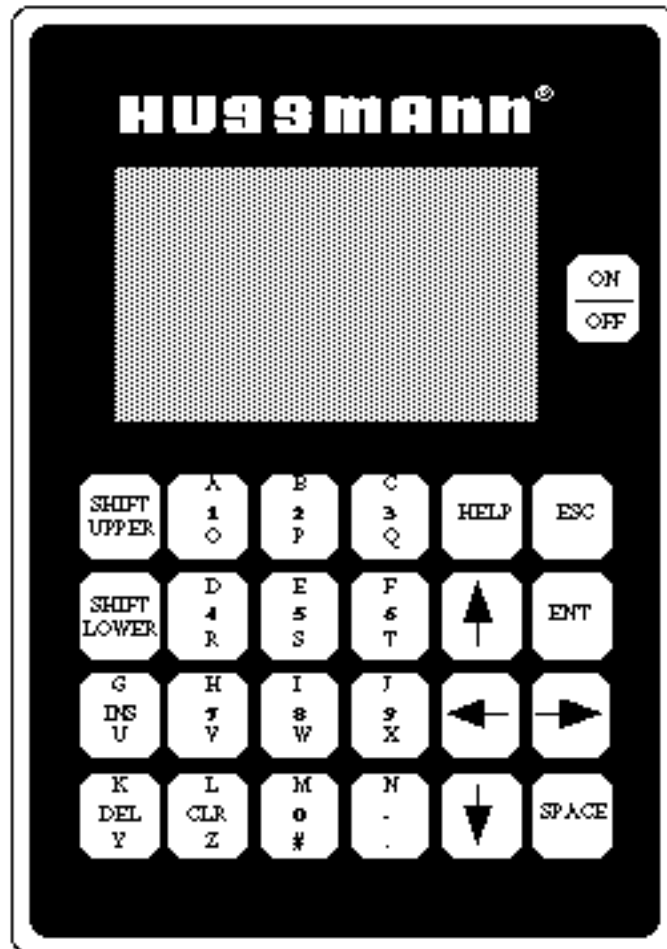


PROTOCOLTM

Hand Held Device



P/N 374511B
March, 1997

HUBMANN®

PROTOCOL™
Hand Held Device

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IMPORTANT
KEEP IN STORE FOR FUTURE REFERENCE
Quality that sets industry standards



KEY PAD INSTRUCTIONS

Shift Upper – This key is used to key in the top (red) letters.

Shift Lower – This key is used to key in the bottom (blue) letters.

NOTE: If either of the above keys is pressed accidentally, simply press it again to deactivate it.

INS & DEL – The screen will prompt you when you need to use these keys.

CLR – Clears last entry

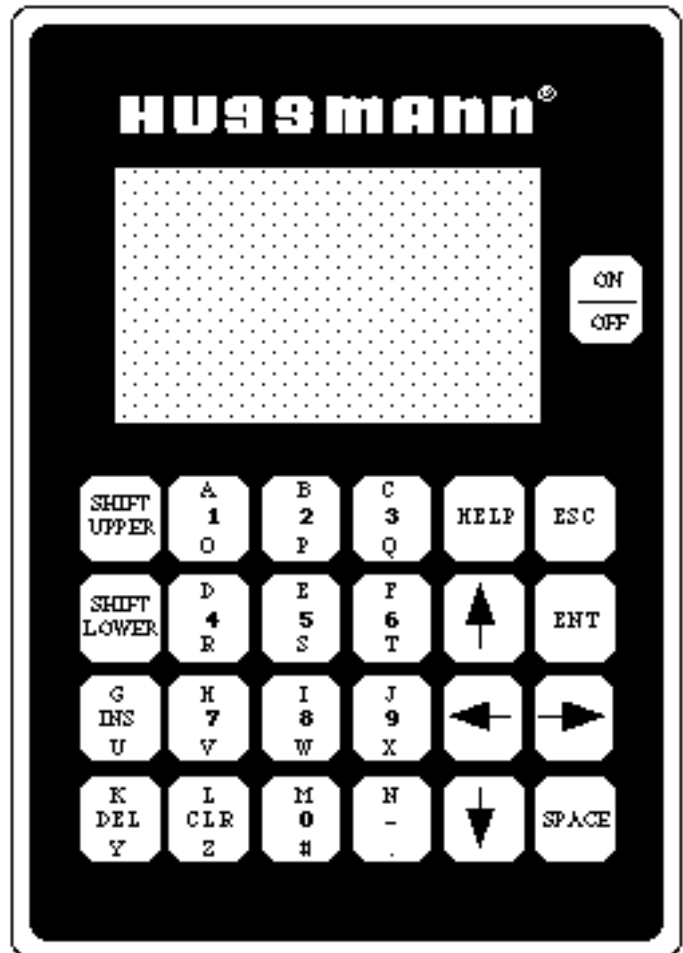
Help – There are no help screens on the current software.

ESC – Escape; returns you to the previous menu.

ENT – Enter; you will be prompted as to when to use this key.

Space – enters a space between letters.

Arrows – These keys move the cursor in the direction shown. The **Right Arrow** key is also used to toggle between functions such as enable/disable and press/temp.



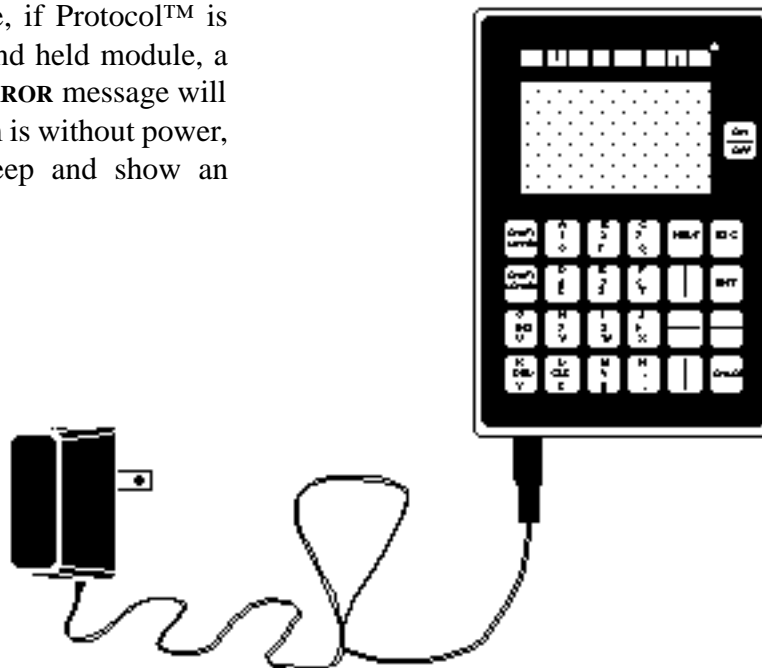
The Hussmann Interface Module may be operated from either battery power or from a 120V/12VDC transformer. When using the transformer, connect Module before plugging in the transformer. The startup screen will automatically appear.

**HUSSMANN
INTERFACE MODULE
(C) 1991 HUSSMANN
CORPORATION
VER 1.30**

When battery operated, the Module will shut down if the key pad has not been used for three minutes. When a transformer is used, the hand held module will beep and remain on.

If the battery is too weak to function, the menu screen will become faint or not come up at all. If the battery is completely without power, the hand held module will beep and show an alarm message. There is also a Low Battery message that appears at the Main Menu for Protocol™.

Regardless of the power source, if Protocol™ is not communicating with the hand held module, a beep will sound and a **COMM ERROR** message will appear. If the Protocol™ system is without power, the hand held module will beep and show an **ALARM** message.



Following the startup screen, the
SELECT EQUIPMENT screen will appear.

SELECT EQUIPMENT

- 1-PROTOCOL
- 2-CASE CONTROL
- 3-PUMPING STATION
- 4-FLUID COOLER

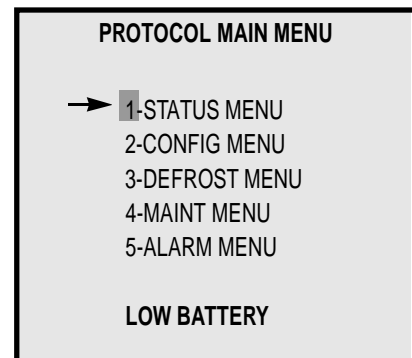
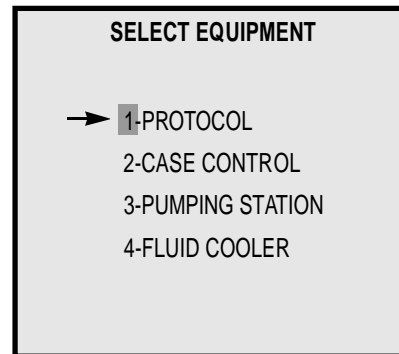
Press **1** on the key pad.

The PROTOCOL™ MAIN MENU will appear. This screen has 5 submenus each of which has its own submenu(s), see page 4.

Any time a numbered list appears on the menu screen, pressing the key pad number will take you to that submenu or function.

