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FAX

To:	Wesley	FAX#:	866-837-7623
With:	Hussmann	Date:	March 10, 2008
From:	Ken Sampson	Total Pages:	27
Re:	Defrost Control		

Wesley,

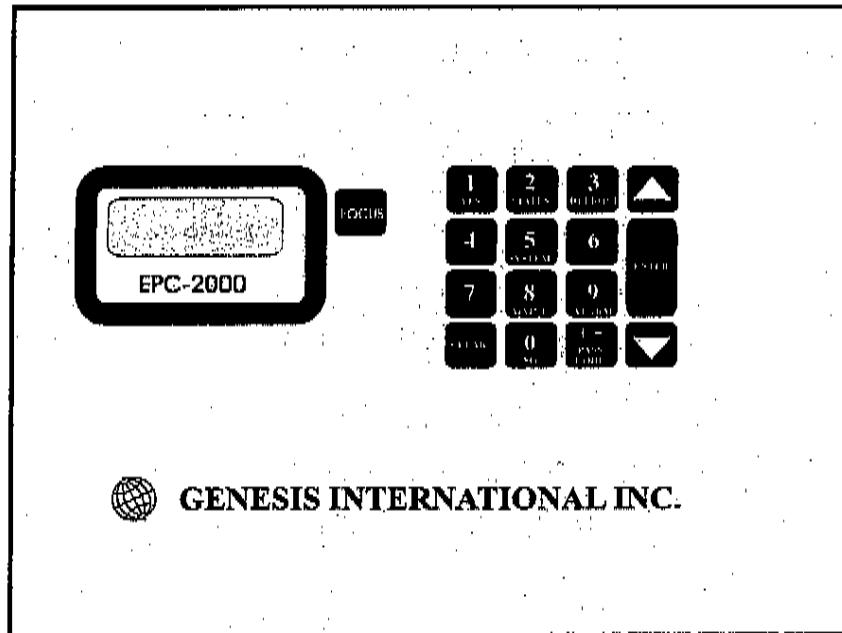
Here is the manual.

If you have any questions, please feel free to contact me at (636) 282-0011 or use my email address KenSampson@Genesis-International.com.

Thank you,

Ken Sampson
Sales Engineer

FAIL-SAFE DEFROST CONTROL



EPC 2000 CONTROL

FAIL-SAFE DEFROST CONTROL

Installation Instructions

PART #44-0079

- FAIL-SAFE DESIGN TO ASSURE THAT DEFROST WILL ALWAYS OPERATE A MAXIMUM OF 32 CIRCUITS
- OFF TIME, GAS AND ELECTRIC DEFROST WITH TEMPERATURE
- TERMINATION HIGH TEMPERATURE CASE ALARM
- BUILT IN GAS DEFROST RELAY
- REMOTE COMMUNICATION THROUGH GENCOM SOFTWARE

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INTRODUCTION EPC-2000 DEFROST CONTROL

INTRODUCTION

GENERAL

This instruction is to be used as an addendum to the EPC-2000 Installation Instruction for Super Plus (P/N 334495). The items contained here are additions to the basic EPC-2000 controller.

Hussmann, in an effort to provide its customers with the most advanced compressor system controller in the industry, offers defrost control options for the EPC-2000. The EPC-2000 defrost control is expandable up to 32 defrost control circuits. The actual control circuit is contained in a 'defrost module'. Each module contains eight defrost control circuit which allows for expandability up to four modules, or 32 defrost circuits.

The EPC-2000 offers an industry first in defrost control with a 'patented defrost fail-safe system'. The 'fail-safe' system is contained in each defrost module. Each defrost module monitors defrost information from the EPC-2000 and keeps a record of the data in battery backed memory. Should the defrost module lose communications with the EPC-2000, for whatever reason, the module will continue to provide the customer with the same defrost initiation and termination patterns that were present over the previous twenty-four hours. The 'fail safe' backup system, an industry first, further distinguishes Hussmann's mark of excellence.

COMPONENTS

There are two versions of the defrost module: a relay version (used on 208 volt systems) and a fiber optic version (used on the Fibertronic Racks). Based upon which system you have the following components (along with their part numbers) are necessary.

208 Volt System:

Relay Version Defrost Module	0365100
Primary Communication Cable	0365101
Transformer Assembly	0365102
(Power Cable)	
EPC-2000 Adaptor Board	0365103
Secondary Communication Cable	0365104
Secondary Power Cable	0365105

Fibertronic Rack

Fiber Optic Version Module	0365106
Primary Communication Cable	0365101
Transformer Assembly	0365102
(Power Cable)	
Secondary Communication Cable	0365104
Secondary Power Cable	0365105

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Relay Version Defrost Module

The relay version defrost module, used on Hussmann's 208 Volt systems, is shown in Figure 1-1.

The relay version module incorporates a ninth relay, in addition to the eight defrost control circuit relays, which is used to energize a gas solenoid valve for gas defrost systems. The relay version module eliminates additional wiring required for gas defrost systems by automatically energizing the gas solenoid valve. This automatic action is accomplished by selecting the dip switch shown in Figure 1-x to the 'ON' position if its corresponding relay is on a gas defrost circuit.

For each defrost circuit contained on a relay version module, there is a corresponding input pin for high temperature defrost termination. Typically, temperature activated switches are located on a particular display case for that defrost circuit. Once the temperature exceeds the switches setpoint, it will close sending a signal back the defrost module which then passes the signal on to the EPC-2000 where the defrost is terminated.

Fiber Optic Version Defrost Module

The fiber optic version defrost module shown in Figure 1-2 is used on Hussmann's Fibertronic systems. With this arrangement, the relay logic for energizing solenoids for a defrost are still contained in Hussmann's Defrost Branch Boards (P/N 340555). The defrost signal is sent from the EPC-2000 to the Fiber module, which records the data for fail-safe backup before sending the signal on to the Defrost Branch Board.

