Carrier
United Technologies

AquaForce®
30XA140-352
Variable Speed Air-Cooled Liquid Chillers
with Greenspeed® Intelligence
and Touch Pilot™ Controls

Controls, Start-Up, Operation, Service and Troubleshooting

CONTENTS

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CONTENTS (cont)

SAFETY CONSIDERATIONS

Installing, starting up, and servicing this equipment can be hazardous due to system pressures, electrical components, and equipment location (roof, elevated structures, etc.). Only trained, qualified installers and service technicians should install, start up, and service this equipment. When working on this equipment, observe precautions in the literature, on tags, stickers, and labels attached to the equipment, and any other safety precautions that apply. Follow all safety codes. Wear safety glasses and work gloves. Use care in handling, rigging, and setting this equipment, and in handling all electrical components.

⚠ WARNING

Electrical shock can cause personal injury and death. Shut off all power to this equipment during installation and service. There may be more than one disconnect switch. Tag all disconnect locations to alert others not to restore power until work is completed.

⚠ WARNING

Electrical shock can cause personal injury and death. After unit power is disconnected, wait at least 20 minutes for the VFD (variable frequency drive) capacitors to discharge before opening drive.

⚠ WARNING

DO NOT VENT refrigerant relief valves within a building. Outlet from relief valves must be vented in accordance with the latest edition of ANSI/ASHRAE (American National Standards Institute/American Society of Heating, Refrigerating and Air-Conditioning Engineers) 15 (Safety Code for Mechanical Refrigeration). The accumulation of refrigerant in an enclosed space can displace oxygen and cause asphyxiation. Provide adequate ventilation in enclosed or low overhead areas. Inhalation of high concentrations of vapor is harmful and may cause heart irregularities, unconsciousness or death. Misuse can be fatal. Vapor is heavier than air and reduces the amount of oxygen available for breathing. Product causes eye and skin irritation. Decomposition products are hazardous.

⚠ WARNING

DO NOT USE TORCH to remove any component. System contains oil and refrigerant under pressure.

To remove a component, wear protective gloves and goggles and proceed as follows:

a. Shut off electrical power to unit.
b. Recover refrigerant to relieve all pressure from system using both high-pressure and low pressure ports.
c. Traces of vapor should be displaced with nitrogen and the work area should be well ventilated. Refrigerant in contact with an open flame produces toxic gases.
d. Cut component connection tubing with tubing cutter and remove component from unit. Use a pan to catch any oil that may come out of the lines and as a gage for how much oil to add to the system.
e. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

Failure to follow these procedures may result in personal injury or death.

⚠ CAUTION

Compressors require specific rotation. Test condenser fan(s) first to ensure proper phasing. Swap any two incoming power leads to correct condenser fan rotation before starting compressors. Operating the unit without testing the condenser fan(s) for proper phasing could result in equipment damage.

⚠ CAUTION

DO NOT re-use compressor oil or any oil that has been exposed to the atmosphere. Dispose of oil per local codes and regulations. DO NOT leave refrigerant system open to air any longer than the actual time required to service the equipment. Seal circuits being serviced and charge with dry nitrogen to prevent oil contamination when timely repairs cannot be completed. Failure to follow these procedures may result in damage to equipment.

⚠ CAUTION

This unit uses a microprocessor control system. Do not short or jumper between terminations on circuit boards or modules; control or board failure may result.

Be aware of electrostatic discharge (static electricity) when handling or making contact with circuit boards or module connections. Always touch a chassis (grounded) part to dissipate body electrostatic charge before working inside control center.

Use extreme care when handling tools near boards and when connecting or disconnecting terminal plugs. Circuit boards can easily be damaged. Always hold boards by the edges and avoid touching components and connections.

This equipment uses, and can radiate, radio frequency energy. If not installed and used in accordance with the instruction manual, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to International Standard in North America EN 61000-2/3 which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

Always store and transport replacement or defective boards in anti-static shipping bag.

⚠ CAUTION

To prevent potential damage to heat exchanger tubes, always run fluid through heat exchanger when adding or removing refrigerant charge. Use appropriate antifreeze solutions in cooler fluid loop to prevent the freezing of heat exchanger or interconnecting piping when the equipment is exposed to temperatures below 32 F (0° C). Proof of flow switch is factory installed on all models. Do NOT remove power from this chiller during winter shut down periods without taking precaution to remove all water from heat exchanger. Failure to properly protect the system from freezing may constitute abuse and may void warranty.

IMPORTANT: If the compressor VFD enclosure is removed for service, it *must* be reinstalled to protect the drive from water intrusion.

GENERAL

This publication contains Controls, Operation, Start-Up, Service and Troubleshooting information for the 30XA140-352 air-cooled liquid chillers with Greenspeed® intelligence and electronic controls. The 30XA chillers are equipped with Touch Pilot™ controls, electronic expansion valves, and variable speed fans and compressors. The AquaForce® 30XA chillers with Greenspeed intelligence come equipped with a 7-in. Touch Pilot display.

Conventions Used in This Manual — The following conventions for discussing configuration points for the Touch Pilot display will be used in this manual.

The menu items are shown in this document as they appear on the Touch Pilot display. A path name for each item will show the user how to navigate through the Touch Pilot display to reach the desired configuration. The arrow symbol (→) in the path name represents touching the menu item on the screen

of the Touch Pilot™ display. See Appendix A for a complete list of Touch Pilot menu items and descriptions.

The CCN and BACnet* point names are shown in **bold**. See Appendix B for a list of CCN points, and Appendix D for a list of BACnet points.

Abbreviations Used in This Manual — The following abbreviations are used in this manual:

- ABV — Actuated ball valve
- AUX — Auxiliary (Board)
- BACnet — Building Automation and Controls Network. Open Protocol for the controlled exchange of data between two or more intelligent control devices or BMS. BACnet is used over IP (Internet Protocol).
- BMS — Building Management System. A computer-based control system installed in buildings that controls and monitors the building's mechanical and electrical equipment such as ventilation, lighting, power systems, fire systems, and security systems. A BMS consists of software and hardware.
- CCN — Carrier Comfort Network®. Protocol for the controlled exchange of data between two or more intelligent PIC (Peripheral Interface Controller)/FID (Field Interface Device) devices within the geographic confines of a single building.
- CWFS — Chilled water flow switch
- DGT — Discharge gas temperature
- DP — Discharge pressure
- EMM — Energy Management Mdoule
- EWT — Entering water temperature
- FSM — Flotronic system manager. System that enables user to control several chillers.
- HMI — Human Machine Interface
- LEN — Local Equipment Network. Protocol for the controlled exchange of data between two or more intelligent control devices within the geographic confines of a single Carrier equipment installation.
- LP — Liquid pressure
- LWT — Leaving water temperature
- OAT — Outdoor air temperature
- SCT — Saturated condensing temperature
- SDT — Saturated discharge temperature
- SLT — Saturated liquid temperature
- SIOB — Standard Input/Output Board
- SM — System Manager
- SP — Suction pressure
- SST — Saturated suction temperature

Touch Pilot Display User Interface — The Touch Pilot display is the standard user interface on all 30XA chillers with Greenspeed® intelligence. The display includes a large 7-in. LCD (liquid crystal display) touch screen for display and user configuration. A stylus is recommended for use on the touch screen. The stylus is included with the unit.

WELCOME SCREEN — The Welcome screen is the first screen shown after starting the Touch Pilot HMI. It displays the application name as well as the current software version number. See Fig. 1.

NOTE: If a communication failure occurs, the HMI Settings button is displayed (see Table 1).

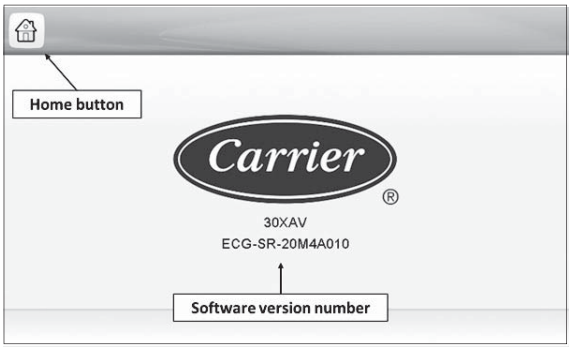
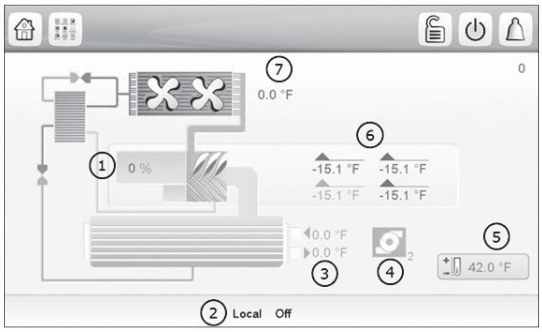


Fig. 1 — Welcome Screen

To exit the Welcome screen, press the Home button  .

HOME SCREEN — The Home screen provides an overview of system controls, allowing the user to monitor the vapor-refrigeration cycle. The screen indicates the current status of the unit, giving information on the unit capacity, refrigerant conditions, the status of the evaporator pumps, the active setpoint, and other information. See Fig. 2.



LEGEND

1 — Unit capacity percentage
2 — Unit status
3 — Evaporator inlet and outlet water temperature
4 — Pump status (if configured)
5 — Active setpoint
6 — SDT/SST (Ckt. A in color, Ckt. B gray)
7 — Outdoor air temperature

Fig. 2 — Home Screen

The following buttons appear on the top panel of the home screen. See Table 1 for more general screen buttons.


Main Menu — Press the Main Menu button to access all unit functions. See Main Menu Screen on page 6 for details.


Log In — Press to enter passwords and select language or change the system of measurement. See page 6 for login details.


Start/Stop — Press to access the chiller operating modes menu. See page 22 for details on available operating modes.


Alarm — The alarm icon turns solid or blinks red when a fault is detected. See page 81 for details on system alarms and alerts.

STATUS MESSAGE BOX — Messages may be displayed in the status bar at the bottom of the screen relevant to the current user action. See Table 2.

*Sponsored by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers)

Table 1 — Screen Buttons

BUTTON	FUNCTION
TOP LEFT PANEL — GENERAL NAVIGATION	
	Home button: Goes back to the home screen. Button is disabled at power up, until the initialization is complete.
	Main Menu button: Goes to the Main Menu screen from the Home screen. Allows access to unit menus and parameters. See page 6.
	Back button: Goes to previous screen.
	HMI Settings: Goes to the Touch Pilot settings. Button appears in the Welcome screen only when a communication failure occurs, to provide the user a chance to fix the problem.
TOP RIGHT PANEL — SPECIAL NAVIGATION	
	Login button: Goes to the User Login screen, where the user can select a display language and system of measurement, and log in. See page 6. Icon shows a closed lock when the user is not logged in, and an opened lock when the user is logged in.
	Start / Stop button: Goes to the chiller start / stop screen. The icon can be gray, green, or blinking between gray and green. See the Machine Control Methods section on page 22.
	Alarm button: Goes to the alarm menu screen.The icon can be gray, red, or blinking between gray and red. See the Alarms and Alerts section on page 81.
BOTTOM LEFT PANEL — ACTIONS SPECIFIC TO CURRENT SCREEN OPERATION	
	User Login screen: Login / Logout. Login button (green check mark) validates the currently entered user level (Basic, User, Service Or Factory), and jumps back to the previous screen. Logout button (red X) resets the user level and jumps to the Welcome screen.
	Start / Stop button: Goes to the chiller start / stop screen. The icon can be gray, green, or blinking between gray and green. See the Machine Control Methods section on page 22.
	Force Screen: Set Force/Remove Force. Set Force button sends a CCN Force command to the point. Remove Force button sends a CCN Auto command to the point.
BOTTOM RIGHT PANEL — SCROLLING INSIDE CURRENT SCREEN	
	Up and Down arrows: Scroll within screen content. A page indicator shows what page is being viewed, and the total number of pages.

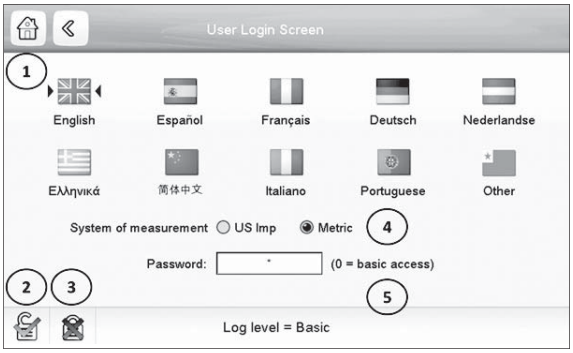
Table 2 — Status Messages

MESSAGE	STATUS
COMMUNICATION FAILURE!	Equipment controller did not respond while reading the table content.
ACCESS DENIED!	Equipment controller denies access to one of the tables. See Touch Pilot Login and Display Setup, page 6.
LIMIT EXCEEDED!	The value entered exceeds the parameter limit.
Save changes?	Modifications have been made. The exit must be confirmed be pressing Save or Cancel.
HIGHER FORCE IN EFFECT!	Equipment controller rejects Force or Auto command. See Table 1.

TOUCH PILOT™ LOGIN AND DISPLAY SETUP — Certain control functions and navigation menus are password protected. There are multiple levels of user access on the Touch Pilot display, each with independent password protection:

- All — At initial start-up and after a timeout period, the access type defaults to All. In this mode the user can view system operating conditions, and select the setpoint only.
- User — The User access level authorizes access to modify the Setpoint Table and some Configuration Menu parameters, as well as access to all menus accessible with the Basic mode. The default password for User level access is 11. To change the User access password, go to Main Menu → Configuration Menu → User Configuration, then enter the new password and press the Save button.
- Service — The Service access level authorizes access to all menus and parameters needed for operation and service of the machine, including Quick Test and Maintenance Menus as well as additional Configuration Menus. The default password for Service level access is 88. To change the Service access password, go to Main Menu → Configuration Menu → Service Parameters, then scroll to the password entry area. Enter the new password and press the Save button.
- Factory — The Factory access level authorizes access to all menus and parameters for the unit, including factory settings. The default password for Factory level access is 113. To change the Factory access password, go to Main Menu → Configuration Menu → Factory Menu, then scroll to the password entry area. Enter the new password and press the Save button.

To log in to the Touch Pilot display, press the Login button on the Main Menu or the Home screen and input the required password on the User Login screen. Then press the Login button on the User Login screen. See Fig. 3.



LEGEND

1 — Arrows indicate selected language
2 — Login button (confirm changes)
3 — Logout button (cancel changes)
4 — System of measurement selection
5 — Password dialog box

Fig. 3 — User Login Screen

Changing the Touch Pilot Display Language — The User Login Screen (Fig. 3) offers 9 language selections for the Touch Pilot Display: English, Spanish, French, German, Dutch, Greek, Chinese, Italian, and Portuguese. The factory default language is English. To change the display language, simply select the language icon on the User Login screen.

Changing the Units of Measurement — The User Login Screen (Fig. 3) offers 2 choices for units of measurement: US Imperial or Metric. The factory default is Metric. To change the measurement system, select the appropriate system on the User Login screen.

MAIN MENU SCREEN — The Main Menu provides access to the main control parameters, including general parameters, temperatures and pressures, inputs and outputs status, and others. Press the Main Menu button on the Home screen to access the Main Menu.

Figure 4 shows the first page of the Main Menu. To navigate through the pages, press the arrows at the lower right corner of the screen.

To view or modify system parameters, press the appropriate icon on the Main Menu. For example, to access the General Parameters table, press the General Parameters button.

Figure 5 shows the first page of the General Parameters table. Use the arrows at the bottom right corner to navigate the General Parameters table.

