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Infrared Leak Detector Installation and Operation Manual

COMPUTER PROCESS CONTROLS

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If this device is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impared.

THIS PRODUCT CONFORMS TO CE STANDARD BSEN 50082-1 AND BSEN 50081-1

THIS DEVICE CONFORMS TO UL POLLUTION DEGREE II IN ACCORDANCE WITH THE IEC 664.

THIS DEVICE IS UL INSTALLATION (OVERVOLTAGE) CLASS II.

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1 Overview

CPC's Infrared Leak Detector System (IRLDS) is designed to detect refrigerant leaks by analyzing air samples with an infrared sensor. The IRLDS's multi-filter analyzer can detect CFC, HFC, HCFC, and NH_3 refrigerant levels as small as 5 ppm. The sensor detects the unique infrared signatures of CFCs, HFCs, and HCFCs, which eliminates the problem of "nuisance alarms" caused by other gases such as propane or methane. If the IRLDS is configured to detect Ammonia (NH_3) it will not be able to detect any other gas besides Ammonia.

The IRLDS in its standard configuration will measure three types of gases that are specified when ordering (see ***Table 1-2***). The unit is also configured with a generic (any refrigerant gas) detection mode for non-specific refrigerant detection.

The different refrigerant types the IRLDS can be configured to detect are in ***Table 1-1***. Any combination of the below refrigerants (besides the ones shown in ***Table 1-2***) can be ordered from CPC to fit any application.

R12	R507
R22	R402A
R134A	R401B
R401A	R11
R404A	R123
R408A	R407C
R502	NH_3

Table 1-1 *- IRLDS Detectable Gases*

Air samples may be taken from up to 16 different areas on a timed schedule. When concentration levels higher than the system's refrigerant leak or spill thresholds are detected, the IRLDS will give a notification of the alarm situation by lighting the LEAK ALARM LED or SPILL ALARM LED on the front panel and by displaying a message on the unit's backlit LCD screen.

The filtered tubes that carry air samples to the IRLDS sensor are constantly monitored for reductions in air flow that might be caused by a crimped tube or clogged filter. The system displays an alarm when a low-flow condition occurs. This feature ensures that a leak or spill won't go undetected because of a lack of air to sample.

The IRLDS has two relays, which activate during alarm conditions. In the default configuration, the first relay activates when a leak, flow fault, or system fault is detected and may be used to turn on an alarm device such as a bell or light. The second relay activates when a spill (in its default configuration) is detected and may be configured to operate a solenoid valve to shut down the leaking refrigeration system or to notify an in-store security system of a health hazard. The two relays maybe configured to alarm according to your specific need and application.

The IRLDS logs the concentration data and alarms it generates. The unit stores 72 hours worth of data readings, plus the last 20 recorded alarms. The data and alarm logs can be viewed on the screen.

For external logging and control, each sampling zone has a corresponding analog output source, which generates 0–4.8V corresponding to the measured concentration or a 5V signal when a system fault or low flow condition is detected. Ideally, these outputs may be used to connect the IRLDS to an REFLECS controller for alarm and concentration monitoring. The IRLDS also connects to a 16AI Analog Input Board (P/N 810-3011), which allows monitoring by a REFLECS controller, such as a Refrigeration Monitor and Case Control unit (P/N 827-1000).

The IRLDS hooks in directly to an Einstein controller via the RS485 Network where the leak detector can monitor concentration levels, but uses Einstein's own alarm parameters.

Part Number	Description	Refrigerants Detected
809-4000	IRLDS, 8 zone, 120vac	R22, R404a, R502
809-4001	IRLDS, 8 zone, 120vac	R22, R404a, R408a
809-4002	IRLDS, 8 zone, 120vac	R22, R402a, R404a
809-4003	IRLDS, 8 zone, 120vac	R12, R22, R404a
809-4004	IRLDS, 8 zone, 120vac	R22, R404a, R507
809-4005	IRLDS, 8 zone, 120vac	R22, R402a, R502
809-4006	IRLDS, 8 zone, 120vac	R134a, R404a, R507
809-4007	IRLDS, 8 zone, 120vac	R22, R402a, R507
809-4008	IRLDS, 8 zone, 120vac	R22, R134a, R507
809-4009	IRLDS, 8 zone, 120vac	R22, R134a, R402a

Table 1-2 *- IRLDS Part Numbers*

Part Number	Description	Refrigerants Detected
809-4010	IRLDS, 8 zone, 120vac	R22, R408a, R502
809-4011	IRLDS, 8 zone, 120vac	R134a, R401a, R402a
809-4012	IRLDS, 8 zone, 120vac	R22, R401a, R402a
809-4013	IRLDS, 8 zone, 120vac	R12, R22, R502
809-4014	IRLDS, 8 zone, 120vac	R22, R401a, R404a
809-4015	IRLDS, 8 zone, 120vac	R22, R408a, R507
809-4016	IRLDS, 8 zone, 120vac	R22, R402a, R404a
809-4017	IRLDS, 8 zone, 120vac	R22, R401a, R507
809-4500	IRLDS, 8 zone, 240vac	R22, R404a, R502
809-4501	IRLDS, 8 zone, 240vac	R22, R404a, R507
809-4502	IRLDS, 8 zone, 240vac	R123, R404a, R408a
809-4503	IRLDS, 8 zone, 240vac	R22, R123, R404a
809-4504	IRLDS, 8 zone, 240vac	R134a, R404a, R502
809-4505	IRLDS, 8 zone, 240vac	R12, R404a, R408a
809-4506	IRLDS, 8 zone, 240vac	R12, R402a, R502
809-4507	IRLDS, 8 zone, 240vac	R401a, R402a, R404a
809-4508	IRLDS, 8 zone, 240vac	R22, R402a, R502
809-4600	IRLDS, 8 zone, 240vac - Woodley	R11, R22, R404a
809-4601	IRLDS, 8 zone, 240vac - Woodley	R22, R123, R404a
809-4602	IRLDS, 8 zone, 240vac - Woodley	R12, R404a, R408a
809-4603	IRLDS, 8 zone, 240vac - Woodley	R22, R404a, R408a
809-5000	IRLDS, 16 zone, 120vac	R22, R404a, R502
809-5001	IRLDS, 16 zone, 120vac	R12, R22, R404a
809-5002	IRLDS, 16 zone, 120vac	R12, R22, R502
809-5003	IRLDS, 16 zone, 120vac	R22, R402a, R507
809-5004	IRLDS, 16 zone, 120vac	R22, R401a, R402a
809-5005	IRLDS, 16 zone, 120vac	R22, R404a, R407c
809-5006	IRLDS, 16 zone, 120vac	R401a, R402a, R404a
809-5500	IRLDS, 16 zone, 240vac	R22, R502, R507
809-5501	IRLDS, 16 zone, 240vac	R22, R404a, R502
809-5502	IRLDS, 16 zone, 240vac	R12, R404a, R408a
809-5503	IRLDS, 16 zone, 240vac	R22, R123, R404a
809-5504	IRLDS, 16 zone, 240vac	R22, R404a, R507
809-5505	IRLDS, 16 zone, 240vac	R22, R404a, R407c
809-5506	IRLDS, 16 zone, 240vac	R12, R22, R404a
809-5507	IRLDS, 16 zone, 240vac	R22, R134a, R404a
809-5508	IRLDS, 16 zone, 240vac	R404a, R408a, R502
809-5509	IRLDS, 16 zone, 240vac	R123, R404a, R408a
809-5600	IRLDS, 16 zone, 240vac - Woodley	R22, R502, R507
809-5601	IRLDS, 16 zone, 240vac - Woodley	R22, R404a, R502
809-5602	IRLDS, 16 zone, 240vac - Woodley	R12, R404a, R408a

Table 1-2 *- IRLDS Part Numbers*

Part Number	Description	Refrigerants Detected
809-5603	IRLDS, 16 zone, 240vac - Woodley	R22, R123, R404a
809-5604	IRLDS, 16 zone, 240vac - Woodley	R22, R404a, R507
809-5605	IRLDS, 16 zone, 240vac - Woodley	R22, R404a, R407c
809-5606	IRLDS, 16 zone, 240vac - Woodley	R12, R22, R404a
809-5607	IRLDS, 16 zone, 240vac - Woodley	R22, R134a, R404a
809-5608	IRLDS, 16 zone, 240vac - Woodley	R404a, R408a, R502
809-5609	IRLDS, 16 zone, 240vac - Woodley	R123, R404a, R408a
809-5610	IRLDS, 16 zone, 240vac - Woodley	R11, R123, R404a
809-5611	IRLDS, 16 zone, 240vac - Woodley	R11, R22, R404a
809-5612	IRLDS, 16 zone, 240vac - Woodley	R12, R22, R134a
809-5613	IRLDS, 16 zone, 240vac - Woodley	R22, R404a, R408a
809-5614	IRLDS, 16 zone, 240vac - Woodley	R123, R134a, R404a
809-5615	IRLDS, 16 zone, 240vac - Woodley	R22, R134a, R407c
809-5800	IRLDS, 8 zone, 120vac - Ammonia	NH_3
809-5810	IRLDS, 16 zone, 120vac - Ammonia	NH_3
809-5820	IRLDS, 8 zone, 240vac - Ammonia	NH_3
809-5830	IRLDS, 16 zone, 240vac - Ammonia	NH_3

Table 1-2 *- IRLDS Part Numbers*

2 Hardware Setup

Figure 2-1 shows an IRLDS operating in a typical supermarket setting. The unit, mounted in the motor room, samples air near the refrigeration rack and the refrigerated cases through filtered tubes. A 485 Alarm Panel and a standard external warning light may be configured to notify when a leak or fault is present. An ISS (in-store security system) may be connected to the spill relay so that a store-wide alarm may sound in case a hazardous concentration of refrigerant is detected. For more advanced alarm and control applications, the IRLDS may be connected to an Einstein controller directly or a REFLECS controller via a 16AI input board.

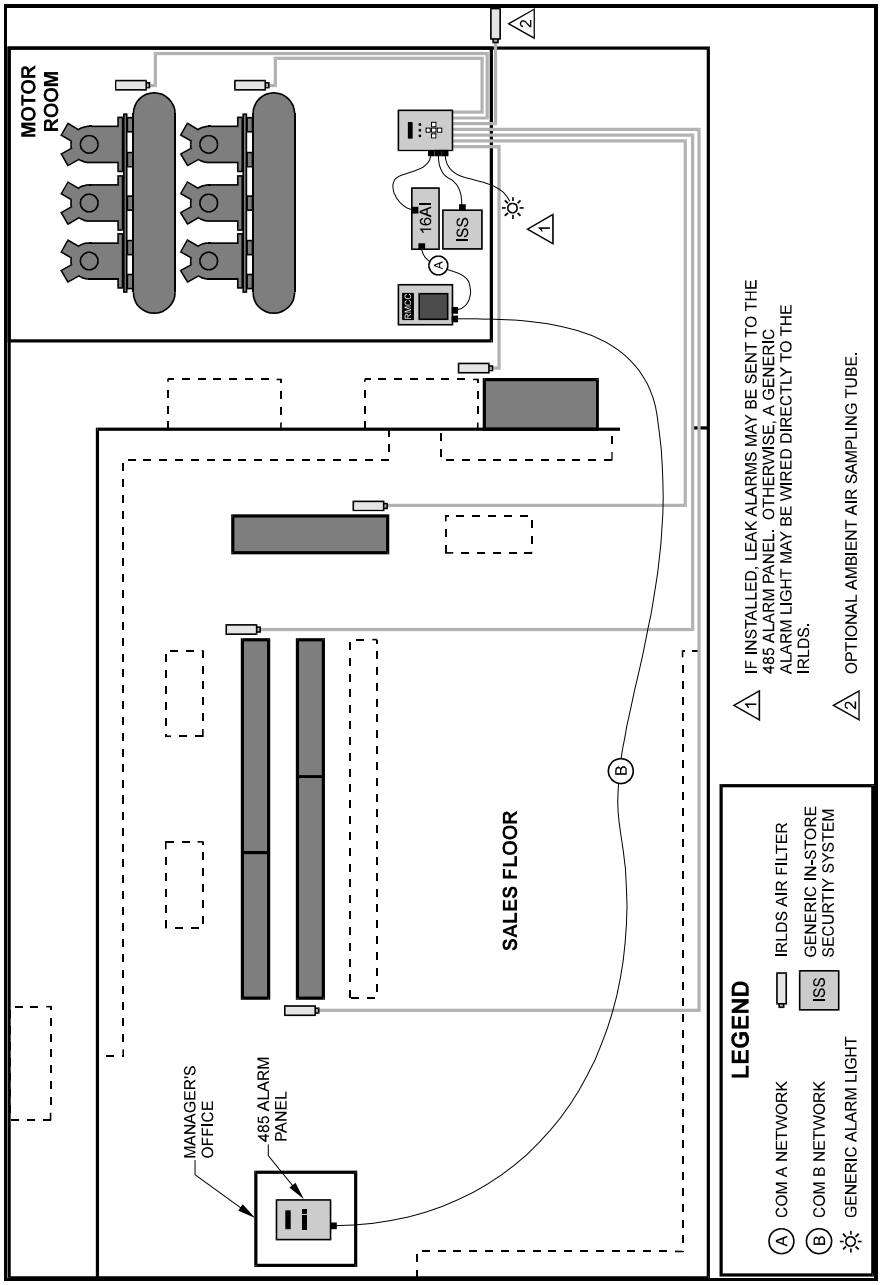


Figure 2-1 *- Diagram of a Typical IRLDS Setup*

Hardware setup of the IRLDS involves checking the dip switch settings, wiring the power cable, setting up the air tubes, and connecting any external devices to the IRLDS's outputs. Setup instructions, along with a brief overview of the system hardware, are provided in this section.