Energizing the gas solenoid valve for gas defrosts, when using the Fiber version modules, is performed on the Defrost Branch Board. Refer to the Superplus Fibertronic Installation Manual (P/N 340272) for setting the Defrost Branch Board with gas defrosts.

Temperature terminated defrosts as an option to the customer is still provided when using the Fiber version module. The termination input is located on the Defrost Branch Board, whereas with the relay version module the input was located on the defrost module.

Commonalities between the Relay and Fiber version modules

Each defrost module incorporates a status light to show a normal operating condition or that it is in 'fail-safe' backup. A light that is on constantly indicates a normal mode. If the light is blinking on and off at a one second interval, the module is in backup. If the light is blinking on and off at an approximately four second interval, there is no backup or communications with the EPC-2000, and consequently no defrost control (refer to troubleshooting checklist). In addition to the status light, there are indicator lights for each defrost circuit to show whether that circuit is in defrost (light on) or that it is in refrigeration (light off).

Each module contains a four pin dip switch for setting the module's address. When more than one module is connected to the EPC-2000, each module must have its own address so that the EPC-2000 can distinguish between the modules.

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EPC-2000 DEFROST CONTROL

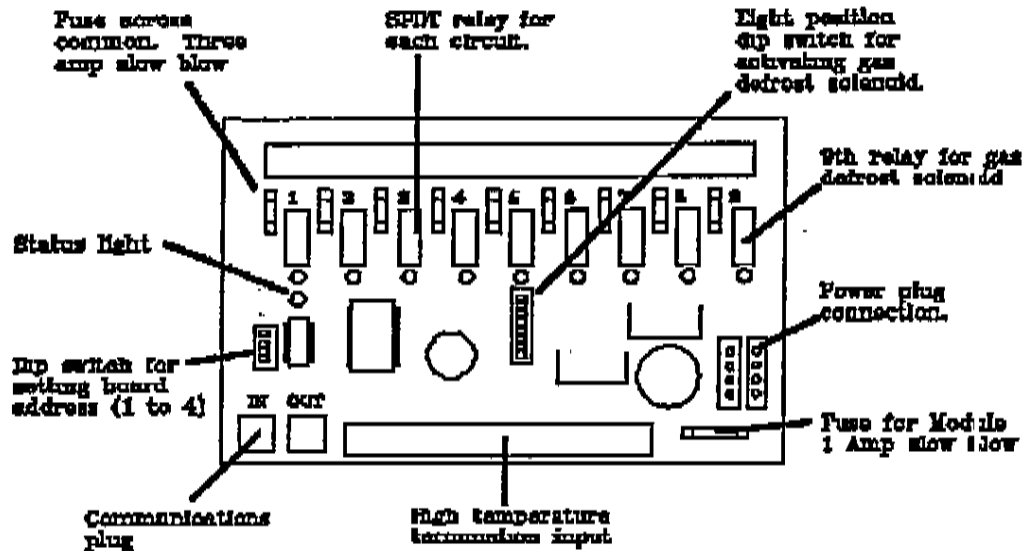


Figure 1-1. Relay Defrost Module.

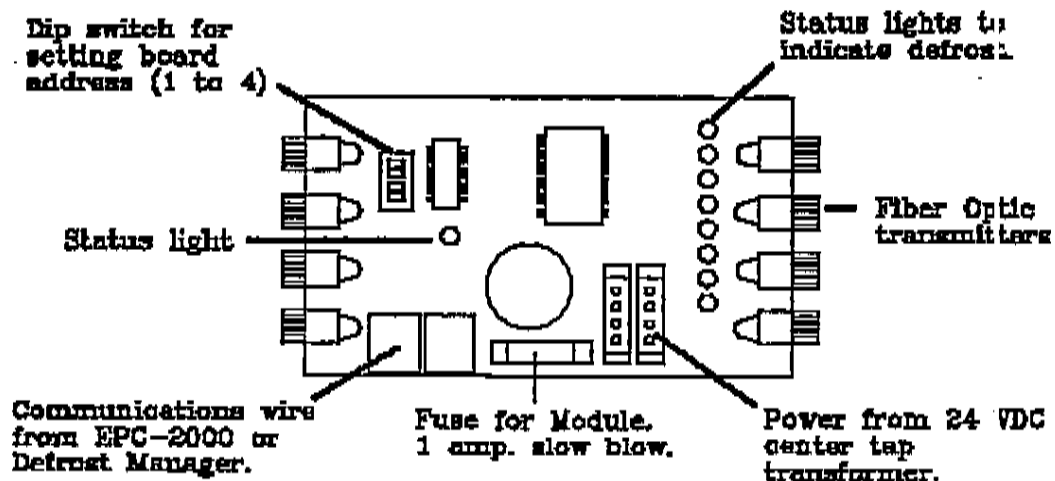


Figure 1-2. Fiber Optic Defrost Module.

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Primary Communication Cable

The Primary Communication Cable (Figure 1-3) is used to connect the first defrost module to the EPC-2000. The cable consists of a four conductor phone cable six feet in length. Each end of the cable is terminated with a six pin RJ11 phone connector.



Figure 1-3. Primary Communication Cable

Transformer Assembly

The transformer assembly is used to supply power to the defrost modules. The assembly consists of a 24 volt center-tap transformer and a power cable. The transformer has the capacity of supplying voltage for up to four defrost modules. The power cable plugs into the defrost module as shown in Figure 1-1 and 1-2.

Figure 1-4. Transformer Assembly

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EPC-2000 DEFROST CONTROL**Secondary Communication Cable**

When more than one defrost module is used, the secondary communication cable is used to chain each module together. As shown in Figure's 1-1 and 1-2, there are two communication plugs on each module. One plug is defined as "IN" and the other plug is defined as "OUT". The primary cable from the EPC-2000 is connected to the "IN" plug. The secondary cable is connected to the "OUT" plug of the first module and to the "IN" plug on the following module. The secondary cable differs from the primary communication cable in that the length is approximately six inches.