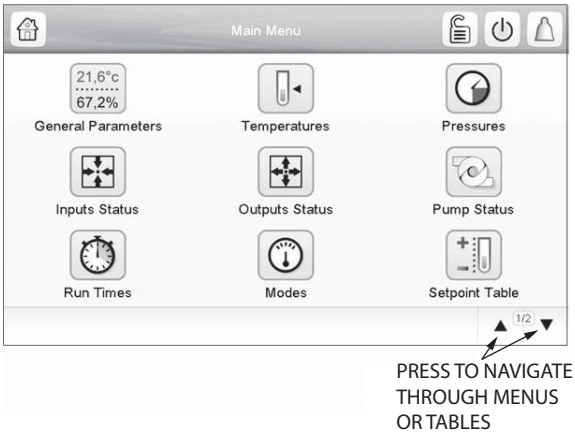


Fig. 4 — Main Menu

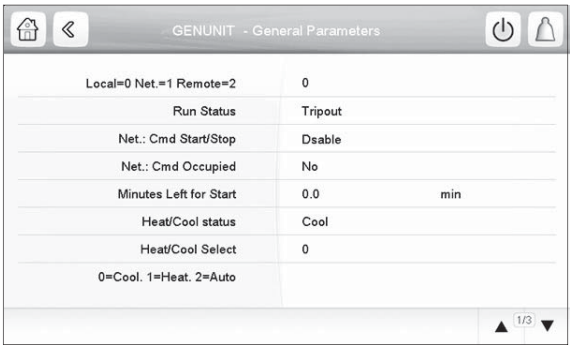


Fig. 5 — General Parameters, Page 1

Points that can be changed with the current level of user access are outlined by a box. For example, to modify the setpoint parameter, select the current setpoint on page 2 of the General Parameters table. See Fig. 6.

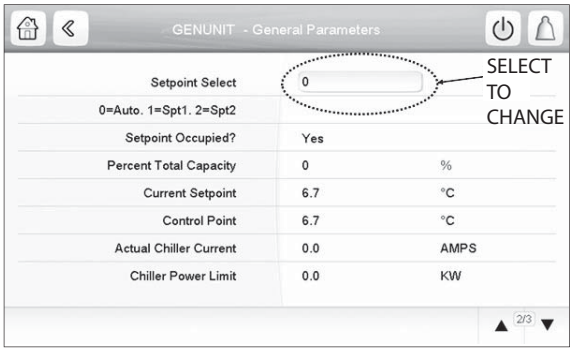


Fig. 6 — General Parameters, Page 2

The data entry screen will be displayed (Fig. 7). Use the graphic "keyboard" to modify the parameter, then press OK to save or EXIT to cancel the modifications.

Fig. 7 — Data Entry Screen

Since Setpoint Select (Fig. 6) is a forcible point (the operator is able to manually override the auto function), the Force Variable screen will be displayed. See Fig. 8. The Force Variable screen provides the option to override the current operation of the unit.

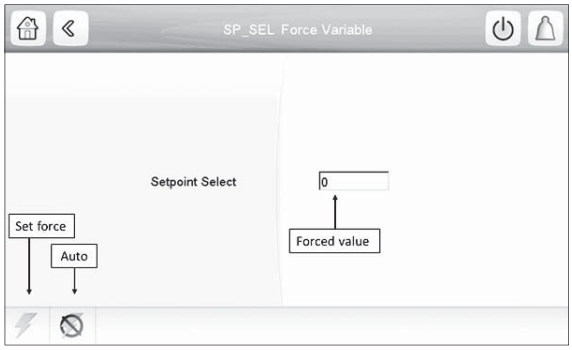
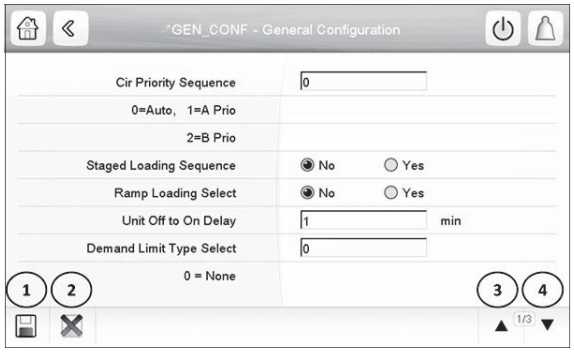


Fig. 8 — Force Variable Screen

Enter the forced value, then press to set the forced point or to remove it (return to Auto).

GENERAL CONFIGURATION TABLE — This table contains configuration settings for the unit. Select Main Menu → Configuration Menu → General Configuration to access the table (Fig. 9).



LEGEND
1 — Save
2 — Cancel
3 — Previous page
4 — Next page

Fig. 9 — General Configuration, Page 1

Press the field corresponding to the parameter to be modified and make the necessary changes. When all necessary changes have been made, press the Save button to confirm or the Cancel button to cancel changes. For a complete list of general parameters, see Appendix A.

TRENDINGS SCREEN — The Trendings screen allows for easy monitoring of parameters selected by the user. To access the Trendings screen, select Trendings on the Main Menu. See Fig. 10.

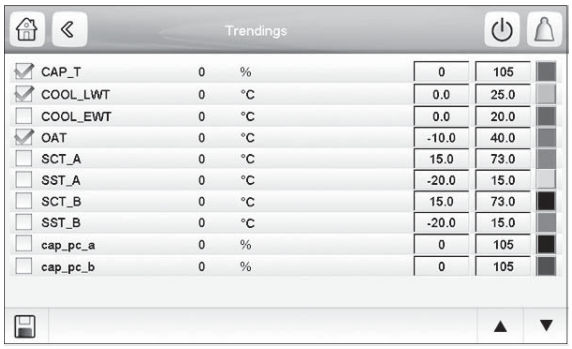


Fig. 10 — Trendings Screen, Page 1

Select the parameters to be displayed and press . Press the up/down page buttons ▲ 1/2 ▼ to see the graph showing the performance of the unit during a selected period of time. See Fig. 11.

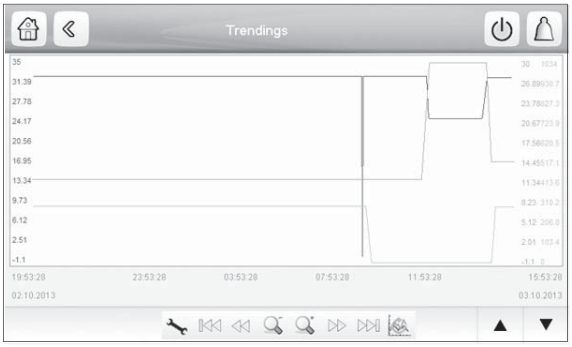


Fig. 11 — Trendings Screen, Page 2

Use the following buttons to adjust the Trendings display:

Press to adjust time and date settings for the display.

Navigate across the timeline.

Go to beginning or end of selected period.

Zoom in to magnify the view.

Zoom out to expand the viewed area.

Refresh (reload) data.

MENU ARCHITECTURE — See Fig. 12-14 for Touch Pilot™ menu structure. The options displayed depend on the user's access level as shown in the figures. The user can navigate through the Touch Pilot display screens by selecting the buttons that appear on the screen. When a button is selected, either a submenu or a list of parameters and values will be shown.

If the list of point names and values are shown, the top line of the display is the table name. Selecting an item will cause a Point Data dialog box to appear. For a complete listing of tables and points with display names and CCN point names, see Appendix A.

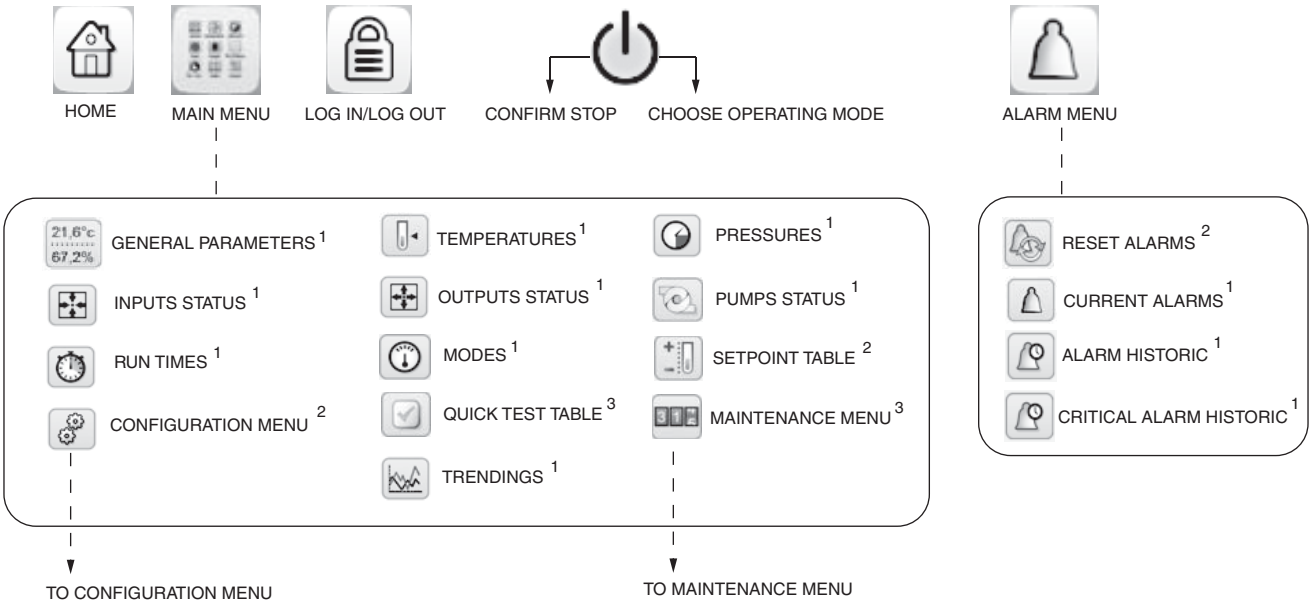


Fig. 12 — Main Menu and Alarm Menu Structure

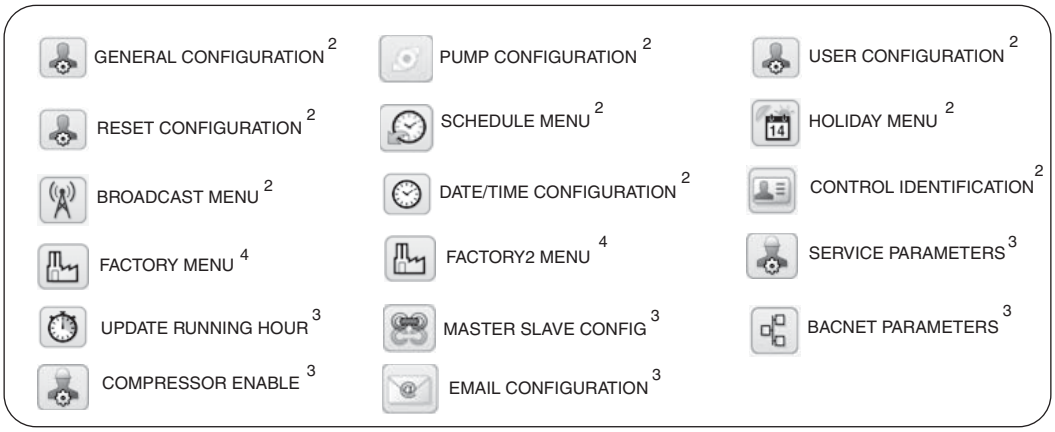


Fig. 13 — Configuration Menu Structure

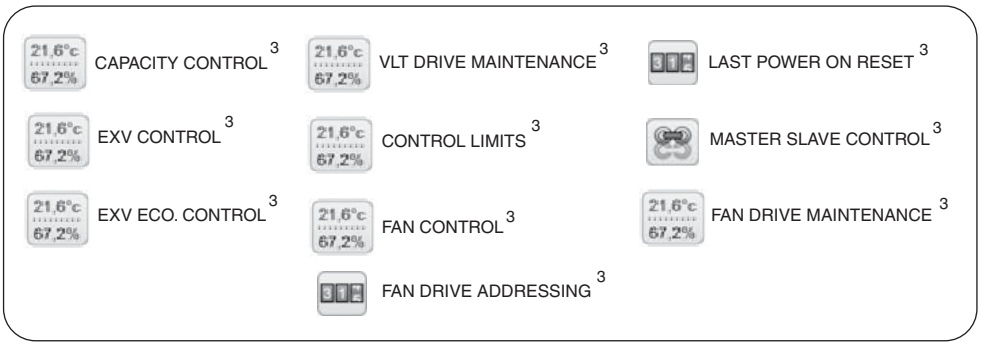


Fig. 14 — Maintenance Menu Structure

LEGEND — FIG. 12-14

1 — All (no password required)
2 — User access required (default password = 11)
3 — Service access required (default password = 88)
4 — Factory access required (default password = 113)

NOTE: For more information about password access, see the section Touch Pilot™ Login and Display Setup on page 6.

SETTING TIME AND DATE — The date and time for the controls can be set by opening the Main Menu → Configuration Menu → Date/Time Configuration. The date, time, day of the week, and daylight saving time option can be set on this screen.

WEB INTERFACE — The Touch Pilot control can be accessed via a web browser. See Appendix H for detailed information on setting up and accessing the web interface.

TOUCH PILOT™ INTERFACE PARAMETERS — The Touch Pilot screen can be customized with additional parameters for connectivity and display. See Appendix H for details.

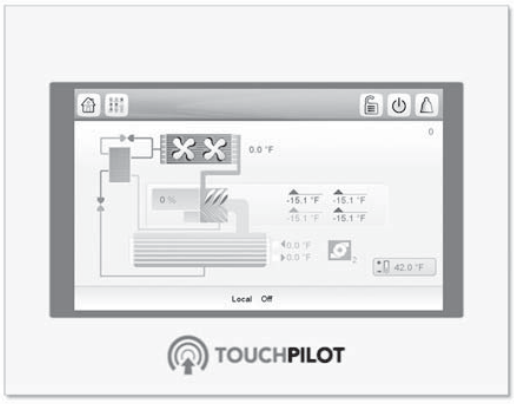
CONTROLS

The 30XA air-cooled liquid chillers with Greenspeed® intelligence contain the Touch Pilot™ electronic control system that controls and monitors all operations of the chiller. The control system is composed of several components as listed in the following sections. All machines have a Touch Pilot module, Standard Input/Output (SIOB) boards, Emergency On/Off switch, and an Enable-Off-Remote Contact switch.

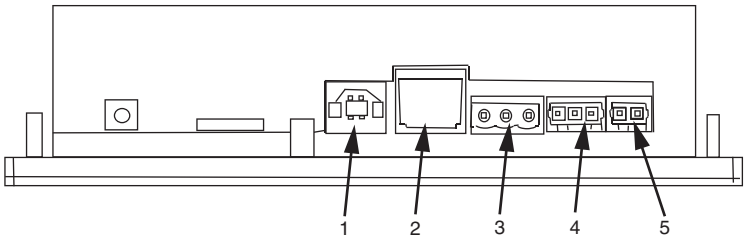
Touch Pilot — The Touch Pilot module is the core of the control system. It contains the major portion of operating software and controls the operation of the machine. See Fig. 15. The Touch Pilot module continuously monitors input/output channel information received from the SIOB boards. The Touch Pilot receives inputs from status and feedback switches, pressure transducers and thermistors. The Touch Pilot module also controls several outputs. Some inputs and outputs that control the chiller are located on other boards, but are transmitted to or from the Touch Pilot module via the internal communications bus. Information is transmitted between modules via a 3-wire communication bus or LEN (Local Equipment Network). The CCN (Carrier Comfort Network®) bus is also supported. Connections to both LEN and CCN buses are made at terminal board TB3 located within the control box enclosure below the Touch Pilot display. For a description of Touch Pilot display port connections, see Table 3.