2.1. Operating Conditions

The IRLDS is designed for use indoors at altitudes up to 2000m (6600ft.) and at a temperature range of 5-40°C (41-104°F). The maximum operating relative humidity is 80% for temperatures up to 31°C (87°F) decreasing linearly to 50% relative humidity at 40°C (104°F).

2.2. Mounting

Do NOT mount the IRLDS on a refrigeration rack. Vibrations from the rack may cause serious damage to the IRLDS's infrared sensor.

Figure 2-2 shows the mounting dimensions of the IRLDS. The IRLDS should be screwed or bolted to a wall using the mounting brackets at the top and bottom rear of the unit. Allow at least six inches of room along the right and left sides of the unit for adequate ventilation during operation. More space on the left-hand side of the unit may be necessary for easier accessibility to the output terminals.

The LCD display on the IRLDS is designed to give maximum readability when viewed from below. For this reason, the IRLDS should be mounted slightly above eye level, if possible.

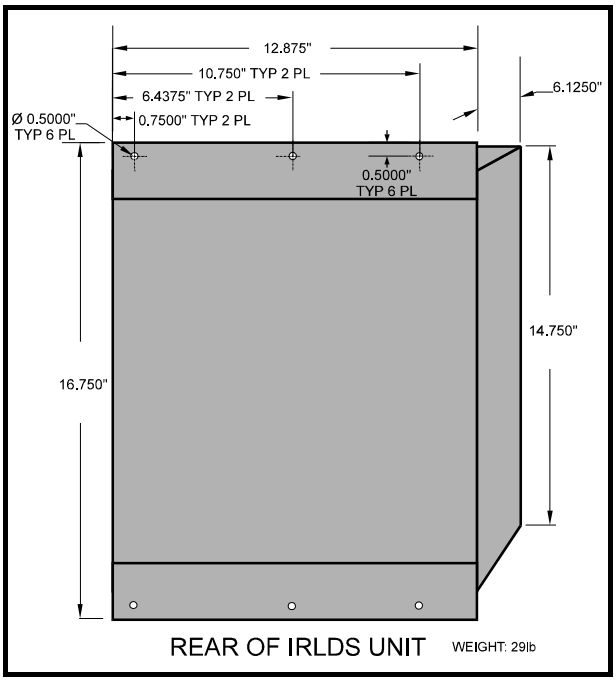


Figure 2-2 *- Mounting Dimensions for IRLDS*

2.3. Dip Switches

The dip switches are set at the factory, but should be checked to ensure no switches were moved during shipment.

The IRLDS has one set of dip switches, located on the board mounted inside the unit's front door.

A dip switch is "Open" or "Off" when the rocker switch is flush with the "Open" side. A dip switch is "Closed" or "On" when the rocker switch is flush with the side labeled "1 - 8."

Switches 1-4 are reserved for use in serial communications numbering when used with a REFLECS or Einstein controller. The switches are used to set the unit's ID number on the REFLECS COM A and COM D or Einstein I/O network. See ***Figure 2-4***.

Switch 5 affects the IRLDS's "watchdog" feature, which allows the IRLDS to reset itself when a system software error occurs. This switch must always be set to OPEN as shown in ***Figure 2-3***; otherwise, the IRLDS's "watchdog" feature will be disabled.

Switch 6, when "on," sets the baud rate to 9600 for RS485 communication. Use this feature when connected and communicating to Einstein.

Dipswitch 7 affects the internal operations of the unit and should be set to the defaults shown in ***Figure 2-3***. See Section 2.4.2. Output Terminal Blocks

Switch 8 determines if the IRLDS will operate in eight-valve or 16-valve mode. The switch should be set to OPEN on eight-valve units and set to CLOSED on 16-valve units as shown in ***Figure 2-3***

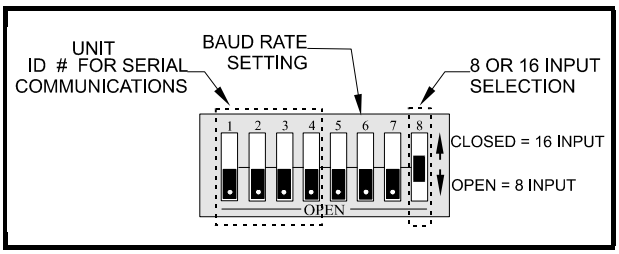


Figure 2-3 *- Setting the IRLDS Dip Switches*

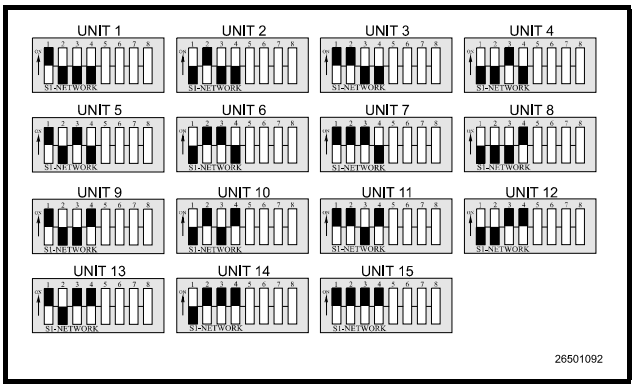


Figure 2-4 *- Serial Communication Dip Switch Settings for Unit ID Number*

2.4. Wiring

2.4.1. Power

2.4.1.1. Ratings

The IRLDS may be shipped as either 115 VAC or 230 VAC. The voltage rating of the unit should be shown on a label near the power switch on the right side of the unit. The pump nameplate also displays the unit's voltage rating.

2.4.1.2. Voltage Ranges

The IRLDS will operate safely with supply voltage fluctuations not to exceed ±10% of the nominal voltage.

2.4.1.3. Wiring Instructions

The unit comes shipped with three wires protruding from the conduit coupling on the right hand side of the unit. These three wires—black, white, and green for 115VAC units and brown, blue, and green/yellow for 230VAC units—are connected where the hot, neutral, and ground wires must be connected. The hot and neutral wires are connected to the underside of the power switch. Connect these wires to a power source using a wiring system in accordance with National Electric Code, ANSI/NFPA 70.

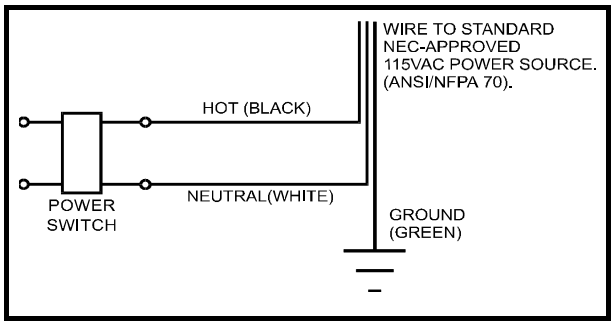


Figure 2-5 *- 115VAC Power Wiring Schematic*

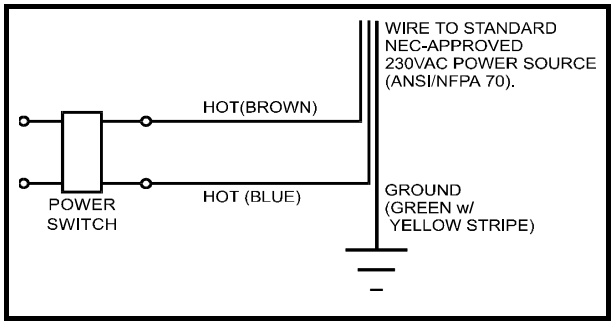


Figure 2-6 *- 230VAC Power Wiring Schematic*

2.4.2. Output Terminal Blocks

To interface with external controllers, the IRLDS has a 0-5V terminal block with 8 or 16 outputs. These terminals are located on a board underneath the panel on the left side of the unit (see ***Figure 2-7***).

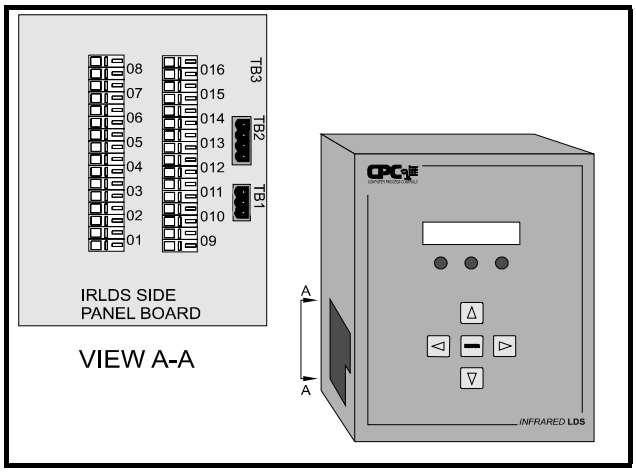


Figure 2-7 *- Diagram of the IRLDS side panel*

The terminals emit an output voltage based on the refrigerant concentrations measured in their corresponding zone. ***Table 2-1*** shows what each voltage output represents:

Voltage	Description
0.0 - 4.8V	Refrigerant concentration value measured by the sensor (250 ppm/V). Range 0-1200ppm
4.9V	Refrigerant concentration higher than 1200 ppm.
5.0V	A system fault, power failure, or a low-flow condition in the air intake tube or filter.

Table 2-1 *- Output Voltage Definitions*

2.4.3. Relay Connections (TB2) ⚠

The two relays, used to activate alarms or control devices during leaks, spills, or faults, are rated at 240VAC / 3A. The two relays are individually assignable to activate upon detection of a spill, leak, low-flow fault or a system fault. These two relays may be reassigned in each zone by going inside the Change Setup Menu (see Section 3.2.1.6. Changing Alarm Relay Configuration, and LED Configuration).

Default settings

The relays' default settings are:

1. Relay 1 - Actvates upon Spill
2. Relay 2 - Activates upon Leak

The output connections to these relays are on the four-pin plug-in connection labelled TB2 located on the unit's left side panel (see ***Figure 2-8***).

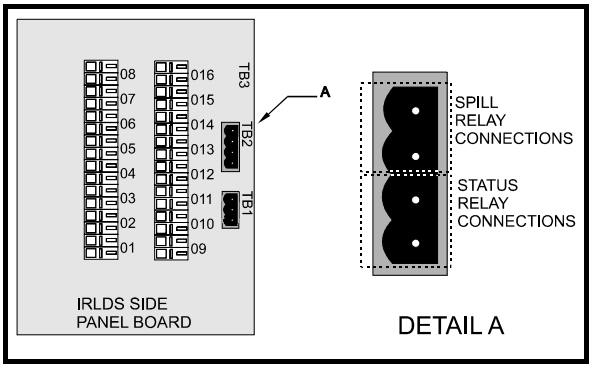


Figure 2-8 *- Diagram of Leak and Spill Relay Connections*

2.4.4. Connecting the IRLDS to a 16AI

Do NOT use common neutrals when wiring the IRLDS to a 16AI board. For each zone being wired, run a dedicated wire from the odd-numbered terminal on the 16AI to the corresponding IRLDS output, as shown in Figure 2-9.

The output terminal blocks may be connected to the input terminals of a 16AI board, which will allow the IRLDS to interface with a CPC REFLECS controller such as a Refrigeration Monitor and Case Control unit (P/N 827-1000). The terminals should be hard-wired as shown in ***Figure 2-9***. Note in this figure that Zone Number 1 is connected to its corresponding point number on the 16AI. The wires should be connected in this way to make setup easier (Zone 11 connected to point 11, etc.).