Notes:

- 1) If Case Control is accidentally selected, the only way to escape is to disconnect power to the Interface Module.
- 2) Neither Pumping Station nor Fluid Cooler information is contained in this manual.
- 3) **LOW BATTERY** appears only if battery voltage is below normal levels



PROTOCOL MAIN MENU

(_) = PAGE NUMBER FOR MORE INFORMATION

- 1- STATUS MENU (07)
- 2- CONFIG MENU (10)
- 3- DEFROST MENU (23)
- 4- MAINT MENU (28)
- 5- ALARM MENU (30)

ALARM MENU

A01- LO SUCTION PRESS
TIME 01:56 01/21
END OF ALARMS

MAINT MENU

- 1-FORCE A COMP ON
- 2-CLEAR FORCE FLAG
- 3-FORCE A COMP OFF
- 4-FORCE A DEFR ON
- 5-FORCE A DEFR OFF
- PRESS ENT FOR MORE
- 6-CLEAR RUN METER
- 7-FORCE LIGHT ON
- 8-FORCE LIGHT OFF
- **9-CLEAR ALM TABLE
- **0-RESETCONTROL

**These options only available with Software Version 2.30 or greater.
Protocol Control must also be V1.30 or greater

DEFROST MENU

- 1-VIEW/SET ITEMS (23)
- 2-COPY SCHEDULE (25)
- 3-ASSIGN OUTPUTS (26)
- *4-ASSIGN CIRCUITS FOR SPLIT SUCT(27)

*This item only appears when unit is configured for split suction option.

CONFIG MENU

- 1-SET THE CLOCK (10)
- 2-SENSOR SETUP (11)
- 3-PROTOCOLSETUP(15)
- 4-COMM SETUP (20)
- 5-LIGHTCONTROL(21)
- 6-TEMPCONTROL(22)

TEMP / CIRCUIT #1

NAME - CIRCUIT #1 NAME
STATUS - REFR
TEMPCTRL - ENABLED
(F) SETPT
AUX #1 22 20
REFRIG: ON REF 18

MAIN STATUS MENU

- 1-PRESSURES (07)
- 2-DEFROST / TEMPCKT (08)
- 3-TEMPERATURE MENU (09)
- 4-COMP RUN METERS (09)

PRESSURE STATUS

	P1	P2
SUCTION	42	0
SETPOINT	40	0
#COMPS -	1	2 3 4 5 6
ON (X)	X	X X X X

TEMPERATURE STATUS

	(F)	SP
T1	-40	0
T2	-40	0
T3	-40	0

PRESS ENT FOR MORE

TEMPERATURE STATUS (CONT)

	(F)	SP
T4	0	0
T5	0	0
T6	0	0
T7	0	0
T8	0	0

AUXILIARY STATUS (EXPANDED)

A7 - 0
A8 - 0
A9 - 0
A10 - 0
A11 - 0
A12 - 0

COMPRESSOR RUN METER

COMP1	56	HOURS
COMP2	57	HOURS
COMP3	56	HOURS
COMP4	53	HOURS
COMP5	0	HOURS
COMP6	0	HOURS

CONFIG MENU

(_) = PAGENUMBER FORMORE INFORMATION

- 1- SET THE CLOCK (10)
- 2- SENSOR SETUP (11)
- 3- PROTOCOLSETUP(15)
- 4- COMM SETUP (20)
- 5- LIGHT CONTROL(21)
- 6-TEMPCONTROL(22)

TEMPERATURE CONTROL

- 1-REFR CIRCUIT #1 (22)
- 2-REFR CIRCUIT #2 (22)
- 3-REFR CIRCUIT #3 (22)
- 4-REFR CIRCUIT #4 (22)
- 5-REFR CIRCUIT #5 (22)
- 6-REFR CIRCUIT #6 (22)
- 7-REFR CIRCUIT #7 (22)
- 8-REFR CIRCUIT #8 (22)

REFR CIRCUIT #1

TEMPCNTL - ENABLED
 SETPOINT - 15 F
 RATE - 3 F
 OUTPUTRELAY - 1

COMM SETUP MENU

STATION NUMBER - 99
 BAUD RATE - 19200

LIGHT MENU

- 1-CIRCUIT #1 (21)
- 2-CIRCUIT #2 (21)

LIGHT CIRCUIT #1

STATUS - ENABLED
 STATUS - ENABLED
 NAME - CASE LTS
 ON TIME - 04:00
 OFF TIME - 22:00
 OUTPUT - 08

PROTOCOLSETUPMENU

- 1-REFR SETUP (15)
- 2-DEFR SETUP (18)
- 3-DESCRIPTION (19)
- 4-ALARM OUTPUT (19)

ALARM OUTPUT
 OUTPUT NUMBER - X

DESCRIPTION
 NAME - PROTOCOLNAME

CONFIG DEFROST
 # OF CIRCUITS - 3
 INTERLOCK - DISABLED
 DRIP CYCLE - 0

SENSOR SETUP MENU

- 1-PRESSURE # 1 (11)
- 2-PRESSURE #2 (12)
- 3-TEMP # 1 (13)
- 4-TEMP # 2 (13)
- 5-TEMP # 3 (13)
- 1-TEMP # 4 (13)
- 2-TEMP # 5 (13)
- 3-TEMP # 6 (13)
- 4-TEMP # 7 (13)
- 5-TEMP # 8 (13)
- 6-AUX SENSORS (14)

CONFIG - REFRIGERATION

COMPS (TOTAL) - 4
 CYCLING - ROUND ROBIN
 SUCTION SP - 15 PSI
 SPLIT SUCTION - DISABLED
 # COMPRS - 0
 SPLITSP - 0 PSI
 SAT CONTROL - DISABLED
 SAT SETPT - 0 F
 SAT DIFF - 0 F
 CONTROL - TEMP
 SPR CONTROL - DISABLED
 SPR SP - 0 F

MIXMATCH SETUP

STEP		COMPRESSORS			
		1	2	3	4
1	- 01 =	X	0	0	0
2	- 03 =	X	X	0	0
3	- 06 =	0	X	X	0
4	- 14 =	0	X	X	X
	:				
	:				
16	- 00 =	0	0	0	0

CLOCK SETUP MENU

TIME - 22:23
 DATE - 02:23
 YEAR - 96
 DAYLIGHT- ENABLED
 SPRING - 02:00 04/27
 FALL - 02:00 10/28

DEFROST MENU

(_) = PAGENUMBER FORMOREINFORMATION

1- VIEW/SET ITEMS (23) → DEFROST MENU → DEFROST CIRCUIT #X

2- COPY SCHEDULE (25)

3- ASSIGN OUTPUTS (26)

*4-ASSIGN CIRCUITS

FOR SPLIT SUCT(27)

SUCTION ASSIGNMENT (27)

CIRCUIT SUCTION

1	01
2	01
3	01
4	01
5	01
6	01
7	01
8	01

DEFROST BOARD #1

OUTPUT CIRCUIT

1	1
2	2
3	3
4	4

DEFROST BOARD #2

OUTPUT CIRCUIT

5	5
6	6
7	7
8	8

EXPANSION BOARD

OUTPUT CIRCUIT

9	00
10	00
11	00
12	00

EXPANSION BOARD

OUTPUT CIRCUIT

13	00
14	00
15	00
16	00

CIRCUIT NAME STATUS

1	CIRCUIT #1 NAME	DEFR
2	CIRCUIT #2 NAME	REFR
3	CIRCUIT #3 NAME	DATV
4	CIRCUIT #4 NAME	N/A
5	CIRCUIT #5 NAME	N/A
6	CIRCUIT #6 NAME	N/A
7	CIRCUIT #7 NAME	N/A
8	CIRCUIT #8 NAME	N/A

TYPE OFTIM

NUMBER	03
LENGTH	15
START	00:00
AMPERAGE	00
DEFR TERM	ENABLED
2ND DEFR	08:15
3RD DEFR	16:00

COPY DEFROST SCHEDULE

COPY FROM CIRCUIT - 00

COPY TO CIRCUIT - -

DEFROST BOARD #3

OUTPUT CIRCUIT

17	00
18	00
19	00
20	00

DEFROST BOARD #4

OUTPUT CIRCUIT

21	00
22	00
23	00
24	00

*This item only appears when unit is configured for split suction option.

STATUS MENU

1-STATUS MENU

This is a read only menu. It gives you current operating conditions.

P1 gives the present pressure for the suction manifold.

P2 gives the second suction pressure input.*

Press ESC Key.

SETPOINT is the Suction Set Point for the control board. The board turns compressors ON and OFF to maintain this suction pressure.