Table 3 — Touch Pilot Display Port Connections

CONNECTOR	PIN	FUNCTION
X5 (Power)	1	24 VAC +
	2	24 VAC –
X4 (LEN)	1	RS485 Port (D+)
	2	RS485 Port (GND)
	3	RS485 Port (D–)
X3 (CCN)	1	RS485 Port (D+)
	2	RS485 Port (GND)
	3	RS485 Port (D–)
X2 (Ethernet)	1	—
X1 (USB)	1	—



TOUCH PILOT DISPLAY INTERFACE



1 - USB CONNECTOR
2 - ETHERNET CONNECTOR
3 - CCN CONNECTOR
4 - LEN CONNECTOR
5 - POWER SUPPLY CONNECTOR (24 VAC)

TOUCH PILOT BOTTOM VIEW

Fig. 15 — Touch Pilot Display Interface and Connectors

Input/Ouput (SIOB) Boards — There are two SIOB (Standard Input/Output Boards) boards for each unit, SIOB-A for Circuit A and SIOB-B for circuit B. See Fig. 16. The device receives inputs from thermistors, transducers, demand limit switch, dual setpoint switch, remote-on-off switch, chilled water flow switch, oil level switch, and cooler heater current sensing switch, and provides output control to expansion valves, load and unload solenoids, cooler heater contactor, customer supplied alarm, and running relays. Information is transmitted between the SIOB board and the main control board via a 3-wire communication bus or LEN (Local Equipment Network). Connections for the LEN bus are J12 and J13. Each SIOB board has a 4-position DIP switch bank used for addressing of the board. SIOB-A is at address 49 and SIOB-B is at address 50. See below for SIOB board DIP switch settings. See Tables 4 and 5 for a list of inputs and outputs for the two SIOB boards.

SIOB-A DIP Switch	1	2	3	4
Position:	OFF	OFF	OFF	OFF

SIOB-B DIP Switch	1	2	3	4
Position:	ON	OFF	OFF	OFF

Auxiliary (AUX) Boards — Two AUX boards, AUX Board 2 and AUX Board 3, are installed in each unit. (AUX Board 1 is field installed only with the Dual Chiller Accessory.) See Fig. 17. The AUX boards respond to commands from the Touch Pilot™ module and send the Touch Pilot module the results of the channels they monitor via the Local Equipment Network (LEN). See below for AUX board 1, 2, and 3 DIP switch settings. See Tables 6-8 for a list of inputs and outputs for the AUX boards.

AUX BOARD 1 DIP SWITCH	1	2	3	4	5	6	7	8
Address:	OFF	ON	OFF	OFF	ON	OFF	ON	OFF

AUX BOARD 2 DIP SWITCH	1	2	3	4	5	6	7	8
Address:	ON	ON	OFF	OFF	ON	OFF	ON	OFF

AUX BOARD 3 DIP SWITCH	1	2	3	4	5	6	7	8
Address:	OFF	OFF	ON	OFF	ON	OFF	ON	OFF

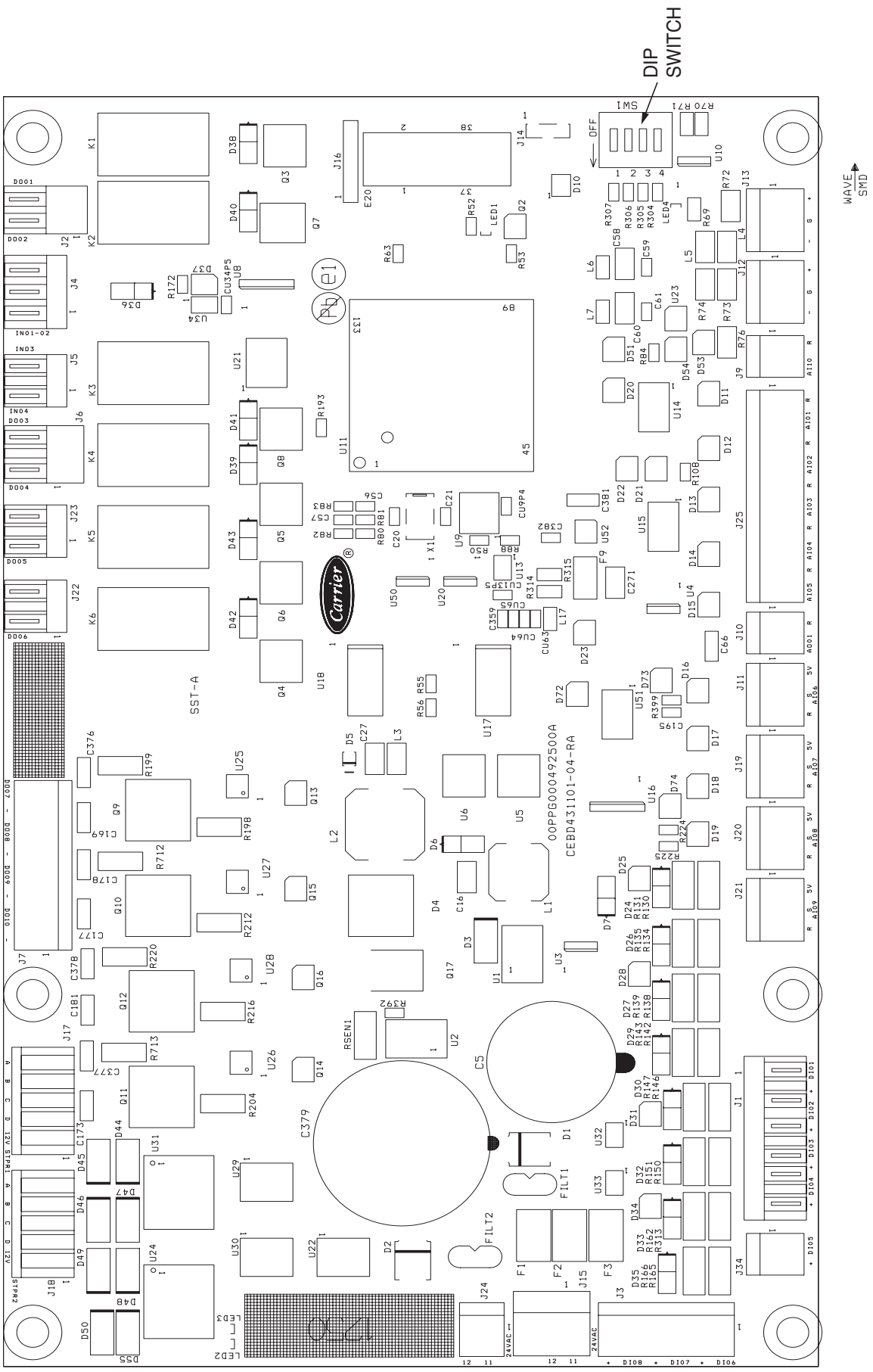


Fig. 16 — SIOB (Standard Input/Output Board)

Table 4 — SIOB-A Inputs and Outputs

ITEM	IN/OUT TYPE	BOARD CONNECTOR	CCN POINT	DESCRIPTION
DI-01	Dry contact	J1	ONOFF_SW	On/Off remote switch
DI-02	Dry contact		SP-SW	Second setpoint switch
DI-03	Dry contact		LIM-SW1	Demand limit switch no. 1
DI-04	Dry contact		— Not Used —	
DI-05	Dry contact	J34	ELEC_BOX	— Not Used —
DI-06	Dry contact	J3	OIL_L_A	Oil level Circuit A
DI-07	Dry contact		FLOW_SW	Flow switch input
DI-08	Dry contact		HTR_FBK	Cooler heater feedback
AI-01	Temp (5000 Ω)	J25	EWT	Entering water temperature
AI-02	Temp (5000 Ω)		LWT	Leaving water temperature
AI-03	Temp (5000 Ω)		OAT	Outdoor air temperature
AI-04	Temp (5000 Ω)		CP_TMP_A	Compressor motor temperature Circuit A
AI-05	Temp (5000 Ω)		ECO_T_A	Economizer temperature Circuit A
AI-06	Pressure	J11	DP_A	Discharge pressure Circuit A
AI-07	Pressure	J19	SP_A	Suction pressure Circuit A
AI-08	Pressure	J20	ECO_P_A	Economizer pressure Circuit A
AI-09	Pressure	J21	OP_A	Oil pressure Circuit A
AI-10	4 to 20 mA	J9	— Not Used —	
DO-01	Relay output	J2	— Not Used —	
DO-02	Relay output		ELECBOX_FAN	Electrical box fan output
DO-03	Relay output	J6	CPUMP1	Cooler pump output 1
DO-04	Relay output		CPUMP2	Cooler pump output 2
DO-05	Relay contact	J23	ALARM	Alarm outputs
DO-06	Relay contact	J22	RUNNING	Running outputs
DO-07	Triac	J7	SET_FLOW	Flow switch config output
DO-08	Triac		COOL_HTR	Cooler heater
DO-09	Triac		SLIDEV1_A	Slide valve 1 output Circuit A
DO-10	Triac		SLIDEV2_A	Slide valve 2 output Circuit A
STPR1	Stepper motor	J17	EXV_A	Expansion valve Circuit A
STPR2	Stepper motor	J18	EXV_EC_A	Expansion valve economizer Circuit A
AO-01	0 to 10 VDC	J10	— Not Used —	

LEGEND

AI — Analog Input
AO — Analog Output
DI — Discrete Input
DO — Discrete Output
STPR — Stepper Motor Output

Table 5 — SIOB-B Inputs and Outputs

ITEM	IN/OUT TYPE	BOARD CONNECTOR	CCN POINT	DESCRIPTION
DI-01	Dry contact	J1	— Not Used —	
DI-02	Dry contact		— Not Used —	
DI-03	Dry contact		— Not Used —	
DI-04	Dry contact		— Not Used —	
DI-05	Dry contact	J34	— Not Used —	
DI-06	Dry contact	J3	OIL_L_B	Oil level Circuit B
DI-07	Dry contact		— Not Used —	
DI-08	Dry contact		— Not Used —	
AI-01	Temp (5000 Ω)	J25	— Not Used —	
AI-02	Temp (5000 Ω)		— Not Used —	
AI-03	Temp (5000 Ω)		— Not Used —	
AI-04	Temp (5000 Ω)		CP_TMP_B	Compressor motor temperature Circuit B
AI-05	Temp (5000 Ω)		ECO_T_B	Economizer temperature Circuit B
AI-06	Pressure	J11	DP_B	Discharge pressure Circuit B
AI-07	Pressure	J19	SP_B	Suction pressure Circuit B
AI-08	Pressure	J20	ECO_P_B	Economizer pressure Circuit B
AI-09	Pressure	J21	OP_B	Oil pressure Circuit B
AI-10	4 to 20 mA	J9	— Not Used —	
DO-01	Relay output	J2	— Not Used —	
DO-02	Relay output		— Not Used —	
DO-03	Relay output	J6	— Not Used —	
DO-04	Relay output		— Not Used —	
DO-05	Relay contact	J23	— Not Used —	
DO-06	Relay contact	J22	— Not Used —	
DO-07	Triac	J7	— Not Used —	
DO-08	Triac		— Not Used —	
DO-09	Triac		SLIDEV1_B	Slide valve 1 output Circuit B
DO-10	Triac		SLIDEV2_B	Slide valve 2 output Circuit B
STPR1	Stepper motor	J17	EXV_B	Expansion valve Circuit B
STPR2	Stepper motor	J18	EXV_EC_B	Expansion valve economizer Circuit B
AO-01	0 to 10 VDC	J10	— Not Used —	

LEGEND

AI — Analog Input
AO — Analog Output
DI — Discrete Input
DO — Discrete Output
STPR — Stepper Motor Output

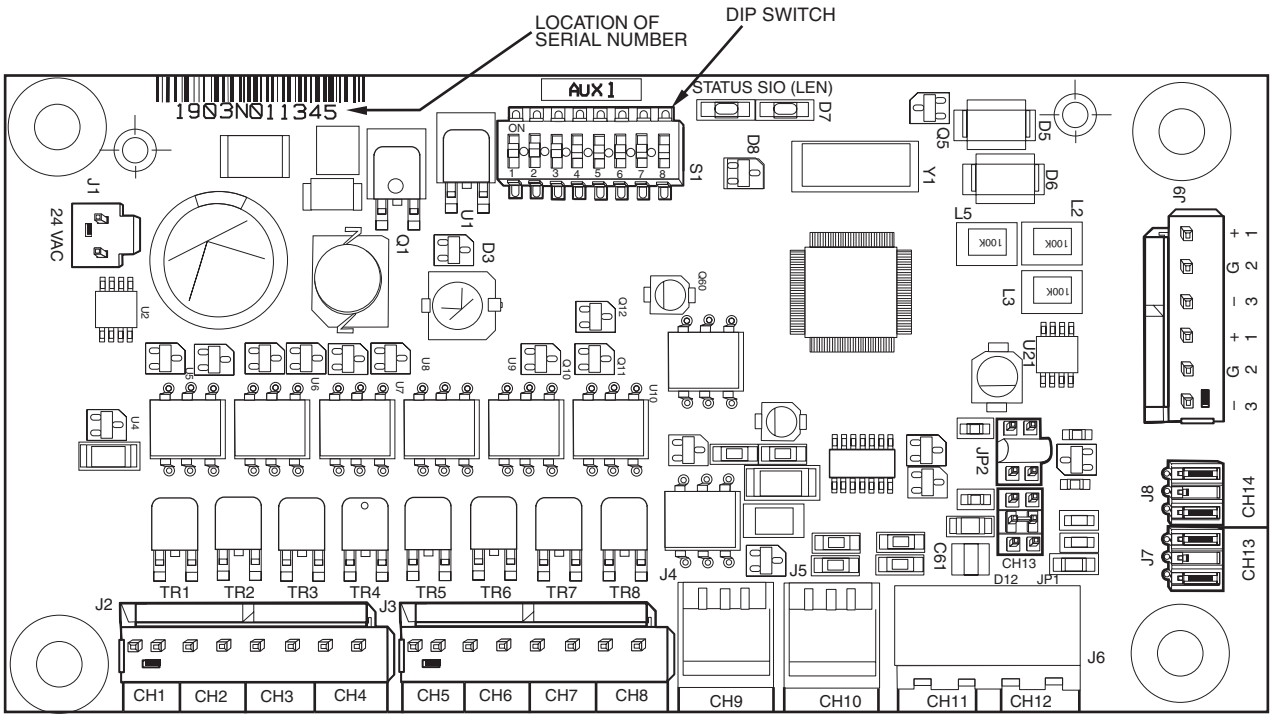


Fig. 17 — AUX Board

Table 6 — AUX Board 1 Inputs and Outputs

CHANNEL	IN/OUT TYPE	CCN POINT	DESCRIPTION
CH 1	DO	—	—
CH 2	DO	—	—
CH 3	DO	—	—
CH 4	DO	—	—
CH 5	DO	—	—
CH 6	DO	—	—
CH 7	DO	—	—
CH 8	DO	—	—
CH 9	AO	—	—
CH 10	AO	—	—
CH 11	th AI	CHWSTEMP	Chilled Water System Temperature
CH 12	th AI	—	—
CH 13	AI	—	—
CH 14	AI	—	—

NOTE: AUX Board 1 is used for the Dual Chiller control option only.

Table 7 — AUX Board 2 Inputs and Outputs

CHANNEL	IN/OUT TYPE	CCN POINT	DESCRIPTION
CH 1	DO	—	—
CH 2	DO	ISO_REFA+	Isolation Valve Circuit A Command (Open)
CH 3	DO	ISO_REFA–	—
CH 4	DO	—	—
CH 5	DO	—	—
CH 6	DO	—	—
CH 7	DO	OIL_HT_A	Oil Heater Circuit A
CH 8	DO	OIL_SL_A	Oil Solenoid Circuit A
CH 9	AO	CAPT010TA	Capacity Analog Output 0 to 10 V
CH 10	AO	—	—
CH 11	th AI	DGT_A	Discharge Gas Temperature Circuit A
CH 12	th AI	SUCT_T_A	Suction Temperature Circuit A
CH 13	AI	LIQ_T_A	Liquid Line Temperature Circuit A
CH 14	AI	LIQ_P_A	Liquid Line Pressure Circuit A

Table 8 — AUX Board 3 Inputs and Outputs

CHANNEL	IN/OUT TYPE	CCN POINT	DESCRIPTION
CH 1	DO	—	—
CH 2	DO	ISO_REFB+	Isolation Valve Circuit B Command (Open)
CH 3	DO	ISO_REFB–	—
CH 4	DO	—	—
CH 5	DO	—	—
CH 6	DO	—	—
CH 7	DO	OIL_HT_B	Oil Heater Circuit B
CH 8	DO	OIL_SL_B	Oil Solenoid Circuit B
CH 9	AO	CAPT010TB	Capacity Analog Output 0 to 10 V
CH 10	AO	—	—
CH 11	th AI	DGT_B	Discharge Gas Temperature Circuit B
CH 12	th AI	SUCT_T_B	Suction Temperature Circuit B
CH 13	AI	LIQ_T_B	Liquid Line Temperature Circuit B
CH 14	AI	LIQ_P_B	Liquid Line Pressure Circuit B

Enable-Off-Remote Contact Switch (SW1) — The position of the Enable/Off/Remote contact switch is ignored except when the "remote mode" control type is selected. Refer to the Machine Control Methods section on page 22 for more details. This switch is installed in all units. It is a 3-position switch used to control the chiller. When switched to the Enable position, the chiller will be under its own control. When switched to the Off position, the chiller will shut down. When switched to the Remote Contact position, a field-installed dry contact can be used to start the chiller. The contacts must be capable of handling a 24-VAC, 50-mA load. In the Enable and Remote Contact (dry contacts closed) positions, the chiller is allowed to operate and respond to the scheduling configuration and set point data.