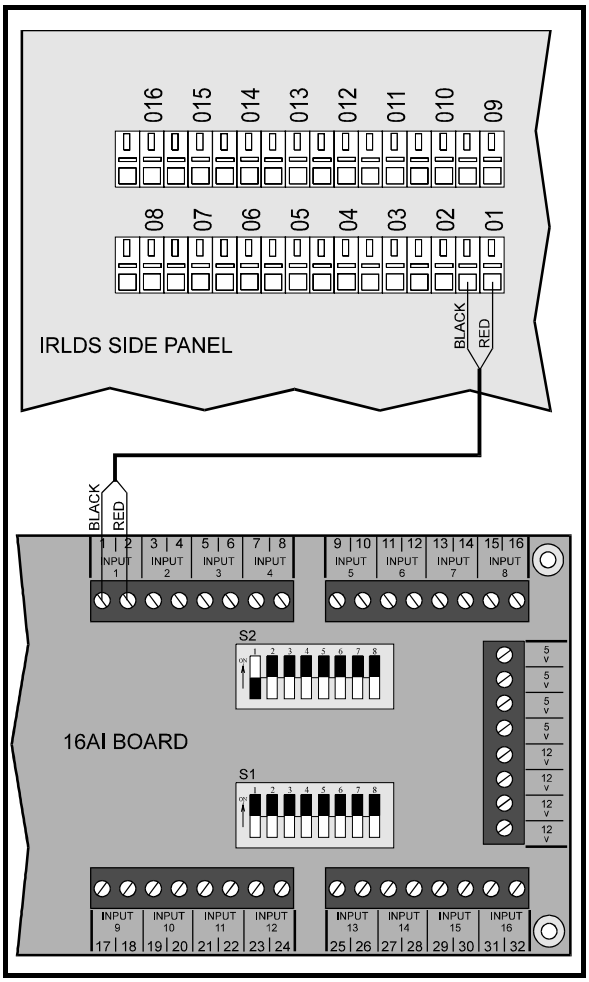


Figure 2-9 *- Wiring a 16AI Input Board to an IRLDS*

Connecting the 16AI board to an RMCC will allow the RMCC to record concentration data and alarms in its Alarm Log. Refer to *P/N 026-1102, Refrigeration Monitor and Case Control Installation and Operation Manual*, for instructions on wiring a 16AI to the RMCC and assigning a board number to the 16AI.

In order for the RMCC to read the proper concentration levels, the sensor settings must be properly set up in the RMCC software. See **Section 3.3.,** *REFLECS Sensor Setup*, to configure the RMCC's sensor settings.

2.4.5. Connecting the IRLDS to Einstein

The IRLDS connects (see ***Figure 2-10***) to the Einstein from the three-pin connector, TB1. Refer to *P/N 026-1601 RX-300 Refrigeration Control Installation and Operation Manual.* Alarm and concentration data for each zone is transmitted across this connection, so a 16AI is not required. Be sure to observe polarity when connecting TB1.

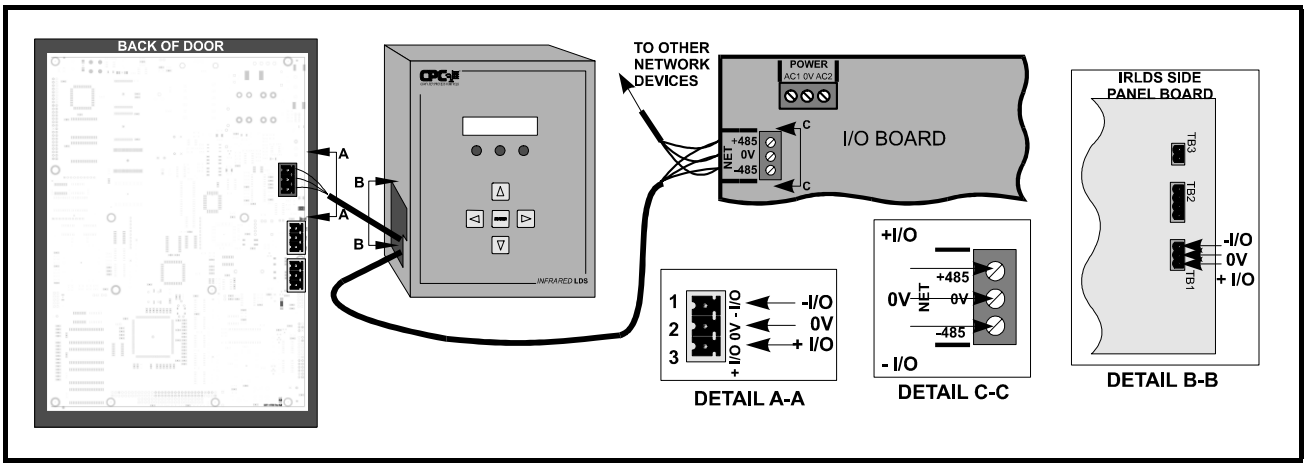


Figure 2-10 *- Connecting the IRLDS to Einstein*

2.5. Air Sampling Setup

2.5.1. Tubing

To take samples from a zone, the IRLDS pumps air from the zone to the sensor through 0.25" O.D., 0.17" I.D. tubing at ambient pressure. The tubing is Parker Hannifin Parflex (P/N 1FRPE4-1000), available from CPC (P/N 270-4401 for a 250’ roll).

Tubes must be connected to the intakes located on the bottom of the unit. The numbers over the nozzles are called zone numbers; they will become important during system software setup (see **Section 3.2.2.3**., *Enter Zone Name*).

To install the tubing:

1. Slide one end of the tube over one of the inlets. Push the nozzle into the tube as far as it will go. The tube should fit snugly over the barb at the top of the nozzle.
2. Run the tube along a traffic-free path so it cannot be crimped in any way. The maximum recommended length of a tube is 500 feet. A tube longer than 500 feet will likely cause a reduction in leak detection performance.
3. Connect the other end of the tube to the zone where the sample will be taken.

Refrigerant is heavier than air; therefore, the ends of the sampling tubes should be mounted close to the floor (about 12 to 18 inches above). When taking samples from refrigeration or freezer units, mount the end of the tubes close to the evaporator unit, or wherever leaks would most likely occur.

If all the air tubes are confined to a single room, consider running a line to a separate ambient air source.

Whenever the IRLDS completes a full cycle of samples (one sample from each zone), it automatically employs a self-correction feature. By defining the lowest recorded concentration of refrigerants as zero for the next cycle, the IRLDS will correct any calibration errors. If all of the sampling zones are in a single room, a refrigerant leak might be picked up by all of the intakes and mistaken for a calibration error.

If all of the sampling zones must be confined to a single room, it is recommended that one tube be connected to an ambient air source outside of the room, preferably an area known to be clean and free of refrigerants. This tube will give the system a constant zero reference point.

When the tubes are all properly connected, the unit will be ready for software setup. After all the zones are set up in the system software, cap any unused inlets with the vinyl caps supplied with the unit.

2.5.2. Filters

At the end of each air tube is a small filter designed to keep liquids and particulates from entering the tube. These filters are available from CPC (P/N 272-0620).

Connect the filter to the tube by inserting the barbed end of the filter into the tubing until the end of the tube is flush with the filter. The flow arrow on the filter should be pointing towards the tube.

The operating temperature of a filter is 32°F-125°F (0°C-48°C). It is allowable to mount a filter in a below-freezing environment as long as the dewpoint remains lower than the ambient air temperature. If the dewpoint is higher than the freezer’s air temperature, frost may collect in the filter, causing filter damage and air flow blockage.

Filter elements should be kept as dry as possible. If a filter becomes soaked, it will need immediate replacement.

In a normal environment, filters will need to be replaced once a year. If the operating environment is particularly dusty, the filters might need to be changed more often. If a filter looks dirty, consider replacing it.

For greater insurance against IRLDS damage, consider an inline filter (P/N 272-0622).

If possible, orient the filter so that it hangs down towards the floor. This will minimize the chances of water precipitating or spraying into the filter.

2.5.2.1. Hydrophobic Air Filters

For very humid applications the hydrophobic (water-blocking) air filter (P/N 572-0980) may be used. This filter is made of a special material that filters particles while restricting the flow of water through the filter element. This filter should be changed when it becomes dirty, but as a general rule, once a year is recommended. The installation procedure for this filter is illustrated in ***Figure 2-11***.

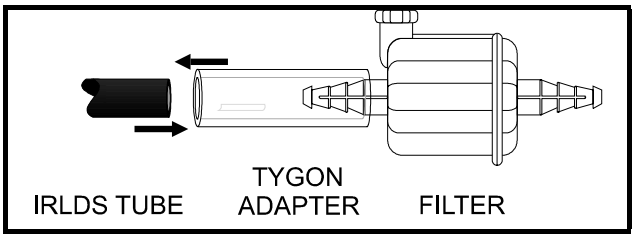


Figure 2-11 *Hydrophobic Air Filter Installation*

2.5.3. Water Separator

To remove moisture from the air that enters the tubes, all of the intakes are filtered through a water separator. The water separator attaches to the two tubes at the bottom right of the IRLDS case, as shown in ***Figure 2-12***. To connect the water separator:

1. Slide the tube marked “1” over the port on the water separator marked “1” so that the tube fits snugly around the barbed end of the port.
2. Slide the tube marked “2” over the port on the water separator marked “2” so that the tube fits snugly around the barbed end of the port.
3. Snap the two metal studs on the water separator’s mounting bracket into the small holes at the bottom right of the unit. The bolts on the mounting bracket should fit into the two large holes, and the separator should snap firmly into place.

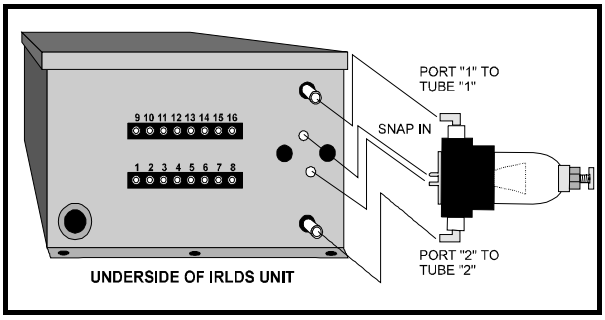


Figure 2-12 *- Connecting the Water Separator*

Over time, water may accumulate in the separator’s bowl. To drain this water, turn off the unit, unscrew the bowl by turning it counterclockwise, and empty the bowl. When finished, reattach the bowl and restart the IRLDS.

2.5.4. Exhaust Tube

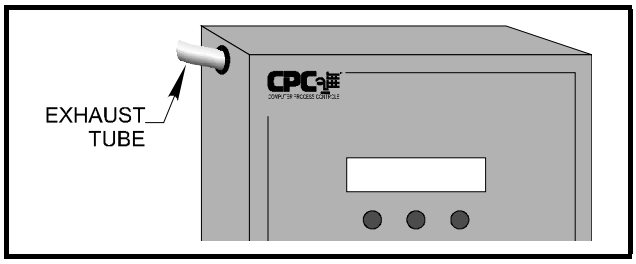


Figure 2-13 *- IRLDS Exhaust Tube*

Do not block or impede the flow of air through the exhaust tube in ANY WAY. Serious damage to the IRLDS’s infrared sensor may result.

Figure 2-13 shows the location of the IRLDS’s exhaust tube, located on the top left-hand side of the unit. The air that comes out of this tube is being pumped out of the IRLDS’s infrared sensor. It is very important that the exhaust tube be positioned so that it cannot be blocked or crimped in any way, or else pressure may build up in the infrared sensor and cause serious damage to the hardware.

If desired, the exhaust tube may be extended so that exhaust from the IRLDS is pumped outdoors. To do this, use tubing one size larger than the existing tubing.

3 Software Setup

Before sampling can begin, setup data must be entered into the IRLDS. This section shows how to use the IRLDS's software to change system settings and set up zones.

3.1. Navigation

System navigation with the IRLDS is done via the directional keys: LEFT, RIGHT, DOWN, UP, and ENTER. These keys are used to select system menus, enter alphanumeric data, and select setup options.

The IRLDS has two system menus: the Zone Menu and the Change Setup Menu. These menus are accessed from the default screen by pressing the LEFT or RIGHT key and pressing ENTER. In addition, users may access the Data Log from the default screen by pressing the DOWN arrow key, and they may access the Alarm Log from the Data Log by pressing the ENTER key. A diagram of these menus and logs is shown in ***Figure 3-1***.

3.1.1. Changing/Entering Names and Passwords

Some commands will prompt users to enter or change a numeric or alphabetical string, such as a system name or a password. Letters and numbers for alphanumeric strings must be chosen and entered one at a time using the UP and DOWN keys to scroll forward and backward through the alphabet. When the desired number or letter is shown, press the RIGHT arrow key to advance the cursor to the next space.When all the letters and numbers have been entered, pressing ENTER will save the string.

