayed peak history is the lowest/highest absolute sensor reading since the peak was last reset – whether cleared due to power-up or manual (user) reset.

The Peaks function first displays the peak level and then asks whether you wish to reset it (clear the history). The example below is for a (single peak type) combustible sensor.

| PEAKS
39.5%LEL | The Peaks function first displays the highest reading encountered. |

| Clr PK?**Y**
39.5%LEL | Select **YES** to clear the peak reading to the ambient level or **NO** to retain it.
The default is **YES** (clear). |

| Cleared | If you selected **YES**, the panel confirms that the peak was cleared. |
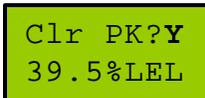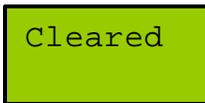
HOLD FUNCTION

| HOLD | Hold locks onto the reading of the addressed sensor in Status Display mode.
To remove the Hold, press **CLEAR** in Status Display Mode. |

To activate Hold, simply select the Hold function in the main menu. Selecting Hold again for a sensor that is already held has no effect.

While the Hold is in place, scrolling of other sensor's readings is suspended.
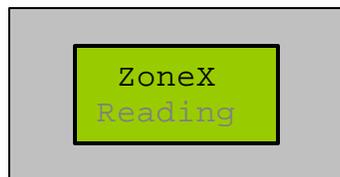
| ZoneX
Reading | The held reading **blinks** to indicate that automatic scrolling has stopped. |

To view other sensors' readings while Hold is in place, scroll manually by pressing the **DOWN** key.

While a sensor's reading is held, the held reading continues to be updated in real-time in response to ongoing sensor stimulus.

While a particular sensor's reading is held, the panel continues to respond to other sensors in the background. Any alarm produced by another (unviewed) sensor is indicated by its enabled alarm output devices (E.G. lamp, beeper, etc.).

The Hold function is temporary and is deactivated when the panel is power-cycled.

Tip: The Hold function is useful:
- To keep the sensor address stable when performing repeated menu operations on the same sensor, and
- When recording the readings of one particular sensor over a period of time.

SOUND FUNCTION

```
SOUND
MUTE
```
Select MUTE to silence the panel's beeper during alarms.

```
SOUND
UNMUTE
```
Select UNMUTE to restore beeping during alarms.

If Muted, the panel's beeper is silenced during alarms until manually Unmuted or the panel is power-cycled.

To permanently disable the beeper, do not select it as an alarm output device (see **SETTINGS — Sensor — AlarmSet**).

RECALL FUNCTION

```
RECALL
```
The Recall function permits viewing of stored alarm history for the addressed sensor.

```
RECALL
NO DATA
```
"No data" is reported if no alarm data has been stored. This could be because **Alarm Store** is disabled, or no Level One (L1) alarms have occurred.

If alarm history has been stored for the addressed sensor, it is reported as follows:

```
[Type:]
READING
```
"Type:" indicates the alarm type: Low Alarm, High Alarm, or Fail (error). As applicable, the lowest/highest reading during the alarm is displayed.

```
Start
MM/DD/YY
```
The start date of the alarm is displayed.

```
Start
HH:MM:SS
```
The start time of the alarm is displayed.

```
End
MM/DD/YY
```
The end date of the alarm is displayed.
If the alarm is still ongoing, "No data" is displayed.

```
  End
HH:MM:SS
```
The end time of the alarm is displayed.
If the alarm is still ongoing, "No data" is displayed.

After the alarm data has been displayed, you have the option to erase it:

```
Clear?Y
Alarm
```
Select **YES** to erase the alarm history, or **NO** to retain it indefinitely.
If retained, only an alarm of greater magnitude will overwrite it.

```
Cleared
```
The "Cleared" message confirms that the alarm data was erased.

MODE FUNCTION

```
  MODE
STANDARD
```
Standard mode offers an abbreviated menu system and fewer key presses to access the functions of a fully configured panel. (Settings are read-only).

```
  MODE
EXTENDED
```
Extended mode provides access to the full Menu System, including advanced functions such as Settings and Calibration.

> **Note:** Switching to Standard mode clears all stored alarms and disables Alarm Storage. The reason for this is that no functions are available under the Standard menu to service stored alarms.

SETTINGS SUB-MENU

Most permanent panel parameters (Settings) can be inspected and altered via the Settings sub-menu. Exceptions to this is are **CAL** and **RECALL**.

Settings are divided into two groups:

- **Sensor** settings that relate only to a specific sensor, and
- **Panel** settings that relate to general panel operation and influence all sensors.

The Settings menu is only available in **Extended** menu mode.

Although it is possible to completely and effectively edit settings via the Menu System, please consider the convenience and rich user interface offered via the *NeoPort*™ PC software for this task.

IMPORTANT NOTICE

Usually KnowzNet™ systems are delivered already set-up by factory personnel for your application. Please be aware that if you alter your settings incorrectly, you can compromise the panel's intended purpose and cause unsafe operation. If you require assistance with or clarification of panel settings, then please contact Neodym's technical support staff.

SENSOR SETTINGS

`SETTINGS` `Sensor`	This sub-menu permits editing of the parameters for a <u>specific</u> sensor. Note: The sensor of interest must be properly **Addressed**.