Figure 1-4. Secondary Communication Cable

Secondary Power Cable

The secondary power cable is used to supply power from the first defrost module to additional modules. The power cable is approximately twelve inches in length.

Figure 1-5. Secondary Power Cable

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EPC-2000 DEFROST CONTROL

EPC-2000 Adaptor Board

The adaptor board (see Figure 1-6) is used with the defrost control to interface the defrost modules to the EPC-2000. The primary communication cable (Figure 1-3) connects to the adaptor board through the RJ11 phone plug. There is a two pin dip switch located on the adaptor board which is set according to the number of defrost modules installed. See page X-X for setting dip switch.

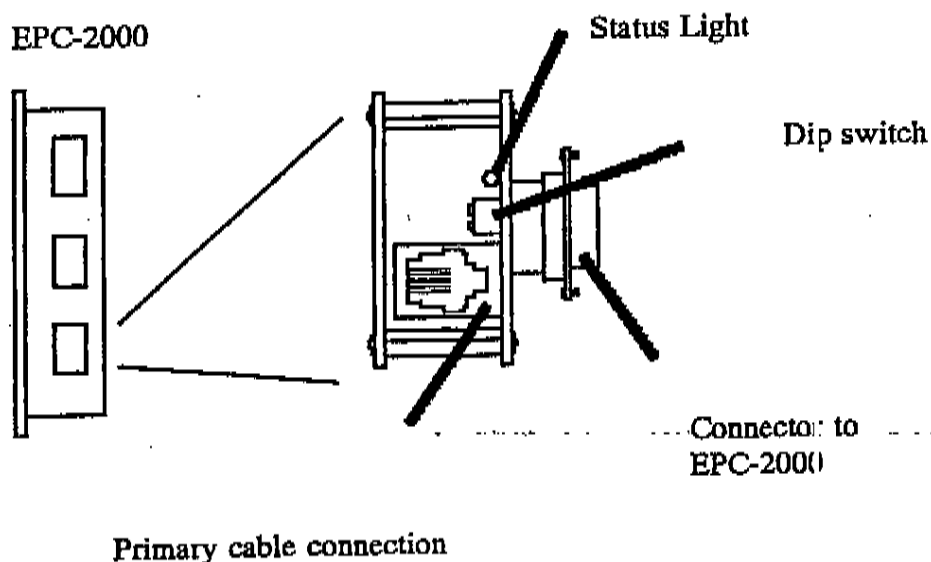
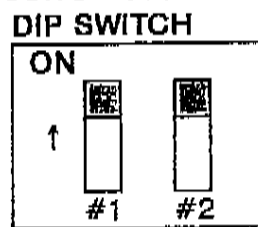
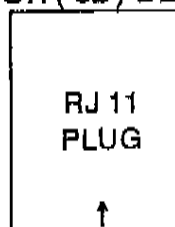


Figure 1-6. Adaptor Board.

DIP SWITCH SETTINGS FOR THE # OF DEFROST BOARDS IN OPERATION

	DIP SWITCH #	#1	#2
1. BOARD FOR (8) DEFROST CIRCUITS		ON	ON
2. BOARDS FOR (16) DEFROST CIRCUITS		OFF	ON
3. BOARDS FOR (24) DEFROST CIRCUITS		ON	OFF
4. BOARDS FOR (32) DEFROST CIRCUITS		OFF	OFF



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INSTALLATION
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INSTALLATION

GENERAL

This section will cover the factory installed defrost modules on the Super Plus Systems. The relay version defrost module can only be used on non-Fibertronic racks. Conversely, the fiber optic defrost module can only be used on Fibertronic racks.

FACTORY INSTALLED DEFROST MODULES

The EPC-2000 and its transformer are located on the left-hand door of the Super Plus System. The Adaptor Board is already installed on the EPC-2000. The defrost module(s) (relay or fiber optic version) and its transformer are mounted inside the panel directly behind the EPC-2000.

The primary cable has been installed to connect the EPC-2000 and defrost module(s) together. If more than one defrost module is installed in the rack, the secondary communication cables and power cable are also installed. The defrost module(s) board address is preset when it comes from the factory.

EPC-2000 and Defrost Module Transformer

Both transformers are a multi-tap transformer. The 120 V primary connections are connected to terminals X1C (through fuse F10) and X21 in the control panel. The unused 208 and 240 V primary wires have been insulated.

NOTE: The bare ground wire is connected to the panel liner to provide the maximum protection against electrical noise

Fiber Optic Version Defrost Module

The fiber optic transmitters on the module are connected to the branch circuit boards through special fiber optic cable, MITSUBISHI SHV-4001. The insulation jacket of the fiber optic cable should be stripped back 1/8 inch to expose the clear plastic core.

CAUTION: The end of the plastic core should have a clean-cut look. It should not be crushed or squeezed at the end

To install the fiber cable, loosen the plastic screw collar on the module to insert the fiber cable. The plastic screw collar should be tight to hold the cable firmly in the optical transmitter.

For proper wiring and configuration of the defrost circuit board, refer to the installation guide for the Fibertronic Defrost Clock, P/N 0340837.

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Relay Version Defrost Module

There are three areas of concern for wiring the relay version modules:

- (1) Connections to the SPDT relay for each defrost circuit.
- (2) Connections to the 9th relay for gas defrost circuits.
- (3) Connections when high temperature termination of defrost is used.

To define these connections, we will concentrate on two commonly used wiring schematics which employ a gas defrost circuit and an offtime defrost circuit. In both examples, the defrost termination thermostat input wired across the terminals shown in Figure 1-1. The defrost module anticipates a temperature activated switch located in the display case which closes when the temperature level has been exceeded.