The alphanumeric characters are arranged in the system as shown in ***Figure 3-1***. Note that the cursor wraps around on both ends of the list; for example, if the cursor were displaying the letter B, pressing the DOWN key would change it to A,<SPACE>, 9, 8, 7, etc.

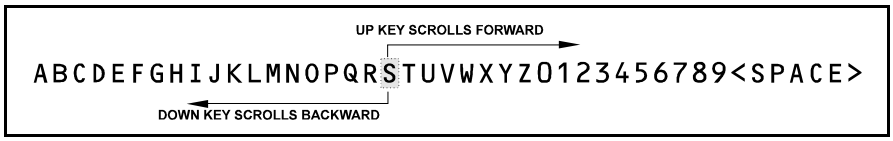


Figure 3-1 *- Map of the alphanumeric characters*

3.1.2. Timeout

When no key has been pressed for 30 seconds, the display automatically reverts back to the Monitor Screen. When this occurs, the system is said to have "timed out."

3.2. System Screens

The following sections show how to access and use each screen in the IRLDS software. Each IRLDS screen is shown, along with a brief description of the screen's function and a list of the buttons that show the exact key sequence necessary to access a particular screen. Although most of these buttons are self-explanatory, several require further discussion.

ENT - *Data Entry*. The Data Entry button means that data, such as a password, may be required before pressing the ENT button. These data vary from screen to screen and a description of the data is provided when necessary.

$_2$ - *Follow-On Keystroke*. When a subscripted number appears next to a key graphic, it means that the key should be pressed that number of times to reach the desired screen. In some instances, a subscripted number may be followed by a + symbol: $_{2+}$. This means that the key may need to be pressed an additional time to reach the desired screen.

A diagram of system menus and screens available from the default screen is shown in ***Figure 3-2***.

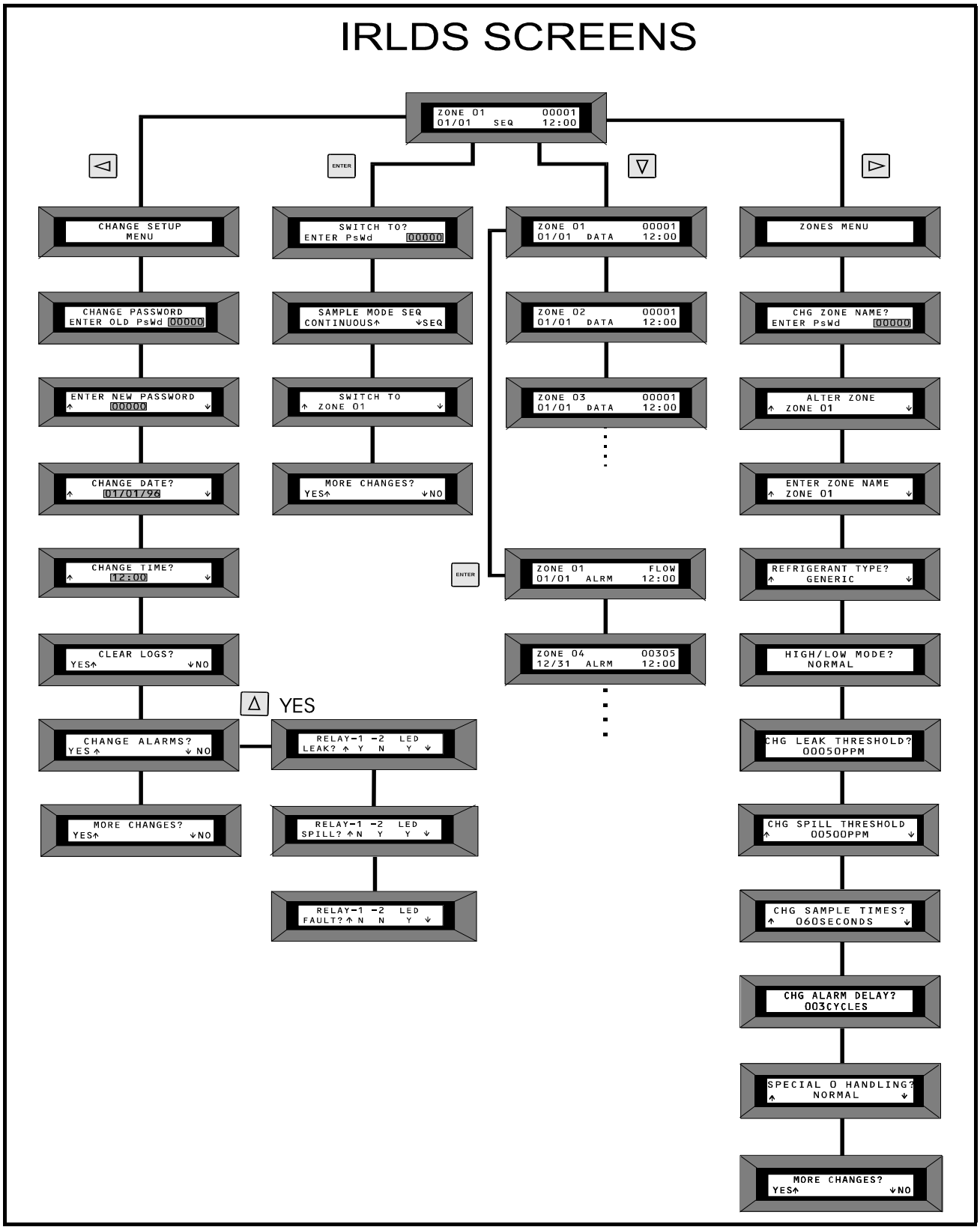
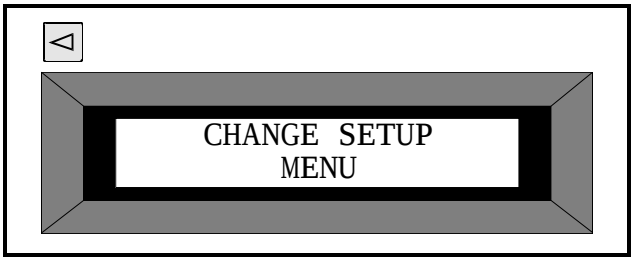


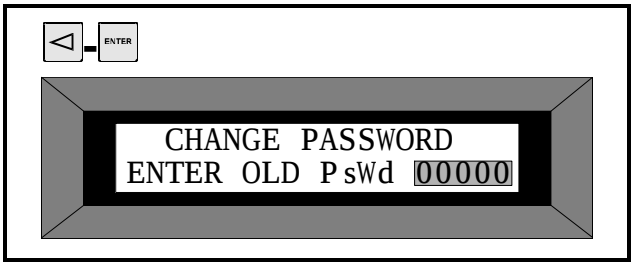
Figure 3-2 *- IRLDS Screen Tree*

3.2.1. Change Setup Menu



In the Change Setup Menu, users may change the system password, set the time and date, and clear all alarm logs.

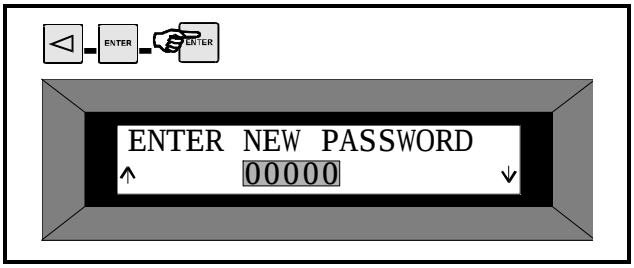
3.2.1.1. Enter Old Password



Before the password may be changed, the old password must first be entered in this screen. Even if the password is not to be changed, users must still enter the password in the Enter Old Password field before any other data may be altered in the Change Setup menu.

To enter the old password, follow the instructions given in **Section 3.1.1.** The default password is 00000.

3.2.1.2. Enter New Password

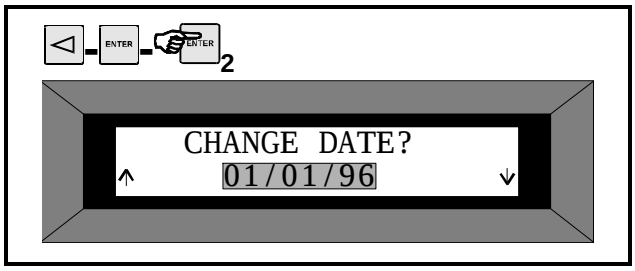


If desired, a new password may be specified after entering the old password. The current password is shown in the Enter New Password field. To alter the password, follow the instructions given in **Section 3.1.1.** To go to the next screen without changing the password, press ENTER.

The system prompts for a password whenever users attempt to access the Change Setup Menu, Zone Menu, or Switch To command, and whenever users attempt to acknowledge and reset a fatal alarm. Users may view Data and Alarm Logs and reset nonfatal alarms without entering a password.

See **Section 4.3.,** *Alarms*, for more information about fatal and nonfatal alarms.

3.2.1.3. Change Date

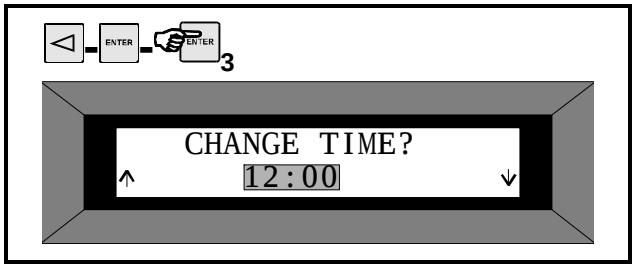


The current month, day, and year are entered in the Change Date field. Once entered, the IRLDS's internal clock will maintain the correct date even when power to the IRLDS is disconnected.

When this screen first appears, the cursor will blink on the MONTH field. Use the UP and DOWN keys to select the desired month number (UP scrolls forward, DOWN scrolls back). Press the RIGHT key when the desired month is shown. Follow the same procedure for the DAY and YEAR fields.

When the correct month, day, and year are shown, press ENTER to save the date and advance to the Change Time screen.

3.2.1.4. Change Time

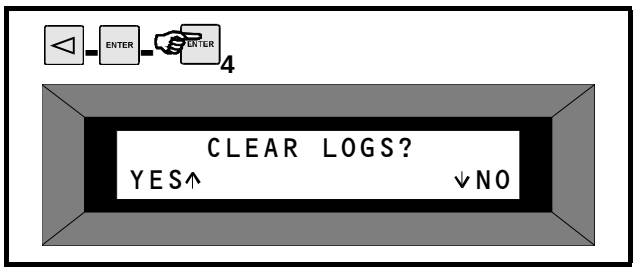


The current time is entered in the Change Time field. Once entered, the IRLDS's internal clock will maintain the correct time even when power to the IRLDS is disconnected. However, the IRLDS makes no adjustments to the internal clock for Daylight Savings Time; these time changes will have to be made manually.

When this screen first appears, the cursor will blink on the HOUR field. Use the UP and DOWN keys to select the desired month number (UP scrolls forward, DOWN scrolls back). Press the RIGHT key when the desired month is shown and follow the same procedure for the MINUTE field.

When the correct time is shown, press ENTER to save the time and advance to the Clear Logs screen.

3.2.1.5. Clearing Logs

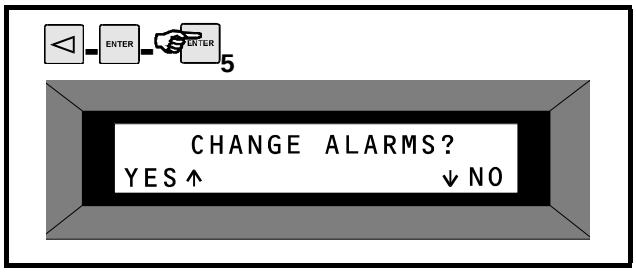


Every 10 minutes, the IRLDS records the last concentration reading taken from each zone in the system's Data Log. Every time an alarm condition occurs in a zone, or the IRLDS experiences a system error (such as a power failure), the alarm is recorded in the Alarm Log. When the IRLDS is being installed for the first time, it is a good idea to clear any old logs that might still be in the memory.

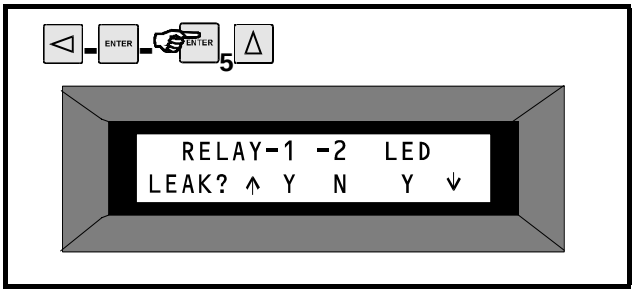
The IRLDS does not ask for a confirmation before erasing the Data and Alarm Logs. When the UP key is pressed at this screen, the logs are erased immediately.