SENSOR SETTINGS SUB-MENU SUMMARY

The following summarizes the sensor settings functions. A detailed description of each function follows later in this section.

SETTINGS Sensor	Brief Description
AlarmSet	Set alarm parameters such as alarm level, alarm actions, etc.
ZRelay	Set behavior of Zone relay (E.G. Latching, normally activated)
Location	Edit location (Zone) identifier text.

Please note: Parameters displayed and/or altered are those of the presently **addressed** sensor.

ALARMSET FUNCTION

`Sensor` `AlarmSet`	This function allows the setting of alarm action levels and the behavior of alarm output devices for each sensor.

The panel supports up to four separate alarm/warning levels for each sensor.

The attributes of Alarm Levels and the rules governing their behavior are as follows:

> Tip: You may ignore the alarm priority structure if only one alarm level is used. Select L1 for single alarm applications if the Alarm Store function is desired.

1. The four alarm levels are coded **L1**, **L2**, **L3** and **L4**

2. Alarm levels are inspected for triggers in **descending** order of priority. L1 is the highest priority level and is checked first, then L2 is checked, and so on.

3. Whichever inspected level produces the first match for an alarm condition is the one whose alarm actions are executed. Therefore, the most serious alarm conditions should be defined at the highest level (i.e. L1), and warning conditions should follow after that. To be clear, if you set an L1 High Alarm trigger level <u>lower </u>than the trigger level for L2, then L2 will never trigger.

4. Each alarm level is enabled or disabled separately. IF YOU DISABLE ALL ALARM LEVELS, THEN NO ALARMS WILL BE PRODUCED!

5. Only the L1 alarm level has the ability to Store alarm history to memory for later Recall.

6. Any alarm level can have up to three alarm-producing sources:

- A **Low** sensor reading (Low Alarm – E.G. Oxygen depletion),
- A **High** senor reading (High Alarm – E.G. Excessive gas concentration), and/or
- An **Error** (Fail Alarm – E.G. Sensor failure or disconnection).

7. Sensor types that do not support either Low or High alarms will not offer the ability to select the unsupported alarm type as a source.

8. Any alarm level can activate up to four different alarm output devices:

- Change the panel **lamp** from green to red,
- Activate the panel **beeper**,
- Activate the sensor's **Zone relay**, and/or
- Activate the panel's **Master relay**.

Alarm level settings are programmed in sequence starting with L1. The procedure for programming each level is summarized as follows:

- Select whether the level is enabled (**InUse**) or not. Disabled levels are not available for further parameter setting.
- Select the alarm Sources and their trigger levels (if applicable), and
- Select the alarm output (Destination) devices.

   Tip: The default settings displayed for each level are the current (last established) settings. Pressing **ENTER** in response to default (unchanged) parameters does not alter the parameter, and is a method that can be used to inspect the current settings, or skip to the parameter of interest.

The following describes the sequence in which alarm level parameters are programmed. Please note that the letter "x" denotes the alarm level number:

```
Lx:InUse
Enable?Y
```
Select **YES** to enable this alarm level. The parameters of disabled levels cannot be accessed and are skipped.

```
Lx:Low
Enable?Y
```
This option is presented if the sensor type supports Low Alarms. To select a low sensor reading as an alarm trigger source for this level, select **YES**.

```
Lx:Low
Reading
```
Establish the trigger level for an enabled Low Alarm trigger source.
Use **UP / DOWN** to set the correct level and then press **ENTER**.

```
Lx:High
Enable?Y
```
This option is presented if the sensor type supports High Alarms. To select a high sensor reading as an alarm trigger source for this level, select **YES**.

```
Lx:High
Reading
```
Establish the trigger level for an enabled High Alarm trigger source.
Use **UP / DOWN** to set the correct level and then press **ENTER**.

`Lx:Fail` `Enable?Y`	This option is presented if the sensor type supports sensor Error detection. To select a sensor error as an alarm trigger source for this level, select **YES**.

`Lx:Lamp` `Enable?Y`	Select **YES** if you wish alarms triggered by this level to change the panel lamp from green to red.

`Lx:Beep` `Enable?Y`	Select **YES** if you wish alarms triggered by this level to activate the panel beeper.

`Lx:Z-Rly` `Enable?Y`	Select **YES** if you wish alarms triggered by this level to activate the Zone relay.

`Lx:M-Rly` `Enable?Y`	Select **YES** if you wish alarms triggered by this level to activate the Master relay.

PLEASE NOTE: If you disable all four alarm levels (Lx:InUse = N), then <u>no</u> alarms will <u>ever</u> be generated.

ZONE RELAY SETTINGS FUNCTION

`Sensor` `ZRelay`	Use this function to set the operational parameters for each Zone relay.

Each sensor/zone has its own (optional) zone relay. These are single-pole single-throw (SPST) devices that can be programmed as follows:

- To either Latch (require manual reset) or to be Auto-resetting (self reset when the alarm ends), and
- To be either Normally On (contacts made) or Normally Off (contacts open).

> Tip: When the panel's power is lost, Zone relays turn OFF. To detect power failure events, the devices should be programmed to be Normally On. In this way, a sensor alarm/error or power loss can change the state of the relay.

`ZR-Latch` `Enable?Y`	Select **YES** to enable Latched operation of the Zone relay. Select **NO** for Auto-resetting Zone relay operation.