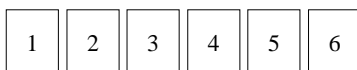
COMPS - 1 2 3 4

ON(X) X X

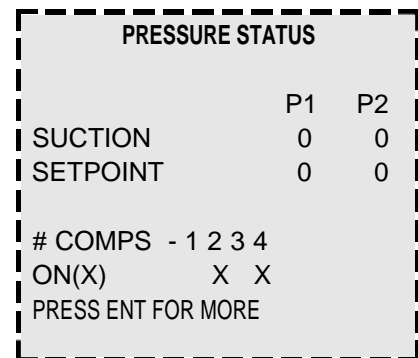
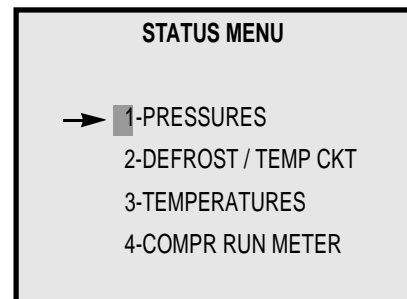
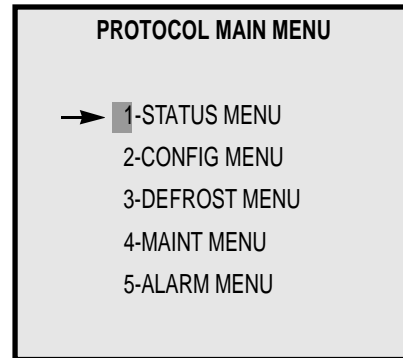
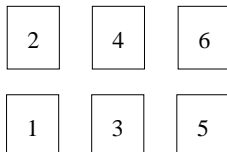
lists the compressor numbers, and indicates which are running.

Note: Compressors are configured as follows:

Horizontal Protocols



Vertical Protocols



*When Split Suction is installed or when Satellite compressor is controlled by pressure, P2 can also be used to monitor high side discharge pressures.

STATUS MENU (Continued)

2-DEFROST / TEMP CKT

This is a read-only menu. This screen shows the current operational status of Defrost Circuits and associated temperatures as provided by Auxiliary inputs.

NAME gives a description of the case loads for this defrost circuit.

STATUS indicates whether the defrost circuit is in defrost (DEFR), refrigeration (REFR), or a Manually Forced condition (F-DEFR, F-REFR).

TEMP-CTRL indicates whether temperature control is available for this circuit. This control feature allows the refrigeration solenoid to be operated ON and OFF to maintain a temperature setpoint.

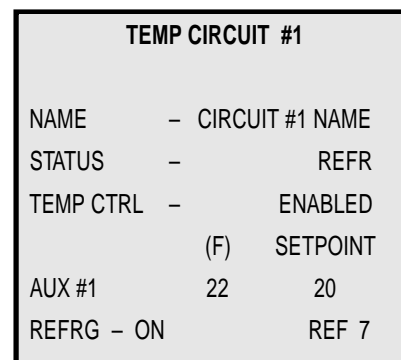
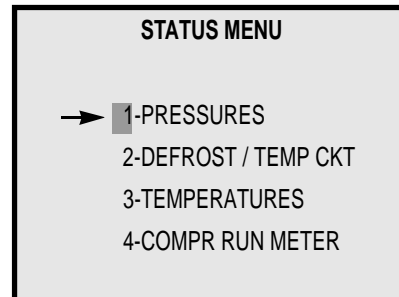
AUX #X provides the actual temperature reading of the circuit. Note that X will be a number between 1 and 8 depending upon the Temp/Circuit number you are currently accessing.

REFRIG is the status of the defrost/refrigeration relay. ON indicates that power is being fed to the solenoid. OFF indicates that the solenoid is de-energized.

REF is an internal setpoint used by the Temp Control algorithm. This number will increase up / decrease down dependent upon the relationship of the temperature reading (AUX #) and the circuit setpoint.

Press ENT to view additional circuit information.

Note: Temperature Control is available on Hand Held Devices V2.40 or greater.



STATUS MENU (Continued)**3-TEMPERATURE MENU**

T1 temperature reading for suction pressure reset or optional temperature input.

T2 temperature reading for satellite or optional temperature input.

T3 If split suction is installed, T3 may be factory set to read head pressure instead of temperature. Screen will show T3- ___PSI.

If split suction is not installed, T3 is a designated temperature input; but if you prefer, it can be configured as a pressure input (See page12).

Press **ESC** Key.

A7 thru A12 are additional temperature inputs. These readings may be established by the user as either **ANALOG** or **DIGITAL** under the **CONFIGURATION MENU**. When set on **DIGITAL** the read out will be either **OPEN** or **CLOSED**. The digital setting is applicable to thermostats or auxiliary contactors.

When the **ANALOG** setting is used a thermistor is used to retrieve temperature readings between – 40 and + 120°F.

When not used the menu will read **OPEN** if set on **DIGITAL**. Set on **ANALOG**, an unused input will produce a – 40.

Press **ESC** Key.

4-COMPRESSOR RUN METER

COMPRESSOR RUN METER submenu appears. This menu shows the total number of hours that each compressor has been operating.

Press **ESC** to return to **STATUS MENU**.

TEMPERATURE MENU		
	F	SP
T1 -	- 40	0
T2 -	- 40	0
T3 -	- 40	0
PRESS ENT FOR MORE		

TEMPERATURE MENU		
	F	SP
T4 -	0	0
T5 -	0	0
T6 -	0	0
T7 -	0	0
T8	0	0
PRESS ENT FOR MORE		

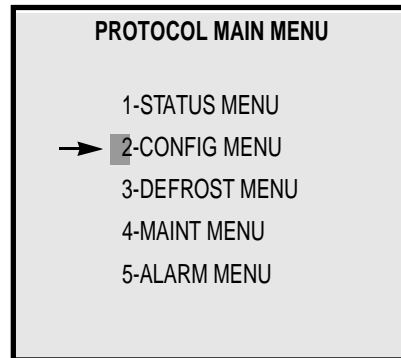
AUXILIARY MENU	
A7 -	OPEN
A8 -	CLOSED
A9 -	OPEN
A10 -	- 40
A11 -	60
A12 -	- 40

COMPRESSOR RUN METER		
COMP1	56	HOURS
COMP2	57	HOURS
COMP3	56	HOURS
COMP4	55	HOURS
COMP5	0	HOURS
COMP6	0	HOURS

CONFIG MENU

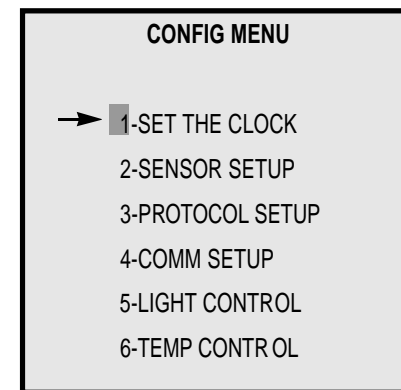
2-CONFIG MENU

This set of menus is used to make changes in the Protocol's configuration. Press **2** on the Keypad to enter the CONFIG submenu.



1- SET THE CLOCK

Press **1** on the Keypad to enter the CLOCK SETUP submenu. This screen has 5 fields used to set the correct time/date.



Hour 22
(24-hr clock only)

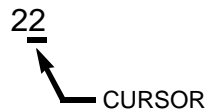
Minute 23

Month date 01

Day date 02

Year date 96
(Last two digits only)

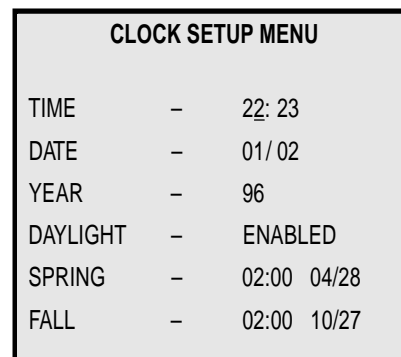
The screen appears with the cursor indicating the hour field.



Press the **CLR** button. This will change the field to **00**. Then input the correct hour and press **ENT**. The cursor will move to the next field. Repeat the process through each field.

Press **ESC** to return to the CONFIG MENU.

When enabled, the **DAYLIGHT** function will automatically adjust the time and year (in case of leap years) corresponding to changes in TIME and DATE.



CONFIG MENU (continued)

2- SENSOR SETUP

Press **2** on the Keypad to enter the Sensor Setup Submenu. This screen has 6 menus.

1- PRESSURE #1

Press **1** on the Keypad to enter the Pressure #1 Submenu.

PRESSURE #1 controls the suction pressure for the Protocol Control. Press the **CLR** key. Key in the applicable suction pressure in psig for HI ALARM and press **ENT**. Repeat for LO ALARM.