To erase both the Data and Alarm logs, press the UP key. To exit this screen without erasing the logs, press the DOWN key.

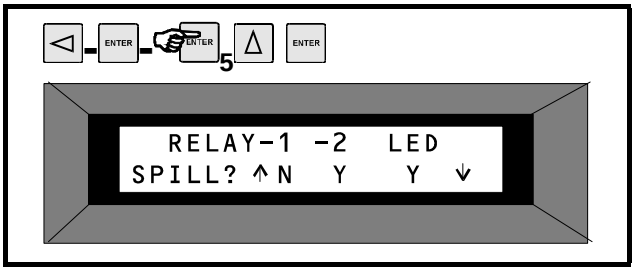
3.2.1.6. Changing Alarm Relay Configuration, and LED Configuration



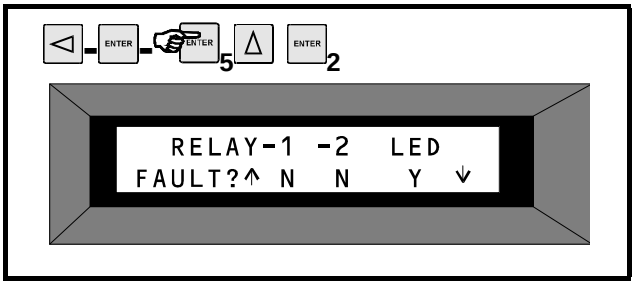
This screen is for specifying alarm configuration information for the IRLDS, determining when Relay 1, Relay 2, and the Status LED are activated. Any combination of these indicators can be specified separately for leaks, spills, and fault conditions. The default settings are: Relay 1 activates with the detection of a leak; Relay 2 activates with spill; the Status LED is activated with either a leak or a spill.



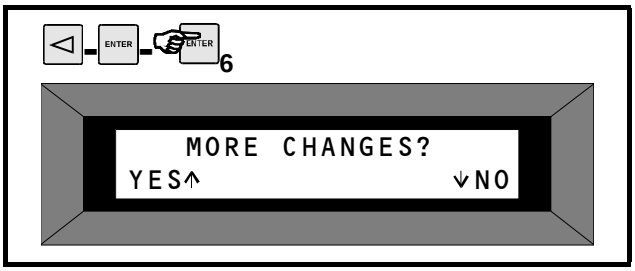
The up arrow navigates to Screen #2. This screen controls how the unit reports a leak. If "Y" is positioned below the relay number, that relay that will activate when a leak is detected in that zone. The same procedure applies to Screen #3 an #4 when setting spill and fault alarms, respectively.



The third position in each screen, if designated with a "Y", changes the corresponding LED from green to red when either a leak, spill or fault occurs. For example, if "Y" is chosen for the LED in the Spill screen, the Spill Alarm LED on the front panel would light red if a spill was detected in that zone. If an "N" were chosen and the zone detected a spill, then the LED in the Spill Alarm position would remain off.



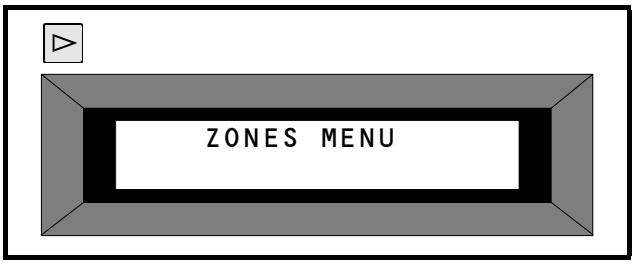
3.2.1.7. More Changes



At the end of the Change Setup Menu, the Zones Menu, and the Switch To command sequence, the IRLDS will display the More Changes screen. If YES is selected from the More Changes prompt, users may make further changes to the system settings without having to reenter the password. The system will allow password-free access until the system times out or until the user enters “NO” at the More Changes prompt.

If more changes need to be made, press UP for Yes. To log out of the IRLDS, press DOWN for No.

3.2.2. Zones Menu



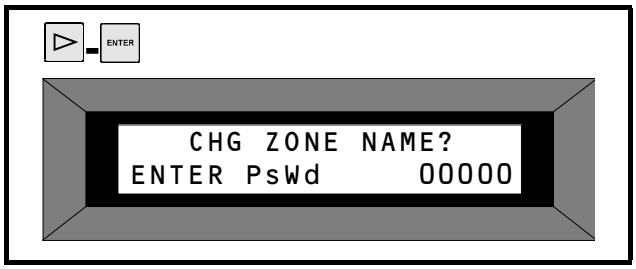
A zone is defined as a single area, such as a motor room or a refrigerated case, where a sample of air is taken and analyzed. Each zone is connected via tubing to an air intake on the IRLDS. When a zone is set up correctly, the IRLDS will detect a refrigerant leak or spill condition and display the zone’s number, name, and refrigerant concentration on the LCD display.

Unused intake zones must be set up in the Zones Menu, or else the IRLDS will attempt to sample from them.

To set up a zone, users must enter a name for the zone, define the zone’s leak and spill thresholds, and specify the amount of time the IRLDS will take a sample from the zone. All of these functions are performed from the Zones Menu.

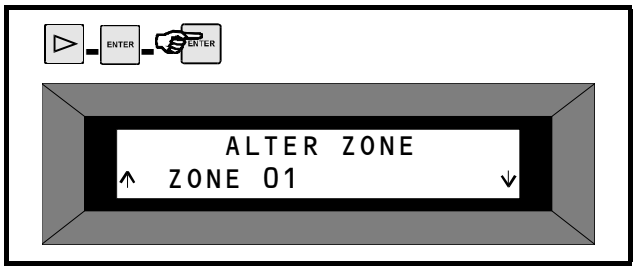
It is important to note that the zone setup process listed below must be repeated for every air intake zone, even if it will not be connected to a zone. By default, the system takes air samples from each intake in 30 second increments. If an intake is not being used, this default value will need to be changed to zero. Change unused zone names to “UNUSED”. When finished, remember to cap unused inlets with the red vinyl caps supplied with the unit.

3.2.2.1. Enter Password



Before the Zones Menu screens may be accessed, the password must be entered. See **Section 3.1.1.,** *Changing/Entering Names and Passwords* for instructions on how to enter.

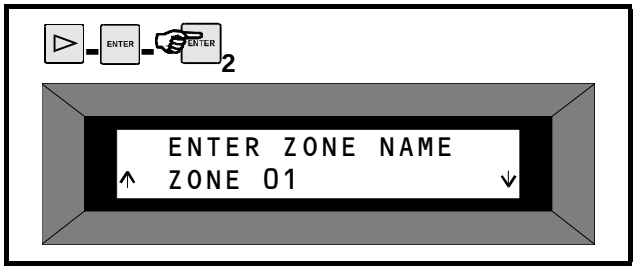
3.2.2.2. Choose a Zone



In this screen, users may select the zone that will be altered. Use the UP and DOWN keys to scroll forward and backward through the list of sixteen zones. When the desired zone is shown on the screen, press ENTER.

By default, all zones are named “ZONE ##,” where ## is the zone number. See **Section 2.5.1.,** *Tubing,* for a definition of zone numbers.

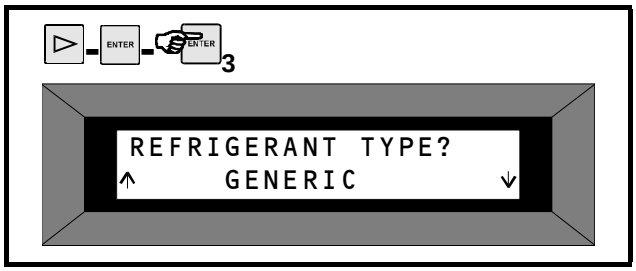
3.2.2.3. Enter Zone Name



To change the name of the selected zone, follow the instructions given in **Section 3.1.1.,** *Changing/Entering Names and Passwords.*

Choose a unique and appropriate name for each zone. Since this name is the key identifier of the leak location during an alarm condition, the name should be as recognizable as possible. The default name is “ZONE ##”, where ## is the zone number of the intake (see **Section 2.5.1.,** *Tubing*, for a definition of zone numbers).

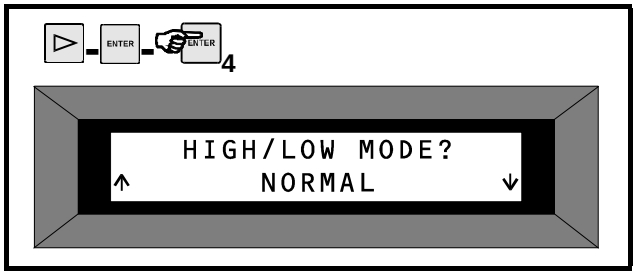
3.2.2.4. Selecting a Refrigerant



Each IRLDS is configured to test the air for up to three kinds of refrigerants, which are specified when ordering. See Table 1-1 on page 1 in the Overview section for types of refrigerant gasses the IRLDS can detect. Each zone may be set up in the system software to look for one of the three refrigerant types, or GENERIC may be chosen if no specific refrigerant is desired.

To select the refrigerant type for the selected zone, scroll through the list of refrigerants using the UP and DOWN arrow keys. When the desired refrigerant type is shown, press ENTER.

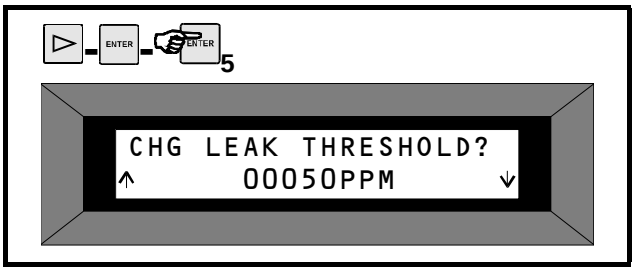
3.2.2.5. Selecting High/Low or Normal Mode



In NORMAL mode, the IRLDS detects refrigerant leaks and spills in a typical refrigeration setting.

The unit should be kept in the NORMAL Mode for normal leak detection applications. The HIGH / LOW setting is for applications where another type of gas must be kept in the atmosphere between a high and low threshold.

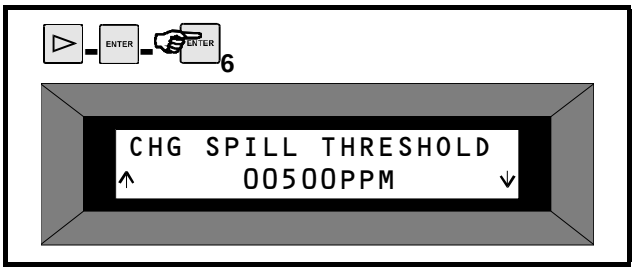
3.2.2.6. Defining Leak Thresholds



When the IRLDS measures a refrigerant concentration, it compares the measured value to the defined leak threshold. If the value is above the leak threshold and below the spill threshold (see **Section 3.2.2.7.**), a leak alarm is generated.

Use the UP and DOWN keys to raise and lower the leak threshold value in 5 ppm increments. The default threshold is 50 ppm. A zone’s leak threshold may never be set greater than its spill threshold (see **Section 3.2.2.7.**). Choosing a leak threshold of zero will disable leak alarms for the zone.

3.2.2.7. Defining Spill Thresholds

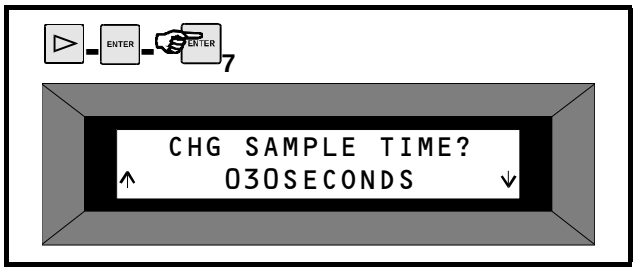


When the IRLDS measures a refrigerant concentration, it compares the measured value to the defined spill threshold. If the value is above the spill threshold, it generates a spill alarm.

Choosing a spill threshold of 0 ppm will prevent both leak and spill alarms from being generated on this zone.

Use the UP and DOWN keys to raise and lower the leak threshold value in 100 ppm increments. The default threshold is 500 ppm.

