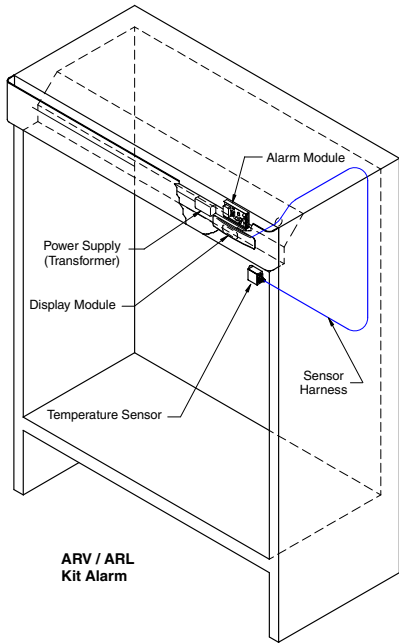


INTRODUCTION

WHAT IS Safe-NET™

Safe-NET is an advanced, electronic system for monitoring or controlling case temperatures in one or more locations. It will help you ensure continuous, reliable refrigeration and safer, fresher foods, 24 hours a day.

The Safe-NET system is composed of sensors, harnesses, control modules, display modules, relay modules and a power supply.



Typical Safe-NET™ Installation

Safe-NET technology provides an ideal system for verifying and maintaining compliance with Federal Department of Agriculture (FDA) and National Sanitation Foundation (NSF) regulations. It uses a standard communication protocol compatible with many third party systems to enable communication with a PC.

Temperature Monitoring

Safe-NET lets you monitor temperatures in up to 10 different areas of each case: discharge air, return air, product temperatures, coil inlet and outlet temperatures, etc. Temperature readings are logged for later review. The system sends an alarm if temperatures exceed predefined limits.

COMPONENTS

All components of the Safe-NET system (displays, sensors, and control modules) are factory installed. A single case-to-case plug-in connector is all that is required for field installation.

Display Module

The display module is a slim four-digit binary coded decimal LED unit which mounts in the case fascia panel. It lets you check temperatures at a glance and performs a variety of other monitoring and control functions via push-buttons or the hand-held controller.

Up to 10 sensors can be connected to each display module.



Typical Safe-NET™ Display Module



Typical Safe-NET™ Sensor Harness



Typical Safe-NET™ Hand-Held Controller



Typical Safe-NET™ Power Supply



Typical Safe-NET™ Relay Module



Typical Safe-NET™ Power Relay

Digital Sensors

Up to 10 digital sensors can be installed in each case with a single cable connection. There are 14 types of sensors. Each sensor has an electronic identifier so it can be recognized by the display module. This eliminates the need for separate wiring. Sensors in each case are harnessed together to a single wire leading to the display module. Sensors are designed for rugged durability. Should a sensor fail, it can be replaced.

Optional Wireless Hand-held Controller and/or PC Control

The wireless controller communicates with the display unit through an infrared sensor. This allows setups and queries which can also be performed via PC over the network.

If the wireless controller is not available, it is possible to program the controller directly with buttons located on the display module.

Solid State Relay Board

A solid state relay board will have multiple (4, 3 or 2) relays.

Real Time Clock

The real time clock (RTC) is an option available to the Safe-NET control. Normally, the clock is manually set upon case startup. If power is lost (for any period of time up to 10 days), the RTC will provide real time to the Safe-NET control upon restoration of power.



Typical Safe-NET™ Real Time Clock

SELF-CONTAINED CASE

Safe-NET components are factory-installed. Once power is supplied to the case as specified in the case's installation and service manual, Safe-NET settings are ready to be selected.

Settings are retained when power is interrupted. Thus, a self-contained case can be moved without re-entering selected settings.

Startup of a new Self-Contained case is quite simple:

1. Verify case type selected.
2. Set the clock.
3. Check or set the temperature set-point.

THREE BUTTON RULES

- Always start by pushing the **SELECT** button, watch what is displayed. Which menu are you in?
— StUP — CLOC — DEFr — tEM — VALv — DiSP — and cycles back to StUP
- Press the **SELECT** button until you are in the proper menu. Once in the proper menu press the **UP** or **DOWN** button to enter the menu and to scroll through the menu.
- Once at the menu item that you want, press the **SELECT** button until the item flashes between the value and the title. You may have to press the **SELECT** button more than once to get the item to flash.
- Then press the **UP** or **DOWN** button to change the item.
- Remember to push the **SELECT** button to save the item. Also remember to set the passcode before any items can be changed.
- Pressing the **UP** or **DOWN** buttons at the same time acts as an escape to go back out of the menus.

Safe-NET™ DISPLAY & ALARM MODULES

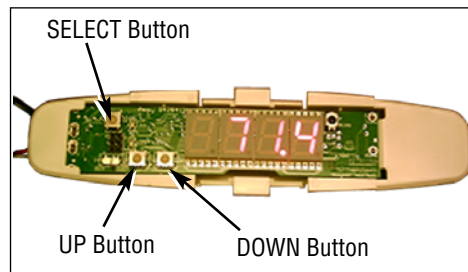
DESCRIPTION

Safe-NET Display Module

The Safe-NET Display Module, shown below, is a temperature-monitoring device. The display module reads and displays temperature sensed by the product simulator temperature sensor mounted in the refrigerated space. The display module notifies the user of alarms based on preset alarm conditions.



Safe-NET Display Module with Top Cover

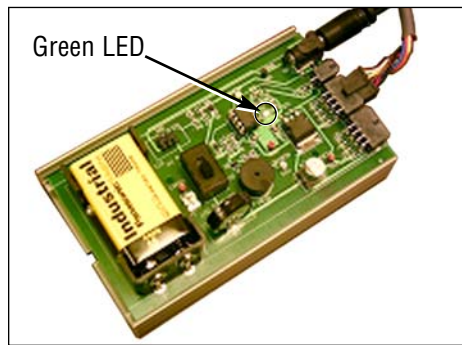


Safe-NET Display Module with Cover Removed

OPERATION

Normal

During normal operating conditions, the product simulator temperature is displayed. The GREEN LED on the alarm module is lighted.