Gas Defrost Circuits

Figure 2-1 shows a typical gas defrost circuit which incorporates an EPR solenoid for use during the refrigeration cycle. The EPR solenoid (ES) is energized off of the normally closed set of contacts from the defrost module relay. During defrost, the ES is denergized and the normally open set of contacts closes to energize the Koolgas solenoid (KG). The ES solenoid closes the suction line to the Suction Manifold and the KG koolgas solenoid opens the Koolgas line to the Evaporator. Koolgas vapor flows backward through the evaporator, giving up heat to the Evaporator for defrost.

The ninth relay on the defrost module is used to energize the Koolgas Relay (KR). The KR energizes the main liquid line solenoid which creates a pressure differential to allow the Koolgas vapor to flow backward through the evaporator. All gas defrost circuits must energize the KR relay. The eight position dip switch located on the defrost module automatically energizes the ninth relay when a gas defrost is started. The wiring of the KR relay to the ninth relay is factory installed.

Offtime Defrost Circuits

When offtime or electric defrost circuits are used, the ninth relay is not needed. Figure 2-2 shows a typical electric defrost circuit which activates a defrost contactor when entering defrost. (this contactor would control an electric heater).

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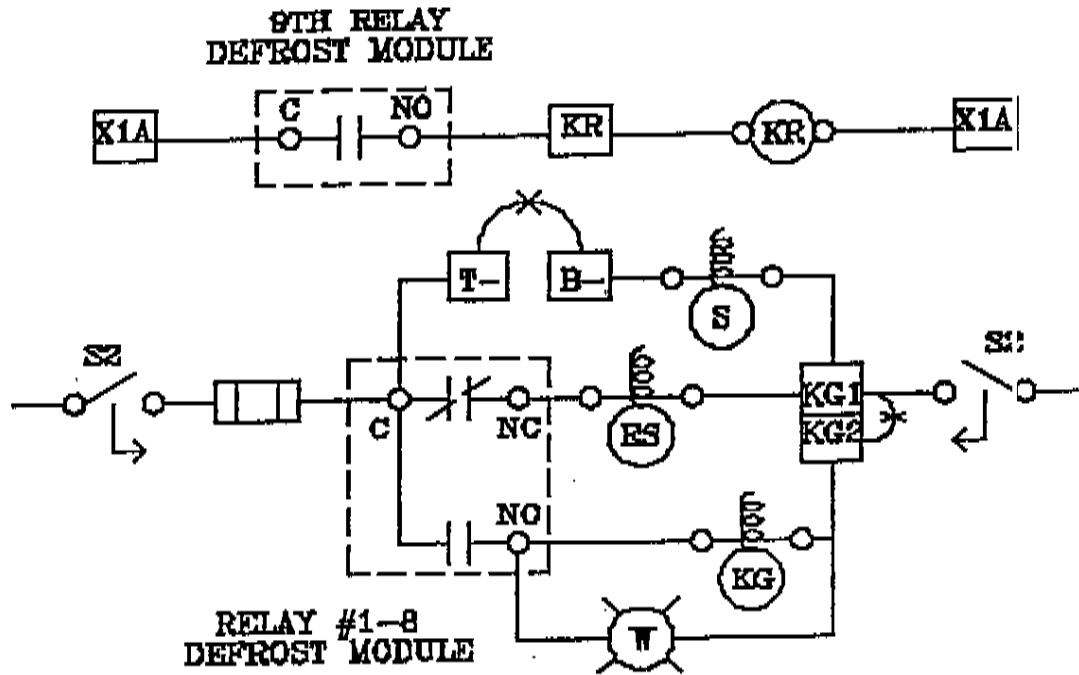


Figure 2-1

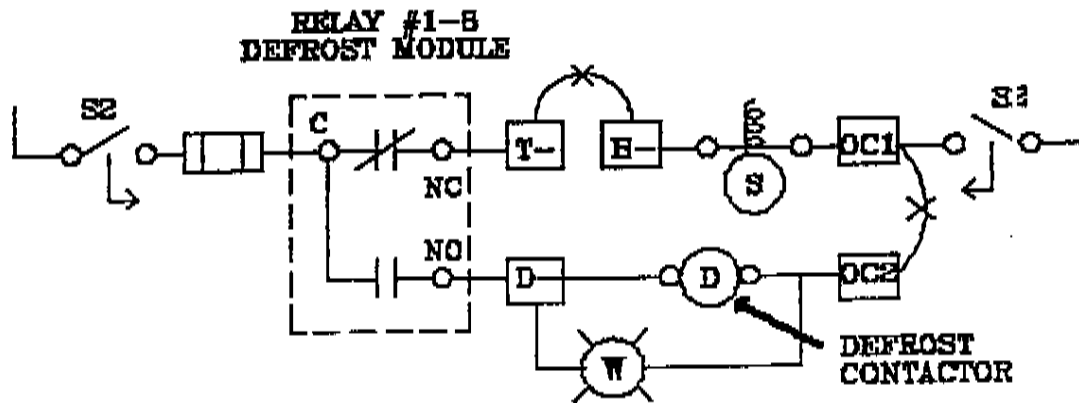


Figure 2-2

INSTALLATION

EPC-2000 DEFROST CONTROL

Adaptor Board Dip Switch Settings

For Proper operation of the defrost control make sure the dip switch settings on both the adaptor board and the defrost modules are set properly. The dip switch on the adaptor board is needed to let the EPC-2000 know how many defrost modules are connected. Figure 2-3 shows the dip switch settings based upon the number of modules connected.

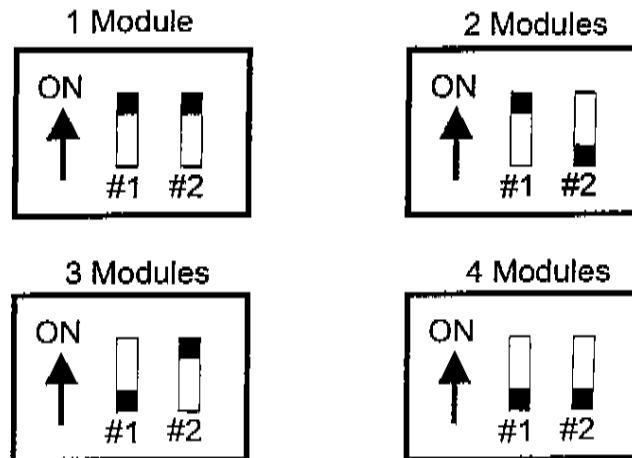


Figure 2-3.