`ZR-NrmON` `Enable?Y`	Select **YES** to enable Normally On (contacts made) operation. Select **NO** for Normally Off (contacts open) operation.

> Please note: "normal" refers to a no-alarm condition.

> Please note: Zone relays are optional devices integrated at the time of purchase and may not have been installed in your system.

LOCATION (ZONE) TEXT SETTING FUNCTION

```
Sensor
Location
```

Use this function to edit the Location (zone) text string that is used to identify the addressed sensor's reading in Status Display Mode.

```
Location
Furnace3
```

Use **UP** / **DOWN** to select new characters. Press **ENTER** to advance to the next character. After all 8 characters are programmed, the text is stored.

Tip: It is more convenient to use the *NeoPort*™ PC software to edit Location text.

PANEL SETTINGS

```
SETTINGS
Panel
```

This sub-menu permits editing of general parameters that apply to all sensors or to shared panel resources.

PANEL SETTINGS SUB-MENU SUMMARY

The following table summarizes the panel settings functions. A detailed description of each function follows later in this section.

SETTINGS- Sensor	Brief Desscription
AlrmWait	Set amount of time that sensor readings must be above/below trigger levels before an alarm is generated.
AlrmHold	Set amount of time alarms persist after sensor readings returns to normal.
MsgDelay	Set length of time that readings and messages are held on the display before moving on to the next item.
Key Wait	Set keypad inactivity time-out limit.
Relay	Set Master relay behavior
Set date	Set panel date (calendar)
Set time	Set panel time (clock)
ClrPeaks	Clear all sensors' Peak history
ClrAlrms	Clear all sensors' Stored Alarm history
Sensors	Add/Remove sensors
AlrmStor	Enable/Disable storage of alarm history

ALARM WAIT FUNCTION

```
AlrmWait
  XX
```

Length of time (0 to 15 secs.) that sensor readings must be over alarm thresholds before alarms are generated. Modify with **UP** / **DOWN** / **ENTER**.

Tip: Use the Alarm Wait function to filter out short, spurious events that could cause false alarms.

ALARM HOLD FUNCTION

```
AlrmHold
  XX
```

Length of time (0 to 15 seconds) that an alarm condition is persisted after a sensor reading returns to normal. Modify with **UP** / **DOWN** / **ENTER**.

Tip: Use the Alarm Hold function to "stretch" rapidly occurring alarm events. This function helps to settle "relay chatter" if a condition is hovering right at an alarm threshold.

MESSAGE DELAY FUNCTION

```
MsgDelay
  XX
```

Length of time (1 to 25 seconds) that information is held on the display before scrolling to the next item. Modify with **UP** / **DOWN** / **ENTER**.

Tip: Press **DOWN** to advance to the next displayed item whenever you do not wish to wait for the elapse of the message delay time.

KEY WAIT FUNCTION

```
Key Wait
  XX
```

Length of time (1 to 25 seconds) of permissible keypad inactivity before a menu operation times-out. Modify with **UP** / **DOWN** / **ENTER**.

RELAY BEHAVIOR SUB-MENU

```
Panel
 Relay
```

This sub-menu allows control of the panel (Master) relay behavior.

The panel has one Master relay that can be activated by any sensor that is programmed to use it as an alarm output (destination) device (please see **ALARMSET FUNCTION**).

The relay is a double-pole double-throw (DPDT) device offering two separate, electrically isolated sets of NO/NC contacts. The two sets of contacts switch in unison and cannot be made to switch independently.

The NO/NC relay contact designations reverse their meaning depending on whether the relay is programmed to be Normally On or Normally Off. The labeled NO contact designation refers to a Normally Open state when the relay is Off (deactivated).

Tip: Use **UP** / **DOWN** to toggle between choices and then press **ENTER** when desired behavior is displayed.

```
Relay
XXXX Clr
```

Select **Self Clr** for Auto-resetting (non-latching) Master relay operation.
Select **User Clr** for Latching (manual reset) Master relay operation.

```
Relay
Norm XXX
```

Select **Norm ON** for relay activation when conditions are Normal.
Select **Norm OFF** for relay activation during alarm and Error conditions.

Tip: When the panel's power is lost, the Master relay turns OFF. To detect power failure events, the relay should be programmed to be normally on. In this way, sensor alarms/errors or power loss will change the state of the relay.

SET DATE AND TIME FUNCTIONS

The panel uses the calendar and clock to date and time stamp stored alarm history and calibration operations.

Once set, the date and time is retained even when the panel is powered off.

```
Set date
mm/dd/yy
```

This function sets the panel's calendar date. The panel first reminds the user that the proper date format is Month / Day / Year

```
Set date
nn/nn/nn
```

Modify date parameters digit-by-digit using **UP** / **DOWN** and press **ENTER** to advance to the next digit. Entering the last digit updates the panel calendar.

```
Set time
 hh:mm
```

This function sets the panel's time (clock). The panel first reminds the user that the proper time format is Hours: Minutes (24 hour clock).

```
Set time
 nn:nn
```

Modify time parameters digit-by-digit using **UP** / **DOWN** and press **ENTER** to advance to the next digit. Entering the last digit updates the panel clock.