3.2.2.8. Setting Sample Times



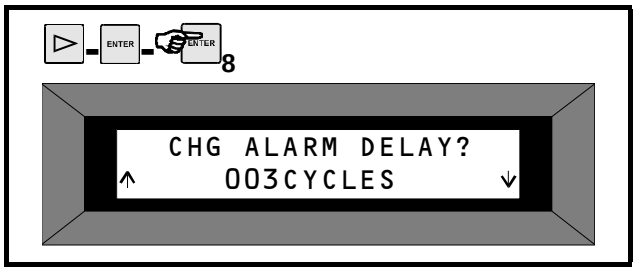
The sample time is the amount of time the IRLDS draws air from a zone during the sampling process. The UP and DOWN arrow keys are used to raise and lower the sample time value in 10 second increments. The number may be set anywhere from 0-990 seconds. The default setting is 30 seconds.

In order for the IRLDS to take an accurate concentration reading, the sampling time must be set up so that the new air has enough time to travel through the tube. Use ***Table 3-1*** to determine the estimated minimum sampling time necessary to obtain an accurate reading.

Tube Length	Minimum Sampling Time
0 feet	10 seconds
50 feet	15 seconds
100 feet	20 seconds
150 feet	25 seconds
200 feet	30 seconds
300 feet	40 seconds
500 feet	60 seconds

Table 3-1 *- Tubing Length vs. Minimum Sample Time*

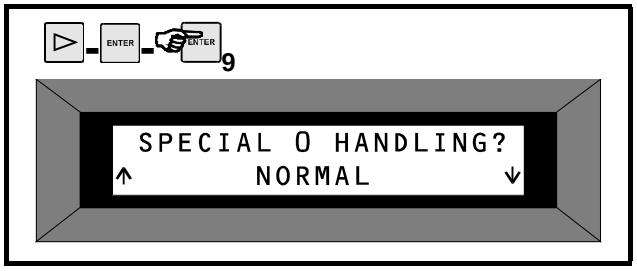
3.2.2.9. Setting the Leak Alarm Delay



After the IRLDS detects a leak condition in a zone, the unit will wait a specified number of cycles before generating an alarm. This is to ensure that the leak alarm was not caused by a single faulty reading. This delay does not apply to spill alarms; when the IRLDS detects a spill, an alarm is generated immediately. **If set to zero, no leak or spill alarms will be generated for that zone.**

The default value for the alarm delay is three cycles. Use the UP and DOWN arrow keys to add or subtract a cycle from the number displayed.

3.2.2.10. Special 0 Handling



This option refers to how each zone is used in the Auto Zero Routine.

In NORMAL mode, after each sampling cycle is complete, the zone that has the lowest concentration level is referred to as “zero.” All the other zones are then referenced to this “zero” in the next sampling cycle.

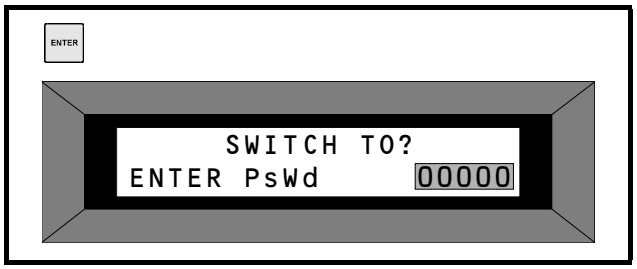
In NO REF mode, the reference zone is ignored (it will not be compared with the other zones). In addition, this zone will never be considered when choosing the zero value for the next cycle. This feature is useful when large concentrations of interfering gas compounds are present,

NO ZERO mode is essentially the same as NORMAL mode, but when selected, that zone will never be considered when choosing the zero value for the next cycle.

3.2.2.11. More Changes

Refer to **Section 3.2.1.7.,** *More Changes*.

3.2.3. Switch To Command

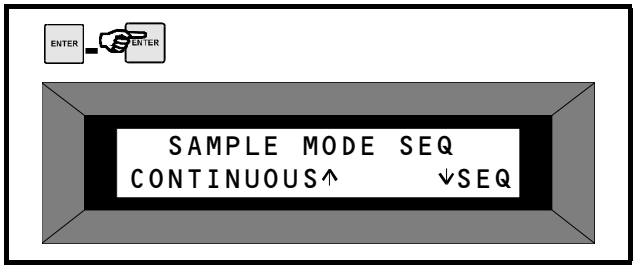


When an immediate zone reading is required, the IRLDS may be commanded to interrupt the normal sam-

pling sequence and take an immediate sample from a specified zone. This command, called the Switch To command, is available from the Monitor Screen by pressing ENTER.

Before the Switch To command may be executed, the IRLDS requires a password. See **Section 3.1.1.,** *Changing/ Entering Names and Passwords*, for directions.

3.2.3.1. Sample Mode



A manual sample may be taken in either of two modes: sequential and continuous.

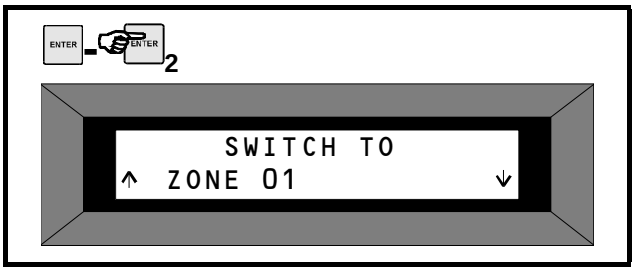
Selecting sequential mode sampling will interrupt the IRLDS's normal sampling cycle and jump straight to a specified zone. The unit will take a sample for the amount of time specified in the Sample Time setting (see **Section 3.2.2.8.**). When finished, the unit will display the measured concentration on the Monitor Screen and will begin sampling from the next zone.

Operating the unit in continuous mode for long periods of time is not recommended. The auto-zeroing function that keeps the unit calibrated is suspended during continuous sampling. Over time, the unit may drift, causing inaccurate readings.

Selecting continuous mode sampling will cause the IRLDS to cease cycling through the zones and take a continuous sample from a specified zone. The unit will continue to monitor the single zone until a user executes the Switch To command again and selects sequential mode sampling.

To select a sampling mode, press UP for continuous or DOWN for sequential.

3.2.3.2. Select Switch To Zone

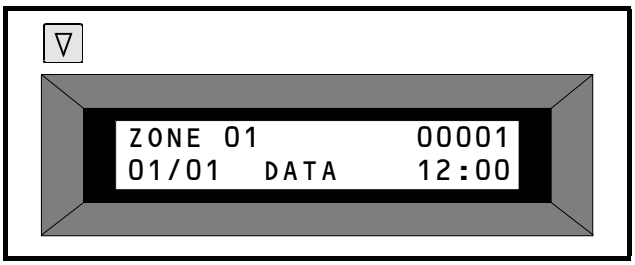


After choosing a sampling mode, choose the zone to be sampled by scrolling through the list of zones with the UP and DOWN arrow keys. When the desired zone is shown, press ENTER.

3.2.3.3. More Changes

Refer to **Section 3.2.1.7.,** *More Changes*.

3.2.4. Data Log



Every ten minutes, the IRLDS records the most recently measured concentration levels of all the zones into the Data Log. The log holds up to 72 hours worth of readings.

To view the Data Log, press the DOWN key from the Monitor Screen. The display will show the Zone 1 reading from the most recent data log. Pressing the LEFT and RIGHT keys will scroll the display through all the zone readings recorded in the most recent log. Pressing the DOWN key will scroll the display through the previous logs in reverse chronological order. Pressing the UP key will scroll the display through the logs in chronological order. ***Figure 3-3*** illustrates the layout of the Data Log entries.

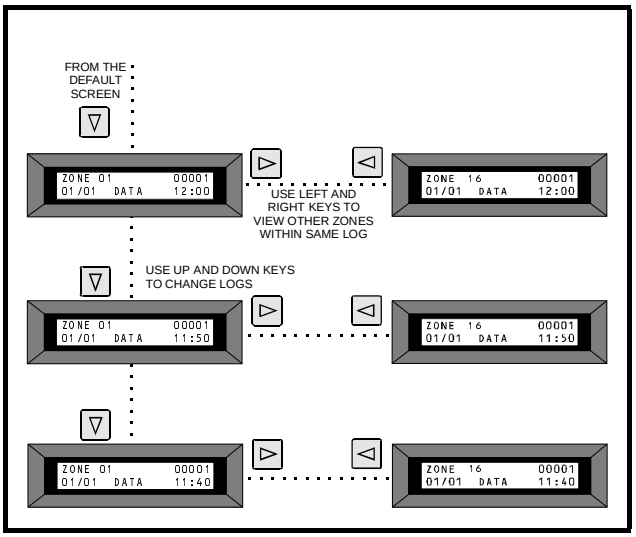
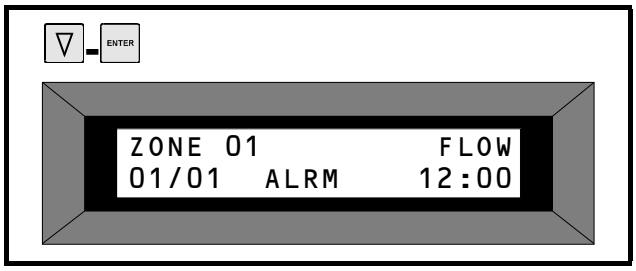


Figure 3-3 *- Illustration of Data Log Entries*

Information in the Data Log is shown in the same format as the Monitor Screen (see **Section 4.2.,** *The Monitor Screen*). Line 1 displays the zone name and the refrigerant concentration (or a line of asterisks, if a flow fault was detected). Line 2 displays the date, the status message, which will read “DATA”, and the time.

3.2.5. Alarm Log



When an alarm occurs, the IRLDS records the zone name, concentration, date, and time into the Alarm Log. The Alarm Log holds up to 20 alarm records.

To view the Alarm Log, press the DOWN key followed by the ENTER key. The display will show the last recorded alarm. Pressing the DOWN key will scroll the display through the previously recorded alarms in reverse chronological order. Pressing the UP key will scroll through the alarms in chronological order.

Information in the Alarm Log is shown in the same format as the Monitor Screen (see **Section 4.2.,** *The Monitor Screen*). Line 1 displays the zone name and the refrigerant concentration (or the word “FLOW” if a flow fault was detected). Line 2 displays the date, the status message, which reads “ALRM”, and the time.

General alarms not particular to a zone (such as power failure alarms) and other system faults particular to a zone are also recorded in the Alarm Log. The name of the alarm appears in Line 1 of the display, and if applicable, the zone number the alarm occurred in. Line 2 shows the date, the status message, which reads “ALRM”, and the time.

3.3. REFLECS Sensor Setup

There are several ways in which the IRLDS may be linked to CPC’s REFLECS line of controllers.

For RMCC software versions 2.1 and above, the specific settings and set points necessary to properly decode the IRLDS output voltages are hard-coded. Users need only set up each zone under Sensor Setup and specify any desired alarm and notice set points (see **Section 3.3.2.,** *Setup for RMCC 2.1*).

RMCC versions below 2.1 and all current versions of BEC and BCU software are not hard-coded to accept IRLDS inputs; more extensive setup is needed to give these controllers the ability to log refrigerant concentration values and to alarm when a leak or fault is detected. To do this, it is necessary to set up two inputs in the REFLECS system software as linear sensors with the same board and point address. One sensor input will be used to read the concentration, and the other to detect a 5V fault signal.

For instance, if Zone 1 was connected to board number 7 and point number 1, one input would need to be set up at 7:1 to read the concentration level, and a second input, also configured at 7:1, would be configured to generate an alarm upon detecting the 5V signal caused by a fault. A 16-valve IRLDS connected to a REFLECS in this manner would require 32 such sensor configurations.

When the REFLECS is set up in this manner, a 5V fault signal is interpreted as both a fault and a high concentration of refrigerant (roughly 1250 ppm). Therefore, when a system fault occurs, the REFLECS will likely generate both a fault alarm and a leak alarm.

Alternately, a REFLECS may be configured to detect alarm conditions by detecting a contact closure on the IRLDS’s status and spill alarm relays. Connecting the status and spill relays to a 16AI and setting up the inputs as

digital sensors would allow the REFLECS to generate status and spill alarms in tandem with the IRLDS. In this configuration, users would have to refer to the IRLDS's alarm log for alarm details (such as the zone where the fault or spill occurred).

The following sections show how to set up a REFLECS controller to read concentration levels and fault status from the IRLDS's analog outputs.