Safe-NET Alarm Module

Product Temperature Alarms

The display module generates an alarm if the product simulator temperature rises above the high alarm set point or drops below the low alarm set point for the preset time duration.

When the display module generates a high temperature alarm, the RED LED on the display module is lighted. Every 12 seconds, PrHi is displayed for 3 seconds; for the remaining time, the product simulator temperature is displayed.

When the display module generates a low temperature alarm, the RED LED on the display module is lighted. Every 12 seconds, PrLo is displayed for 3 seconds; for the remaining time, the product simulator temperature is displayed.

For either alarm, the beeper on the alarm board beeps every 6 seconds.

Power Failure

If external power to the unit is interrupted, the backup battery on the alarm board supplies power to maintain the non-volatile memory in the display module.

To conserve power, the display LEDs are blanked except for a period of 6 seconds every 3 minutes when product temperature is displayed.

Product temperature alarms can be generated during external power loss. The audible alarm is active only for product temperature alarms.

Low Battery

During normal operating conditions, the alarm module monitors battery condition. The display shows bAtt when the battery becomes low on power and the beeper on the alarm board beeps every 2 minutes to indicate a low battery condition. The low battery audible alarm is active only when external power is applied.

Connection Failure

Loss of communication between the display module and the alarm module activates an alarm. When the display module generates a loss of communication alarm, the RED LED on the display module is lighted. Every 12 seconds, A-Er is displayed for 3 seconds; for the remaining time, the product simulator temperature is displayed. The beeper on alarm board beeps every 30 seconds. The A-Er audible alarm is active only when external power is applied.

Precedence of Alarms

Severity of the alarm determines the beeper action. The following table shows the priority of the alarms.

An alarm with higher severity takes precedence over a low severity alarm. For example, if there is a product alarm and low battery alarm:

- The alarm board beeper beeps every 6 seconds to indicate the product temperature alarm.
- Indication of the low battery alarm is ignored by the beeper, but is active in the display.
- Every 12 seconds, the display shows PrHi for 3 seconds followed by bAtt for 3 seconds. For the remaining time, product simulator temperature is displayed.

Alarm	Display Action	Beeper OFF Time (seconds)	Severity
Product HIGH/LOW Alarm	PrHi/PrLo	6	1
Connection Failure	A-Er	30	2
Low Battery	bAtt	120	3

Alarm Set Points

Refer to the manual that came with the specific case or model.

Notes:

- A high temperature alarm typically activates during case startup. This is normal since the refrigerated space requires an extended period to reach operating temperature. Product must not be loaded until operating temperature is reached. Premature stocking may result in product loss.
- Battery backup operation is possible for up to 6 hours. The initial condition of the battery determines the length of time. Operation of Safe-NET is compromised once the battery runs low. Product integrity cannot be ensured until power is restored and the battery is replaced.

MODIFYING SETTINGS

The Safe-NET display module stores alarm set points and alarm delay times for monitoring cases. The suggested default set points may be modified.

Use a flat, narrow tool such as a small screwdriver to remove the cover of the display module.



IMPORTANT!

- Hussmann recommends against changing any parameter value other than those described herein. Modification of any other parameter may result in unpredictable Safe-NET operation.
- The user must monitor each case after altering product alarm set points and/or product alarm time delays to verify proper operation.

There are three visible buttons on the left hand side of the display board, as indicated in Figure 2 on Page 1. Although labels are not clear, buttons can be determined by their location.

The SELECT button is located near the top edge of the display board. It is used to select the menus and to edit the menus.

The UP button is the left button of the two buttons located on the bottom lineup of the display board. The DOWN is the right button of the two buttons located on the bottom lineup of the display board. The UP and DOWN buttons are used to move within and between menus, and to increment or decrement values.

Notes:

- The SELECT button is used to scroll through the following menus:
 StUP — Setup
 CLoC — Clock
 dEFr — Defrost
 tEM — Temperature
 uALu — Valve
 diSP — Display Default
- User must enter valid password to edit parameter settings.
- To edit any menu item, press either the UP or DOWN button to enter the selected menu.
- Use the SELECT button to modify and save the parameter once the UP or DOWN button is pressed.
- The display cycles between menu item and edited menu value once the edited value is entered using the SELECT button, .
- The display returns to showing the product simulator temperature if no button is pressed for 12 seconds once the menu is displayed. User must scroll through the menus using the SELECT button to return to the SETUP menu.
- Holding a button down has the same effect as pressing once.

PASSWORD

Entering the password is done in the SETUP menu. At the top of the SETUP menu, press the UP button. The display will begin to cycle between PASS and 0.

While 0 is being displayed, press the SELECT button to allow editing of the value. With the Safe-NET display module flashing 0, use the UP /DOWN buttons to increment or decrement the value until it reaches 595. 595 is the password value.

Once 595 is displayed, press the SELECT button. The display will revert to cycling between PASS and 595. This enables editing of parameters.

The user may now navigate the menu system and edit parameters as necessary.

Note:

The password protected access remains active for 5 minutes. Each time a new parameter is entered by pressing the ENTER key on the Hand-Held device or the SELECT button on the Safe-NET display module, the 5 minute timer is restarted. After 5 minutes with no parameter entries, the password value reverts to 0 and the password entry process must be performed to regain access to critical parameters. The SETUP menu can be navigated without a valid password in a "view only" mode.