Defrost Module Dip Switch Settings

Each defrost module has its own address so that the EPC-2000 can distinguish as to which module it is communicating. Figure 2-4 shows the different dip switch settings for each module address. These settings are printed on the defrost module for your convenience.

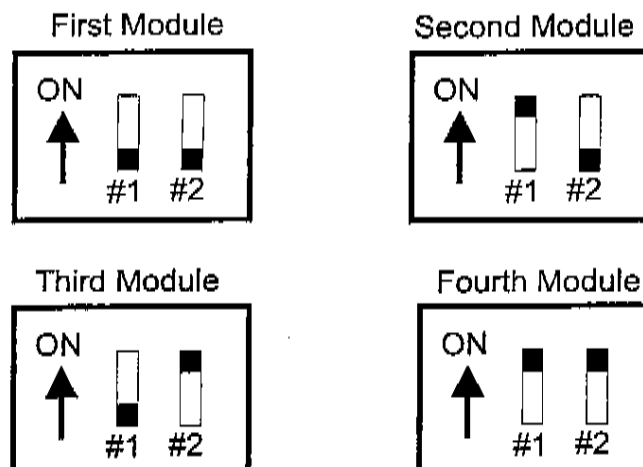


Figure 2-4.

INSTALLATION EPC-2000 DEFROST CONTROL

When the relay version defrost module is used with gas defrosts an eight pin dip switch must be properly set. This dip switch is used to automatically energize the liquid line solenoid valve needed for gas defrosts. Figure 2-5 shows an example of how the dip switch can be used. In this figure, defrost circuits 1 through 4 have been configured as gas defrost circuits. When the EPC-2000 energizes any one of these outputs, the ninth relay will auto-matically be energized.

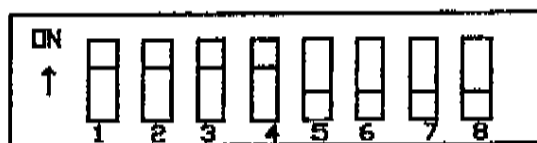


Figure 2-5

STARTUP

Carefully check all wiring before startup. Check that the wiring of defrost circuits to the defrost modules are properly inserted and that no loose strands of wire are present at the terminals blocks of the defrost module. Check that the communication cables and power cables are properly seated into their respective plugs.

Complete the following sequence to startup the Super Plus System:

1. Unplug the 24 VAC power plug assembly from the side of the EPC-2000 processor assembly and the 24 VAC C.T. power plug assembly from the defrost module.
2. Refer to the STARTUP procedure for the Super Plus System in the Installation Instruction Manual P/N 334495.
3. Using a digital voltmeter, verify that 24 VAC are present at both power plug assemblies (EPC-2000 transformer and the defrost module transformer). If the power supply is between 21 and 30 VAC, only connect the power plug assembly to the EPC-2000.

CAUTION: It is advisable to program the defrost circuit information into the EPC-2000 before applying power to the defrost modules. Defrost information already in the EPC-2000 may cause defrosts to start occurring.

4. Activate the defrost control of the EPC-2000 by installing the DEFROST option and activating the number of defrost circuits that are wired to the defrost modules. See the section on OPERATION for details.
5. Program the defrost information for each defrost circuit. See the section on OPERATION for details.

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EPC-2000 DEFROST CONTROL

CHECKOUT PROCEDURE

Once the Startup procedure has been properly completed, the EPC-2000 provides a checkout function which allows each defrost circuit to be manually forced into defrost. See the section on OPERATION for details on how to manually force a system in and out of defrost. If any system does not respond, refer to the TROUBLESHOOTING section in this manual.

OPERATION
EPC-2000 DEFROST CONTROL

OPERATION

GENERAL

The EPC-2000 Defrost Control was developed to offer the customer easy viewing and programming of his defrost parameters. The EPC-2000 also provides the capability of communicating from a remote site to view or change the defrost information. This is possible through Hussmann's communication package COMPAK (see Installation Instructions for COMPAK Communications Control P/N 356251).

MENU DISPLAYS

The following pages reflect the additional messages shown for the EPC-2000 Defrost Control. Refer to the EPC-2000 manual (P/N 334495) for complete menus.

System Menu

The following messages are shown in the factory setup of the System Menu. These screens are for installing the defrost control option and the number of defrost circuits to be controlled.

▼	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Defrost</td> <td style="width: 50%;">Not Inst</td> </tr> <tr> <td>1 = Yes</td> <td>0 = No</td> </tr> </table>	Defrost	Not Inst	1 = Yes	0 = No
Defrost	Not Inst				
1 = Yes	0 = No				
0 NO	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Defrost</td> <td style="width: 50%;">Inst</td> </tr> <tr> <td>1 = Yes</td> <td>0 = No</td> </tr> </table>	Defrost	Inst	1 = Yes	0 = No
Defrost	Inst				
1 = Yes	0 = No				
▼	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">0 Defr Systems</td> </tr> <tr> <td>Change to: 0</td> </tr> </table>	0 Defr Systems	Change to: 0		
0 Defr Systems					
Change to: 0					
X	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40px; text-align: center; vertical-align: middle;">X</td> <td style="width: 60%;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">0 Defr Systems</td> </tr> <tr> <td>Change to: xx</td> </tr> </table> </td> </tr> </table>	X	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">0 Defr Systems</td> </tr> <tr> <td>Change to: xx</td> </tr> </table>	0 Defr Systems	Change to: xx
X	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">0 Defr Systems</td> </tr> <tr> <td>Change to: xx</td> </tr> </table>	0 Defr Systems	Change to: xx		
0 Defr Systems					
Change to: xx					
ENTER	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">xx Defr Systems</td> </tr> <tr> <td>Change to: 0</td> </tr> </table>	xx Defr Systems	Change to: 0		
xx Defr Systems					
Change to: 0					

To install the Defrost control option, answer "NO" if the screen indicates that the Defrost option is not installed.