Tip: It is more convenient to use the *NeoPort*™ PC software to synchronize the panel's time and date with the PC's clock and calendar.

CLEAR PEAKS FUNCTION

```
Panel
ClearPks
```

Select this function to clear (reset) the Peak history of <u>all</u> sensors at once.

```
Cleared
```

The panel confirms that all Peak history is cleared (all peaks readings are restored to ambient levels).

CLEAR ALARMS FUNCTION

```
Panel
ClrAlrms
```

Select this function to clear (reset) the Stored Alarm history of all sensors at once.

```
Cleared
```

The panel confirms that all stored alarm history is cleared (Recall function reports "No Data").

ADD/REMOVE SENSORS FUNCTION

The panel supports up to 8 sensors. "Added" sensors are active sensors whose activities are monitored and reported by the panel. The panel ignores "Removed" sensors, even if the sensors are physically attached to a panel port.

The parameters of Removed sensors are not available for inspection or modification.

If you Remove all sensors, then the Status Display will remain blank, and only the Menu System will function.

> Tip: Unlit panel indicator lamps provide quick indication as to which sensors are Removed.


```
SensorX
 [A/R]
```

Use **UP** and **DOWN** to **Add** or **Remove** sensor "X" and then **ENTER** to advance to the next sensor. "X" refers to the sensor (port) number.

> Note: Only the *NeoPort*™ PC software can install advanced driver information needed for new sensor types.

ALARM STORE FUNCTION

```
AlrmStor
Enable?Y
```

Select **YES** to enable storage of alarm history for later Recall. This function enables or disables alarm storage for all sensors at once.

The panel is able to store alarm history for each sensor. The stored event can be viewed using the **Recall** function.

Note: Only Level One (L1) alarms are able to be stored (please see **ALARMSET FUNCTION**).

Only one alarm event is stored per sensor. The following information is captured:

- Lowest sensor reading detected (if Low Alarm sensor type),
- Highest sensor reading detected (if High Alarm sensor type),
- Date and time that the alarm started, and
- Date and time that the alarm ended.

While an alarm is ongoing, the Alarm Store function will continue to update the lowest/highest alarm readings in the alarm history.

The alarm end time is not captured until sensor readings return to normal levels.

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A new alarm occurring after an alarm event has been stored overwrites the existing stored alarm ONLY IF the latest alarm is more serious than the previous one.

Stored alarm data is not lost when the panel's power is removed, and can only be erased through deliberate clearing. Use the **Clear Alarms** function to erase all sensors' alarm history at once, or use the "Clear" option after Recall to selectively erase individual alarm history.

Note: Disabling Alarm Store causes all existing alarm history to be cleared (erased).

CALIBRATION SUB-MENU

CAL

The CAL sub-menu is used to access sensor calibration functions for the **addressed** sensor.

IMPORTANT NOTE:

The accuracy of sensor readings is wholly dependent on accurate calibration of the sensors while following proper calibration procedures and using accurate calibration references.

Sensor calibration should not be attempted without adequate knowledge of the proper techniques and impact of calibration.

IMPROPER CALIBRATION CAN LEAD TO INCORRECT SENSOR READINGS AND UNSAFE PANEL OPERATION.

CALIBRATION SUB-MENU SUMMARY

The following table summarizes sensor calibration functions. A detailed description of each function follows later in this section. Note: Only the Display function is accessible in Standard Menu mode. In this section, "SenX" refers to the sensor/port number of the **addressed** sensor.

> Note: Some calibration functions may not be applicable for the type of sensor selected. E.G. Binary sensors cannot be calibrated, Range sensors (temperature, oxygen, etc.) do not use Zero Points, etc. Unsupported sensor calibration functions are not presented in the sub-menu.

> Note: Calibration functions are not subject to **Key Wait** (keypad inactivity) time-outs. The only way to exit a calibration function is to either complete the operation or by pressing **CLEAR** to abort the operation with no changes to settings.

Cal SenX	Brief Desscription
Cal Zero	Calibrate only the Zero Point (Baseline Offset), if applicable.
Cal Span	Calibrate only the Span (Factor), if applicable.
Cal Z&S	Calibrate Zero Point and Span in sequence, if applicable.
Ent Fctr	Enter Span Factor directly, if applicable.
Display	Display calibration data, if applicable.

CAL ZERO FUNCTION

BACKGROUND

Sensors that read from zero to increasing levels (E.G. combustible and toxic gas types) employ a Baseline Offset to establish their Zero Point. Usually these sensors generate a small output signal as a result of their internal chemical activity or in response of benign environmental conditions – even in the complete absence of the target gas or sensing condition for which they are being employed. The loss of this signal component is useful to detect sensor failure or sensor disconnection. It is often necessary to remove this 'false" signal component from the sensor's reading to determine the starting point for 'real' readings.

Zeroing may be performed as often as is deemed appropriate or necessary and usually does not need to be followed with Spanning <u>unless</u> the shift in zero point is dramatic enough to impact accuracy.

> Note: Depending on the sensor type the Cal Zero option may not be presented, as certain sensor types do not employ Baseline Offsets.

PROPER CONDITIONS FOR ZEROING

Sensors that report small readings in the complete absence of the target gas/condition have their Offsets set too low and may be responding to 'dirty' air (trace amounts of interference substances). Often such insignificant readings do not need to be zeroed-out as they provide assurances that the sensor is 'alive' and sensitive.