Emergency On/Off Switch (SW2) — This switch is installed in all units. The Emergency On/Off switch should only be used when it is required to shut the chiller off immediately. Power to all modules is interrupted when this switch is off and all outputs from these modules will be turned off.

Energy Management Module (EMM) — The EMM is available as a factory-installed option or as a field-installed accessory. See Fig. 18. The EMM receives 4 to 20 mA inputs for the temperature reset, cooling set point and demand limit functions. The EMM also receives the switch inputs for the field-installed second stage 2-step demand limit and ice done functions. The EMM communicates the status of all inputs with the Touch Pilot module, and the controls adjusts the control point, capacity limit, and other functions according to the inputs received. See Table 9 for EMM board mapping.

⚠ CAUTION

Care should be taken when interfacing with other manufacturer's control systems due to possible power supply differences, full wave bridge versus half wave rectification, which could lead to equipment damage. The two different power supplies cannot be mixed. Touch Pilot™ controls use half wave rectification. A signal isolation device should be utilized if a full wave bridge rectifier signal generating device is used.

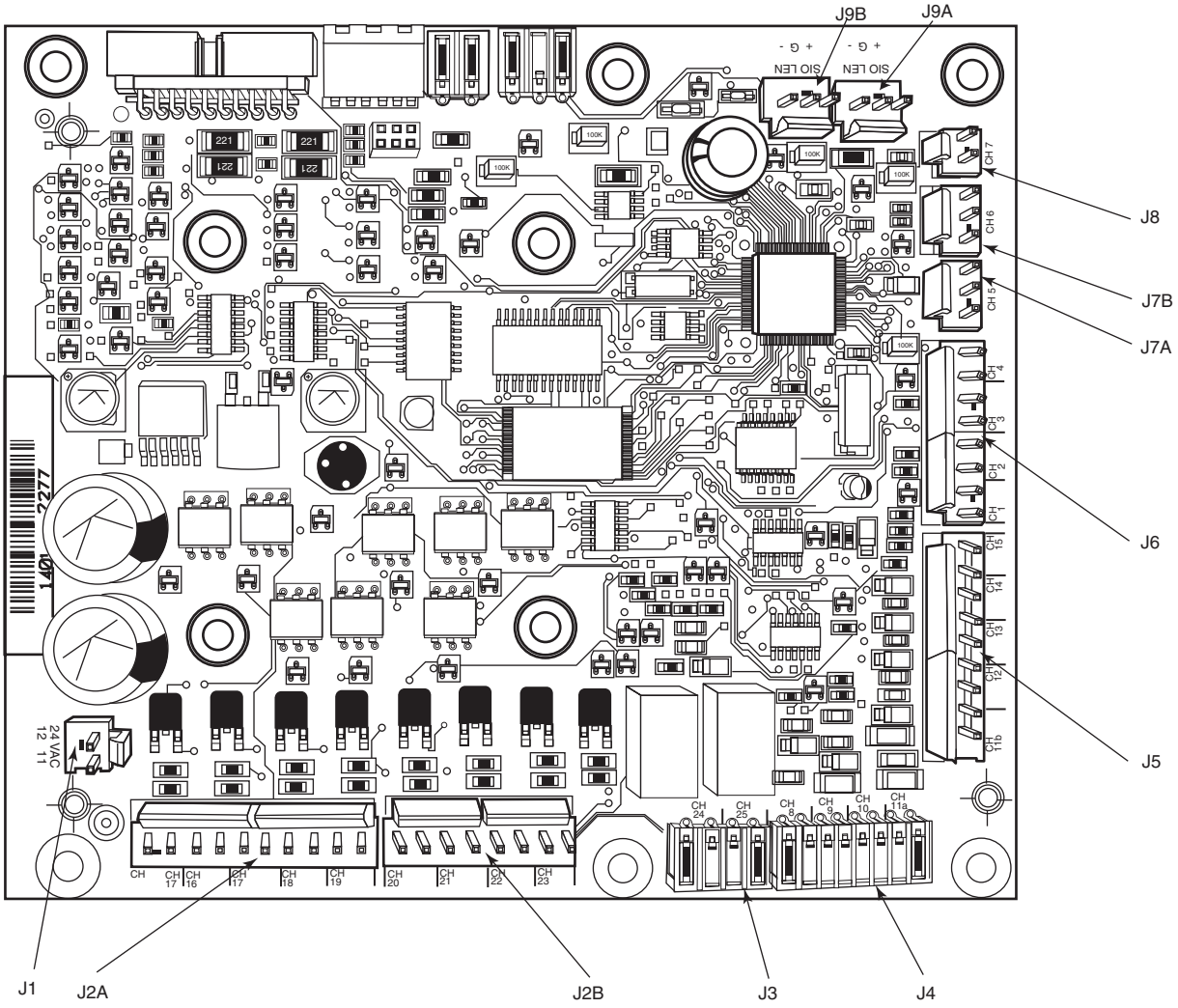


Fig. 18 — Energy Management Module

Table 9 — EMM Board Mapping

CHANNEL	IN/OUT TYPE	PARAMETER MNEMONIC	PARAMETER DESCRIPTION
CH 01	AI	—	—
CH 02-J6	AI	—	—
CH 03	AI 10k	SPACETMP	Space temperature for reset control
CH 04	AI	—	—
CH 05-J7A	AI 4 to 20 mA*	SP_RESET	Setpoint reset control
CH 06-J7B	AI 4 to 20 mA*	LIM_ANAL	Capacity limit control
CH 07-J8	AO 0 to 10 VDC	CAPT_010	Chiller capacity running output (0 to 10 volts)
CH 08-J4	DI	OCC_OVSW	Occupancy override switch
CH 09-J4	DI	LIM_SW2	Capacity limit switch input #2
CH 10-J4	DI	REM_LOCK	Customer interlock = Disable chiller operation Open = Allow chiller operation
CH 11a	DI	ICE_DONE	Ice done contact
CH 11b			
CH 12	DI	—	—
CH 13	DI	COND_FLOW	Condenser flow switch
CH 14	DI	—	—
CH 15	DI	—	—
CH 16-J2A	DO TRIAC	COMP_A	Compressor A running status
CH 17-J2A	DO TRIAC	COMP_B	Compressor B running status
SW16-17	DI	—	—
CH 18	DO	—	—
CH 19	DO	—	—
CH 20	DO	—	—
CH 21	DO	—	—
CH 22	DO	—	—
CH 23	DO	—	—
CH 24-J3	DO RELAY	SHUTDOWN	Chiller totally shutdown
CH 25-J3	DO RELAY	ALERT	Chiller Alert

*A field-supplied 1/2 watt 250 ohm resistor is required across terminals TB6-1,2 (CH6) and/or TB6-3, 4 (CH5) to convert a 4 to 20 mA signal to 1 to 5 vdc.

Local Equipment Network — Information is transmitted between modules via a 3-wire communication bus or LEN (Local Equipment Network). External connection to the LEN bus is made at terminal board TB3.

Board Addresses — All boards (except the Touch Pilot Display and the Energy Management Module Board) have DIP switches to set the address.

Control Module Communication

RED LED — Proper operation of the control boards can be visually checked by looking at the red status LEDs (light-emitting diodes). When operating correctly, the red status LEDs will blink in unison at a rate of once every 2 seconds. If the red LEDs are not blinking in unison, verify that correct power is being supplied to all modules and that all communication wiring is connected securely. Be sure that the Touch Pilot™ module is supplied with the current software. If necessary, reload current software. If the problem still persists, replace the Touch Pilot module. A red LED that is lit continuously or blinking at a rate of once per second or faster indicates that the board should be replaced.

GREEN LED — All boards have a green LEN (SIO) LED which should be blinking whenever power is on. If the LEDs are not blinking as described check LEN connections for potential communication errors at the board connectors. A 3-wire bus accomplishes communication between modules. These 3 wires run in parallel from module to module. They connect to J9 on EMM and AUX boards, and to J12 or J13 on SIOB boards.

Carrier Comfort Network® (CCN) Interface — All 30XA units with Greenspeed® intelligence can be connected to the CCN, if desired. The communication bus wiring is a shielded, 3-conductor cable with drain wire and is field supplied and installed. The system elements are connected to the communication bus in a daisy chain arrangement. The positive pin of each system element communication connector must be wired to the positive pins of the system elements on either side of it. The negative and signal ground pins of each system element must also be wired in the same manner. Wiring connections for CCN should be made at TB3. Consult the CCN Contractor's Manual for further information. See Fig. 19.

NOTE: Conductors and drain wire must be 20 AWG (American Wire Gage) minimum stranded, tinned copper. Individual conductors must be insulated with PVC, PVC/nylon, vinyl, Teflon*, or polyethylene. An aluminum/polyester 100% foil shield and an outer jacket of PVC, PVC/nylon, chrome vinyl, or Teflon with a minimum operating temperature range of –20 C to 60 C is required. See Table 10 for recommended wire manufacturers and part numbers.

Table 10 — CCN Communication Bus Wiring

MANUFACTURER	PART NUMBER	
	Regular Wiring	Plenum Wiring
Alpha	1895	—
American	A21451	A48301
Belden	8205	884421
Columbia	D6451	—
Manhattan	M13402	M64430
Quabik	6130	—

*Registered trademark of DuPont.

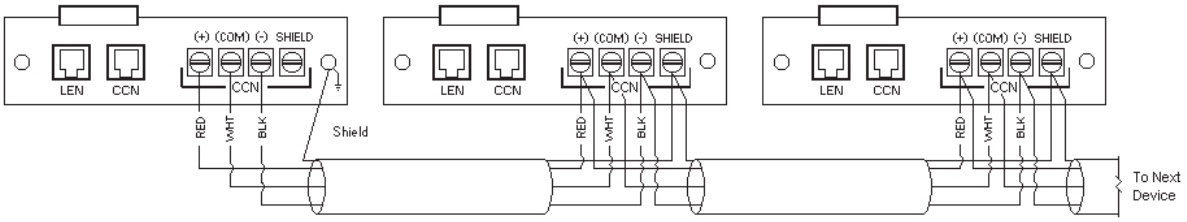


Fig. 19 — Touch Pilot CCN Communication Wiring

It is important when connecting to a CCN communication bus that a color-coding scheme be used for the entire network to simplify the installation. It is recommended that red be used for the signal positive, black for the signal negative, and white for the signal ground. Use a similar scheme for cables containing different colored wires.

At each system element, the shields of its communication bus cables must be tied together. If the communication bus is entirely within one building, the resulting continuous shield must be connected to a ground at one point only. If the communication bus cable exits from one building and enters another, the shields must be connected to grounds at the lightning suppressor in each building where the cable enters or exits the building (one point per building only). To connect the unit to the network:

1. Turn off power to the control box.
2. Cut the CCN wire and strip the ends of the red (+), white (ground), and black (–) conductors. (Substitute appropriate colors for different colored cables.)
3. Connect the red wire to (+) terminal on TB3 of the plug, the white wire to COM terminal, and the black wire to the (–) terminal.
4. The RJ14 CCN connector on TB3 can also be used, but is only intended for temporary connection (for example, a laptop computer running Service Tool).

IMPORTANT: A shorted CCN bus cable will prevent some routines from running and may prevent the unit from starting. If abnormal conditions occur, disconnect the CCN bus. If conditions return to normal, check the CCN connector and cable. Run new cable if necessary. A short in one section of the bus can cause problems with all system elements on the bus.

Remote Alarm and Alert Relays — The 30XA chiller with Greenspeed® intelligence can be equipped with a remote alert and remote alarm annunciator contacts. Both relays connected to these contacts must be rated for a maximum power draw of 10 va sealed, 25 va inrush at 24 volts. The alarm relay, indicating that the complete unit has been shut down, can be connected to TB5-12 and TB5-13. Refer to unit wiring diagrams. For run relay, indicating that at least 1 circuit is off due to the alert, a field-supplied and installed relay must be connected between TB5-16 and TB5-13.

CONFIGURATION (SOFTWARE)

Touch Pilot™ Operation Configuration Tables — The Touch Pilot control system can be configured for a range of operating conditions and equipment arrangements. The following parameters should be configured based on unique system layout and operating requirements.

The system parameters may be configured through the Touch Pilot interface or remotely through the CCN. Table 11 shows the Touch Pilot configuration required to access the unit on the CCN.

Table 11 — Touch Pilot Controller Identification Configuration Table

DISPLAY NAME	PATH	LINE NO.	VALUE
CCN Element Number	Main Menu → Configuration Menu → Control Identification	1	Default=1
CCN Bus Number		2	Default=0
CCN Baud Rate		3	Default=9600
Location Description		4	Default=Blank

Touch Pilot Menu Tables — Touch Pilot operation is controlled by configuration information entered in the configuration tables listed in Tables 12-15. Access to different parameters may be available to all users (ALL) or password-protected (USER, FACTORY, or SERVICE). See Appendix A for detailed descriptions of all control tables and parameters.

Table 12 — Main Menu Table

ITEM	CCN MENU NAME	ACCESS	MENU TEXT DESCRIPTION	MENU ICON
1	GENUINT	ALL	General Parameters	
2	TEMP	ALL	Temperatures	
3	PRESSURE	ALL	Pressures	
4	INPUTS	ALL	Inputs Status	
5	OUTPUTS	ALL	Outputs Status	
6	PUMPSTAT	ALL	Pump Status	
7	RUNTIME	ALL	Run Times	
8	MODES	ALL	Modes	
9	SETPOINT	USER	Setpoint Table	
10	CONFIG	USER	Configuration Menu	
11	QCK_TEST	SERVICE	Quick Test	
12	MAINTAIN	SERVICE	Maintenance Menu	
13	TRENDING	ALL	Trendings	

Table 13 — Alarms Menu Table

ITEM	CCN MENU NAME	ACCESS	MENU TEXT DESCRIPTION	MENU ICON
1	ALARMRST	USER	Reset Alarms	
2	CUR_ALM	ALL	Current Alarms	
3	ALMHIST1	ALL	Alarm Historic	
4	ALMHIST2	ALL	Major Alarm Historic	

Table 14 — Configuration Menu Table

ITEM	CCN MENU NAME	ACCESS	MENU TEXT DESCRIPTION	MENU ICON
1	GEN_CONF	USER	General Configuration	
2	PUMPCONF	USER	Pump Configuration	
3	USERCONF	USER	User Configuration	
4	RESETCFG	USER	Reset Configuration	
5	SCHEDULE	USER	Schedule Menu	
6	HOLIDAY	USER	Holiday Menu	
7	BROCASTS	USER	Broadcast Menu	
8	DATETIME	USER	Date/Time Configuration	
9	CTRL_ID	USER	Control Identification	
10	FACTORY	FACTORY	Factory Menu	
11	FACTORY2	FACTORY	Factory2 Menu	
12	SERVICE	SERVICE	Service Parameters	
13	UPDTHOUR	SERVICE	Update Running Hour	
14	MST_SLV	SERVICE	Master Slave Config	
15	CMP_PI*	SERVICE	Comp PI Parameters	

* Tables available only through the CCN.