MODIFYING SET POINTS

With the password active and the display reading product temperature, use the SELECT button to scroll through the menus. Once the display reaches the StUP menu, use the UP button until the display shows the parameter to be modified:

- To change the product low alarm set point, press the UP button until the display cycles between PrLo and the current product low alarm set point.
- To change the product high alarm set point, press the UP button until the display cycles between PrHi and the current product high alarm set point.
- To change the product alarm delay, press the UP button until display cycles between P-dL and the current product alarm delay.

Once the desired menu item is displayed, press SELECT button. The display cycles between the corresponding menu item and the VALUE. Press the UP button to increment the value or the DOWN button to decrement the value.

When the entered value begins flashing, press the SELECT button to store the new value. The display cycles between the new value and the menu item. Within 12 seconds after button activation, the display starts showing the product temperature.

ALARMS

A red LED on the board turns on during alarm. The display will show a four-character word for about 3 seconds alternating with a blank display for 9 seconds. Following are details of alarms applicable to self-contained cases.

Alarm with Sensor Number –“SenS”

This alarm is generated when the control is initialized, and indicates that the number of sensors entered in the control is different from the number of sensors connected to the control. This Alarm can be cleared only by changing the reading for number of sensors to 0 and resetting the display module which then updates the reading to the number of sensors connected. This is caused by the control not being set up correctly or by a sensor having failed.

Alarm with Sensor reading –“noSn”

This alarm is generated when the display module is unable to read the sensors for five consecutive seconds. This alarm clears automatically when the control is able to read the sensors. This may be caused by a sensor being disconnected or shorted. This alarm clears automatically when the control is able to read the sensors.

Discharge Air High Alarm –“dSHi”

This alarm is generated when the average discharge air temperature in the case, over the programmed alarm delay time, is higher than the High Alarm value stored in the control. This alarm will clear if the average discharge air temperature goes below the High alarm value.
THIS ALARM IS AVAILABLE ONLY IF DISCHARGE SENSORS ARE INSTALLED.

Discharge Air Low Alarm –“dSLo”

This alarm is generated when the average discharge air temperature in the case, over the programmed alarm delay time, is lower than the Low Alarm value stored in the control. This alarm will reset if the average discharge air temperature goes higher than Low alarm value.
THIS ALARM IS AVAILABLE ONLY IF DISCHARGE SENSORS ARE INSTALLED.

Note: Programmable alarm delay (AdLy) is described in a later section.

Communication Alarm –“CoM”

If there are no network communication attempts for a period of more than 30 minutes, the display module sets a communication alarm and shows it on the display. When the display module itself is controlling rather than (dSPn) a network, the Display Number in setup must be set to “nonE” to prevent alarm generation.

Product High Temperature Alarm –“PrHi”

This alarm will be generated if the product simulator average is above high alarm set-point for product alarm delay time

THE PrHi AND PrLo ALARMS ARE AVAILABLE ONLY IF PRODUCT SENSORS ARE INSTALLED.

Product Low Temperature Alarm –“PrLo”

This alarm will be generated if the product simulator average is below low alarm set-point for product alarm delay time.

Door Open Alarm

This alarm will be generated only if the input of the display is connected to a door switch and the input configuration on the display board is set to “door”. It is generated when the door is kept open for more than 2 minutes and will be cleared when the door is closed.

The display alternates two words “cLoS” and “door” until the door is closed.

Door Open

If the doors are left open for more than 5 minutes even after the alarm, the fans are turned back on.

MENU NAVIGATION OVERVIEW

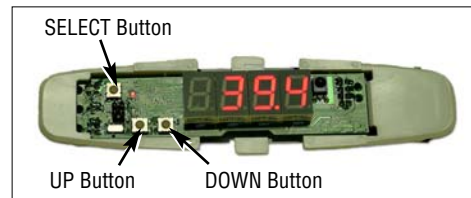
The presentation of the Safe-NET Menu system and associated button and key operation vary somewhat according to the currently displayed menu item and/or action to be performed. Individual menu items, definition of purpose, associated action and keypad/button behavior is described in detail in the following sections.

Some actions and behaviors of the Safe-NET Menu system are consistent throughout. These should be taken into account to avoid confusion when navigating the Safe-NET Menu system.

TIME OUTS

Password

Once the valid ‘595’ PASSWORD has been entered, it will remain active for 5 minutes. A 5 minute timer is restarted each time a new value is confirmed with the SELECT button on the Safe-NET Display module. Re-setting the Safe-NET Display module clears the PASSWORD entry



Safe-NET™ Display Module Button Action

and sets the 5-minute timer to 0. Therefore, if a setting is modified that requires the Safe-NET Display module to be reset and subsequent values require modification, the PASSWORD must be re-entered.

Inactivity

Anytime the display is moved from the default display whether a PASSWORD has been entered or values and settings are simply being viewed and not modified, the display will revert to the default display after 10 seconds. This occurs if no key is pressed on the Hand-Held device or button on the Safe-NET Display module. If a valid PASSWORD has been entered, and the display reverts to the default display due to keypad and/or button activity, the PASSWORD will remain active for the remainder of the aforementioned 5-minute timeout period. To resume modifying values, re-enter the menu of interest while the PASSWORD is active and continue modifying values.

A modified value will revert to its original value if the value has been modified but the SELECT button has not been pressed before simultaneously pressing the UP and DOWN buttons on the Safe-NET Display module.

BUTTON ACTION

This photo identifies the buttons and the corresponding action on the Safe-NET Display Module.

DISPLAY SYMBOL IDENTIFICATION

(A larger version is on Page 8.)

A	L	y
b	M	Not Used z
C	n	1
c	o	2
d	P	3
E	Not Used q	4
F	r	5
G	S	6
Not Used g	t	7
H	U	8
h	v	9
i	W	0
J	Not Used w	-
Not Used k	Not Used x	

TOP LEVEL MENUS

By using the SELECT button on the Safe-NET display module, the seven top-level menus can be sequentially accessed.