Pressure Transducers are supplied in one of three ranges:

0 to 100
0 to 200
0 to 500

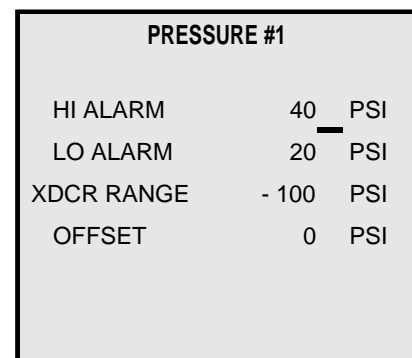
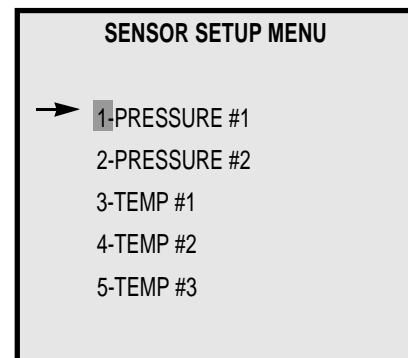
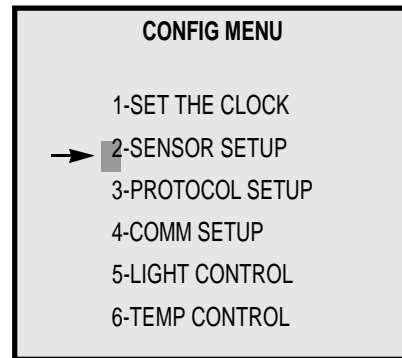
Using the **→** key, toggle to the range of the transducer used. Press **ENT**.

Offset allows manual calibration for the pressure transducer. Manual calibration is achieved by entering a number between -5 and +5. This number will then be used to offset the pressure reading by the entered amount.

WARNING: Improper calibration of the transducer could lead to unpredictable operation of the control. Verify the accuracy of the transducer reading with a minimum of two gauges.

Note: Manual calibration is available on Hand Held version V2.40 or greater.

Press **ESC** to return to SENSOR SETUP MENU.



CONFIG MENU (continued)

2- PRESSURE #2

Press **2** on the Keypad to enter the Pressure #2 Submenu.

PRESSURE #2 controls the suction pressure or Split Suction on the Protocol Control. Press the **CLR** key. Key in the applicable suction pressure in psig for HI ALARM and press **ENT**. Repeat for LO ALARM.

Pressure Transducers are supplied in one of three ranges:

- 0 to 100
- 0 to 200
- 0 to 500

Using the **→** key, toggle to the range of the transducer used. Press **ENT**.

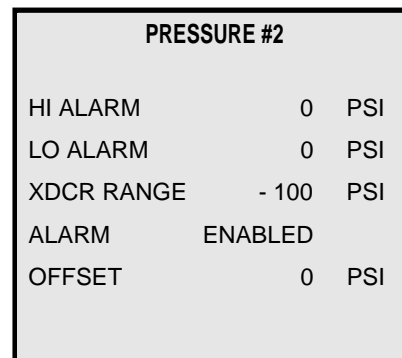
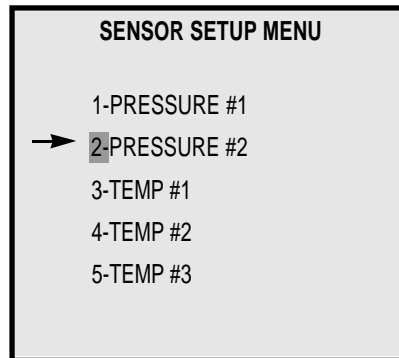
Using the **↓** key, move down to the Alarm status selection. Using the **→** key, toggle ENABLED or DISABLED. Press **ENT**.

Offset allows manual calibration for the pressure transducer. Manual calibration is achieved by entering a number between -5 and +5. This number will then be used to offset the pressure reading by the entered amount.

WARNING: Improper calibration of the transducer could lead to unpredictable operation of the control. Verify the accuracy of the transducer reading with a minimum of two gauges.

Note: Manual calibration is available on Hand Held version V2.40 or greater.

Press **ESC** to return to SENSOR SETUP MENU.



CONFIG MENU (continued)

3- TEMP #1

3-TEMP #1 allows you to establish set point and alarm levels for the first temperature input.

Press **3** on the Keypad to enter the TEMP #1 Submenu.

The ALM DELAY is a programmable time delay. This sets the time it will take before the control log's the alarm.

The CIRCUIT - X allows you to attach a defrost circuit to the temperature input (or vice versa). When the circuit is in defrost, the HI ALARM will be ignored.

Press **CLR.** Key in your selection and press **ENT.**

Using the **→** key, toggle ENABLED OR DISABLED. Press **ENT.**

Press **ESC** to return to SENSOR SETUP MENU.

4- TEMP #2

Press **4** on the Keypad to enter the TEMP #2 Submenu. Follow instructions above.

5- TEMP #3

Press **5** on the Keypad to enter the TEMP #3 Submenu.

If split suction is installed, TEMP #3 may be *factory set* to read head pressure instead of temperature. This is accomplished by changing the input mode to Pressure.

If split suction is not installed, TEMP #3 is a designated temperature input; but if you prefer it can be *factory set* as a pressure input.

Using the **→** key, toggle TEMP OR PRESS. Press **ENT.**

Press **ESC** to return to SENSOR SETUP MENU.

SENSOR SETUP MENU	
	1-PRESSURE #1
	2-PRESSURE #2
→	3-TEMP #1
	4-TEMP #2
	5-TEMP #3

3

TEMPERATURE # 1		
SET PT	-	XX F
HI ALARM	-	XX F
LO ALARM	-	XX F
ALARM	-	ENABLE
ALM DELAY	-	30 MIN
CIRCUIT	-	X

4

TEMPERATURE # 2		
SET PT	-	XX F
HI ALARM	-	XX F
LO ALARM	-	XX F
ALARM	-	ENABLE
ALM DELAY	-	30 MIN
CIRCUIT	-	X

5

TEMPERATURE # 3		
INPUT MODE	-	TEMP
SET PT	-	XX F
HI ALARM	-	XX F
LO ALARM	-	XX F
ALARM	-	ENABLE
ALM DELAY	-	30 MIN
CIRCUIT	-	X

Note: When using T3 for a pressure reading, remember to place the hardware switch on the main control board in the pressure position.

CONFIG MENU (continued)

6- AUX SENSORS

Press **6** on the Keypad to enter the Auxiliary Sensors Submenu.

AUXILIARY SENSORS provide six temperature inputs—analog or digital.

Analog for thermistors
Digital for thermostats.

ANALOG SETTING

ANALOG accommodates temperature readings between - 40 and + 120°F. Set on ANALOG, an unused input will produce a - 40.

DIGITAL SETTING

When set on DIGITAL the read out will be either OPEN (not in use) or CLOSED.

Use the → key to toggle between ANALOG and DIGITAL.

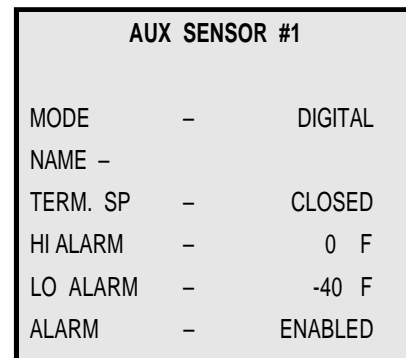
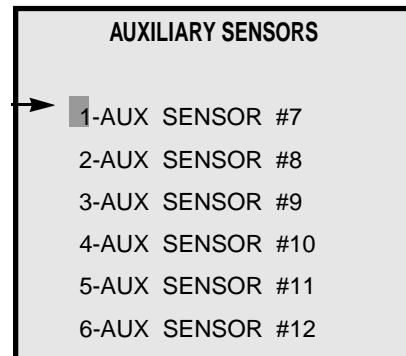
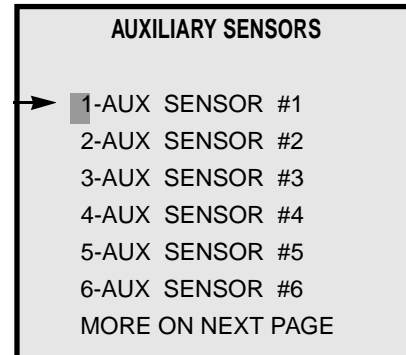
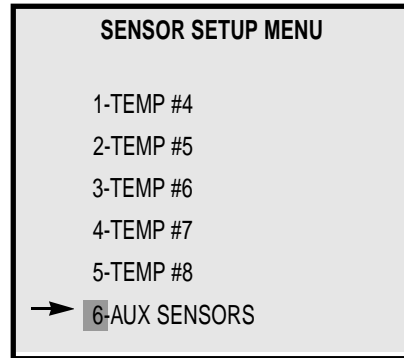
Using the ENT key, move down the selections.

Press CLR. Key in your selection and press ENT. The cursor will move down to the next sensor.

Press ESC to return to AUXILIARY SENSORS MENU.

Press ESC again to return to SENSOR SETUP MENU.

Press ESC again to return to CONFIG MENU.



Note: Aux Sensors 7 through 12 are available only on Expansion Module.

CONFIG MENU (continued)

3- PROTOCOL SETUP

Press **3** on the Keypad to enter the Protocol Setup Submenu.

1- REFR SETUP

Press **1** on the Keypad to enter the REFR SETUP submenu.

This screen programs the Control Board for the refrigeration parameters:

- Number of compressors controlled
- Compressor Cycling Algorithm*
- Suction Pressure Set Point
- Split Suction Control—
ENABLED/DISABLED
- Number of compressors controlled
- Split Suction Reset Set Point

To change numeric fields, press the **CLR** key. Key in the applicable number. Press **ENT**. Use the **→** key, toggle between ENABLED/DISABLED. Press **ENT**.