Table 14 — Configuration Menu Table (cont)

ITEM	CCN MENU NAME	ACCESS	MENU TEXT DESCRIPTION	MENU ICON
16	SLDV_PI*	SERVICE	Slide Vlv PI Parameters	
17	EXV_CFG*	SERVICE	EXV Configuration	
18	DELTA*	SERVICE	Action Parameters	
19	BACNET	SERVICE	BACnet Parameters	
20	FAN_CFG*	SERVICE	Fan Configuration	
21	ECO_PI*	SERVICE	EXV ECO PI Parameters	
22	CP_UNABL	SERVICE	Compressor Enable	
23	EMAILCFG	SERVICE	Email Configuration	

* Tables available only through the CCN.

Table 15 — Maintenance Menu Table

ITEM	CCN MENU NAME	ACCESS	MENU TEXT DESCRIPTION	ICON
1	CAPACTRL	SERVICE	Capacity Control	
2	VLT_DRV	SERVICE	VLT Drive Maintenance	
3	LAST_POR	SERVICE	Last PowerOn Reset	
4	EXV_CTRL	SERVICE	EXV Control	
5	LIMITS	SERVICE	Control Limits	
6	M_MSTSLV	SERVICE	Master Slave Control	
7	ECO_CTRL	SERVICE	EXV Eco. Control	
8	FAN_CTRL	SERVICE	Fan Control	
9	FAN_DRV	SERVICE	Fan Drive Maintenance	
10	FAN_DRV2	SERVICE	Fan Drive Addressing	

Machine Control Methods — The unit state is determined based on a number of factors, including its operating type, active overrides, open contacts, master/slave configuration, or alarms triggered due to operating conditions. These parameters can be controlled by one of the following methods:

- Locally on unit: Local Control type
- Remotely through a user contact: Remote Control type
- Remotely through the CCN network: CCN Control type

The main interface Start/Stop button is used to select one of the above control types. In addition, when the Local control type is selected, this button can be used to select a particular functional mode: On, Off or Schedule mode. See Fig. 20. If the Start/Stop button is green the unit is running. If the Start/Stop button is gray the unit is not running. If the button is flashing green then the unit is preparing to start.

Table 16 summarizes the available operating types.

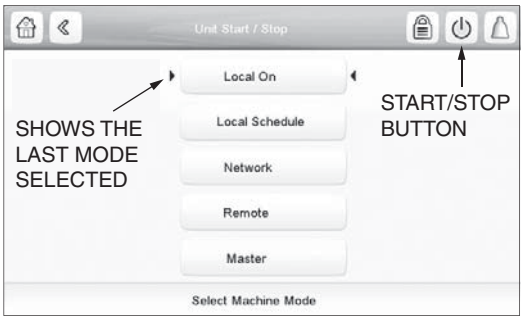


Fig. 20 — Machine Control Methods

Table 16 — Operating Types

OPERATING TYPE	CONTROL TYPE	OPERATING MODES	DESCRIPTION
LOCAL — OFF	Local	Off	The unit is under Local control type. It shall remain halted and shall ignore all CCN network commands and remote switch contacts.
LOCAL — ON	Local	On	The unit is under Local control type and shall be allowed to start. The control shall ignore all remote control contacts (except the demand limit contact) and all CCN network force commands (except the Emergency Stop Command).
LOCAL — SCHEDULE	Local	Schedule	The unit is under Local control type and shall be allowed to start if the schedule #1 is occupied (chil_occ). Otherwise, the unit shall remain off. The control shall ignore all remote control contacts (except the demand limit contact) and all CCN network force commands (except the Emergency Stop Command).
NETWORK	CCN	None	The unit is under CCN control type and shall be controlled by CCN force commands. The control shall ignore all remote control contacts (except the demand limit contact).
REMOTE	Remote	None	The unit is under Remote control type and shall be controlled by the start/stop and setpoint contacts. In this mode, no CCN force command can affect the unit control except the Emergency Stop Command.
MASTER UNIT	Master	Master	The unit is configured as the master unit in a two-unit master/slave plant. The master unit control type control can be done locally, remotely or through CCN commands upon the master/slave configuration.

OPERATING TYPE SELECTION — The operating type is selected through the main interface by pressing the Start/Stop button. If the unit is On, pressing the Start/Stop button displays a screen with a Confirm Stop button, which when pressed switches the chiller to Local Off mode. If the unit is Off, pressing the Start/Stop button shows a list of operating types with the currently selected type corresponding to the last running operating type (Fig. 20).

Start/Stop Selection Screen — In Local mode (LEN bus), the interface treats the Start/Stop button as a hotkey, and goes directly to the Start/Stop selection screen. In CCN mode, the interface ignores Start/Stop key presses.

Start a Stopped Machine — With the unit in the Local off mode, press the gray Start/Stop button to display the list of operating modes and select the required mode.

Stop a Running Machine — To stop a running unit, press the green Start/Stop button. Confirm the unit shutdown by pressing Confirm Stop or cancel by pressing the Back button (Fig. 21).

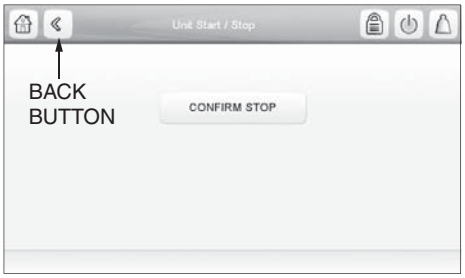


Fig. 21 — Confirm Stop

Once the unit has been stopped, the Home screen is displayed.

NOTE: Start/Stop a machine is not authorized through a web connection for security reasons.

Machine On/Off Function — The machine operating state can be viewed by going to Main Menu → General Parameters → Run Status. Table 17 summarizes possible unit states.

Table 17 — Unit States

STATE	DESCRIPTION
Off	Unit is commanded to be off
Stopping	Unit is currently stopping (after a manual, emergency, or shutdown request). Next state shall be Off.
Delay	Unit is in delay at start-up (waiting for the end of the On/Off delay to be reached). Next state shall be Running.
Running	Unit compressor capacity is more that 0% (unit has started running)
Ready	Unit compressor capacity is 0%. Unit is ready to start.
Override	The compressor cannot start because of an override (SST, SCT, etc.)
Tripout	Unit is Off due to an alarm
Test	Unit is in Quick Test
Runtest	Unit is in Run Test

Table 18 summarizes the unit control type and stop or go status with regard to the following parameters:

- Operating type: Operating Type as selected on the unit Start-Stop screen.
- CHIL_S_S: Current CCN chiller start/stop force command (enable/disable). Main Menu → General Parameters → Net:Cmd Start/Stop.
- Onoff_sw: Start-stop contact status when unit is under remote operating type. Main Menu → Inputs Status → Remote On/Off Switch.
- chil_occ state: Chiller occupied state. If the occupancy override input switch is closed, the chiller remains occupied regardless of the setpoint scheduled selection. Main Menu → General Parameters → Net:Cmd Occupied.
- ms_ctrl: Master control type. This parameter status will determine if the master unit is going to be controlled locally, remotely, or through CCN. Main Menu → Maintenance Menu → Master Slave Control (0=disabled, 1=master, 2=slave).
- EMSTOP: CCN emergency stop command (enable/disable). Main Menu → General Parameters → Emergency Stop
- Alarm shutdown: Unit is totally stopped due to alarm.

Table 18 — Start/Stop Control

ACTIVE OPERATING TYPE	PARAMETER STATUS						CONTROL TYPE	UNIT STATUS
	CHIL_S_S	Onoff_sw	ms-ctrl	chil_occ state	EMSTOP	Alarm Shutdown		
Local Off (LOFF)	—	—	—	—	—	—	Local	Off
Local On (L-C)	—	—	—	—	Disable	No	Local	On
Local Schedule (L-SC)	—	—	—	Occupied	Disable	No	Local	On
	—	—	—	Unoccupied	—	—	Local	Off
Remote (rEM)	—	Open	—	—	—	—	Remote	Off
	—	—	—	Unoccupied	—	—	Remote	Off
		Closed		Occupied	—	—	Remote	On
CCN	Disable	—	—	—	—	—	CCN	Off
	—	—	—	Unoccupied	—	—	CCN	Off
	Enable	—	—	Occupied	Disabled	No	CCN	On
Master (MA St)	—	—	Local	Unoccupied	—	—	Local	Off
	—	Open	Remote	—	—	—	Remote	Off
	—	—	Remote	Unoccupied	—	—	Remote	Off
	Disable	—	CCN	—	—	—	CCN	Off
	—	—	CCN	Unoccupied	—	—	CCN	Off
	—	—	Local	Occupied	Disable	No	Local	On
	—	Closed	Remote	Occupied	Disable	No	Remote	On
	Enable		CCN	Occupied	Disable	No	CCN	On
—	—	—	—	—	Enable	—	—	Off
					—	Yes	—	Off

LEGEND

CHIL_S_S — CCN Chiller Start/Stop Command
Onoff_sw — Remote On/Off Switch
chil_occ — Chiller Occupied State
EMSTOP — Emergency Stop

All of the control type and unit state combinations listed in Table 18 will determine the actual unit running state. In addition, when under remote type control, unit Start/Stop actions shall be determined by both On/Off and Cooling switches if the changeover option is enabled. If the changeover option is not enabled, only the On/Off switch will be used to command the unit to Start or Stop.

NOTE: When swtiching from one control type (Local, Remote, or CCN) to another, the unit shall observe a transition through the Off state before being allowed to start again. At this time the on-to-off delay is always applied.

MACHINE START DELAY — An option to delay the start of the machine is available. This parameter is useful in keeping multiple machines from starting at the same time in case of a power failure. The parameter has a factory default of 1 minute. This parameter also has a role in the timing for a chilled water flow switch alarm. To configure this option with the Touch Pilot display, select Main Menu → Configuration Menu → General Configuration and select Unit Off to On Delay.

FAST LOADING — The Fast Capacity Recovery function allows for an accelerated unit start-up. To activate the Fast Capacity Recovery, go to Main Menu → Configuration Menu → Service Parameters and set Fast Capacity Recovery. The available options are as follows:

- 0 (Normal Loading Sequence): Follows the set delays for unit and circuit start up
- 1 (Quick Start Loading): Removes the unit start-up delay and ignores Capacity Override #53
- 2 (Fast Capacity Recovery): Removes the unit start-up delay, ignores Capacity Override #53, and allows both compressors to start at the same time (with a 10-second delay between starts)

Chilled Water Setpoint Configuration — The chilled water setpoint and fluid type configuration will determine the chiller operating conditions.

FLUID SETPOINT CONTROL LOCATION — The factory default for the chilled water fluid setpoint is to control to the leaving water temperature. An option to configure the machine for entering water control is available. To configure this option go to Main Menu → Configuration Menu → Service Parameters. The default for Entering Fluid Control is No (leaving fluid control is the default condition).

COOLING SETPOINT SELECTION — The control point represents the water temperature that the unit must produce. The unit will vary the capacity depending on the unit load operating conditions in order to satisfy the setpoint. The control point is calculated based on the active setpoint and the reset calculation, where Control Point = Active Setpoint + Reset. (See the section Temperature Reset on page 35 for more information about Reset.) The forced value can be used instead of any other setpoint calculation only when the unit is in the Network operating type (go to Main Menu → General Parameters to verify operating type).

DEFINING SETPOINTS — The cooling setpoints are set via the Setpoint Table (Main Menu → Setpoint Table). Cooling Setpoint 1 and Cooling Setpoint 2 are the temperatures that are selectable as the Active Setpoints for the unit operation. These temperatures will be limited by the type of fluid in the system (see Table 19).

In addition to the Cooling setpoints, users can also select the Cooling Ice Setpoint and Cooling Ramp Loading from this menu. See the Ice Storage Operation section on page 42 for more details about the Cooling Ice Setpoint. Ramp Loading limits the rate at which the unit will change cooling water temperature (default is 1º F/min [0.6º C/min]).

All default setpoints are based on Leaving Water Control (Entering Fluid Control, EWTO set to No). Values must be confirmed for the individual setpoints. Limits for the setpoints are listed in Table 19. These values depend on the Cooler Fluid Type and the Brine Freeze Setpoint (see Chilled Water Fluid Type Selection on page 27).

Table 19 — Cooler Fluid Setpoint Limits

Setpoint Limits	COOLER FLUID TYPE (flui_typ)		
	1 = Water	2 = Medium Brine	3 = Low Brine
Minimum*	38 F (3.3 C)	21.2 F (-6 C)	14 F (-10 C)
Maximum	60 F (15.5 C)		

*The minimum setpoint for brine applications is related to the brine freeze setpoint. The setpoint is limited to be no less than the brine freeze setpoint + 5° F (2.8° C).

CURRENT OPERATING SETPOINT — Depending on the current operation type, the active setpoint can be selected manually in the Main Menu, with the volt-free user contacts, with network commands (CCN or BACnet), or automatically with the setpoint time schedule (Occupancy Schedule 2).

Setpoints can be selected manually through the main interface when the unit is in Local operating type, through contacts when the unit is in Remote operating type, or through the RS485 bus when unit is in CCN mode.

Setpoints can also be selected automatically through a setpoint time schedule: when the period is occupied Cooling Setpoint 1 shall be activated, and when the period is Unoccupied Cooling Setpoint 2 shall be active. When in local operating type, time schedule is available if the Setpoint Select Variable is set to AUTO. In remote operating type, the AUTO mode shall be available unless the dual setpoint control through contacts has already been selected. In CCN mode, the setpoint selection always depends on the time schedule. The setpoint can be forced through the **SP_OCC** CCN point (0 = Occupied = Cooling Setpoint 1, 1 = Unoccupied = Cooling Setpoint 2).

Setpoint selection offers three different control options (Main Menu → General Parameters → Setpoint Select): Auto, Setpoint 1, and Setpoint 2.

- 0 = Auto: The active cooling setpoint will be determined by the configured Occupancy Schedules. See the Defining Occupancy Schedule section for details on setting the schedules. Depending on the Ice Storage configuration and ice contact state, the active setpoint may alternately be set to the Cooling Ice Setpoint.
- 1 = Setpoint 1: The active cooling setpoint will be Cooling Setpoint 1 defined in the setpoint table.
- 2 = Setpoint 2: The active cooling setpoint will be Cooling Setpoint 2 defined in the setpoint table. Depending on the Ice Storage configuration and ice contact state, the active setpoint may alternately be set to the Cooling Ice Setpoint.

SETPOINT OCCUPANCY — Setpoint Occupancy is the default configuration for the Setpoint Select variable. When Setpoint Select (Main Menu → General Parameters → Setpoint Select) is configured to 0 (Auto), the unit's active setpoint is based on the programmed occupancy schedules. Under Time Schedule 1 (OCCPC01S), the unit controls to Cooling Set Point 1 (csp1) during the occupied periods. If the Time Schedule 2 (OCCPC02S) is in use, the unit's active setpoint is based on Cooling Set Point 1 (csp1) during the occupied period and Cooling Set Point 2 (csp2) during the unoccupied period. The two schedules are used together to determine periods when the chiller will be controlling to Setpoint 1, Setpoint 2, or Off.

See Table 20 for details on how the active cooling setpoint is determined based on unit operating type and parameter settings.

DEFINING OCCUPANCY SCHEDULE — Two internal Time Schedules are available and must be field programmed. Occupancy Schedule 1 (OCCPC01S) is used for single setpoint On/Off control. Occupancy Schedule 2 (OCCPC02S) is used in combination with OCCPC01S for dual setpoint On/Off and Occupied/Unoccupied setpoint control. To access the Schedule screens, go to Main Menu → Configuration Menu → Schedule Menu.