The seven top-level menus, submenus, actions and definitions are discussed in detail in the following sections.

SELECT Button Action

The SELECT button on the Safe-NET display module performs two functions as follows:

1. When the 'Default Display' is shown on the Safe-NET display, the SELECT button navigates through the top-level menus in sequence. Each consecutive press of the SELECT button will advance to the next top-level menu.

After initial power-up or following a unit reset, navigation begins at 'dSEt' (set-point), then 'SETUP' and advances in accordance with the pattern outlined below.

If the unit reverts to the default display due to either an inactivity time-out or use of the escape button sequence, pressing the SELECT button will advance to the next top-level menu in sequence as shown above.

Once a top-level menu is displayed, the first sub menu item and its associated value will be displayed after 1 second.

Pressing the SELECT button will move to the next top-level menu in sequence and the submenu/value cycling will repeat for the new top-level menu.

2. After using the SELECT button to navigate to the desired top-level menu, pressing the UP or DOWN button will enter the associated submenu. If no PASSWORD was previously entered, submenu items are view-only. If a valid PASSWORD was entered prior to entering the submenu, editing the submenu items will be allowed as described in the following sections.

After a submenu has been entered with the UP or DOWN buttons, the SELECT button functions as an enter key to select submenu items for modification and to confirm new submenu item values after modification via the UP or DOWN buttons.

After a submenu has been entered using the UP or DOWN buttons, the UP/DOWN buttons become activated to navigate the submenu and to modify submenu item values when the value of interest is selected by pressing the SELECT key.

The SELECT / ENTER button will continue functioning as an ENTER button until a reset occurs, a power up/down sequence occurs, or an escape sequence is executed. Once any of the aforementioned occurs, the SELECT button reverts to its original function of navigating top-level menus.

SETUP MENU

The SETUP menu is used to configure operating parameters of the Safe-NET system. Enter the SETUP menu by pressing the SELECT button on the Safe-NET Display module. Once the SETUP menu is entered, use the UP and DOWN arrows on the Hand-Held device or the UP and DOWN buttons on the Safe-NET Display module to navigate the SETUP sub-menu. The menu navigates in a circular fashion; i.e., when the last menu item is displayed, pressing the DOWN arrow or button will cycle back to the top of the menu. Conversely, pressing the UP arrow or button when the top menu item is displayed will navigate to the bottom of the menu. To exit the menu, simultaneously press the UP and DOWN buttons on the Safe-NET Display module.

When a menu item is displayed, the Safe-NET display will cycle between the menu item and its current value. To edit the value of the currently displayed menu item, with the value displayed, press the SELECT button on the Safe-NET display. The value will begin to flash. Use the UP/DOWN arrows or buttons to increment/decrement the selected value. Once the desired value is displayed (flashing), press the SELECT button on the Safe-NET display to save the value. The Safe-NET display will revert to cycling between the menu item and its new value. The UP/DOWN arrows or buttons can now be used to navigate to any other SET UP menu item to be viewed or modified.

After certain parameter changes are completed, the Safe-NET system must be reset to initiate operation in accordance with the modified parameter(s). This may be accomplished in one of two ways. Either navigate to the RESET sub menu item in the SETUP menu and press the SELECT button on the Safe-NET display, OR cycle power to the Safe-NET system. Parameter changes requiring a RESET are noted accordingly in the detailed parameter descriptions.

PASSWORD PROTECTION

Parameters that are critical to proper equipment performance cannot be modified until a numeric password is entered into the Safe-NET display module. This prevents accidental or malicious changes in the Safe-NET system from occurring.

Entering the password is done in the SETUP menu. At the top of the SETUP menu, press the UP button on the Safe-NET display module. The display will begin to cycle between PASS and 0.

While 0 is being displayed, press the SELECT button on the Safe-NET display module to allow editing of the value. With the Safe-NET display module flashing 0, increment or decrement the value until it reaches 595. 595 is the password value.

Once 595 is displayed, press the SELECT button on the Safe-NET display module. The display will revert to cycling between PASS and 595. This enables editing of critical system parameters.

The user may now navigate the menu system and edit parameters as necessary.

Note:

The password protected access remains active for 5 minutes. Each time a new parameter is entered by pressing the SELECT button on the Safe-NET display module, the 5 minute timer is restarted. After 5 minutes with no parameter entries, the password value reverts to 0 and the password entry process must be performed to regain access to critical parameters. The SETUP menu can be navigated without a valid password in a "view only" mode.

DSET

(FIRST OPTION WHEN THE CASE IS TURNED ON.)

The DSET parameter sets the discharge air set point. This set point is the control point when the Safe-NET system is configured to provide temperature control of the refrigerated fixture. The configurable range of the HIGH and LOW alarm set points is centered around this parameter's settings.

When the Safe-NET system is applied as a temperature monitoring device only, this set point has no effect other than limiting the range of the HIGH and LOW alarm set points.

The display will cycle between DSET and the current set point. While the set point is being displayed, press the SELECT button on the Safe-NET display module to allow editing of the value. When the Safe-NET display module begins flashing the value, use the UP or DOWN arrow keys on the Hand-Held device or the UP /DOWN buttons on the Safe-NET display module to increment or decrement the value to the desired set point.

Once the desired set point is displayed, press the SELECT button on the Safe-NET display module to store the new value to non-volatile (NV) memory. The display will revert to cycling between DSET and the new value.

Note:

The HIGH and LOW alarm settings are limited to +/- 16 deg F from discharge air set point. Setting the discharge air set point will not modify the current alarm settings. They must be set independently to ensure proper alarming.

The discharge air set point has a range of -55 to +170 deg F. Proper performance is not guaranteed outside -40 to +50 deg F.

The Safe-NET system must be RESET for the new value to take effect.

DSET may be selected as the default display item for the Safe-NET display module.