3.3.1. Setup for BEC and RMCC Versions Less Than 2.1

3.3.1.1. Input Definitions

```
INPUT DEFINITIONS                          12:00
 Input      Bd  Pt    Input      Bd  Pt
 SENS01     01  01    SENS02     01  01
 SENS03     00  00    SENS04     00  00
 SENS05     00  00    SENS06     00  00
 SENS07     00  00    SENS08     00  00

↑=PREV  ↓=NEXT  ->=SET-DATA        0=MENU
```

Locate the screens in the BEC or RMCC that are used to define input board and points. This is usually achieved by pressing 7 then 1 from the Main Menu. Press the DOWN ARROW key several times until the SENS01-SENS08 inputs are shown.

The 16AI connected to the IRLDS's output terminals must be set up in the REFLECS's system software. If the instructions in **Section 2.4.4.,** *Connecting the IRLDS to a 16AI*, were followed, the 16AI was given a unique board number by setting the dip switch S3, and the 16AI was wired to the terminals so that each zone number corresponded to a 16AI point number (zone 01 connected to point 01, for example). These board and point addresses must now be entered into the REFLECS.

The screen above shows how the board and point addresses for zone 1 would be set up for a 16AI board numbered 1. Both SENS01 and SENS02 are set up as 01:01 so that SENS01 can monitor concentration and SENS02 can monitor fault status.

Set up the remaining sensors using the instructions given above. For each point on the 16AI, set up two sensors with the same addresses.

3.3.1.2. Sensor Setup

```
SENSOR SETUP                               12:00
 #:01  Status:OFF  Name:REFR LK ZN 01
 Type: Linear
      (T)mp (1)00 (5)00 (R)fLeak (K)Watt
      (H)um (2)00 (D)ig (L)inear L(Q)Lev
      (6)450 Tmp     Dew(P)nt
 Logging Interval (HH:MM:SS):  00:03:00
↑=PREV  ↓=NEXT  ->=SET-DATA        0=MENU
```

Locate the screen in the BEC or RMCC where sensors are set up. This is usually a menu option in the Sensors Menu, which may be reached from the Main Menu.

The 0-4.8V signal is a linear signal representing a measured concentration of 0-1200 ppm, and a voltage of 5.0V indicates a fault. In order for the REFLECS to read these voltages correctly, the REFLECS sensor inputs must be configured as linear sensors.

Name

A name for the sensor input may be entered in the Name field. Since each IRLDS zone is set up with two REFLECS sensor inputs (see **Section 3.3.1.1.,** *Input Definitions*), choose names for each input that distinguish the input's function. For example, the sensor input set up to read leak concentrations on zone 1 should have a name like REFR LK ZN 01, and the input set up to monitor fault status should have a name like FAULT ZN 01.

Type

All sensor inputs connected to an IRLDS should be set up as linear sensors. Enter (L)inear in the Type field.

Logging Interval

The logging interval is the amount of time between log entries in the REFLECS's Data Log.

When choosing a logging interval, keep in mind the amount of time it takes an IRLDS to go through an entire cycle of samplings. For example, a 16-valve IRLDS with 30 second sampling times for each zone takes a total of eight minutes to sample all zones. Choosing a logging interval smaller than the IRLDS's cycle time will simply clutter the REFLECS data log with multiple copies of the same sample.

3.3.1.3. Sensor Setpoints

```
SENSOR SETPOINTS  LINEAR INPUT             12:00
 #:01  Status:OFF  Name:REFR LK ZN 01
 Stay  ON for:000 min    Eng.Unit:PPM
 Using Diff  Of 01     00     00     00
       0     Of 0      0      0      0
 Gain 250          Offset  00000 mv
ON: 0      Dly: 0000  OFF:0       Dly:0000
↑=PREV  ↓=NEXT  ->=SET-DATA        0=MENU
```

Locate the screen in the BEC or RMCC where sensor set points are specified. This is usually a menu option in the

Sensors Menu, which may be reached from the Main Menu.

After the linear sensors have been set up, the REFLECS must be told how to interpret the linear voltage given by the IRLDS.

Eng. Unit

The REFLECS does not require any specific engineering unit to be specified for sensor values. However, for easier reading of status screens and data logs, “PPM” should be entered for sensor inputs that read concentration, and “MV” should be entered for sensor inputs that read fault status.

Gain

Since the output terminals emit one volt for every 250 ppm of refrigerant detected, the gain for the refrigerant leak sensors must be set to 250. The sensors configured to detect faults must be given a gain of 1000; this way, the REFLECS can be set up to alarm whenever it detects a 5000 mV signal

3.3.1.4. Alarm Setpoints

```
SENSOR ALARM SETPOINTS                12:00
 No.:01   Name:REFR LK ZN 01
 Type: Linear        Eng. Unit:  PPM

 Alarms :High 0100  Low NONE    Dly 010m
 Notices:High NONE  Low NONE    Dly 000m

↑=PREV  ↓=NEXT  ->=SET-DATA        0=MENU
```

Locate the screen in the BEC or RMCC where sensor alarm set points are specified. This is usually a menu option in the Sensors Menu, which may be reached from the Main Menu.

The REFLECS should now be capable of interpreting the 0-4.8V output voltage as a refrigerant concentration of 0-1200 ppm and the 5V output voltage as a fault. The desired alarm set points must now be specified. When set up correctly, alarms will appear in the REFLECS Alarm log as “Hi Sensor” alarms (refer to the REFLECS manual for alarm descriptions).

Alarms: High

In this field, specify a high alarm setpoint for refrigerant leak alarms between 0 and 1200 ppm. For fault status alarms, enter a setpoint of 4960 mV (slightly below 5V, as a precautionary measure).

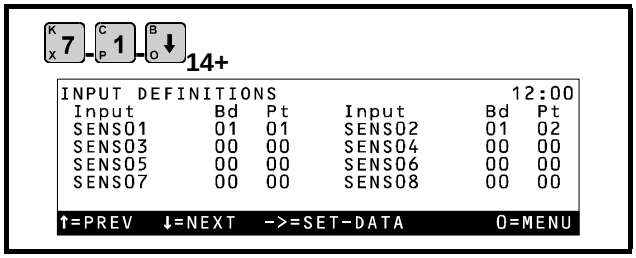
Alarms/Notices Dly

The value entered in the Alarms Dly field is the number of minutes the sensor reading must be above the Alarms:High set point before the REFLECS may generate a leak alarm

When choosing an alarm delay, keep in mind the amount of time it takes an IRLDS to complete a sampling cycle. For example, a 16-valve IRLDS with 30 second sampling times for each zone takes a total of eight minutes to sample all zones. Choosing an alarm delay smaller than the IRLDS’s cycle time will cause an alarm to be generated after only one high reading is taken.

3.3.2. Setup for RMCC 2.1

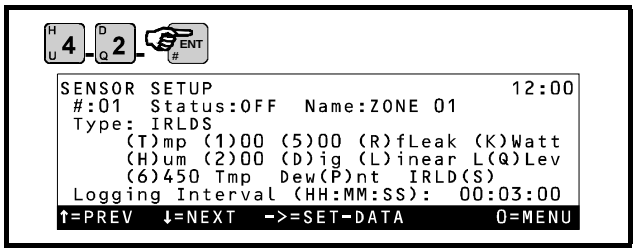
3.3.2.1. Input Definitions



The 16AI connected to the IRLDS’s output terminals must be set up in the RMCC’s system software. If the instructions in **Section 2.4.4.,** *Connecting the IRLDS to a 16AI*, were followed, the 16AI was given a unique board number by setting the dip switch S3, and the 16AI was wired to the terminals so that each zone number corresponded to a 16AI point number (zone 01 connected to point 01, for example). These board and point addresses must now be entered into the RMCC.

For each sensor, enter the board number of the 16AI in the Bd field and enter the point number of the IRLDS zone connection in the Pt field.

3.3.2.2. Sensor Setup



Name

A name for the sensor input may be entered in the Name field.

Type

For each input, choose IRLD(S) from the options in the Type field.

Logging Interval

The logging interval is the amount of time between log entries in the RMCC’s Data Log.

When choosing a logging interval, keep in mind the amount of time it takes an IRLDS to go through an entire cycle of samplings. For example, a 16-valve IRLDS with 30 second sampling times for each zone takes a total of eight minutes to sample all zones. Choosing a logging interval smaller than the IRLDS's cycle time will simply clutter the RMCC data log with multiple copies of the same sample.

3.3.2.3. Alarm Setpoints

```
SENSOR ALARM SETPOINTS                    12:00
 No.:01    Name:ZONE 01
 Type: IRLDS        Eng. Unit:   PPM

 Alarms :High 0100       Delay   010m
 Notices:High NONE       Delay   000m
 Fault Alarm: (ENABLED)
↑=PREV  ↓=NEXT  ->=SET-DATA        0=MENU
```

In the Alarm Setpoints screen, users may enter set points to generate alarms or notices for high concentrations of refrigerant. Also, to generate a fault alarm, the Fault Alarm field must be set to "Enable". When properly set up, leak and spill alarms will appear in the RMCC Alarm log as "Hi Sensor" alarms, and fault alarms will appear as "IRLDS FAULT" alarms. Refer to *P/N 026-1102, RMCC Installation and Operation Manual,* for further information about alarm descriptions.

Alarms: High/Notices: High

In this field, specify a high alarm setpoint for refrigerant leak alarms between 0 and 1200 ppm.

Alarms/Notices Dly

The value entered in the Alarms Dly field is the number of minutes the sensor reading must be above the Alarms:High set point before the RMCC may generate a leak alarm

When choosing an alarm delay, keep in mind the amount of time it takes an IRLDS to complete a sampling cycle. For example, a 16-valve IRLDS with 30 second sampling times for each zone takes a total of eight minutes to sample all zones. Choosing an alarm delay smaller than the IRLDS's cycle time will cause an alarm to be generated after only one high reading is taken.

Fault Alarm

When a fault occurs, the IRLDS sends 1200+ millivolts to the 16AI. When the Fault Alarm field in the RMCC software is set to "ENABLED," the RMCC will alarm when this voltage is detected.

3.4. EINSTEIN Setup

The IRLDS reports concentration data for each zone to the Einstein across the RS485 I/O Network. Configuring an IRLDS to work with an Einstein is simply a matter of defining logging groups and alarm set points for all of the IRLDS's zone inputs.

Note that the leak and spill alarm set points entered through the IRLDS front panel are **not** recognized by the Einstein in any way. These set points are used only for the IRLDS's own alarm purposes (such as controlling the IRLDS alarm relays and the front panel LEDs). You will program an additional set of alarm set points into the Einstein for use in alarm control and logging.

Additionally, the alarm outputs of the IRLDS are **not** recognized by the Einstein. The alarm relay outputs on the IRLDS need not be wired for alarm purposes (yet they still may perform other functions, such as closing valves or turning on a fan).

Navigating Network Status

To include an IRLDS into Einstein:

1. Go into the Actions Menu by pressing F8.
2. Under Global Actions find System Setup and press Y.This is the System Configuration Menu.
3. Press 4 to enter the Network Status / Setup.

Set Number of IRLDSs in System

1. Choose 2 to go into the Connected I/O Boards and Controllers submenu. At this point, the display will show all the devices associated with the controller.
2. Near the bottom of the screen there is a line which states "IRLDS Ctrls" with a number block to the right.
3. Enter the number of IRLDS units for the system.
4. Press the F9 to return to the main screen.

Setting Up Individual Zones

The IRLDS is now recognized by Einstein.The next step is to tell Einstein how many zones of the IRLDS are being used.

1. From the main status screen press F5 (More). This is the Existing Applications menu.
2. Press L. This is the IRLDS Status screen with the inputs listed in a frame. From here press F8 B (Setup).
3. "Num Channels" is the number of zones out of the IRLDS that are being used. Type the number of zones being used.

4. Press F2 (Next Tab) for the Output screen. Enter the name of the channel or zone for each one being used.

5. After each entry press F8 (Actions), then 6 (Generic Alarm Setup).

Alarm Settings

Enter Advisory Method for each zone using the “Next” or “Previous” buttons on the number pad.

1. In most applications, choose “Absolute Levels.”
2. After pressing Enter, the screen will show two columns with information on concentration levels, reporting delays, etc.
3. Move to the “Report Priority” field under the "Alarm Levels" column. In a basic setup, set the priority to 1 to make sure that Einstein reports this alarm.
4. The “Alarm Levels” column is for setting the concentration levels that are to trigger an alarm condition. Fill the fields with concentration values for giving notices and alarming. Enter concentration levels for triggering notices and alarms in the “Occupied Hi” column.
5. Press F10 to return to the output screen and continue to configure all other zones of the IRLDS with the same type of information.

4 Operation

This section provides an overview of the IRLDS's normal functions and instructions showing how to deal with alarms.