If the chiller is to be controlled to a single set point, use Schedule 1 (OCCPC01S). This type of schedule will start and stop the machine only. During the unoccupied times, the chiller will be off. The unit start/stop schedule OCCPC01S has a default setting of always occupied. If the chiller is to be controlled to 2 set points, occupied and unoccupied, also use Schedule 2 (OCCPC02S). Cooling Setpoint 1 will be active during occupied periods, and Cooling Setpoint 2 will be active during unoccupied periods.

To set the occupancy schedules, select OCCPC01S or OCCPC02S and select the applicable days for the displayed time schedule period. The selected period will be displayed as a green band on the timeline. Press the Save button to confirm or the Cancel button to cancel changes. See Fig. 22.

Table 20 — Active Cooling Setpoint Parameters

OPERATING TYPE	PARAMETER STATUS					ACTIVE SETPOINT
	Setpoint Selection	Ice Storage Configuration*	Ice Done Contact*	Setpoint Switch	Schedule 2 Status	
Local	sp-1	Default	Any	Any	Default	Cooling Setpoint 1
	sp-2	No	Any	Any	Default	Cooling Setpoint 2
	sp-2	Yes	Closed	Any	N/A	Cooling Setpoint 2
	sp-2	Yes	Open	Any	N/A	Cooling Ice Setpoint
	automatic	Default	Any	Any	Occupied	Cooling Setpoint 1
	automatic	No	Any	Any	Unoccupied	Cooling Setpoint 2
	automatic	Yes	Closed	Any	Unoccupied	Cooling Setpoint 2
	automatic	Yes	Open	Any	Unoccupied	Cooling Ice Setpoint
Remote	Default	Default	Any	Open	Default	Cooling Setpoint 1
	Default	No	Any	Closed	Default	Cooling Setpoint 2
	N/A	Yes	Closed	Closed	N/A	Cooling Setpoint 2
	Default	Yes	Open	Closed	Default	Cooling Ice Setpoint
Network	Default	Default	Any	Any	Occupied	Cooling Setpoint 1
	Default	Default	Any	Any	Unoccupied	Cooling Setpoint 2

* Ice Storage Configuration and Ice Done Contact apply only to units with energy management module (EMM).

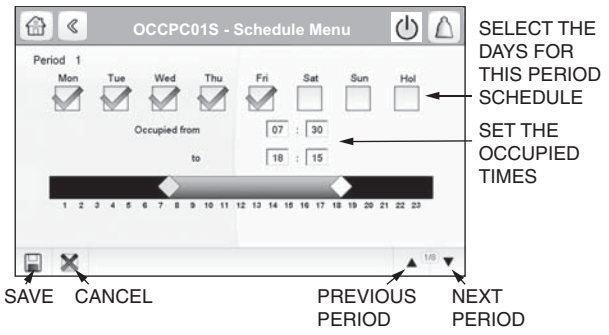


Fig. 22 — Schedule Menu

The schedules consist of 8 user-configurable occupied time periods. The control supports time schedules for local control, remote control, and ice building. These time periods can be flagged to be in effect or not in effect on each day of the week. The day begins at 00:00 and ends at 24:00. The machine is in unoccupied mode unless a scheduled time period is in effect. If an occupied period is to extend past midnight, the occupied period must end at 24:00 hours (midnight) and a new occupied period must be programmed to begin at 00:00 hours.

In the example in Table 21, an early morning pulldown time period is scheduled for Monday morning from 12:00 AM to 3:00 AM. The occupied period starts at 7:00 AM, Monday through Saturday. The occupied time ends at 6:00 PM on Monday and Tuesday, 9:30 PM on Wednesday, 5:00 PM on Thursday and Friday, and 12:00 PM on Saturday.

NOTE: This example schedule was designed to illustrate the programming of the schedule function and is not intended as a recommended schedule for chiller operation.

Holiday Schedule — The unit control allows up to 16 holiday periods. Each holiday period is defined by three parameters: the month, the start day, and the duration of the holiday period. During the holiday periods, the controller will be in occupied or unoccupied mode, depending on the periods validated as holidays. The Holiday Configuration Table is accessed by Main Menu → Configuration Menu → Holiday Menu. Select one of the 16 available Holiday periods (HOLDY_01 through HOLDY_16) to define the holiday.

CCN Global Time Schedule — In addition to the two onboard occupancy schedules (OCCPC01S and OCCPC02S), the Touch Pilot™ can also receive a time schedule broadcast from another element in the CCN network.

The 30XA with Greenspeed® intelligence chillers can be configured to follow a CCN Global Time Schedule broadcast by another system element. The Occupancy Table (OCCPC01S) number must be changed to configure the unit to broadcast a Global Time Schedule. The Schedule Number can be set from 65 to 99 (**OCCPC65S** to **OCCPC99S**). When **OCC1PxxS** is set to a value of 65 or greater and all attached schedules are 00:00 (that is, no occupied time periods), an occupancy flag is broadcast over the CCN every time it transitions from occupied to unoccupied or vice-versa. The ComfortVIEW™ Network Manager's Configure and Modify commands or the Service Tool's Modify/Names function must be used to change the number of the Occupancy Equipment Part Table Name (**OCCPC01E**) to the Global Schedule Number. The Schedule Number can be set from 65 to 99 (**OCCPC65E** to **OCCPC99E**).

Table 21 — Configuring Schedules (Example)

ITEM	PATH	VALUE
Period 1		
Occupied from	Main Menu → Configuration Menu → Schedule Menu → OCCPC01S or OCCPC02S → Page 1	00:00
Occupied to		03:00
Monday Select		Yes
Tuesday Select		No
Wednesday Select		No
Thursday Select		No
Friday Select		No
Saturday Select		No
Sunday Select		No
Holiday Select		No
Period 2		
Occupied from	Main Menu → Configuration Menu → Schedule Menu → OCCPC01S or OCCPC02S → Page 2	07:00
Occupied to		18:00
Monday Select		Yes
Tuesday Select		Yes
Wednesday Select		No
Thursday Select		No
Friday Select		No
Saturday Select		No
Sunday Select		No
Holiday Select		No
Period 3		
Occupied from	Main Menu → Configuration Menu → Schedule Menu → OCCPC01S or OCCPC02S → Page 3	07:00
Occupied to		21:30
Monday Select		No
Tuesday Select		No
Wednesday Select		Yes
Thursday Select		No
Friday Select		No
Saturday Select		No
Sunday Select		No
Holiday Select		No
Period 4		
Occupied from	Main Menu → Configuration Menu → Schedule Menu → OCCPC01S or OCCPC02S → Page 4	07:00
Occupied to		17:00
Monday Select		No
Tuesday Select		No
Wednesday Select		No
Thursday Select		Yes
Friday Select		Yes
Saturday Select		No
Sunday Select		No
Holiday Select		No
Period 5		
Occupied from	Main Menu → Configuration Menu → Schedule Menu → OCCPC01S or OCCPC02S → Page 5	07:00
Occupied to		12:00
Monday Select		No
Tuesday Select		No
Wednesday Select		No
Thursday Select		No
Friday Select		No
Saturday Select		Yes
Sunday Select		No
Holiday Select		No

When **OCC1PxxS** is set to a value of 65 or greater and a time schedule is configured for at least one occupancy period, the system shall assume that the unit is going to be the master element for this schedule (the system element doing the broadcasting). In that case the unit Equipment and Supervisory part table names shall be automatically modified to **OCCPCxxE** and **OCCPCxxS**.

By configuring their appropriate Time Schedule decisions to the same number, other devices on the network can follow this same schedule. The Enable/Off/Remote Contact must be in the Enable position or the Remote Contact position with the contacts closed for the unit to operate.

The Unit Run Status (Main Menu → General Parameters → Run Status) will indicate the current status of the machine depending on the schedule. The unit Occupied status (Main Menu → General Parameters → Setpoint Occupied) will indicate the current occupied schedule according to the schedule, either NO or YES.

The Status Unit Control Type (Main Menu → General Parameters) will be 0 when the switch is Off. The Status Unit Control Type will be 2 when the Enable/Off/Remote Contact switch input is On.

CCN Control — To operate under this control, Network must be selected under the Select Machine Mode accessed by pressing the Start/Stop button (see the Operating Type Selection section on page 23).

An external CCN device such as Chillervisor controls the On/Off state of the machine. Careful evaluation of Chilled Water Plant control is necessary. In the event Local Control is established, be sure that all pumps, valves, and other devices are capable of operating properly. In the event of a loss of communication with the network, the machine will start and be controlled locally. The CCN device forces the variable **CHIL_S_S** to control the chiller. The Unit Run Status (Main Menu → General Parameters → Run Status) will indicate the current status of the machine (OFF, RUNNING, STOPPING or DELAY), depending on the CCN command. The unit Occupied status (Main Menu → General Parameters) will indicate the current occupied state according to the CCN command and will be displayed as either NO or YES. The Status Unit Control Type (**ctrl_typ**) will be LOCAL OFF when the Start/Stop button is Off. The Status Unit Control Type will be CCN when the Enable/Off/Remote Contact switch input is Closed and the **CHIL_S_S** variable is Stop or Start. For dual chiller control applications, the slave chiller must be enabled using the CCN CONTROL option.

CHILLED WATER FLUID TYPE SELECTION — The chilled water fluid type must be configured to obtain the proper leaving water setpoint control range and freeze protection. The Cooler Fluid Type (**flui_typ**) can be set to water or brine.

To configure this option:

DISPLAY NAME	PATH	LINE NO.	VALUE	SETPOINT RANGE
Cooler Fluid Type	Main Menu → Configuration Menu → Service Parameters	1	1 = Water	38 to 60 F (3.3 to 15.5 C)
			2 = Medium brine	21.2 to 60 F (–6 to 15.5 C)
			3 = Low brine	14 to 60 F (–10 to 15.5 C)

Fresh Water — Configure the unit Cooler Fluid Type to Water for units without brine or glycol installed in the chilled water loop. The factory default fluid type is fresh water. This option will allow for a water temperature setpoint range of 38 to 60 F (3.3 to 15.5 C). With water as the selection, the freeze point is fixed at 34 F (1.1 C).

Brine or Glycol — Configure the unit Cooler Fluid Type to Medium Brine or Low Brine for units with brine or glycol added to the chilled water loop. The Medium Brine option will allow for a setpoint temperature range of 21.2 to 60 F (–6.0 to 15.5 C). The Low Brine option will allow for a set point temperature range of 14 to 60 F (–10.0 to 15.5 C).

Before making this selection, confirm that a suitable antifreeze has been added and is at a sufficient concentration to protect the loop. Additionally, the Brine Freeze Setpoint (Main Menu → Configuration Menu → Service Parameters → Brine Freeze Setpoint) must be set for proper freeze protection operation. Set the Brine Freeze Setpoint to the burst protection provided by the glycol concentration. This value will be the freeze point for the fluid.

Cooler Pump Control — Cooler pump control is required on all flooded cooler units unless the chilled water pump runs continuously or the chilled water system contains a suitable antifreeze solution. The 30XA units with Greenspeed® intelligence can be configured for single or dual external cooler pump control with the standard controls. In addition to the pumps, all wiring including connections to the pump contactor and a feedback circuit from the contactor must be field supplied. Table 22 summarizes cooler pump configuration parameters.

Table 22 — Cooler Pump Configuration Parameters

DISPLAY NAME	PATH	LINE NO.	VALUE
Cooler Pumps Sequence	Main Menu → Configuration Menu → Pump Configuration	1	0 = No Pump (Default) 1 = One Pump Only 2 = Two Pumps Auto 3 = Pump #1 Manual 4 = Pump #2 Manual
Pump Auto Rotation Delay		7	Default: 48 hrs. (Range 24 to 3000 hrs.)
Pump Sticking Protection		8	Default: No
Stop Pump During Standby		9	Default: No
Flow Checked If Pump Off		10	Default: Yes
Cooler Pump Off In Heat		11	Default: No Not Applicable
Cond Pump Off in Cool		12	Default: No Not Applicable
VS Pump Regulation Config		13	Default: 1 Not Applicable
Kit Hydro Pump Type		14	Default: 1 Not Applicable

PUMP SELECTION — The Cooler Pump Sequence mode can be reached by following Main Menu → Configuration Menu → Pump Configuration. The available settings are:

- 0 = No Pump: The cooler pump will not be controlled by the chiller. This is the default setting.
- 1 = One Pump Only: If only one pump is selected it will be the active pump.
- 2 = Two Pump Auto: When two pumps are selected in auto mode, only one pump will be allowed to run at a time and the control will determine the On/Off state of each pump. The control will start the pumps and automatically alternate the operation of the pumps to even the wear on the pumps, based on the hours configured under Pump Auto Rotation Delay (Main Menu → Configuration Menu → Pump Configuration → Pump Auto Rotation Delay). If the difference between the operating hours of the two pumps exceeds the Pump Auto Rotation Delay the lead pump will change. If a flow failure is detected, the other pump will attempt to start.

- 3 = Pump #1 Manual: Pump #1 shall be the active pump.
- 4 = Pump #2 Manual: Pump #2 shall be the active pump.

When the Cooler Pumps Sequence is configured, the cooler pump output will be energized when the chiller enters an On state. Proof of flow from the chilled water flow switch (CWFS) is required for the unit to start mechanical cooling. The cooler pump output is also energized when certain alarms are generated. The cooler pump output should be used as an override to the external pump control if cooler pump control is not utilized. The cooler pump output is energized if a 10001 Cooler Freeze Protection alarm is generated, which provides additional freeze protection if the system is not protected with a suitable anti-freeze solution.

If the Master/Slave function is not active for the chiller or if the Master/Slave function is active and the unit is the lead, the pump shall be turned on when the unit is in On, Stopping or Delay state. In addition, when the unit is turned off the pump shall continue operating for 20 seconds after the last compressor is turned off. The pump shall be turned on when requested by the cooler heater function (see the Cooler Freeze Protection section on page 62).

MASTER/SLAVE CHILLER PUMP OPERATION — If the Master/Slave function is active and if the chiller is the lag unit, then the pump shall be turned on when the unit is in On mode and if the unit active lag demand limit is greater than 1%. Otherwise, the pump shall be stopped 30 seconds after the last compressor is turned off. However, if the lag unit pump has been configured to run even if the unit is commanded to stop (Main Menu → Configuration Menu → Master Slave config → Lag Unit Pump control = 1) then the above condition shall be ignored and the lag pump shall run all the time.

PERIODIC PUMP QUICK START — The control system has the ability to start the pumps periodically to maintain bearing lubrication and seal integrity. This function shall be used when the unit is stopped for a long time period (e.g., during the winter season). If Pump Sticking Protection (Main Menu → Configuration Menu → Pump Configuration → Pump Sticking Protection) is set to YES and if the unit is off at 2:00 PM, a pump will be started once each day for 2 seconds. If the unit has 2 pumps, Pump 1 will be started on even days (such as day 2, 4, or 6 of the month); Pump 2 will be started on odd days (such as day 1, 3 or 5 of the month). The default for this option is NO.

CHILLED WATER FLOW SWITCH STATUS — If Flow Checked if Pump Off (Main Menu → Configuration Menu → Pump Configuration → Flow Checked if Pump Off) is set to YES, the control will monitor the chilled water flow switch status and will send an alarm if the pump is commanded off and the chilled water flow switch is closed. This can provide the user with information of a faulty cooler pump contactor or a failed chilled water flow switch. This parameter should be set to NO for series flow machines. The factory default for this item is YES.

MANUAL OPERATION — The cooler pumps can be forced ON through the CCN when the chiller is off. This allows the unit to run with no delay and for an unlimited length of time for flow rate calculations when the unit is installed on site. Manual operation of the pumps is controlled through CCN points **CPUMP_1** and **CPUMP_2** (0 = OFF, 1 = ON).

FREEZE PROTECTION — The cooler pump shall be turned ON even if the unit is in OFF state when the outside temperature is low to provide freeze protection for the cooler.

Circuit/Compressor Staging and Loading —

The AquaForce® 30XA chillers with Greenspeed® intelligence employ one compressor per circuit. As a result, circuit and compressor staging are the same. The control has several control option parameters to load the compressors. The circuit/compressor start can be configured as well as the loading of each circuit/compressor.