PSEN

The PSEN option enables / disables password protection for the DSET parameter and allows the TOD clock to be set. This may be desirable when employees or service personnel must have the option of changing the operating set point of the refrigerated fixture. While PSEN allows easy modification of the operating set point and TOD clock, no other operational settings can be modified without entering a password.

Setting this parameter is done in the SETUP menu. After navigating to the PSEN sub menu item, the display will cycle between PSEN and the current setting. While the setting is being displayed, press ENTER on the Hand-Held device or press the SELECT button on the Safe-NET display module to allow editing of the value. When the Safe-NET display module begins flashing the value, use the UP or DOWN arrow keys on the Hand-Held device or the UP /DOWN buttons on the Safe-NET display module to step through the selections.

Once the desired setting is displayed, press the SELECT button on the Safe-NET display module to store the new value to NV memory. The display will revert to cycling between PSEN and the new value.

Note:
Factory default is *NO* to disable password protection for *CLOCK* and *DSET*.

CNTN

The CNTN parameter sets the network address of the Safe-NET control module to which Safe-NET display modules, or the master network are connected. **This setting has no effect when the Safe-NET system:**
is applied as a temperature-monitoring device only; or,
does not require the Safe-NET control module; or,
is in a non-networked installation.

DSPN

The DSPN parameter sets the network address of the Safe-NET display module. When the Safe-NET system applied does not require the Safe-NET control module or is in a non-networked installation, this setting has no effect.

NSEN

The NSEN parameter displays the number of temperature sensors attached to the Safe-NET display module. The Safe-NET display module scans the sensor network during each reset cycle to locate and identify the attached sensors. Subsequent to a reset action, the number of sensors detected is displayed here. The number of sensors is stored in NV memory and is continuously compared to the number of responding sensors. In this way failed or additional sensors are detected.

Setting / viewing this parameter is done in the SETUP menu. After navigating to the NSEN sub menu item, the display will cycle between NSEN and the current number of sensors stored in NV memory.

LGHT

This setting assigns one of four possible outputs for control of case lighting.

The Safe-NET system has an optional Relay Board component that when attached, allows the Safe-NET display board to control up to four outputs. The controlled outputs are assigned using the SETUP MENU. The possible controlled output devices are:

- 1) Compressor (CMP)
- 2) Evaporator Fans (FANS)
- 3) Defrost Heaters (DHTR)
- 4) Anti-Sweat Heater (ANTI)

The Safe-NET system, by design, supports four control outputs. Since not all possible controlled items are valid in any given configuration, the Light control output is assigned to an unused output.

Setting this parameter is done in the SETUP menu. After navigating to the LGHT sub menu item, the display will cycle between LGHT and the current setting. While the current value is being displayed, press the SELECT button on the Safe-NET display module to allow editing of the value. When the Safe-NET display module begins flashing the value, use the UP or DOWN arrow keys on the Hand-Held device or the UP /DOWN buttons on the Safe-NET display module to increment or decrement the value to the desired output.

DEGR

The DEGR parameter determines the units in which the Safe-NET display module presents temperature information. The Safe-NET display module is capable of displaying either degrees Fahrenheit or degrees Celsius.

DUTY

The Safe-NET system has an optional Relay Board component that when attached, allows the Safe-NET display board to control up to four outputs. The possible controlled output devices are:

- 5) Compressor (CMP)
- 6) Evaporator Fans (FANS)
- 7) Defrost Heaters (DHTR)
- 8) Anti-Sweat Heater (ANTI)

The DUTY parameter determines the percentage of ON time for control of Anti-Sweat heaters if installed and controlled by the Safe-NET display module. The control period is 100 seconds. A range of 0 to 100 is possible, with 0 = OFF CONTINUOUSLY to 100 = CONTINUOUSLY ON. Adjusting this parameter can improve energy consumption. However, a setting of sufficient ON time is required to prevent condensation from appearing on the fixture frame.

DIFF

The Safe-NET system is capable of controlling temperature inside the refrigerated space of a refrigerated merchandiser. The Safe-NET system can achieve this control in the various ways discussed earlier. When ON/OFF control is selected, the control methodology makes use of a set point and a control band known as a differential (DIFF). For example: with a DIFF setting of 10, and DSET set point of 10 deg F, the ON/OFF control method will attempt to maintain the 10° by cycling the control device ON at temperatures above 10° and OFF at 0°. This temperature control is superceded by a fixed minimum ON time of 3 minutes. Hence lower DIFF settings will result in tighter temperature control but more frequent control device (compressor, valve) cycling. Conversely, higher DIFF settings will reduce control device cycling at the expense of product integrity. Typically, this setting is at user discretion.

FSET

The Safe-NET system is capable of controlling defrost activity and scheduling. When the Safe-NET system is configured to control evaporator fans during defrost, this setting provides a temperature set point to resume evaporator fan operation after defrost cycle termination. This provides a means to delay activation of the evaporator fans until the specified coil temperature is reached. This setting works in conjunction with the FCTL menu option in the DEFROST MENU. If FCTL (Fan Control) is disabled, this setting has no effect.

CTRL

The Safe-NET system is capable of controlling temperature inside the refrigerated space of a refrigerated merchandiser. The Safe-NET system can achieve this control in the various ways discussed earlier.

This parameter selects the temperature input to use in controlling the temperature of the refrigerated space. Alarms and control set points are applied to this temperature input source. Available sources are:

- PrAv • Product Simulator Average
- dSAv • Discharge Air Average
- rtAv • Return Air Average
- tnLo • Coil Temperature

PD-L

The PD-L parameter sets the alarm delay in minutes for the product temperature simulator temperature. In the event that the sensed temperature of the product simulator exceeds the pre-set high temperature alarm setting for the product simulator temperature for a period equal to or greater than the PD-L setting, the alarm is signaled. This is true for low temperature alarms as well. There is only one time delay associated with all product simulator temperature alarms.