Sensors that fail to report readings until a significant change in ambient conditions occurs may have their Offsets set too high. This represents an unusual situation, as most sensors provided with *KnowzNet*™ systems feature Baseline Offset Management functions that automatically adjust the Offset downward to maximize sensor sensitivity.

Sensors must be zeroed in 'clean' air, or air that is representative of ambient conditions in the target environment. These conditions should be fully representative of expected temperature, pressure, humidity and flow rate (as applicable).

The sensor must be stable and properly acclimatized for proper Zeroing. Generally this means leaving the sensor powered and exposed to the ambient environment for at least 10 minutes, or until the offset value is stable (see below).

SENSOR STABILIZATION

The Zero Point should not be captured until the Offset value is stable. As a general rule, observe the offset value for a 15 second period. If during that time there is no increasing or decreasing trend in the offset value, <u>and</u> the value remains stable within +/- two units, then you may consider the offset to be stable.

> Note: Certain sensors require a lengthy stabilization time after long periods of non-use (E.G. Ammonia sensors). Please refer to the sensor head's specifications to determine the stabilization time for the sensor in question.

Sensors that are employed as sources of compensation data must also be acclimatized and stable prior to calibration of the target sensor. E.G. a compensating temperature sensor must have fully saturated to ambient levels.

SETTING THE ZERO POINT (OFFSET)

```
Cal SenX
CAL ZERO
```

Select the Cal Zero sub-menu to access the sensor Zeroing function

```
OFX:nnne
READING
```

The Cal Zero function establishes a sensor's Baseline Offset. Press **ENTER** when you are satisfied with the displayed Offset value and wish to capture it.

"X" refers to the sensor (port) number that is being calibrated.

"nnn" represents the (new) digital reading value of the sensor's signal in real-time.

"e" is an error code that appears if the signal is too high to be accepted (see below).

"Reading" is the sensor reading, in real-time, as produced by the historic (last) Offset value.

OFFSET ERROR ("E")

Each sensor driver (installed at the time of integration) determines a maximum permissible Offset value for the sensor type in question. These limits on Offset values exist to prevent inadvertent unsafe zeroing. Excessive zeroing can translate into unacceptable reduction of sensor sensitivity and inaccurate readings.

The Cal Zero function indicates an unacceptable Zero Point by appending "e" (error) to the Offset value. While the error condition persists, the panel will not respond to the **ENTER** (capture Offset) key.

Offset value errors may be caused by an attempt to set the Zero Point:

- Under conditions where the target gas/condition is significantly present,
- Before the sensor has properly stabilized, or
- For a sensor that is faulty or no longer operating within acceptable limits.

To abort the Zeroing function without any changes to the settings, press **CLEAR**.

CAL SPAN FUNCTION

BACKGROUND

To provide accurate readings, most sensors require a proper Zero Point (see **Cal Zero**) and to be Spanned according to an accurate, known reference. During Spanning, the panel memorizes the sensor's response to the reference value, and uses that data to interpret future sensor readings.

The panel employs a digital spanning technique that uses a numeric Span Factor to 'stretch' or 'contract' the sensor reading. Each sensor driver (installed at the time of integration) determines a minimum and maximum permissible Span Factor value for the sensor type in question. These limits exist to prevent spanning of sensors whose signals are no longer within acceptable limits and to avoid reduction in reading resolution below specified parameters.

> Note: Depending of the sensor type, the Cal Span option may not be presented, as certain sensor types employ a fixed Span Factor.

WHEN TO SPAN

The internal chemical activity of most sensors drops off as they age. Sensors that are employed in hostile or corrosive environments exhibit accelerated degeneration. This gradual degeneration manifests itself as reduced output signal strength and sometimes more sluggish response and recovery times. For this reason, it is important to check the Spanning ability of sensors on a periodic basis - and when they are out of calibration, to re-span them.

Calibration testing entails exposing the sensors to a known reference level and observing them to read correctly. If the accuracy of the reading in response to the test reference is inadequate, then recalibration must be performed.

Usually, setting of the Zero Point (see **Cal Zero**) precedes a Spanning operation. This assures the highest degree of accuracy in sensor readings.

SPANNING REFERENCE

Most Spanning operations require a Spanning reference. For combustible and toxic gas sensors, this may be an accurate and known concentration of "Span" or "Test" gas mixture. For other sensors it is simply necessary to accurately determine the ambient conditions (E.G the temperature is 25 degrees Celsius, or the ambient oxygen concentration is 20.9% by volume).

SETTING THE SPAN

If necessary, first calibrate the Zero Point. Observe the same sensor stabilization procedure for Spanning as is described above for Zeroing.

Span sensors under conditions that are representative of the temperature, pressure, humidity, and flow rate in the target environment.

If Spanning a gas sensor using Span Gas, assure that the gas mixture is delivered to the sensor in a reliable fashion and at a steady rate.

Once you apply the Span Gas, observe the Span Reading and wait for it to stabilize. Use the **UP** and **DOWN** keys to adjust the Span Reading until it most closely approximates the reference level. Depending on the sensor's resolution, it may not be possible to adjust the span to exactly match the reference level. It is normal for the reading to 'bounce' around by one or two Resolution Units. Once the fluctuations hover above and below the same point within a ten second interval, and the Reading is close enough to the reference level, the Spanning operation is complete. To terminate the operation, press **Enter**.