Use the down arrow to get to the next screen which programs the satellite and Suction Pressure Reset controls.

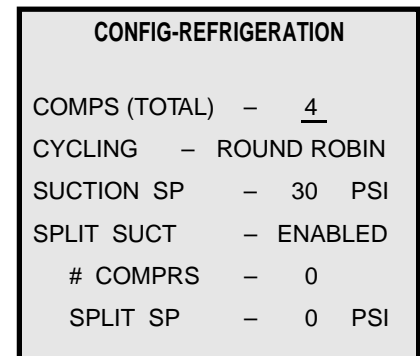
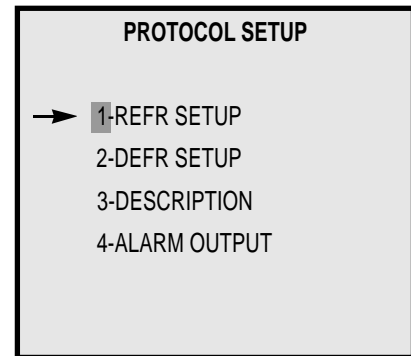
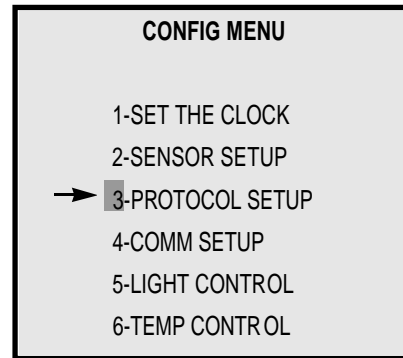
- Satellite Control — ENABLED/DISABLED
- Satellite Set Point
- Satellite Differential
- Sat. Control Status — TEMP/PRESS**
- **When configured for pressure, the P2 input serves as the connection point for the transducer.
- Suction Pressure Reset status —
ENABLED/DISABLED
- Suction Pressure Reset Set Point

To change numeric fields, press the **CLR** key. Key in the applicable number. Press **ENT**. Use the **→** key, toggle between ENABLED/DISABLED and TEMP/PRESS. Press **ENT**.

Press **ESC** to return to enter the MixMatch Setup.

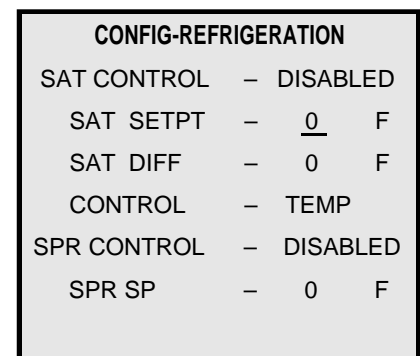
Press **ESC again** to return to PROTOCOL SETUP MENU.

*Algorithm options are Round Robin or MixMatch.



NOTE:

COMPS(TOTAL) is the total number of compressors on the Protocol units
COMPRS is the number of compressors (total) assigned to split suction



CONFIG MENU (continued)

MixMatch compressor cycling is used when compressors of varying horsepowers have been installed. This algorithm allows the compressor horse power to be more closely matched with the evaporator load

There are 16 available steps for MixMatch cycling. The additional steps are accessible by pressing the ↓ arrow to view additional screens.

Each step can be programmed by entering a number between 1 and 63 of the step number. The Hand Held Device will use this number to display the compressors selected with an 'X' and those not selected with a '0.'

The number entered and used by the Hand Held Device is a binary number. The following example describes the relationship of the number to compressors. Caution: If you have concerns over this programming, consult Bridgeton Refrigeration Engineering.

MIXMATCH SETUP							
			COMPRSSORS				
SETUP			1	2	3	4	
1	-	01	-	X	0	0	0
2	-	02	-	0	X	0	0
3	-	03	-	0	0	X	0
4	-	04	-	0	0	0	X

CONFIG MENU (continued)

MIXMATCH PROGRAMMING EXAMPLE

1. Start by making a column for each compressor.
2. The first row must be all 0's.
3. Each row will be a step. Each step should increase rack capacity by the smallest increase in capacity possible.
4. Use an X in the column for a compressor being on, and a 0 in the column for a compressor being off. It may help to write the capacity in horsepower to the right of each row.
5. For each row, add the value of each column with an X in it and put it on the right of each row. These are the numbers you enter in for each step.
6. Adjust the X's and the 0's for equal runtime on each compressor.

A programming worksheet is available at the back of this manual.

Any unused steps must have a zero inserted for the numbers to prevent unwanted compressors from running.

Mixmatch Programming Worksheet								
Compr #	1	2	3	4	5	6	Total HP	Total Column Value
HP	4	4	5	6				
Column Value	1	2	4	8	16	32		
1							0	0
2	X						4	1
3			X				5	4
4				X			6	8
5	X	X					8	3
6		X	X				9	6
7		X					10	10
8			X	X			11	12
9	X	X		X			14	11
10	X		X	X			15	13
11	X	X	X	X			19	14
12								0
13								0
14								0
15								0
16								0

CONFIG MENU (continued)

2- DEFR SETUP

Press **2** on the Keypad to enter the Defrost Setup Submenu.

This screen programs the Control Board for the defrost parameters:

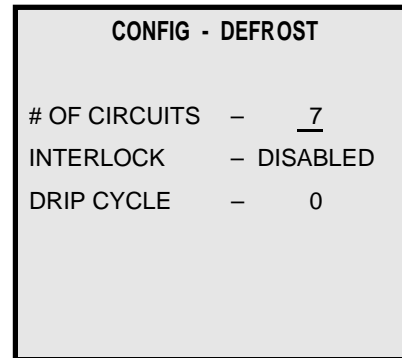
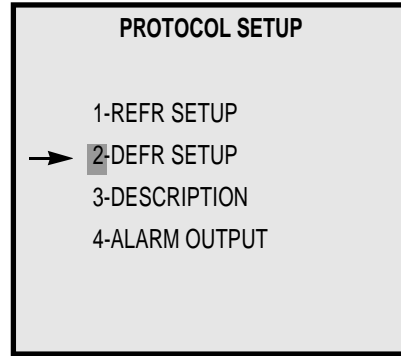
Number of defrost circuits controlled

Interlock status—
ENABLED/DISABLED

To change numeric fields, press the **CLR** key. Key in the applicable number. Press **ENT**. Use the **→** key, toggle between ENABLED/DISABLED. Press **ENT**.

Press **ESC** to return to PROTOCOL SETUP MENU.

Interlock is used when there is only one defrost circuit programmed into the control. If that one defrost circuit is electric, all compressors will turn on during the duration of the defrost. If the single defrost circuit is gas, the reverse cycle algorithm will be activated.



* This drip cycle is only used for reverse cycle gas defrost units.

CONFIG MENU (continued)

3- DESCRIPTION

Press **3** on the Keypad to enter the Description Submenu.

This screen provides for a 16 character description of the Protocol unit for user identification on Hussnet™.

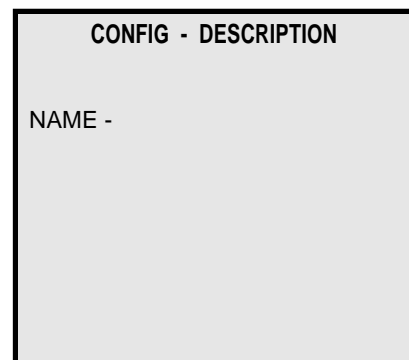
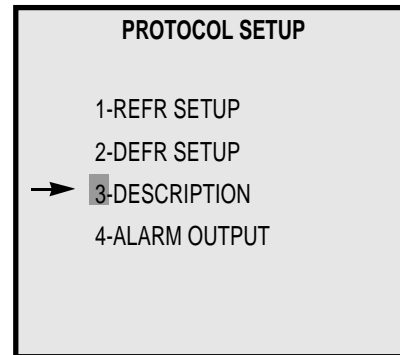
Press the **CLR** key.

Key in the description . Press **Shift Upper** to use the red (upper) letters and **Shift Lower** to use the blue (lower) letters.

Press **ENT**.

Press **ESC** to return to PROTOCOL SETUP MENU.

Press **ESC again** to return to CONFIG MENU.

**4- ALARM OUTPUT**

Press **4** on the Keypad to enter the Alarm Output Submenu.

The alarm output feature allows one of the 24 available outputs to be energized during the occurrence of any alarm (High/Low Pressure, High/Low Temp, etc.)

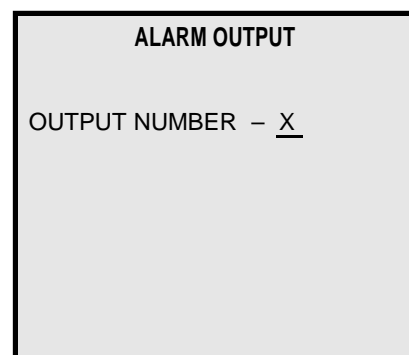
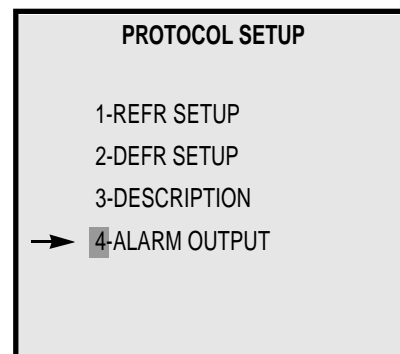
The output number refers to a relay which is wired into the main Protocol Alarm Relay (AR).