PRHI

The PRHI parameter sets the high temperature alarm set point for the product simulator temperature. This set point and associated alarm is valid for the Safe-NET system when applied as a Monitoring or Control system. The configurable range of the HIGH alarm is (control set point) +16 °F.

Note:
A product simulator temperature sensor must be installed in order to enable associated alarm functions.

PRLO

The PRLO parameter sets the low temperature alarm set point for the product simulator temperature. This set point and associated alarm is valid for the Safe-NET system when applied as a Monitoring or Control system. The configurable range of the LOW alarm is (control set point) -16 °F.

Note:
A product simulator temperature sensor must be installed in order to enable associated alarm functions.

ADLY

The ADLY parameter sets the alarm delay in minutes for the discharge air temperature. In the event that the sensed temperature of the product simulator exceeds the pre-set high temperature alarm setting for the discharge air temperature sensor for a period equal to or greater than the ADLY setting, the alarm is signaled. This is true for low temperature alarms as well. There is only one time delay associated with all discharge air temperature alarms.

Note:
One or more Discharge Air temperature sensors must be installed in order to enable associated alarm functions.

HIGH

The HIGH parameter sets the high temperature alarm set point for the discharge air temperature sensor(s). This set point and associated alarm is valid for the Safe-NET system when applied as a Monitoring or Control system. The configurable range of the HIGH alarm (control set point) is +16 °F.

LOW

The LOW parameter sets the low temperature alarm set point for the discharge air sensor(s) temperature. This set point and associated alarm is valid for the Safe-NET system when applied as a Monitoring or Control system. The configurable range of the LOW alarm (control set point) is -16 °F.

INPT

Safe-NET display module is equipped with a general-purpose digital input. Purpose and associated actions of the input are defined in accordance with the needs of the application and/or user requirements. The following input definitions are available:

- **NONE**
Not used.
- **ALAR**
Safe-NET Alarm Module attached. Used to communicate with the Alarm Module.
- **DFRT**
Used to terminate defrost from switch input (bi-metal device; i.e., Klixon).
- **CLEN**
Clean switch. De-Activates refrigeration to the fixture and disables high temperature alarms.
- **DOOR**
Monitors door openings and closings to deactivate evaporator fans and or alarm.
- **DUAL**
Allows for dual temperature operation of cases so equipped.

Note:

Configuring the switch for operation not enabled by hardware will result in erroneous alarms and unpredictable performance.

The Safe-NET system must be RESET for the new value to take effect.

CASE

This menu item allows the user to configure operating parameters based on case type. Selecting the appropriate case type and then performing a RESET on the Safe-NET system loads the default operating parameters into the NV memory.

The Safe-NET menu system can be used to tailor these parameters to meet specific needs. Once modified from the default setting, they will remain active until modified by the user again.

An extra level of security has been added to this modification procedure to further protect the operating parameters from errant modification.

To change the case type:

Navigate to the CASE menu. Press the UP / DOWN buttons on the Safe-NET display module until 'NONE' is displayed. Press the SELECT button on the Safe-NET display module. Again use the UP / DOWN buttons to navigate to the desired case. Press the SELECT button on the Safe-NET display module. Then RESET the Safe-NET display module. On RESET the Safe-NET display module will load the appropriate default settings for the case type selected.

Always go to 'NONE' then case type.

CLOCK MENU

This menu allows the user to set the internal Time-of-Day (TOD) clock. This clock is a 24 hour clock that displays hours in the range of 00 to 23. Minutes are displayed in the range of 00 to 59; i.e., 8:00 A.M. = 08.00 and 8:00 P.M. = 20.00. To set the time, the valid PASSWORD must be entered first. See the section on entering PASSWORD for instructions on how to do this.

Enter the CLOCK menu by pressing the SELECT button on the Safe-NET Display module until CLOC is displayed. Once the CLOCK menu is entered, the display will cycle between CLOC and the current time. While the time is being displayed, press the SELECT button on the Safe-NET display module to edit the time value. The first press of the SELECT button allows editing of the minutes. With the Safe-NET display module flashing the minutes value, use the UP /DOWN buttons on the Safe-NET display module to increment or decrement the minutes to the desired value. Press the SELECT button to store the new minutes value and begin editing the hour value. With the Safe-NET display module flashing the hour value, use the UP /DOWN buttons on the Safe-NET display module to increment or decrement the hour to the desired value.

Once the desired hour is displayed, press the SELECT button on the Safe-NET display module to store the new time. The display will now cycle between CLOC and the new time.

To exit the menu, press the UP and DOWN buttons on the Safe-NET Display module simultaneously.

DEFROST MENU

The DEFROST menu is used to configure defrost type and scheduling for units whose defrost is controlled by the Safe-NET display module. This menu also contains maintenance functions for use in manually controlling defrost for troubleshooting and repair activity.

A relay module properly connected to defrost heaters, solenoids, etc., is required for the defrost cycle control function. **Refer to Safe-NET Technician's Manual, section on Safe-NET wiring, for proper equipment, techniques and safety considerations.**

Note:

Changing these parameters as well as performing maintenance functions requires that a valid PASSWORD be entered first.

DTYP

The Safe-NET system is capable of controlling defrost activity and scheduling. The Safe-NET system is capable of controlling six types of defrost: OffC, DET, Mod, ELE2, GAS, and ELE1.

1. **OffC** (Off-Cycle) — During off-cycle defrost, refrigeration to the fixture is stopped by either cycling off the compressor if so equipped, shutting off the liquid line solenoid valve, shutting off the suction stop solenoid, or closing the EEPR if so equipped. Termination of the defrost cycle can be configured as temperature, time, time/temperature or via a command received from a master device when in a network configuration.