> Note: The sensor's Span Factor is captured and permanently stored after each up/down adjustment.
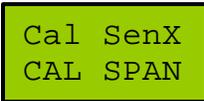
```
Cal SenX
CAL SPAN
```
Select the Cal Zero sub-menu to access the sensor Spanning function.
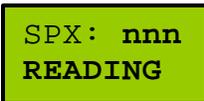
```
SPX: nnn
READING
```
Use **UP** and **Down** to adjust the Span Factor until the Span Reading equals the reference level, and then press **ENTER**.

> "X" refers to the sensor (port) number that is being calibrated.

> "nnn" represents the current Span Factor.

> "Reading" is the sensor reading, in real-time, as produced by the current Span Factor

CAL ZERO & SPAN FUNCTION

```
Cal SenX
CAL Z&S
```
Select the Cal Zero & Span function to set a sensor's Zero and Span in Sequence. Please see **CAL ZERO** and **CAL SPAN**.

ENTER (SPAN) FACTOR FUNCTION

```
Cal SenX
ENT FCTR
```
Select the Enter Factor sub-menu to restore or to set a factory-provided sensor Span Factor value. No span gas/reference is required.

```
Cal SenX
FCTR:NNN
```
Use **UP** / **Down** to adjust the Span Factor, and then press **ENTER** to update the sensor calibration database.

> "X" refers to the sensor (port) number that is being calibrated.

> "NNN" represents the Span Factor.

Use this function when:

- You are installing a pre-calibrated sensor and wish to key in the provided Factor, or
- You have upgraded your panel's firmware and wish to restore previously recorded sensor calibration data.

IMPORTANT NOTE:

Do not alter a Span Factor unless you fully understand the implications thereof. Setting the wrong Span Factor can result in inaccurate sensor readings and/or unsafe panel operation. For information about the function of the Span Factor, please see **CAL SPAN**.

DISPLAY (CALIBRATION DATA) FUNCTION

```
Cal SenX
DISPLAY
```
Select the Calibration Display sub-menu to inspect the current calibration parameters for the addressed sensor ("X").

```
Ofs: ###
FCTR:NNN
```
First the calibration offset ("###") and Span Factor ("NNN") are displayed.

```
Last cal
[DATE]
```
Next the date on which the Span Factor was last modified is shown.

INFO SUB-MENU

The INFO sub-menu permits inspection of panel parameters without the danger that settings may be modified unintentionally.

INFO is divided into two groups:

- **Sensor** information that relates only to a specific sensor, and
- **Panel** information that relates to <u>all</u> sensors and panel resources in a general way.

SENSOR INFO

```
   INFO
 SENSOR
```
This sub-menu displays sensor-specific information relating to the addressed sensor.

The following sensor information is available under the Sensor Info sub-menu:

- Sensor Type,
- Location (Zone) identification text, and
- Alarm Settings.

```
TYPE:
[TYPE]
```
Displays the Sensor Type (E.G. Methane, Motion, etc.)

```
Location
[ZONE]
```
Displays the sensor location text (as presented in Status Display mode).

```
LX:[Y]
READING
```
Displays the alarm type(s) ("Y") and trigger readings(s) for each enabled level ("X"). "Off" denotes an alarm level that is not enabled.

```
LX:Src
Y Y Y
```
Displays the enabled trigger sources for each enabled level ("X"). Source codes ("Y") are "**L**" (Low Alarm), "**H**" (High Alarm) and "**E**" (Sensor Error).

```
LX:Dest
Y Y Y Y
```
Displays enabled alarm output devices for each enabled level ("X"). The codes are "**L**" (Lamp), "**B**" (Beeper), "**Z**" (Zone relay) and "**M**" (Master relay).

PANEL INFO

INFO PANEL

This sub-menu displays information pertinent to all sensors and shared panel resources.

The following information is available under the Panel Info sub-menu:

- Sound status (Muted/Unmuted),
- Master relay behavior,
- Panel Time and Date,
- AlarmWait and AlarmHold intervals,
- Message Delay and Key Wait intervals, and
- Status of Alarm Storage (enabled/disabled).

Sound [STATUS]

Displays status of Sound Function. "**Muted**" means that the beeper has been silenced. "**Unmuted**" permits beeping for beeper-enabled alarm levels.

Relay xxxx/D:n

Displays set behavior of the Master relay. "xxxx" denotes **User** (Latched) or **Self** (auto) reset modes. "D:n" reports default (normal) state: 1=On, 0=Off.

Date MM/DD/YY

Displays the panel's calendar as Month / Day / Year.

Time HH:MM:SS

Displays the panel's clock as Hours : Minutes : Seconds (24 hour format).

AlrmWait NN

Displays the Alarm Wait setting (seconds). Sensor readings must cross trigger points for the displayed time interval before alarms are initiated.

AlrmHold NN

Displays the Alarm Hold setting (seconds). Sensor readings must return to normal levels for the displayed time interval before alarms are terminated.

MsgDelay NN

Displays the Message Delay setting (seconds). This is the length of time that information is held on the display before scrolling to the next item.