The EPC-2000 will allow you to install up to 32 defrost circuits. The number of circuits installed does not have to equal the number of circuits available on the defrost modules. For example, if you need 22 defrost circuits, you will need three defrost modules (at 8 circuits per module) for a maximum of 24 defrost circuits. When installing the number of circuits in the EPC-2000, you only need to select 22 circuits. The remaining two circuits will not be used.

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EPC-2000 DEFROST CONTROL

Defrost Menu

All defrost parameters can be found in the Defrost Menu. This menu consists of two levels of menu screens. The first level shows the status for each defrost circuit (i.e. the circuit is in defrost or refrigeration) and a brief summary of the circuits parameters (number of defrost per day, the length of each defrost, and the start time of the first defrost). The second level of screens consists of the programmable defrost settings.

The first level of menu screens are:

3 <<DEFROST MENU>>

ENTER TIME MO DA YR
hh:mm MM/DD/YY

▼ System #? 0

▼ SYS 1 (xx) REFR
xxX xx Min hh:mm

■
■
■
■

Through xx number of
systems installed.
Up to 32.

■
■
■
■

▼ SYS xx (xx) REFR
xxX xx Min hh:mm

SYS 1 (xx) DEFR
- FORCED -

Access to the Defrost Menu can be gained by entering the appropriate passcode and pressing the number '3' key.

The first screen shows the current date and time.

You can jump to a particular defrost system. Enter a number between 1 and 32 or scroll down to see a system.

The assignment number is located in the parenthesis (XX). This number refers to a physical store system where as the EPC-2000 system number, 1 through 32, pertains to the position on the defrost modules.

The current status for this system is shown in the last four columns of the first line:

REFR - system is in refrigeration

DEFR - system is in defrost

DATV - system is deactivated.

No defrost control for this system.

The second line displays some of the systems defrost parameters:

xxX - number of defrosts per day

xxx MIN - length of each defrost

hhmm - start time of first defrost

If a system has been forced into defrost or forced out of defrost, the second line will display 'FORCED'.

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The second level of the Defrost Menu screens consist of:

Access to this level of screens can be obtained by entering a particular defrost circuit output (1 to 32) at the jump screen and pressing enter. You will notice that the first line of these screens display which defrost circuit output you are currently viewing, the physical store system, displayed in parenthesis, and the current status of the system: refrigeration or defrost. It is suggested that you do not reprogram a system that is currently defrosting.

X	System #? x
ENTER	SYS x (xx) REFR Deactivate Y/N?
1 YES	Confirm Deactivate Y/N
▼	Defr Type Oftime 1 = Yes 0 = No
0 NO	1—Oftime 2—Gas 3—Electric
2	Defr Type Gas 1 = Yes 0 = No
▼	SYS xx (xx) REFR Defr/Day xx
4	SYS xx (xx) REFR Defr/Day 4
▼	SYS xx (xx) REFR Defr Length xx
15	SYS xx (xx) REFR Defr Length 15
▼	SYS xx (xx) REFR 1st Defr hh:mm
0	2 ENTER
	SYS xx (xx) REFR 1st Defr 02:mm
1	ENTER
	SYS xx (xx) REFR 1st Defr 02:15

Enter the defrost circuit number at the jump screen.

You can activate or deactivate any defrost circuit. Remember that a deactivated circuit has no defrosts.

The EPC-2000 will ask for a confirmation when activating or deactivating a circuit.

You can select the type of defrost for each circuit.

The number of defrosts per day range from 1 to 12.

The length of defrosts range from 1 to 120 minutes.

You can enter the start time of the first defrost of the day. All defrost starting times must be in military time and can only start on the quarter hour.

The EPC-2000 assumes that the start of the day is at midnight or 00:00.

To program the start time, enter the hour you wish to start, then you enter the quarter hour you wish to start (:00,:15,:30,:45). You only need to enter the first number, the EPC will automatically enter the second number.

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EPC-2000 DEFROST CONTROL

The second level of Defrost Menu screens continued:

▼	SYS xx (xx) REFR 2nd Deifr hh:mm	
0	4	ENTER
	SYS xx (xx) REFR 2nd Deifr 04:mm	
	3	ENTER
	SYS xx (xx) REFR 2nd Deifr 04:30	

Thru xx number
of defrost/day

▼	SYS xx (xx) REFR xxth Deifr hh:mm	
▼	SYS xx (xx) REFR Reassignment xx	
9	9	ENTER
	SYS xx (99) REFR Reassignment 99	
▼	SYS xx (xx) REFR Deactivate Y/N?	

Once the number of defrosts, the length of defrosts, and the start time for the first defrost of the day has been entered, the EPC-2000 will automatically program the remainder of defrosts for that circuit.

You can change the start time of each defrost. The start time must fall on the quarter hour.

The reassignment screens is for convenience purposes. It allows you to identify each defrost circuit according to the physical store system the circuit is attached.

You may reassign each defrost circuit a number between 1 and 99. No overlaps are allowed.

The reassignment screen is the last display in this menu. Pressing the down arrow will scroll back to the first screen

Maintenance Menu

The EPC-2000 allows the serviceman an easy mechanism for testing defrost circuits by manually forcing the circuit into defrost or out of defrost. The screens needed to manually force a defrost circuit are contained in the Maintenance Menu.

▼	Start a Defrost 1 = Yes 0 = No	
1	YES	Start a Defrost System(1-32) xx
X	X	Do another one 1 = Yes 0 = No
▼	Stop a Defrost 1 = Yes 0 = No	
1	YES	Stop a Defrost System(1-32) xx
X	X	Do another one 1 = Yes 0 = No

You can manually start an unscheduled defrost. The length of the defrost matches the duration of the circuit you wish to force on.