2. **DET** — Defrost terminates when the digital input is high. This requires the digital input of the Safe-NET display module to be connected to the defrost termination temperature activated switch. Defrost will terminate when the coil temperature satisfies the setting of the termination temperature activated switch.

3. **Mod** — Modular defrost is selected to support HUSSMANN medium temperature Impact™ cases with modular coils installed. Each 4 foot section of coil defrosts in sequence up to 28 minutes each hour (overridden by termination temperature if temperature is reached before the timer expires).

4. **ELE2** — ELE2-type defrost will terminate the defrost cycle based on time or termination temperature. The defrost heaters will de-energize but refrigeration will not start until a command is received from a master device. This is done to coordinate restart of refrigeration after all cases in a system have finished their associated defrost cycle.

5. **GAS** — Not Available at this time.

6. **ELE1** — ELE1-type defrost will terminate the defrost cycle based on time or termination temperature. The defrost heaters will de-energize and refrigeration will start simultaneously. This type is for stand-alone operation of low temperature units.

Note:

A relay module properly connected to defrost heaters, solenoids, etc., is required for this control function.

STOP

To prematurely terminate a defrost cycle, navigate to the DEFROST submenu item. The display will show STOP. While STOP is being displayed, press the SELECT button on the Safe-NET display module. This will terminate the defrost cycle and cause the display module to terminate according to the programmed terminate sequence.

START

To initiate a defrost cycle, navigate to the DEFROST submenu item. The display will show STRT. While STRT is being displayed, press the SELECT button on the Safe-NET display module. This will initiate the defrost cycle and cause the display module to initiate a defrost cycle according to the programmed defrost sequence.

FCTL

The Safe-NET system is capable of controlling defrost activity and scheduling. This menu setting determines evaporator fan operation during defrost.

1. Selecting DTCL causes the fans to cycle in conjunction with the defrost termination temperature activated switch. Fan operation is inverted from the switch operation to cause the fans to be off during defrost and on (running) after defrost termination.
2. If NONE is selected, fan control is disabled during defrost.
3. DFON causes the evaporator fans to run throughout the defrost cycle
4. DFOF turns the fans off during defrost. The evaporator fans will resume operation when defrost terminates from time or temperature or after a preset coil temperature is reached. This value is set in the setup (STUP) menu.

Note:

At least one coil temperature sensor must be installed for fan control by coil temperature.

TSET

The Safe-NET system is capable of terminating defrost activity based on evaporator coil temperature, return air, or discharge air. When the Safe-NET system is configured to control defrost, the TSET setting provides a temperature set point at which to terminate a defrost cycle. This setting is only effective when defrost termination is set to TSEN, RAIR or DAIR.

Note:

At least one coil temperature sensor, one discharge air sensor or one return air sensor must be installed, and defrost termination must be set to TSEN for this setting to have an effect.

DURA

The DURA parameter sets the time duration in minutes for defrost cycle operation. This time applies to all types of defrosts and acts as a fail safe time for those defrosts terminated by coil temperature or the temperature activated switch. In the event that the sensed temperature of the coil does not reach the preset termination temperature in the time allotted by this setting, the defrost will terminate and refrigeration will resume in accordance with the applicable settings (fan control, master comm. control, etc.)

TTYF

The Safe-NET system is capable of terminating defrost activity based on evaporator coil temperature (TSEN), return air (RAIR), discharge air (DAIR), time (TIM) or input from a termination temperature activated switch (DIGI). When the Safe-NET system is configured to control defrost, this setting determines which input parameter is used to terminate a defrost cycle. The DURA setting is always enabled as a fail-safe defrost duration time in the event a selected termination input fails. If the failure is such that defrost termination would occur immediately, a 10- minute guaranteed defrost cycle duration is employed.

Note:

The sensed input selected for defrost termination must be installed and defrost termination set to TSEN for this feature to operate.

STAR

The STAR parameter sets the time of day for the first defrost cycle and works in conjunction with the NDEF parameter discussed below. This time setting is for the initial defrost in a 24-hour period. The NDEF (number of defrosts) determines the number of defrosts that will occur in a 24-hour period beginning with the STAR (first defrost) parameter. The maximum number of defrosts allowed in a 24 hour period is 8. The defrost cycles are spaced evenly across the 24- hour period beginning with the STAR time. The formula for calculating defrost start times is as follows:

- Defrost interval = 24/NDEF
- First defrost cycle start time = STAR
- Second start time = STAR + Interval
- Third start time = STAR + 2 X Interval
- ~
- Eighth start time = STAR + 7 X Interval

For example, with a STAR value of 01:00 and an NDEF setting of 4 the defrost cycle start times are:

- 1:00 A.M.
- 7:00 A.M.
- 1:00 P.M.
- 7:00 P.M.

This scheme applies to all types of defrosts.

NDEF

The NDEF parameter sets the number of defrost cycles in a 24-hour period. This number works in conjunction with the STAR parameter discussed above. The NDEF (number of defrosts) determines the number of defrosts that occur in a 24-hour period beginning with the STAR (first defrost) parameter. The maximum number of defrosts allowed in a 24 hour period is 8. The defrost cycles are spaced evenly across the 24- hour period beginning with the STAR time. The formula for calculating defrost start times is as follows:

- Defrost interval = 24/NDEF
- First defrost cycle start time = STAR
- Second start time = STAR + Interval
- Third start time = STAR + 2 X Interval
- ~
- Eighth start time = STAR + 7 X Interval

For example, with a STAR value of 01:00 and an NDEF setting of 4, the defrost cycle start times are:

- 1:00 A.M.
- 7:00 A.M.
- 1:00 P.M.
- 7:00 P.M.

This scheme applies to all types of defrosts.

TEMPS MENU

The TEMPS menu is used to display the individual temperatures, pressures, voltages, current or power factor of connected individual sensors. The following list shows the order in which the values would be displayed if all possible sensors were connected. However, the Safe-NET display module allows only 10 (ten) of the sensors to be connected simultaneously. At this time, there is no known application where all 10 sensors or all available sensors would be applied.