Key Wait NN

Displays the Key Wait setting (seconds) – the permissible keypad inactivity time before the Menu System times out and returns to Status Display mode.

AlrmStor [STATUS]

Displays whether the alarm history storage function is **Enabled** or **Disabled**. Please note that only Level One (L1) alarms are stored.

APPENDICES

APPENDIX 1 - GLOSSARY OF TERMS

ADDRESSED SENSOR – Target sensor in Menu System operations. Lamp blinks green.
AUTO-RESETTING – Automatic (self) deactivation of a relay when an alarm condition ends.
BASELINE OFFSET – See ZERO POINT.
BASELINE OFFSET MANAGEMENT – Downward adjustment of Zero Point to optimize sensitivity.
BEEPER – Audio transducer used to provide audible status indication.
BINARY SENSOR – On/Off-type sensor (E.G. motion detector, power fail detector, etc.)
DESTINATION (ALARM) – Possible alarm output device (E.G. beeper, relay, etc).
ERROR – Condition reported when a sensor exhibits total signal loss (disconnection or failure).
FAIL ALARM – Alarm produced by a sensor Error.
KEYPAD – Group of four pushbutton switches (keys) for Panel user input and control.
HIGH ALARM – Alarm produced by a reading <u>above</u> ambient levels.
HIGH PEAK – Peak data updated with increasing sensor readings (E.G. toxic gas).
LAMP – Sensor indicator lamp - one per sensor. Used to provide visual sensor status indication.
LATCH (MODE) – Sustained activation of a relay until deliberately (manually) reset.
LCD – Liquid crystal display used to provide text-based status indication and information.
LOCATION – Text denoting the physical location (Zone) or other user description of a sensor.
LOW ALARM – Alarm produced by a reading <u>below</u> ambient levels.
LOW PEAK – Peak data updated with decreasing sensor readings (E.G. oxygen depletion).
MASTER RELAY - General relay that can trip in response to any/several sensor alarm(s).
NO - Option selected when pressing Enter while "N" is displayed.
NORMAL – Condition that does not trigger an alarm. Generally refers to ambient levels.
PANEL - *KnowNet*™ control panel
PEAK (HISTORY) – Recorded greatest (absolute) departures from ambient levels.
PORT – Interface connector permitting attachment of sensors to the Panel
STATUS DISPLAY MODE – Normal display mode indicating sensor readings and status
POWER-CYCLE – Removing and re-applying power to the Panel.
RESOLUTION UNITS – Varying base resolving capability of a sensor as per sensor specification.
SENSOR – Sensing element/transducer housed in Sensor Head and attached to a sensor port.
SENSOR TYPE – Specific sensor target function (E.G. methane, water level, temperature, etc.)
SOURCE (ALARM) – Possible trigger input for an alarm (E.G. high reading or sensor Error).
SPAN (FACTOR) – Digital calibration value used to scale accuracy of sensor reading.
SPANNING REFERENCE – Accurate, known test gas or environmental condition used to Span.
USB – Universal Serial Bus PC interface standard.
YES – Option selected when pressing Enter while "Y" is displayed.
ZERO POINT – Baseline signal level at which sensor starts to respond to target condition.
ZONE – See LOCATION.
ZONE RELAY – Specific relay that trips only in response to it's own sensor/port alarm.

LOW/HIGH SENSORS AND ALARMS

Sensors that normally read zero (E.G. combustible types) produce greater-than-zero readings and produce only high alarms and high peaks. Some sensors (E.G. temperature) read ambient levels and can produce readings both above and below the norm. Such sensors produce both Low and High peaks/alarms. Still other sensors produce low peaks/alarms only (E.G. fluid level and oxygen depletion sensors).

APPENDIX 2. - MENU NAVIGATION

The panel normally remains in Status Display Mode unless specifically instructed to enter the Menu System.

To enter the Menu System, press **ENTER** while the panel is in status display mode.

On entering the menu system, the main menu selections will be displayed.

Use the **UP** or **DOWN** keys to scroll to the desired menu entry.

When the desired menu item is displayed, press **ENTER** to select that menu function.

System functions have been grouped according to logical associations, and therefore main menu entries often lead to sub menus. Navigate the sub menus in the same way as the main menu until the desired function is presented.

Main menu items use all uppercase letters and are displayed on the first (top) line. Sub menu items generally appear on the second (bottom) line and are usually composed of mixed text.

All menus are circular, meaning that once you reach the end of the list of items in a particular menu, the panel will once again display items from the top of the list. This means that any menu item is accessible using either the **UP** or the **DOWN** key, and quicker access of a particular menu entry is possible by going in the appropriate direction. This document list menu items as you would encounter them if you kept on pressing the **DOWN** key.

If you make an incorrect selection while navigating the Menu System, press **CLEAR** at any time, and the panel will exit the Menu System and return to Status Display Mode.

After a successful menu operation, the panel will exit the Menu System and return to Status Display Mode. Additional menu operations may be performed be re-entering the Menu System.

Note that navigation through the Menu System is subject to a keypad inactivity time limit. If the panel detects a long pause between menu navigation keystrokes, it will automatically exit the Menu System. The default keypad time-out is 25 seconds and can be shortened under Panel Settings (see example below).