Key in the number (between 1 and 24). Make sure that the output is available and not being used by another function (defrost, lighting or temperature control).

Press **ENT**.

Press **ESC** to return to PROTOCOL SETUP MENU.

Press **ESC again** to return to CONFIG MENU.



CONFIG MENU (continued)

4- COMM SETUP

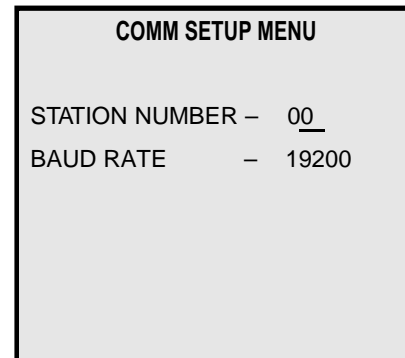
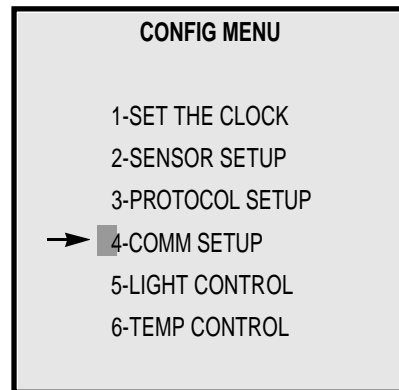
Press **4** on the Keypad to enter the Communication Setup Submenu.

This screen provides for assigning each Protocol a station number for computer identification on Hussnet™. It also provides baud rate assignment. The baud rate is the rate at which a computer can receive data from Protocol. All Protocols must have the same baud rate in order to communicate. A baud rate of 19200 is suggested.

Press the **CLR** key. Key in the number. Press **ENT**.

Press **ESC** to return to CONFIG MENU.

Note: All baud rates will be the same for all Protocols in a given store. However, the station numbers must be different.



CONFIG MENU (continued)

5- LIGHT CONTROL

Press **5** on the Keypad to enter the Light Control Submenu.

1-CIRCUIT #1

Press **1** or **2** on the Keypad to enter the Circuit # Submenu.

This screen programs lighting controls on one circuit.

Use the **→** key to toggle between **ENABLED / DISABLED** to activate the lighting function. Press **ENT**.

Using the **ENT** key, move down the selections.

Press **CLR**. Key in your selection and press **ENT**. The cursor will move down to the next sensor.

NAME identifies the lights on this circuit.

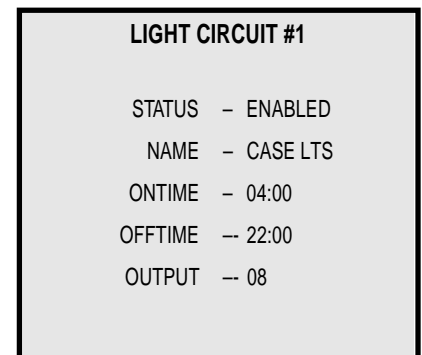
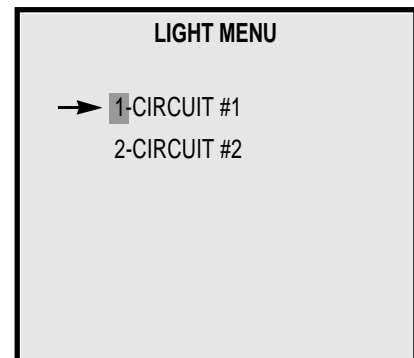
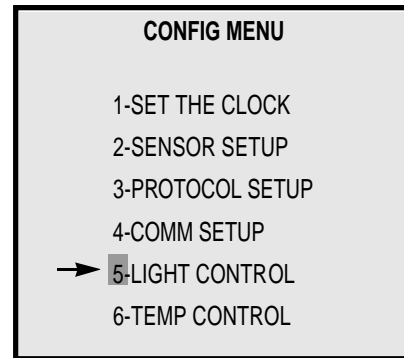
ONTIME controls when the lights turn on.

OFFTIME controls when the lights turn off.

OUTPUT controls the relay used by these PowerLinks™ (lighting circuit breakers).

Press **ESC** to return to **LIGHT MENU**.

Press **ESC again** to return to **CONFIG MENU**.



CONFIG MENU (continued)

6- TEMPERATURE CONTROL

Press **6** on the Keypad to enter the Temperature Control Submenu.

Note: Temperature Control is available on HAND HELD DEVICE V2.40 or greater.

Press the number of the Temp Refr Circuit you wish to view or use the **↑** and **↓** to move to the appropriate entry and press **ENT**.

1-REFR CIRCUIT #1

This screen allows configuration for temperature control of a given circuit.

Use the **→** key to toggle between **ENABLED / DISABLED** to activate the control function. Press **ENT**.

SETPOINT will be the setting the control will try to achieve for this circuit.

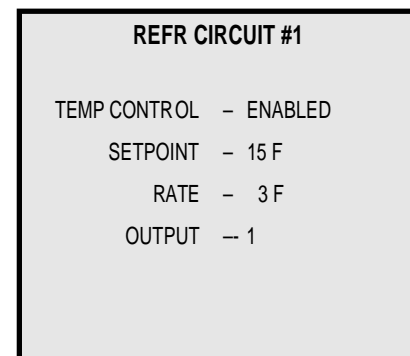
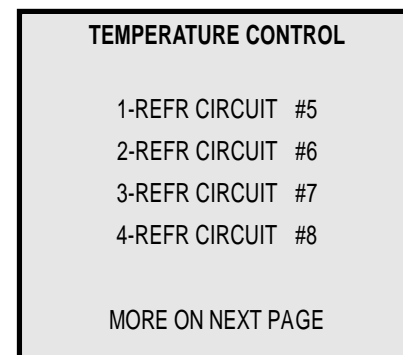
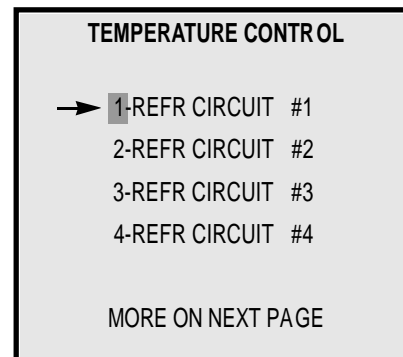
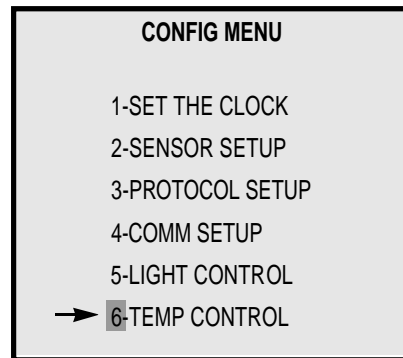
RATE is a number from 1 to 3 which allows the algorithm to be adjusted for different evaporators. A rate of 1 establishes a 30 second cycle rate for the output; 2 establishes a 60 second cycle rate; and 3 establishes a 90 second cycle rate. You may need to experiment with the rate adjustment in order to achieve the optimum level of performance.

OUTPUT controls the relay used by the corresponding Defrost Circuit.

Important – Verify the output number between this temperature circuit and the connected defrost circuit to ensure proper energizing and de-energizing of solenoids. Make sure that in the case of electric defrosts, you haven't selected the output that operates defrost heaters.

Press **ESC** to return to **TEMP CONTROL MENU**.

Press **ESC again** to return to **CONFIG MENU**.



DEFROST MENU

3-DEFROST MENU

Press **3** on the Keypad to enter the Defrost sub-menu.

1- VIEW/SET ITEMS

Press **1** on the Keypad to enter the VIEW/SET ITEMS Submenu.

This screen shows three columns:

CIRCUIT lists the defrost circuit within the Protocol. The numbers 1 through 8 are fixed.

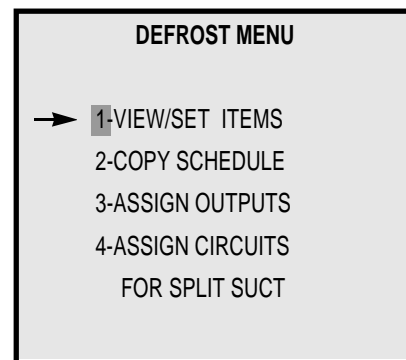
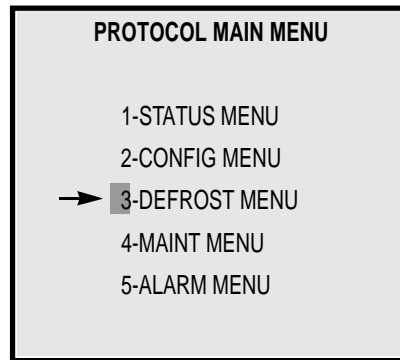
NAME refers to the description used to identify the defrost circuit.