The order in which the temps are displayed is dependent upon which sensing devices are installed, as represented to the right. Missing or non-connected sensors will not appear in the designated sequence.

Average temperatures are available to view so long as the associated sensing devices are attached.

- DSAV= Discharge Air Average
- RTAV=Return Air Average
- PDAV=Product Average
- T-LO=Lowest Termination Sensor Reading
- ILET=Evaporator Inlet
- OLET=Evaporator Outlet
- TSNL=Left Termination Sensor
- TSNC=Center Termination Sensor
- TSNR=Right Termination Sensor
- DACL= Discharge Air Left
- DACC=Discharge Air Center
- DSCR=Discharge Air Right
- RETR= Return Air Right
- RETC=Return Air Center
- RETL= Return Air Left
- PRDR=Product Right
- PRDC=Product Center
- PRDL=Product Left
- ANTI=Anti-sweat Heater temp
- PRES-LO=0-200 PSI
- TEMP-LO=0-200PSI liquid temp
- PRES-HI=0-500 PSI
- TEMP-HI=0-500 PSI liquid temp
- Controlled load Volts
- Controlled load Amps
- Controlled Load Power factor

VALVE MENU

The Valve menu is used to configure temperature control output type and operational parameters for units whose temperature controlling device (compressor, VSD, liquid solenoid, suction stop solenoid, EEXP, EEPR) is controlled by the Safe-NET display module. This menu also contains maintenance functions to allow manual control of a temperature controlling device for troubleshooting and repair activity.

A relay module properly connected to the compressor contactor, solenoids, etc., is required for temperature regulating device control functions. Refer to *Safe-NET Technician's Manual*, section on Safe-NET wiring, for proper equipment, techniques and safety considerations.

Note:

Changing these parameters (as well as performing maintenance functions) requires that a valid PASSWORD be entered first.

DSVR

The Safe-NET display module software version. The value is not user changeable so a PASSWORD isn't needed.

DHVR

Safe-NET display module hardware version. The value is not user changeable so a PASSWORD isn't needed.

CLAV

CSVF

CHVR

C-OF

V-OF

NORL

CLOSE

OPEN

SREF

Not applicable for self-contained units.

VTYP

This menu item defines the temperature control method applied. This can consist of electronic evaporator pressure regulating valves, electronic expansion valves, on/off control of fixed speed compressors, variable speed drive control of VSD driven compressors, PWM control of liquid line solenoids and /or suction stop solenoids.

Depending on the temperature control strategy employed, a relay module properly connected to the compressor contactor, solenoids, etc., and /or a Safe-NET control module is required for temperature regulating device control functions. Refer to *Safe-NET Technician's Manual*, section on Safe-NET wiring for proper equipment, techniques and safety considerations.

0-10

CD-16

CD-09

CD-08

ES-20

ES-12

VPOS

Not applicable for self-contained units.

NONE

No valve or other temperature control mechanism attached. Safe-NET used for monitoring purposes only.

CSELF

Safe-NET display module performing ON/OFF control independent of a Safe-NET control module, but operating under a control module for defrost coordination. Such applications could include walk-in coolers with multiple evaporators.

SELF

Safe-NET display module performing ON/OFF control independent of a Safe-NET control module. The Safe-NET display module can exist on a network as a sole entity receiving command from a master device. It controls all functions of the fixture if so equipped (defrost, lighting, dual-temperature operation, temperature control, alarming, etc.)

OnOff

Safe-NET display module acting as user I/O for a Safe-NET control module. The Safe- NET display module performs the on/off control and schedules defrost, case lighting, and evaporator fan control through the Safe-NET display module control outputs.

DISPLAY DEFAULT

The Safe-NET Display module can be configured to display one of seven values continuously when not in an alarm condition or being navigated via the Hand-Held Device or the module buttons.

The possible selections are:

- 1) Discharge Air Temperature Average
(the average of multiple sensors)
- 2) Discharge Air Set Point
- 3) Average Discharge Air from a Control Module, if so equipped.
- 4) Product Sensor
(the lowest temperature if multiple sensors are attached)
- 5) Return Air Temperature Average
(the average of multiple sensors)
- 6) Product Simulator Temperature Average
(the average of multiple sensors)
- 7) Time-of-Day Clock

To select this item for modification, press the SELECT button on the Safe-NET display module. The display will cycle between DISP and the current setting. While the setting is being displayed, press SELECT button on the Safe-NET display module to allow editing of the value. When the Safe-NET display module begins flashing the value, use the UP or DOWN buttons on the Safe-NET display module to change the setting.

Once the desired setting is displayed, press the SELECT button on the Safe-NET display module to store the new value to NV memory. The display will revert to cycling between DISP and the new value.






































Note:

One or more sensors of the type selected must be installed to support the selection.

Alarm Module (OPTIONAL)

The alarm module is an additional feature to Safe-NET. The alarm module supplies power to the display module via an 8-wire cable. The alarm module provides battery back up power to the display module during loss of A.C. power. The display module communicates with the alarm module via a 2-wire cable. Additionally, the alarm module is equipped with a beeper to provide audible notification of alarms.

DISPLAY SYMBOL IDENTIFICATION

 A	 L	 y
 b	  M	Not Used z
 C	 n	 1
 c	 o	 2
 d	 P	 3
 E	Not Used q	 4
 F	 r	 5
 G	 S	 6
Not Used g	 t	 7
 H	 U	 8
 h	 v	 9
 i	  W	 0
 J	Not Used w	 —
Not Used k	Not Used x	

Detailed technical information is available in the *Safe-NET Technician's Manual* (Hussmann part number 0461391A), at http://www.hussmann.com/docs/inst_manuals/other/0461391A_SafeNET.pdf