CIRCUIT/COMPRESSOR STAGING — The control can be configured to decide which circuit/compressor starts first. Three options for this variable are allowed: Automatic Lead-Lag, Circuit A Leads, or Circuit B Leads. The factory default is Automatic Lead-Lag.

The automatic lead-lag function determines which circuit/compressor starts first to even the wear on the compressors. The control system determines the lead circuit to equalize the operating time of each circuit (value weighted by the number of start-ups of each circuit). As a result, the circuit with the lowest number of operating hours always starts first. The parameter can also be configured to always start a particular circuit/compressor first.

To configure this option:

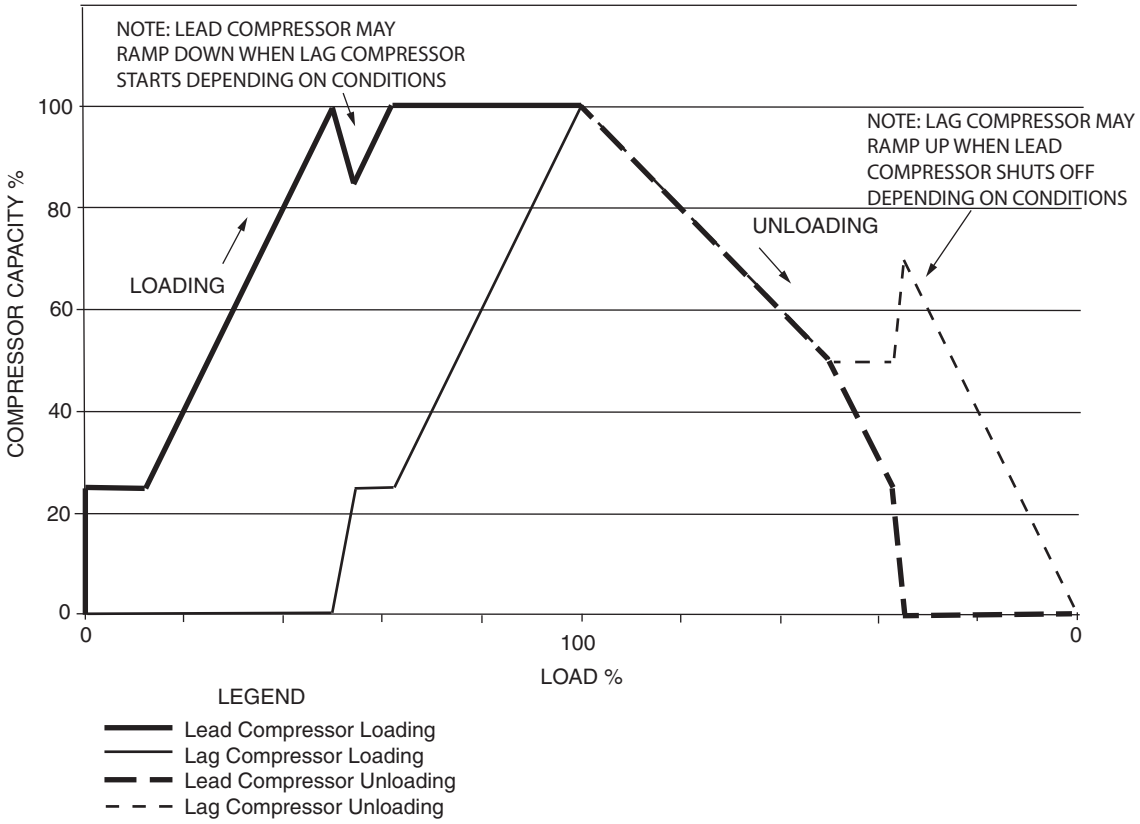
DISPLAY NAME	PATH	LINE NO.	VALUE
Circuit Priority Sequence	Main Menu → Configuration Menu → General Configuration	1	0 = Auto 1 = Ckt A Priority 2 = Ckt B Priority

CIRCUIT/COMPRESSOR LOADING/UNLOADING — The control uses an equal compressor loading and unloading scheme as described below to optimize the efficiency of the unit. The Staged Loading Sequence parameter in the controls is currently disabled.

At start-up, the lead compressor will ramp up capacity by changing the slide valve position while maintaining a low variable frequency drive (VFD) frequency. After the slide valve is in the fully loaded position, the VFD frequency will increase to meet load. When the first compressor is fully loaded, the lag compressor will start up and increase capacity using the same process.

After both compressors are fully loaded, the control system will respond to changes in demand by unloading and loading both compressors equally using the VFDs.

As demand continues to decrease, the compressors will unload equally until the minimum frequency is reached. At that point the lead compressor will unload with the slide valve. If lower capacity is still required, the lag compressor will then unload with the slide valve before shutting off. See Fig. 23 for a graphical representation of initial system loading and unloading. (Fig. 23 shows an example of possible compressor loading for a given scenario. Since the controls are adaptive, actual loading will vary.)



NOTE: After compressors are fully loaded, they will both load and unload equally with the VFDs (variable frequency drives).

Fig. 23 — Initial Compressor Loading/Unloading Method

Dual Chiller Control — The dual chiller function allows for master/slave control of two units installed in parallel or series arrangement supplying chilled fluid on a common loop. The chillers must be linked by the Carrier Comfort Network® (CCN) network and operate on the same bus.

When the units are installed for parallel operation and chilled water control is done on the outlet side of the units, the Dual Chiller Accessory kit (P/N 00EFN900005600A) is required. The kit includes additional leaving fluid temperature thermistors that must be installed on the common chilled water leaving piping as described in the Installation Instructions for the kit. The leaving fluid temperature sensors shall be connected to each chiller with the Auxiliary Board included in the kit. When the chilled water control is done on the inlet side of the parallel units no additional temperature sensor is required. See the Field Wiring section in the 30XA Installation Instructions for Dual Chiller LWT sensor control wiring. When chillers are configured to operate in series mode no additional chilled water temperature sensor is required. See the Auxiliary (AUX) Boards section on page 10 for details on the address and inputs for AUX Board 1 included in the kit.

The master chiller shall monitor all external commands such as start/stop, demand limiting or setpoint select, and needs to be started in Master operating type. The commands are transmitted automatically to the slave unit, which must operate in CCN (Network) mode. The slave chiller has no action in the master/slave operations; it shall only verify that CCN communication with the master chiller is correct. If the master chiller is turned off while the master/slave function is active then the slave chiller will be stopped. Under certain circumstances, the slave unit may be started first to balance the run times of the two units. In the event of a communication failure between the two units, each unit will return to an autonomous operating mode until the fault is cleared. If the master unit is stopped due to an alarm, the slave unit is authorized to start.

The CCN communication port for the Master and Slave chillers must be joined using a shielded cable in order to avoid communication issues.

The master/slave linkage shall not be allowed to operate if any one of the slave chiller **CTRL_PNT**, **DEM_LIM**, **LAG_LIM**, **CTRL_PNT**, **HC_SEL** or **LCW_STPT** variables has a force priority higher than a control force. In that case, the master/slave operations shall not be allowed or shall be disabled.

The control algorithm relies on several parameters that must be field configured for operation. Both chillers must be on the same CCN bus with different addresses. On both chillers, Master/Slave Select (Main Menu → Configuration Menu → Master Slave config → Master/Slave Select) must be enabled (set to 1 or 2). The water piping arrangement must be specified with the Chiller in Series variable (Main Menu → Configuration Menu → Master Slave config → Chiller in Series). The Master chiller must be programmed with the Slave Address (Main Menu → Configuration Menu → Master Slave config → Slave Address). Additional optional programming parameters may be configured to meet application requirements.

The Lead Lag Select variable (Main Menu → Configuration Menu → Master Slave config → Lead Lag Select) determines which chiller is the lead machine. The options are: Always Lead, Lag Once Failed Only, and Lead/Lag Runtime Select. Under Runtime Select control, the lead chiller will change based on the time increment selected in the Lead/Lag Balance

Delta configuration (Main Menu → Configuration Menu → Master Slave config → Lead/Lag Balance Delta). If the run hour difference between the master and the slave remains less than the Lead/ Lag Balance Delta, the chiller designated as the lead will remain the lead chiller. The Lead/Lag changeover between the master and the slave chiller due to hour balance will occur during chiller operating odd days, such as day 1, day 3, and day 5 of the month, at 12:00 a.m. If a lead chiller is not designated, the master chiller will always be designated the lead chiller.

The dual chiller control algorithm has the ability to delay the start of the lag chiller in two ways. The Lead Pulldown Time parameter (Main Menu → Configuration Menu → Master Slave config → Lead Pulldown Time) is a one-time time delay initiated after starting the lead chiller, before checking whether to start an additional chiller. This time delay gives the lead chiller a chance to remove the heat that the chilled water loop picked up while inactive during an unoccupied period. The second time delay, Lead/Lag Start Timer (Main Menu → Configuration Menu → Master Slave config → Lead/Lag Start Timer) is a time delay imposed between the last stage of the lead chiller and the start of the lag chiller. This prevents enabling the lag chiller until the lead/lag delay timer has expired.

A quicker start of the lag chiller can be accomplished by configuring the Lag Unit Pump Control parameter (Main Menu → Configuration Menu → Master Slave config → Lag Unit Pump Control). If the difference between the common leaving water temperature and the setpoint is greater than the configured value, then the lag chiller will start.

A minimum On time for the lag chiller can be programmed with the Lag Minimum Running Time configuration (Main Menu → Configuration Menu → Master Slave config → Lag Minimum Running Time). This parameter causes the control to run the lag chiller for the programmed minimum On time. The Lag Unit Pump Control (Main Menu → Configuration Menu → Master Slave config → Lag Unit Pump Control) can be configured such that the pump can be on or off while the chiller is off. This parameter is only active in Parallel Chiller Operation.

The lead chiller shall always be started first and the lag chiller shall be maintained at zero percent capacity through master forcing the lag demand limit value (**LAG_LIM**) to 0%. The lag water pump shall be maintained off. When the lead chiller cannot be loaded anymore (because it is loaded at its full available capacity or at the master demand limit value) then the lag start timer is started. When the lag start time has elapsed, if the error on the master controlled setpoint is greater than the dead band (**start_di**) and if the pulldown time is elapsed then the lag chiller water pump shall be turned on (if required by configuration) and the lag chiller shall be allowed to start through the master chiller forcing the lag chiller demand limit value (**LAG_LIM**) to its own demand limit value. To ensure that the lag chiller will be unloaded first in case of water load decrease, the lead chiller setpoint error shall be reset downwards by 4° F (2.2° C) provided that the lead capacity is not zero.

NOTE: To ensure that no compressor is started before the flow rate is correctly established, water flow control is absolutely required on the lag chiller for master slave operations.

Each dual chiller application, Parallel and Series, is described separately below.

DUAL CHILLER CONTROL FOR PARALLEL APPLICATIONS — To configure the master chiller for parallel applications, see Table 23. To configure the slave chiller for parallel applications, see Table 24.

Table 23 — Dual Master Chiller Control Parameters for Parallel Applications

DISPLAY NAME	PATH	LINE NO.	VALUE
Master/Slave Select	Main Menu → Configuration Menu → Master Slave config	2	1 (Master) Default: 0 (Disable)
Master Control Type		6	1=Local Control 2=Remote Control 3=CCN Control Default: 1(Local) Configure for proper control type.
Slave Address		10	Must be set to the Slave Chiller's address. The Master and Slave chiller must have different addresses and be on the same Bus Number Default: 2
Lead Lag Select		11	0 (Master Always Leads) 1 (Lag One Failed Only) 2 (Lead/Lag Runtime Select) Default: 0 (Master Always Leads)
Lead/Lag Balance Delta		15	Range: 40 to 400 hours Default: 168 hours
Lead/Lag Start Timer		16	Range: 2 to 30 minutes Default: 10 minutes
Lead Pulldown Time		17	Range: 0 to 60 minutes Default: 0 minutes
Start If Error Higher		18	Range: 3.0 to 18 ΔF (1.7 to 10.0 ΔC) Default: 4.0 ΔF (2.2 ΔC)
Lag Minimum Running Time		19	Range: 0 to 150 minutes Default: 0 minutes
Lag Unit Pump Control		20	0 (Stop If Unit Stops) 1 (Run If Unit Stops) Default: 0 (Stop If Unit Stops)
Chiller In Series		23	No (Not in Series) Default: No

NOTE: If pump control is configured to OFF, then Lag Unit Pump Control = 1. If pump control is set to any other value, then Lag Unit Pump Control = 0. This configuration must be set consistently for both master and slave chillers.

Table 24 — Dual Slave Chiller Control Parameters for Parallel Applications

DISPLAY NAME	PATH	LINE NO.	VALUE
Master/Slave Select	Main Menu → Configuration Menu → Master Slave config	2	2 (Slave) Default: 0 (Disable)
Master Control Type		6	1=Local Control 2=Remote Control 3=CCN Control Default: 1(Local) Configure for proper control type.
Slave Address		10	Must be set to the Slave Chiller's address. The master and slave chiller must have different addresses and be on the same Bus Number Default: 2
Lead Lag Select		11	0 (Master Always Leads) 1 (Lag Once Failed Only) 2 (Lead/Lag Runtime Select) Default: 0 (Master Always Leads)
Lead/Lag Balance Delta		15	Range: 40 to 400 hours Default: 168 hours
Lead/Lag Start Timer		16	Range: 2 to 30 minutes Default: 10 minutes
Lead Pulldown Time		17	Range: 0 to 60 minutes Default: 0 minutes
Start If Error Higher		18	Range: 3.0 to 18 ΔF (1.7 to 10.0 ΔC) Default: 4.0 ΔF (2.2 ΔC)
Lag Minimum Running Time		19	Range: 0 to 150 minutes Default: 0 minutes
Lag Unit Pump Control		20	0 (Stop If Unit Stops) 1 (Run If Unit Stops) Default: 0 (Stop If Unit Stops)
Chiller In Series		23	No (Not in Series) Default: No

NOTE: If pump control is configured to OFF, then Lag Unit Pump Control = 1. If pump control is set to any other value, then Lag Unit Pump Control = 0. This configuration must be set consistently for both master and slave chillers.

DUAL CHILLER PUMP CONTROL FOR PARALLEL CHILLER APPLICATIONS — Parallel chiller control with dedicated pumps is recommended. The chiller must start and stop its own water pump located on its own piping. If pumps are not dedicated for each chiller's piping, chiller isolation valves are required; each chiller must open and close its own isolation valve through the control. Figures 24-27 show typical pump arrangements for dual chiller parallel applications.

Although not recommended, it is possible to configure the system with no individual pump control. In applications where the unit is configured for fresh water (Main Menu → Configuration Menu → Service Parameters, Cooler Fluid Type=1 [Fresh Water]), and Set Point temperature is close to the lower limit of the fresh water range, it is possible for changeable leaving water conditions as the chilled water flow rate drops to an operating unit, causing the leaving chilled water temperature to drop and initiate the cooler freeze protection override. Constant water applications may alleviate this issue. In constant water flow applications, the master chiller should be the primary control source for the chilled water pump. The slave chiller should have override capability. In the event of a communication failure between the master and slave chillers, the slave chiller will operate as a stand-alone machine and therefore must be able to enable the chilled water pump.

DUAL CHILLER CONTROL FOR SERIES CHILLER APPLICATIONS — When chillers are configured to work in series mode no additional chilled water supply sensor is required. The master chiller shall be installed downstream of the slave chiller (the slave chiller outlet fluid is the master inlet fluid). If pump control is required, it shall be controlled by the master chiller.

To configure the master chiller for series applications, see Table 25. To configure the slave chiller for series applications, see Table 26.