For brevity, menu operations are coded in this text as follows:

> In this example, **SETTINGS - Panel - Key Wait** implies that the bold parameters refer to the following menu operation:

1. From Status Display Mode, press **ENTER** to access the menu system
2. Scroll through the main menu until you encounter **SETTINGS** and press **ENTER**
3. Scroll though the Settings sub menu until you see the **Panel** entry and press **ENTER**
4. Find the **Key Wait** sub menu entry in the Panel Settings sub menu and press **ENTER**
5. Change the Key Wait value to the desired interval and press **ENTER**

Please note:

Certain menu functions are not accessible while the panel is in Standard Menu Mode. These more advanced functions are only available in the Extended Menu Mode. The Menu Mode is selectable in the **MODE** menu.

APPENDIX 3. – MODIFYING PARAMETERS

Please note that, with few exceptions (E.G. Calibration), altering of panel parameters is subject to a keypad inactivity time limit. If the panel detects a long pause between parameter editing or acceptance keystrokes, it will automatically exit the menu system and leave the parameter unaltered. The keypad time-out interval can be modified under **SETTINGS – Panel – Key Wait**.

When it is necessary to alter a parameter value, the panel displays the default parameter value and the user is prompted to either:

- Leave the value as it is (press **CLEAR** and exit that menu function),
- Press **ENTER** to accept the value as presently displayed and exit the menu function, or
- Use the **UP** and **DOWN** keys to modify the parameter, and when the value is as desired, press **ENTER** to accept the changed value and exit the menu function.

Generally, the default parameter value that is shown when first entering the menu function is the value that was last set. If the user has not previously altered the value, then the default value will be the factory setting.

If you make a mistake while altering a parameter, you may press **CLEAR** at any time to exit the menu function without any alteration of the parameter.

Most parameters that are changed via the Menu System are stored in non-volatile memory. This means that even if the panel is powered down, the settings will be retained. The exceptions are SOUND and HOLD.

Parameters available to be changed can be Numeric (E.G. Alarm Level), Alphanumeric (E.G. Zone Identification text) or Binary (E.G. Yes/No, On/Off, etc.) Different methods are used to modify different parameter types:

MODIFYING ALPHANUMERIC PARAMETERS

The panel allows the user to modify text data one character at a time. A blinking cursor is used to indicate which character is being edited. Use the **UP** and **DOWN** keys to select alternate characters. When the desired character is displayed, press **ENTER** to advance the cursor to the next character. When the last character is **ENTER-**ed, the panel will accept the whole parameter string and store it.

MODIFYING NUMERIC PARAMETERS

Certain numeric parameters are modified in a way that is similar to the alteration of alphanumeric values (see above), except that only numbers are available for selection. An example of this method includes the setting of the panel's time and date.

Most numeric parameters are changed by "bumping" the values up or down by using the **UP** and **DOWN** keys. When the displayed parameter has been bumped to the desired value, press **ENTER** to accept the new value. This bumping method is implied when no (digit-by-digit) blinking cursor is displayed.

Please note: The panel allows numeric parameters to be modified only within the numeric range that is appropriate for that particular parameter. If you find that you are unable to modify a number, it is because you have reached the minimum or maximum permissible value.

MODIFYING BINARY PARAMETERS

Binary values are "toggled" using the **UP** or **DOWN** keys. For example, when prompted to provide a "Yes" or "No" response, the panel will prompt "**Y**" or "**N**" with a blinking cursor. To change a default "Y" to an "N", press **UP** or **DOWN**. The new selection will then be "N". To permanently accept that new selection, press **ENTER**.

APPENDIX 4 - TROUBLESHOOTING GUIDE

This section addresses common problems that may be encountered with the *KnowNet*™ control panel. If you require technical assistance, then please contact Neodym using the co-ordinates at the head of this document.

Probelm	Cause / Solution
Status Display is blank. Only menus work.	All sensors have been disabled (Removed). Enable (Add) one or more sensors.
Cannot access all documented functions.	Certain advanced functions are only available in Extended Menu mode. Select Extended menu mode using the MODE function.
Information scrolls off the display faster than it can be read.	The Message Delay time is set too low. Increase the **MsgDelay** time in **Panel Settings**.
Insufficient time to input keypad data.	The Key Wait time is set too low. Increase the **Key Wait** time in **Panel Settings**.
Zone text keeps blinking.	The sensor in that zone has alarm history stored. RECALL and Clear the alarm.
The sensor reading keeps blinking.	You have enabled the HOLD function. Press **CLEAR** to release the hold.
Status Display remains stuck on one reading.	1. You only have one sensor enabled, or 2. You have enabled the HOLD function.
Sensor readings says: "**ERROR**"	1. The sensor is disconnected, check panel port and sensor head connections, or 2. The sensor has expired and needs to be replaced. Contact Neodym.
Sensor shows non-zero readings even when there is no gas.	Improperly Zeroed sensor. Please see **Cal Zero**.
The panel keeps returning to the start of Warm Up without being power-cycled.	Computer Operating Properly watchdog has detected damaged panel software. Download repair/upgrade kit or contact Neodym.
Panel restarts to Warm Up when touched.	Static "zapped" panel electronics. Make sure panel back plate is properly grounded.
Panel display shows strange characters and/or display is dim.	Improper panel input power. Check/correct rating of AC adapter or DC supply voltage.