STATUS lists the status of each defrost circuit.

- REFR = In refrigeration
- DEFR = In defrost
- DATV = DE-activated, will **not** defrost.
- TERM = Defrost terminated by temp.
- N/A = Not Available or Not Installed

The horizontal arrows are used to activate or deactivate a circuit for defrost control, to force a circuit in or out of refrigeration or defrost go to the MAINTENANCE MENU. Note that the DATV status permanently disables the defrost function.

Use the vertical arrows to move up and down the circuit list.



DEFROST MENU		
CIRCUIT	NAME	STATUS
1	CIRCUIT #1 NAME	REFR
2	CIRCUIT #2 NAME	DEFR
3	CIRCUIT #3 NAME	DATV
4	CIRCUIT #4 NAME	REFR
PRESS ENT TO SET		

DEFROST MENU (continued)

WITH THE CURSOR ON A CIRCUIT NUMBER, press the **ENT** key to open that circuit submenu.

CIRCUIT #6 - REFR

Press the **CLR** key. Key in the applicable Lineup name. Press **ENT**. Repeat for NAME, NUMBER/DAY, DEFR LENGTH and 1ST DEFR HOUR:MINUTES.

Note: To key in name, press **Shift Upper** to use the red (upper) letters and **Shift Lower** to use the blue (lower) letters.

Three different types of defrost may be used:

- Offtime
- Gas
- Electric

Using the **→** key, toggle to the desired defrost type. Press **ENT**.

The amperage number is used for electric defrosts to turn off compressors and reduce over-all amp draw.

Using the **→**key, toggle between **ENABLED / DISABLED** for defrost termination. Press **ENT**.

Note: the termination signal is provided by the appropriate Auxiliary input (i.e., AUX1 for CKT1, AUX2 for CKT2, ...).

The remaining defrosts are listed. The control panel spaces the number of defrosts evenly across a 24 hour day. To customize the defrost schedule, press the **CLR** key. Key in the applicable hour for defrost start. (Defrost times can be entered on the quarter hour – :00, :15, :30 or :45.) Press **ENT**. Press the **CLR** key. Key in the applicable minute for defrost start. Press **ENT**.

Press **ESC** to return to previous screen and to return to **VIEW / SET ITEMS MENU**.

Press **ESC again** to return to **DEFROST MENU**.

DEFROST MENU		
CIRCUIT	SYSTEM	STATUS
5	00	N/A
→ 6	00	N/A
7	00	N/A
8	00	N/A

PRESS ENT TO SET

CIRCUIT #6 - REFR	
NAME	-
DEFR TYPE	- OFTIM
NUMBER/DAY	- 03
DEFR LENGTH	- 15
1ST DEFR	- 00:00
AMPERAGE	- 00

CIRCUIT #6 - REFR	
DEFR TERM	- ENABLED
2ND DEFR	- 08:15
3ND DEFR	- 16:00

END OF DEFROSTS

DEFROST MENU (continued)

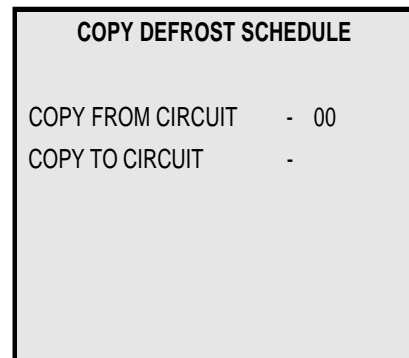
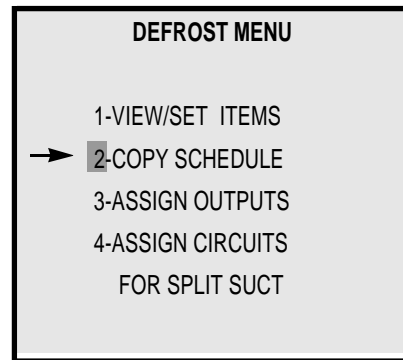
2- COPY SCHEDULE

Press **2** on the Keypad to enter the Copy Schedule Submenu.

Press the **CLR** key. Key in the applicable Circuit # for Copy From. Press **ENT**.

Press the **CLR** key. Key in the applicable Circuit # for Copy to. Press **ENT**.

Press **ESC** to return to DEFROST MENU.



DEFROST MENU (continued)

3- ASSIGN OUTPUTS

Press **3** on the Keypad to enter the Assign Outputs Submenu.

Press **ENT** to move the cursor to the value to be changed. Press the **CLR** key.

Key in the applicable Circuit #. Press **ENT**.

Electric defrost circuits will typically require two outputs (one for solenoid and one for heater control); while offtime and gas defrost circuits require only one.

Press **ESC** to return to DEFROST MENU.

DEFROST MENU	
1-VIEW/SET ITEMS	
2-COPY SCHEDULE	
→ 3-ASSIGN OUTPUTS	
4-ASSIGN CIRCUITS FOR SPLIT SUCT	

DEFROST BOARD #1	
OUTPUT	CIRCUIT
1	00
2	00
3	00
4	00

DEFROST BOARD #2	
OUTPUT	CIRCUIT
5	00
6	00
7	00
8	00

DEFROST BOARD #4	
OUTPUT	CIRCUIT
21	00
22	00
23	00
24	00

DEFROST BOARD #3	
OUTPUT	CIRCUIT
17	00
18	00
19	00
20	00

EXPANSION BOARD	
OUTPUT	CIRCUIT
13	00
14	00
15	00
16	00

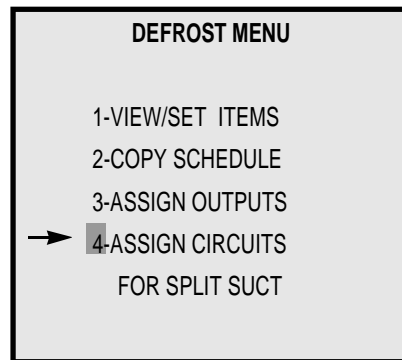
EXPANSION BOARD	
OUTPUT	CIRCUIT
9	00
10	00
11	00
12	00

DEFROST MENU (continued)

**4- ASSIGN CIRCUITS
FOR SPLIT SUCTION**

NOTE: This item only appears when the unit is configured for the split suction option.

Press **4** on the Keypad to enter the Assign Circuits For Split Suction Submenu.



Press **ENT** to move the cursor to the value to be changed. Press the **CLR** key.

Press the left and right arrow keys to toggle between suctions #1 and #2.

Press **ESC** to return to DEFROST MENU.

Press **ESC again** to return to PROTOCOL MAIN MENU.

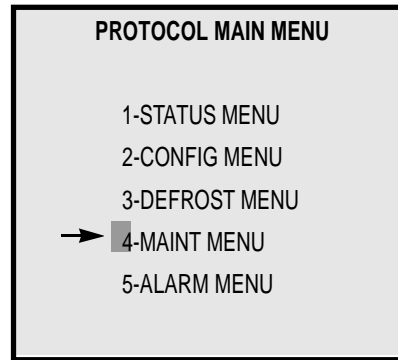
SUCTION ASSIGNMENT	
CIRCUIT	SUCTION
1	00
2	00
3	00
4	00

SUCTION ASSIGNMENT	
CIRCUIT	SUCTION
5	00
6	00
7	00
8	00

MAINT MENU

4- MAINT MENU

Press **4** on the Keypad to enter the Maintenance Menu Submenu. This screen has one function, four menus, and a second page.



The functions is: 2-CLEAR FORCE FLAG

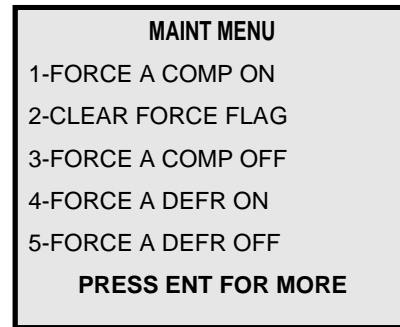
Simply press **2** to activate clear function.

Press Numbers **1, 3, 4, 5** on the Keypad to enter the Submenu. Key in compressor or defrost circuit #. Press **ENT**.

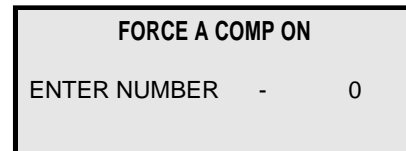
The time limit on COMPRESSORS forced on/off is 20 minutes. After time limit expires, compressors return to normal operation.

The time limit for DEFROST CIRCUITS forced on is a function of the defrost length programmed for that circuit. For circuits forced out of defrost, operation is suspended for the current defrost only. Normal operation resumes at the next scheduled defrost.

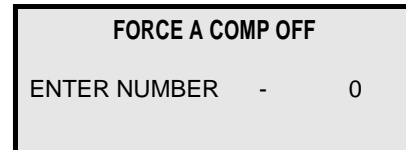
Press **ESC** to return to MAIN MENU.