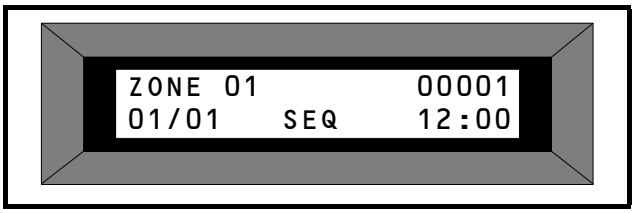
4.1. System Warm-Up Cycle

When the IRLDS is powered up, it undergoes a warm-up cycle, which lasts about five minutes. During this cycle, the IRLDS performs a number of system checks. While the test is being performed, the LCD display will show the date, the word "WARMUP", and the time.

When the warm-up cycle is complete, the IRLDS will begin sampling. After the warm-up cycle, the IRLDS will need 30 to 90 minutes to stabilize before it will begin making accurate readings.

The IRLDS automatically performs a 10-20 second self-test every 24 hours.

4.2. The Monitor Screen



When the IRLDS is operating normally, the Monitor Screen will be displayed. The Monitor Screen is the default screen for the IRLDS's normal operation. Line 1 of the Monitor Screen displays the last zone sampled by the IRLDS and the concentration of the zone (in ppm). Line 2 of the Monitor Screen displays the date, the status message, and the time.

4.2.1. Status Message

Under normal operations, the status message will display either "CON" or "SEQ", designating the mode of sampling being used by the IRLDS. Listed below are the other messages that may be displayed in the status message.

- WARMUP- The IRLDS is currently undergoing a system warm-up cycle.
- LEAK- The IRLDS has detected a leak, but has resumed normal sampling. This message is given as a result of an unacknowledged leak alarm. See **Section 4.3.1.,** *Leak Alarms*, for more information.
- SPILL- The IRLDS has detected a spill, but has resumed normal sampling. This message is given as a result of an unacknowledged flow fault alarm. See **Section 4.3.2.,** *Spill Alarms*, for more information.
- FLOW- The IRLDS has detected low flow in one or more zones, but has resumed normal sampling. This message is given as a result of an unacknowledged flow fault alarm. See **Section 4.3.3.,** *Flow Fault Alarms*, for more information.
- DATA- This signifies that a Data Log entry, not the Monitor Screen, is displayed. See **Section 3.2.4.,** *Data Log*, for more information.
- ALRM- This signifies that an Alarm Log entry, not the Monitor Screen, is displayed. See **Section 3.2.5.,** *Alarm Log*, for more information.
- FAULT- This signifies that a nonfatal system fault has occurred within the IRLDS, and normal sampling has been resumed. An unacknowledged power failure alarm is the most common cause of this fault; see **Section 4.3.4.,** *Power Failures and System Faults*, for more information. Pressing any key will clear the alarm and return the display to normal.

4.3. Alarms

The IRLDS generates alarms whenever leaks, spills, flow faults, or system errors are detected. There are two main types of alarms: fatal alarms and nonfatal alarms.

Fatal Alarms

Fatal alarms occur when major internal software or hardware problems have crippled the IRLDS's ability to function normally. When a fatal alarm occurs, an alarm description appears on the screen, and the IRLDS ceases sampling. A password is required to reset a fatal alarm.

Most fatal alarm warning descriptions give error numbers instead of names. When these errors occur, record the number and contact CPC for more information.

Nonfatal Alarms

Nonfatal alarms include the following:

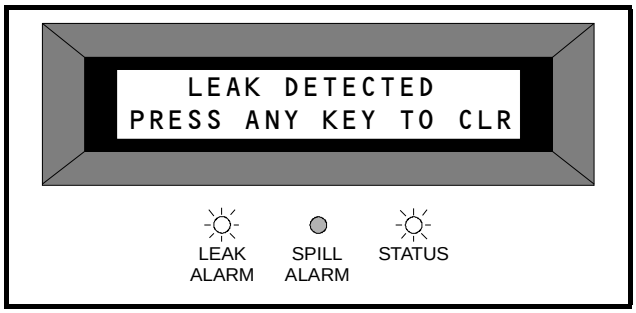
- Leak alarms
- Spill Alarms
- Flow Faults
- System errors that do not affect the IRLDS's ability to sample.

When nonfatal alarms occur, the IRLDS notifies users of the alarm condition and continues to sample normally. The unit will continue to notify users of the error until the alarm is acknowledged. No password is required to clear a nonfatal alarm.

The sole exception to this rule is the spill alarm; when a spill alarm occurs, the IRLDS ceases the normal air sampling sequence and takes a continuous sample from the zone where the spill was detected. A password is required to clear a spill alarm and make the IRLDS resume normal sampling.

When a leak, spill, or flow fault notification is given, it will not be immediately obvious which zone is responsible for causing the alarm. For complete details, users must clear the alarm and then check the Alarm Log. See **Section 3.2.5.,** *Alarm Log*, for more information about viewing alarm log entries.

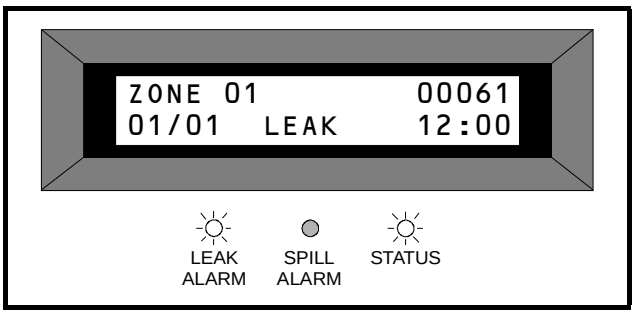
4.3.1. Leak Alarms



When the IRLDS reads a refrigerant concentration higher than the Leak Threshold specified in Section 3.3.3., Defining Leak and Spill Thresholds, it will continue normal operation for the number of cycles specified by the Leak Alarm Delay (see Section 3.3.5., Setting the Leak Alarm Delay). If a leak is still being detected (in the unit's default setting), the IRLDS takes the following actions:

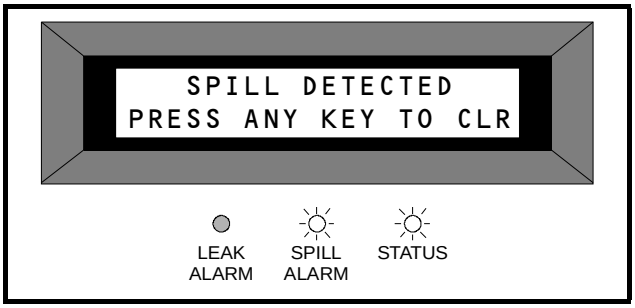
- The LEAK ALARM and STATUS LEDs on the front panel will glow red.
- The status relay will close.
- The IRLDS will record the alarm conditions in the Alarm Log.
- The screen will display "LEAK DETECTED — PRESS ANY KEY TO CLR".
- The IRLDS will resume sampling as normal.

The LEAK ALARM LED, the STATUS LED, and the status relay will remain activated until the alarm is acknowledged and cleared. The display will read "LEAK DETECTED — PRESS ANY KEY TO CLR" every time a leak is detected in the zone. The display will return to the Monitor Screen when sampling other zones; however, the word LEAK will appear as the Monitor Screen's status message until the alarm is acknowledged and cleared (see below).



To acknowledge and clear an alarm, press any key. The Monitor Screen status message will return to normal, the status relay will close, and the LEDs will return to normal.

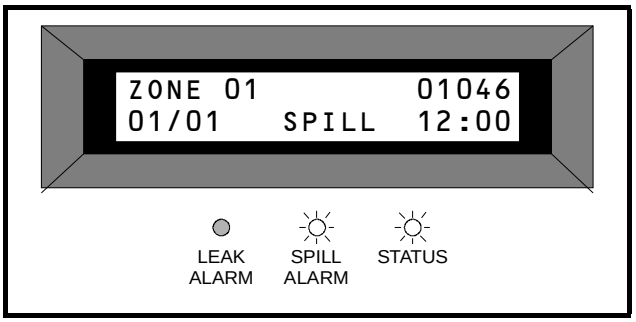
4.3.2. Spill Alarms



When the IRLDS reads a refrigeration concentration in a zone higher than the Spill Threshold specified in Section 3.3.3., Defining Leak and Spill Thresholds, it will immediately (in the unit's default setting) take the following actions:

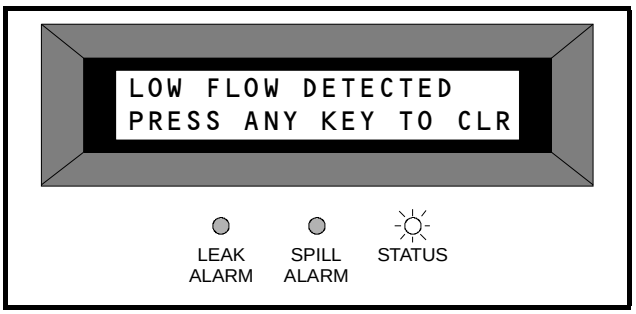
- The SPILL ALARM and STATUS LEDs on the front panel will glow red.
- The spill and status relays will close.
- The IRLDS will record the alarm conditions in the Alarm Log.
- The screen will display "SPILL DETECTED — PRESS ANY KEY TO CLR".
- The IRLDS will resume sampling as normal.

The SPILL ALARM LED, the STATUS LED, the alarm notification on the LCD display, and the spill relay will remain activated until the alarm is acknowledged and cleared. The display will read "SPILL DETECTED — PRESS ANY KEY TO CLR" every time a spill is detected in the zone. The display will return to the Monitor Screen when sampling other zones; however, the word SPILL will appear as the Monitor Screen's status message until the alarm is acknowledged and cleared (see below).



In order to acknowledge and clear a spill alarm, the password must be entered. When the correct password is given, the display will return to the Monitor Screen, the LEDs will return to normal, and the relays will open.

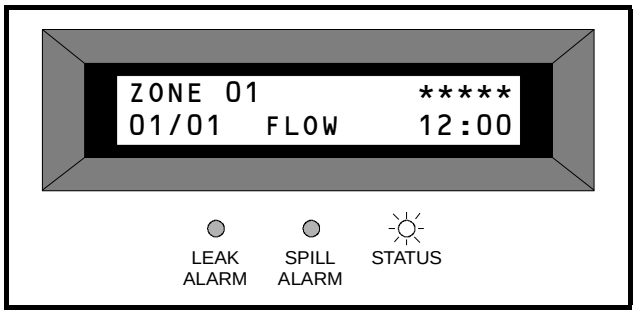
4.3.3. Flow Fault Alarms



When the IRLDS measures low air flow in an air tube, it will immediately take the following actions:

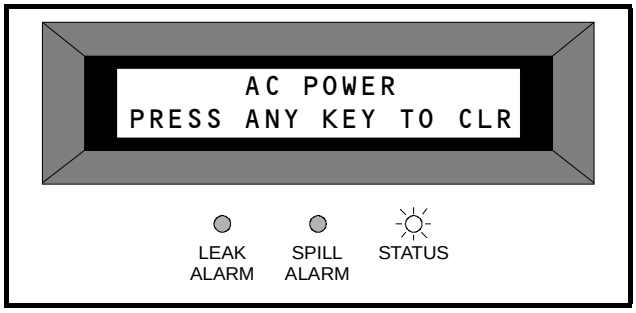
- The STATUS light on the front panel will turn from green to red (if still in the default setting).
- The status relay will close.
- The IRLDS will record the fault alarm data in the Alarm Log.
- The screen will display “LOW FLOW DETECTED — PRESS ANY KEY TO CLR”.
- The IRLDS will resume normal sampling.

The STATUS light will remain red until the alarm is acknowledged and cleared. In the Monitor Screen, the word FLOW will appear as the Monitor Screen’s status message (see below).



To acknowledge and clear the alarm, press any key. The Monitor Screen will return to normal, and the STATUS light will turn from red to green.

4.3.4. Power Failures and System Faults



When the power fails and is restored, or when a fatal or nonfatal system fault occurs, the STATUS light on the front panel will glow red, and the status relay will close. The LCD display will show a description of the alarm.

If the fault is a power failure or a nonfatal fault, the IRLDS undergoes a system warm-up cycle and a self-test, and then begins sequential sampling. If the alarm is not acknowledged and cleared when the IRLDS begins sampling, the display will revert to the Monitor Screen. The status message will read “FAULT”, and the STATUS LED will remain red. To clear the alarm, press any key. The STATUS light will then turn green, and the status message will return to normal.

If the fault is a fatal system fault, the IRLDS will cease sampling and continue to display the alarm message until the alarm is reset by a user. To reset a fatal alarm, press any key and enter the password at the password prompt. The IRLDS will then undergo a warm-up cycle and a self-test, and then begin sequential sampling.

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