To start a defrost, enter the output number corresponding to the defrost module position (i.e. 1 through 32).

You can manually stop a defrost and forced that circuit into refrigeration.

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EPC-2000 DEFROST CONTROL

PROGRAMMING DEFROST SCHEDULES

This section is used to summarize the programming of a defrost circuit. As stated earlier, the Defrost Control of the EPC-2000 has the capability of maintaining defrost schedules for up to 32 defrost circuits. The primary settings required to program a defrost circuit are:

- (1) Circuit Activation
- (2) Defrost type
- (3) Number of defrosts per day
- (4) Length of the defrost
- (5) Start time for the first defrost of the day

Once these five items have been programmed, the EPC-2000 will automatically configure the rest of the day for defrosts. The EPC-2000 accomplishes this by dividing the remainder of the day (from the start time of the first defrost) into equal portions based upon the number of defrosts remaining. Although the EPC-2000 automatically calculates the remaining defrosts, these start times can be altered to any quarter hour starting increment you wish.

IMPORTANT: A defrost circuit in the EPC-2000 must be activated before defrosts can occur. Make sure that the defrost circuit you are programming is activated before leaving that menu.

The reassignment screen is only for customer convenience. It allows you the ability to relate a particular defrost output of the EPC-2000 to a specific system number.

Programming Errors/Warnings

The EPC-2000 provides error checking to ensure the capability of the refrigeration system and the defrost schedule you have programmed. The error checking is primarily concerned with gas defrosts and the overlapping of defrost times. The EPC-2000 error checking routine limits the number of defrost circuits, with a gas type defrost, that can occur at any one time. The maximum number of overlapping gas defrosts is three (3). The EPC-2000 will allow an unlimited number of offtime and electric type defrosts.

CAUTION: Even though the EPC-2000 will allow overlapping gas defrosts, it is suggested to avoid these overlaps if possible. It is recommended that no more than 25 percent of the rack load be in a gas defrost at any one time.

The EPC-2000 will ask for a confirmation to accept the overlapping gas defrosts with a YES or NO question. This confirmation will occur for up to the maximum of three overlapping gas defrosts. When the fourth overlap occurs the EPC-2000 will display the error and ask that you reprogram that circuit with a different schedule.

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The EPC-2000 error checking routine also includes a warning message which informs you when gas defrosts are scheduled within 15 minutes of each other. This warning message should not be confused with the gas overlap check.

Error Messages

The following screens will display when an overlap of gas defrosts occur:

Gas Defr Overlap Press ENTER	
ENTER	Outputs XX YY ZZ Confirm (Y/N)
1 YES	System #? x
0 NO	SYS x (xx) DATV Activate Y/N?

When a gas defrost time from one circuit overlaps with the time from another circuit, the EPC-2000 will ask for a confirmation to proceed with the programmed overlap.

The EPC-2000 will display which circuits the overlap occurs.

A yes confirmation, retains the programmed overlap and exits back to the jump screen.

A no confirmation, discards the programmed overlap, deactivates the circuit and allows you the reprogram a new defrost schedule for that circuit.

The following screens will occur when more than four gas defrost times overlap:

Gas Defr Overlap SYS: XX YY ZZ ##	
ANY KEY	Try Again 1 = Yes 0 = No
1 YES	SYS x (xx) DATV Activate Y/N?
0 NO	System #? x

Upon the fourth overlapping gas defrost, the EPC-2000 will display the circuits in which the overlap has occurred.

The EPC-2000 will then ask if you wish to reprogram the defrost schedule for that circuit.

A yes answer will cause the EPC-2000 to discard the previous defrost information and deactivate the defrost circuit you were programming. You may then proceed to program a new schedule.

A no answer will cause the EPC-2000 to discard the defrost schedule, de-activate the circuit and return to the jump screen.

OPERATION
EPC-2000 DEFROST CONTROL

Warning Messages

The following screen will occur when two gas defrost time are programmed within 15 minutes of each other:

Gas Defr Warning
Outputs XX YY

The two circuits in which the program warning has resulted will be displayed for approximately 4 seconds.

The EPC-2000 will then accept the defrost program and proceed to the jump screen.

EPC-2000 DEFROST CONTROL

SERVICE**GENERAL**

This section is designed to assist the serviceman in troubleshooting the EPC-2000 Defrost Control. A step-by-step procedure is included to isolate the malfunction. This instruction will cover the defrost control part of the EPC-2000. For additional service techniques, refer to the EPC-2000 operating manual 334495.

RECORDING INFORMATION

Upon arrival at the refrigeration rack, make a record of the following information for future reference.

- A. Rack model and serial number
- B. EPC-2000 model and serial number
- C. EPC-2000 options installed on the rack

Record the following applicable settings and present readings as shown in the STATUS menu.

Suction Pressure	_____	psi
Suction Setpoint	_____	psi
Koolgas Defrost	_____	ON/OFF

Record the following settings and readings as shown in the DEFROST menu.

Systems in Defrost	SYS ____ (____)	DEFR
Systems forced into Defrost (Blinking Status)	SYS ____ (____)	DEFR
Systems forced out of Defrost (Blinking Status)	SYS ____ (____)	REFR
Systems Deactivated	SYS ____ (____)	DATV

Check the alarm log for a history of rack alarms. Note the most recent alarm entered and the time and date.

APPARENT MALFUNCTIONS

Based upon your observations and recordings of the above settings, proceed to the Troubleshooting Checkout Procedures Page to determine the most likely cause. Proceed in order through the checkout procedures listed until the fault is isolated.

4-2

SERVICE

EPC-2000 DEFROST CONTROL

Defrost Circuit Test

This test is designed to verify the EPC-2000's ability to send a signal to the defrost module for the required system output.

NOTE: When troubleshooting the Fibertronic Rack, power must be applied to the Defrost board (P/N 340555) to perform this test.