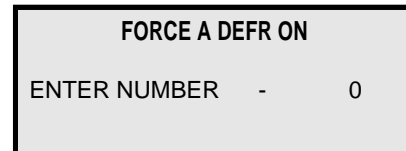
1



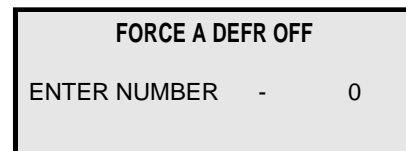
3



4



5



4- MAINT MENU

Press **4** on the Keypad to enter the Maintenance Menu Submenu.

Press **ENT** to move to the second page.
This screen has two functions and three menus.

The two functions are:

- 6-CLEAR RUN METER
- 9-CLEAR ALARM TABLE

Simply press **6** or **9** to activate clear function.

Press Numbers **7, 8, 0** on the Keypad to enter the Submenu. Key in compressor or defrost circuit #.
Press **ENT**.

Press **ESC** to return to **MAIN MENU**.

Options 9 and 0 are available with Software Version 2.30 or greater. Protocol™ Control must be V1.30 or greater

MAINT MENU	
6-CLEAR RUN METER	
7-FORCE LIGHT ON	
8-FORCE LIGHT OFF	
9-CLEAR ALM TABLE	
0-RESET CONTROL	

7

FORCE A LIGHT ON	
ENTER NUMBER	0

8

FORCE A LIGHT OFF	
ENTER NUMBER	0

0

RESET CONTROL	
ENTER NUMBER	0

ALARM MENU

5-ALARM MENU

Press **5** on the Keypad to enter the Alarm Submenu.

This screen lists the last 16 alarms giving the type, time (24 hour clock) and date of each. Alarms may be continued on the next screen. To read continued alarms, Press **ENT**.

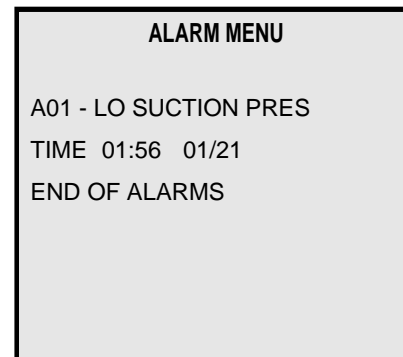
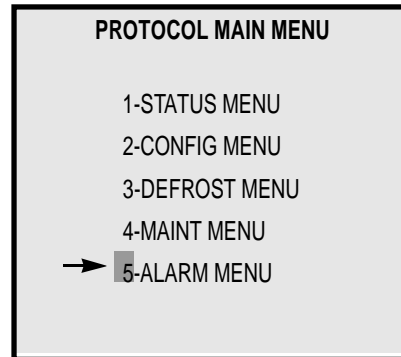
The screen will read END OF ALARMS after last alarm reading.

Press **ESC** to return to MAIN MENU. When exiting the menu, you will be prompted whether to clear the alarms. Press the **CLR** Key to remove the current alarm.

Types of Alarms

- POWER DOWN
- POWER RESET
- HI TEMPALARM – AUXILIARY INPUT
- MODULES IN BACKUP MODE
- HIGH SUCTION PRESSURE*
- LOW SUCTION PRESSURE*
- HIGH HEAD PRESSURE
- LOW HEAD PRESSURE
- ALL COMPRESSORS OFF ALARM*
- LO TEMPALARM – AUXILIARY INPUT
- HI ALARM T1
- LO ALARM T1
- HI ALARM T2
- LO ALARM T2
- HI ALARM T3
- LO ALARM T3
- MEMORY CHECK ERROR
- DEFROST MEMORY CHECK ERROR
- HI ALARM T4
- LO ALARM T4
- HI ALARM T5
- LO ALARM T5
- HI ALARM T6
- LO ALARM T6
- HI ALARM T7
- LO ALARM T7
- HI ALARM T8
- LO ALARM T8

*Denotes switchback. Control operated by mechanical low pressure switch. No defrosts occur during switchback.



Mixmatch Programming Worksheet								
Compr #	1	2	3	4	5	6	Total HP	Total Column Value
HP								
Column Value	1	2	4	8	16	32		
1	—	—	—	—	—	—	—	—
2	—	—	—	—	—	—	—	—
3	—	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—	—
5	—	—	—	—	—	—	—	—
6	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—
8	—	—	—	—	—	—	—	—
9	—	—	—	—	—	—	—	—
10	—	—	—	—	—	—	—	—
11	—	—	—	—	—	—	—	—
12	—	—	—	—	—	—	—	—
13	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—
15	—	—	—	—	—	—	—	—
16	—	—	—	—	—	—	—	—

Mixmatch Programming Worksheet								
Compr #	1	2	3	4	5	6	Total HP	Total Column Value
HP								
Column Value	1	2	4	8	16	32		
1	—	—	—	—	—	—	—	—
2	—	—	—	—	—	—	—	—
3	—	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—	—
5	—	—	—	—	—	—	—	—
6	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—
8	—	—	—	—	—	—	—	—
9	—	—	—	—	—	—	—	—
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HUSSMANN[®] CORPORATION

CONDENSING UNITS AND REFRIGERATION SYSTEMS

This warranty is made to the original purchaser user and is **NOT TRANSFERABLE**.

ONE YEAR LIMITED WARRANTY

1. Hussmann Corporation warrants the new Hussmann Equipment, and all parts thereof, to be free of defects in material and workmanship at time of purchase.
2. Hussmann's obligation under this warranty shall be limited to repairing or exchanging free of charge any part or parts of the system or unit, supplied by Hussmann Corporation, Bridgeton, Missouri, F.O.B. factory or the nearest authorized parts depot, which may prove to be defective within one year from date of original installation (not to exceed fifteen months from date of shipment from factory) and which is proven to the satisfaction of Hussmann to be thus defective.
3. THIS WARRANTY TO REPAIR OR REPLACE ABOVE RECITED, IS THE ONLY WARRANTY EXPRESSED, IMPLIED, OR STATUTORY MADE BY HUSSMANN WITH RESPECT TO THE EQUIPMENT ABOVE LISTED, AND IT NEITHER ASSUMES NOR AUTHORIZES ANY PERSON TO ASSUME FOR IT, ANY OTHER OBLIGATION OR LIABILITY IN CONNECTION WITH THE SALE OF SAID EQUIPMENT OR ANY PART THEREOF.

EXCLUSIONS

1. THIS WARRANTY SHALL NOT APPLY TO LOSS OF FOOD DUE TO FAILURE FOR ANY REASON.
2. HUSSMANN SHALL NOT BE LIABLE:
 - a. For any repairs or replacements made by buyer without written consent of Hussmann, or when equipment is installed or operated in a manner contrary to printed instructions covering installation and service which accompanied or was supplied for such equipment.
 - b. For any damages, delays, losses, direct or consequential, caused by defects, nor for damages caused by short or reduced supply of material, fire, flood, strikes, acts of God or circumstances beyond its control.
 - c. When the failure or defect of any part or parts is incident to ordinary wear, accident, abuse or misuse, or when the serial number of the equipment has been removed, defaced, altered or tampered with.
 - d. When equipment is operated on low or improper voltages, or put to use other than normally recommended by Hussmann.
 - e. For payment of any removal or installation charges of warranted parts.
 - f. For payment of refrigerant losses for any reasons.
 - g. When equipment is moved to an address other than the original installation.

ADDITIONAL FOUR YEAR PROTECTION PLAN FOR MOTOR/COMPRESSOR ASSEMBLY ONLY (OPTIONAL – MUST BE PURCHASED PRIOR TO SHIPMENT OF CONDENSING UNIT OR REFRIGERATION SYSTEM)

In addition to the above One Year Warranty on said Condensing Unit or Refrigeration System, Hussmann Corporation, agrees to repair or replace the motor compressor only, with a motor compressor of like or authorized similar capacity (F.O.B. Factory or nearest Vendor authorized parts depot), at any time during this four year period immediately following the expiration of the above one year warranty, if proven to the satisfaction of Hussmann, that the compressor is inoperative due to defects in factory workmanship or material under normal use and service. Hussmann reserves the right to inspect the job site, installation and reason for failure.

The Four Year Protection Plan does not include controls, relay, capacitor, overload protector, valve plates, oil pumps, gaskets or any external part on the motor compressor replaceable in the field, or any other part of the refrigeration system.

GENERAL CONDITIONS

No service or labor charges incidental to the replacement of parts during the First Year Warranty and the succeeding four years under the protection plan will be allowed under the terms thereof.

All claims must be presented and completed within six months from date of failure. Claims must be accompanied by the vendor invoice and credit showing model and serial number of compressor that failed and the new replacement compressor. Records should be maintained with copies of above documents to show any inwarranty replacements within the One Year Warranty and should be submitted along with claim to show original compressor model and serial number.

HUSSMANN CORPORATION
Bridgeton, Missouri 63044 – U.S.A.

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