1. Enter the correct passcode for access to the Maintenance menu. Using the arrow keys, scroll down to the START A DEFROST screen and press the 'YES' key (number 1).
2. Using the number keys, select the number of the output under consideration and press ENTER.

STEPS 3 THROUGH 5 USED FOR RELAY VERSION DEFROST MODULES.

3. Observe that the corresponding indicator light for the defrost circuit forced into defrost, is lit.
 - a. If the indicator light is lit, verify that the relay is energized properly, that is the Normally closed contacts are now open and vice-versa.
 - b. If the indicator light is not lit, check that the defrost communications cable is properly installed.
4. If the proper output relay is energized and the corresponding defrost solenoids, contacts, etc. are not active, refer to Section 2 of this manual, Installation instructions, and check that electrical wiring is installed correctly.
5. If the indicator light does not come on perform the **Module Setup Test**.

STEPS 6 THROUGH 8 USED FOR FIBER OPTIC DEFROST MODULES

6. Observe that the corresponding indicator light for the defrost circuit forced into defrost, is lit.
 - a. If the indicator light is lit, verify that the defrost branch board STATUS light is also lit.
 - b. If the indicator light is not lit, check that the defrost communications cable is properly installed.
7. If the proper defrost branch board is energized, refer to the operating manual for the Fibertronic Defrost Clock P/N 0340837 and begin checking that the wiring is correct.
8. If the indicator light does not come on perform the **Module Setup Test**.

Module Setup Test

This test is used to verify that the correct number of defrost modules are recognized by the EPC-2000. This test can be used for both the relay and fiber optic version defrost modules.

1. A maximum of four defrost modules can be connected to one EPC-2000. Verify that no more than four modules are connected.
2. Make sure that each module has been assigned its own address and that no two modules have the same address. Refer to Figure 2-4 for proper settings of the four pin dip switch.
3. Verify that the Adaptor dip switch setting reflects the number of defrost modules connected to the EPC-2000. Refer to Figure 2-3 for proper settings.
4. Enter the proper passcode into the EPC-2000 and enter the SYSTEM menu. Scroll down to the FACTORY SETUP portion of the menu and press ENTER. Scroll down to verify that:
 - a. The DEFROST option is installed.
 - b. The correct number of defrost circuits are installed.
5. If all cables are properly installed and the correct settings have been verified, cycle power to both transformers (the EPC-2000 and defrost modules transformer).

Cable Test

This test is used to verify that the correct cables have been installed for defrost control.

1. Verify that the primary communication cable has been installed between the Adaptor board connected to the EPC-2000 and the first defrost module.
2. Verify that the secondary communication cable has been installed between the remaining defrost modules.

Transformer Test

This test is used to verify that the proper power has been applied to the defrost modules. This test requires a digital voltmeter set to read AC Volts.

1. Remove the primary power cable (cable connected to the defrost module transformer) and measure between the two outside pins of the four pin connector. The voltage present should be between:
 $20 < \text{and} < 30 \text{ VAC}$
2. Replace the primary power cable and remove the secondary cable from the each defrost module to verify that power has been transferred to each module. The voltage present should be between:
 $20 < \text{and} < 30 \text{ VAC}$

SERVICE
EPC-2000 DEFROST CONTROL

Circuit Program Test

This test is designed to verify that the correct defrost parameters have been programmed into the EPC-2000. Refer to Section 3 on OPERATIONS to aid you in this test.

1. Enter the proper passcode to the EPC-2000 and select the DEFROST menu.
2. At the "jump screen" select the defrost circuit under consideration and press ENTER.
3. Verify that the defrost circuit is ACTIVE (ACTV).
4. Verify the following settings:

Defrost Type	_____
Number of Defrosts	_____
Defrost Length	_____
Start Time of 1st Defrost	_____
" 2nd Defrost	_____
" 3rd Defrost	_____
" nth Defrost	_____

5. Reprogram the defrost parameters for the defrost circuit under consideration.

DEFROST CONTROL - TROUBLESHOOTING CHECKOUT PROCEDURES

OBSERVATIONS	PROBABLE CAUSE	CHECKOUT PROCEDURE	PAGE
System missed or misses scheduled defrost	<ul style="list-style-type: none"> - Defrost circuit has been deactivated in EPC - Temperature termination input preventing defrost - Total Rack power outage - Defrost parameters programmed incorrectly 	<ul style="list-style-type: none"> - Defrost circuit test - Circuit program test 	4-2 4-4
Defrost module in backup	<ul style="list-style-type: none"> - EPC2000 in Switchback - Comm. cable failure - Loss of power to module - Module address set incorrectly 	<ul style="list-style-type: none"> - Refer to manual 334495 for EPC checkout tests - Cable test - Transformer test - Module setup test 	4-3 4-3 4-2
Liquid line solenoid not energized during gas defrost	<ul style="list-style-type: none"> - 9th relay on module not configured for gas defrost - 9th relay on module not wired 	<ul style="list-style-type: none"> - Refer to page 2-3 for dip switch settings 	

ORDERING INFORMATION

In the first section of this manual we discussed and identified the specific components of the EPC-2000 defrost control. Based upon which rack system you have, Fibertronic or 208 V racks, the following numbers can be used to supplement or replace the electronic defrost components.

Description	Nomenclature
Primary Defrost Module - Relay version	51VY
Secondary Defrost Module - Relay version	53VY
Primary Defrost Module - Fiber Optic version	52VY
Secondary Defrost Module - Fiber Optic	54VY

The primary defrost module numbers come with these parts:

Defrost Module Board	
Relay version	0365100
Fiber Optic version	0365106
Primary Communication Cable	0365101
Transformer Assembly (Primary Power Cable)	0365102

The secondary defrost module numbers come with these parts:

Defrost Module Board	
Relay version	0365100
Fiber Optic version	0365106
Secondary Communication Cable	0365104
Secondary Power Cable	0365105