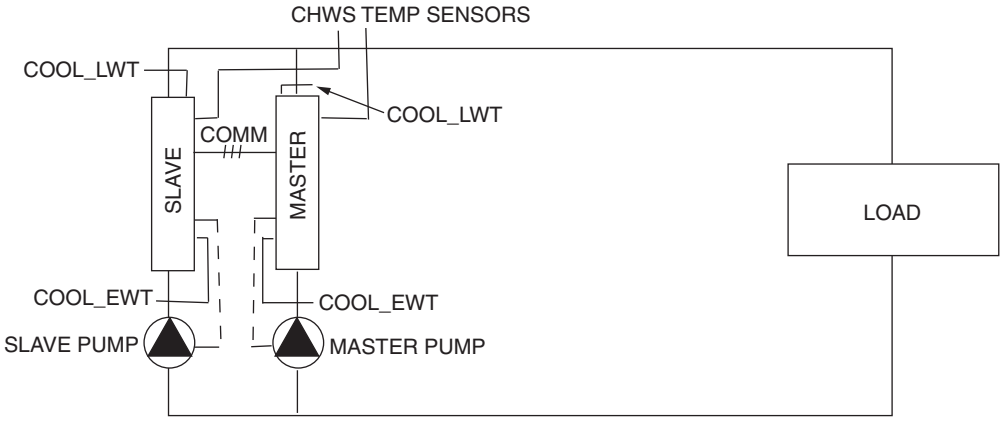


Fig. 24 — Typical Parallel Master/Slave Chillers
Dedicated Primary Pumping, Variable Flow, Leaving Water Control

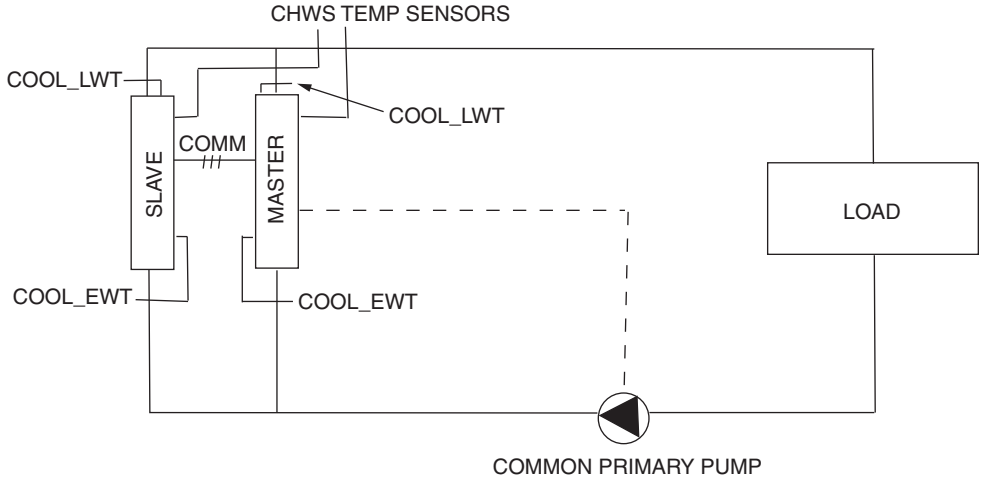


Fig. 25 — Typical Parallel Master/Slave Chillers
Common Primary Pumping, Constant Flow, Leaving Water Control

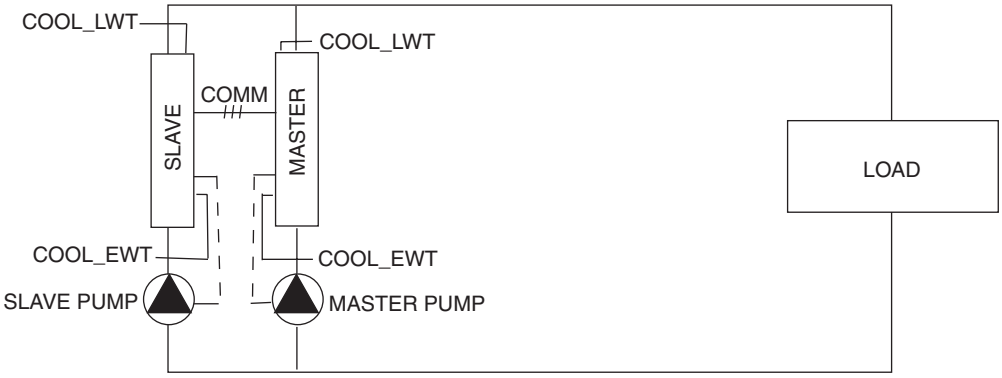


Fig. 26 — Typical Parallel Master/Slave Chillers
Dedicated Primary Pumping, Variable Flow, Entering Water Control

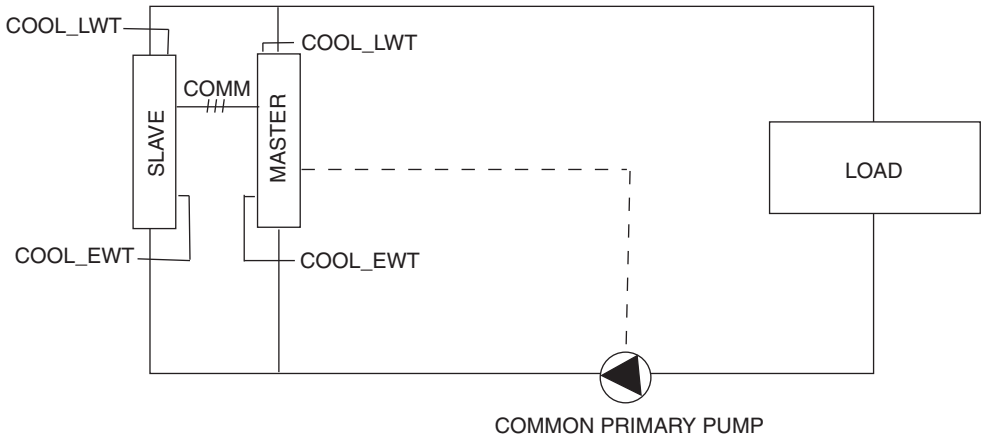


Fig. 27 — Typical Parallel Master/Slave Chillers
Common Primary Pumping, Variable Flow, Entering Water Control

Table 25 — Master Chiller Configuration in Series Applications

DISPLAY NAME	PATH	LINE NO.	VALUE
Master/Slave Select	Main Menu → Configuration Menu → Master Slave config	2	1 (Master) Default: 0 (Disable)
Master Control Type		6	1=Local Control 2=Remote Control 3=CCN Control Default: 1(Local) Configure for proper control type.
Slave Address		10	Must be set to the Slave Chiller's address. The Master and Slave chiller must have different addresses and be on the same Bus Number Default: 2
Lead Lag Select		11	0 (Master Always Leads) 1 (Lag One Failed Only) 2 (Lead/Lag Runtime Select) Default: 0 (Master Always Leads)
Lead/Lag Balance Delta		15	Range: 40 to 400 hours Default: 168 hours
Lead/Lag Start Timer		16	Range: 2 to 30 minutes Default: 10 minutes
Lead Pulldown Time		17	Range: 0 to 60 minutes Default: 0 minutes
Start If Error Higher		18	Range: 3.0 to 18 ΔF (1.7 to 10.0 ΔC) Default: 4.0 ΔF (2.2 ΔC)
Lag Minimum Running Time		19	Range: 0 to 150 minutes Default: 0 minutes
Lag Unit Pump Control		20	0 (Stop If Unit Stops) 1 (Run If Unit Stops) Default: 0 (Stop If Unit Stops)
Chiller In Series		23	Yes (In Series) Default: No

Table 26 — Slave Chiller Configuration in Series Applications

DISPLAY NAME	PATH	LINE NO.	VALUE
Master/Slave Select	Main Menu → Configuration Menu → Master Slave config	2	2 (Slave) Default: 0 (Disable)
Master Control Type		6	1=Local Control 2=Remote Control 3=CCN Control Default: 1(Local) Configure for proper control type.
Slave Address		10	Must be set to the Slave Chiller's address. The master and slave chiller must have different addresses and be on the same Bus Number Default: 2
Lead Lag Select		11	0 (Master Always Leads) 1 (Lag Once Failed Only) 2 (Lead/Lag Runtime Select) Default: 0 (Master Always Leads)
Lead/Lag Balance Delta		15	Range: 40 to 400 hours Default: 168 hours
Lead/Lag Start Timer		16	Range: 2 to 30 minutes Default: 10 minutes
Lead Pulldown Time		17	Range: 0 to 60 minutes Default: 0 minutes
Start If Error Higher		18	Range: 3.0 to 18 ΔF (1.7 to 10.0 ΔC) Default: 4.0 ΔF (2.2 ΔC)
Lag Minimum Running Time		19	Range: 0 to 150 minutes Default: 0 minutes
Lag Unit Pump Control		20	0 (Stop If Unit Stops) 1 (Run If Unit Stops) Default: 0 (Stop If Unit Stops)
Chiller In Series		23	Yes (In Series) Default: No

NOTE: If pump control is configured to OFF, then LAG UNIT PUMP SELECT (page 3 of the Master Slave config menu) = 1. If pump control is set to any other value, then LAG UNIT PUMP SELECT = 0. This configuration must be set consistently for both master and slave chillers.

DUAL CHILLER PUMP CONTROL FOR SERIES CHILLER APPLICATIONS — Pump control for series chiller applications is controlled by the master chiller only. The control of the slave chiller is directed through commands emitted by the master chiller. The slave chiller has no action in master/slave operations. The slave chiller only verifies that CCN communication with the master chiller is present. See the Dual Chiller Sequence of Operation section on page 51. Figure 28 shows a typical pump arrangement for dual chiller series applications.

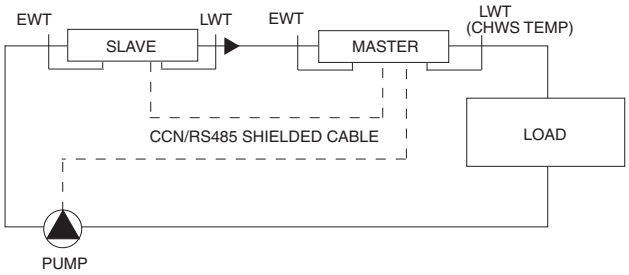


Fig. 28 — Typical Series Master/Slave Chillers Dedicated Primary Pumping, Constant Flow, Leaving Water Control

Night Time/Low Noise Operation — The Touch Pilot™ controls have the ability to lower the sound level of the machine by limiting the speed of the fans, provided that the conditions are acceptable. Reducing the speed of the fans also limits the capacity. Three parameters must be configured for this operation. A start and end time for the mode of operation is required and an optional capacity limit set point must also be configured as shown below:

DISPLAY NAME	PATH	LINE NO.	VALUE
Night Mode Start Hour	Main Menu → Configuration Menu → General Configuration	11	hh:mm
Night Mode End Hour		12	hh:mm
Night Capacity Limit		13	Default = 100% (0 to 100)

The status of the low noise option can be verified through the Modes menu: Main Menu → Modes → Night Low Noise Active (Yes / No).

Ramp Loading — The Ramp Loading function limits the rate of change of the leaving fluid temperature. The minimum compressor speed is calculated based on saturated condensing temperature and saturated suction temperature. To enable the Ramp Loading sequence:

DISPLAY NAME	PATH	LINE NO.	VALUE
Ramp Loading Select	Main Menu → Configuration Menu → General Configuration	5	Yes
Cooling Ramp Loading	Main Menu → Setpoint Table	4	Range: 0.2 to 2.0° F/min (0.1 to 1.1° C/min) Default: 1.0° F/min (0.5 °C/min)

Temperature Reset — The temperature reset function shall determine the cooling or heating control point. This control point is the active setpoint adjusted with the current reset value:

Control Point = Setpoint + Reset

The purpose of this reset value is to decrease the required capacity if it is allowed by unit load operating conditions. When a non-zero temperature reset is applied, the chiller controls to the new control point instead of the setpoint. The type of temperature reset is configured with the Cooling Reset Select variable. Four types of temperature reset are available: Outdoor Air Temperature (OAT), Return Water Reset (Delta T), 4-20mA control, and Space Temperature control:

DISPLAY NAME	PATH	LINE NO.	VALUE
Cooling Reset Select	Main Menu → Configuration Menu → Reset Configuration	1	0 = None 1 = OAT 2 = Delta T 3 = 4-20 mA Control 4 = Space Temp

Under normal operation, the chiller will maintain a constant entering or leaving fluid temperature, based on the configuration, approximately equal to the chilled fluid set point. As the cooler load varies, the cooler fluid temperature difference will change in proportion to the load. For example, if the chiller was selected for an entering to leaving water temperature difference of 10° F (5.5° C) at full load, at 50% load the temperature difference would be 5° F (2.2° C). See Fig. 29. Because the change in temperature through the cooler is a measure of the building load, the temperature difference reset is the average building load. Usually the chiller size and fluid temperature set point are selected based on a full load condition. At part load, the fluid temperature set point may be lower than required. When the fluid temperature is allowed to increase at part load, the efficiency of the machine will increase. The chiller can also be set for return water temperature control. See Fig. 30.

Other indirect means of estimating building load and controlling temperature reset are also available and are discussed below.

To verify that reset is functioning correctly, subtract the Current Setpoint (Main Menu → General Parameters → Current Setpoint) from the Control Point (Main Menu → General Parameters → Control Point) to determine the degrees reset.

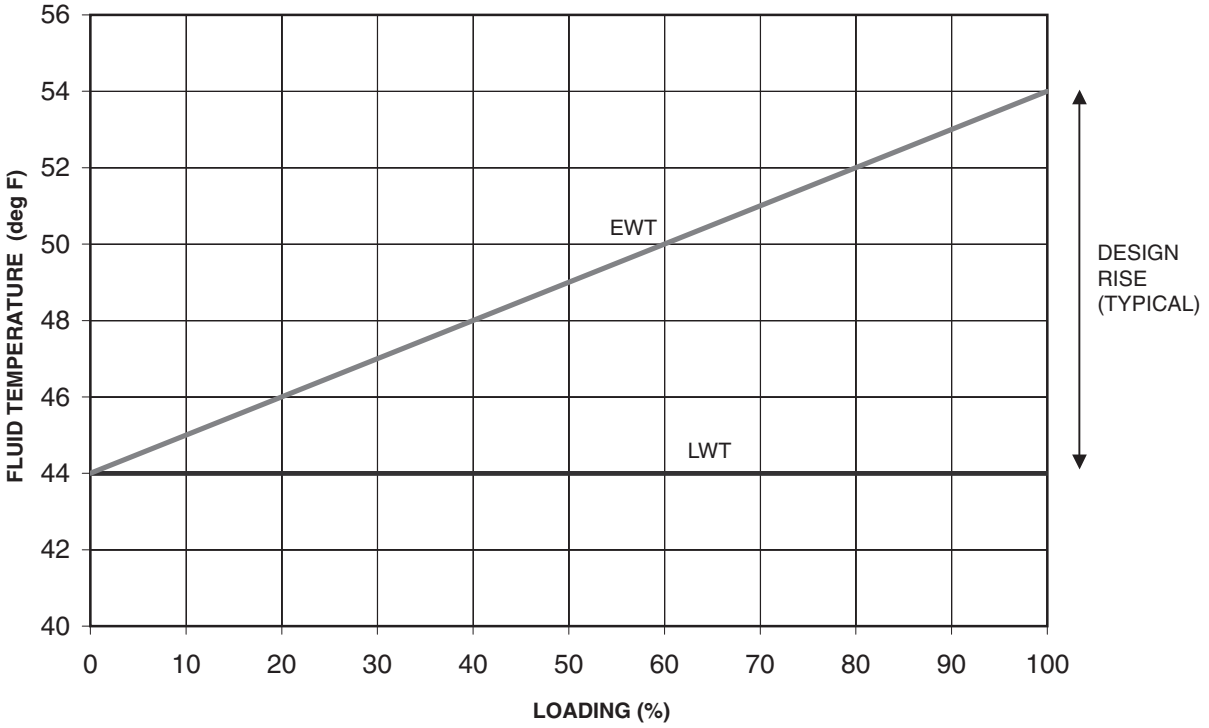


Fig. 29 — Leaving Chilled Water Temperature Control

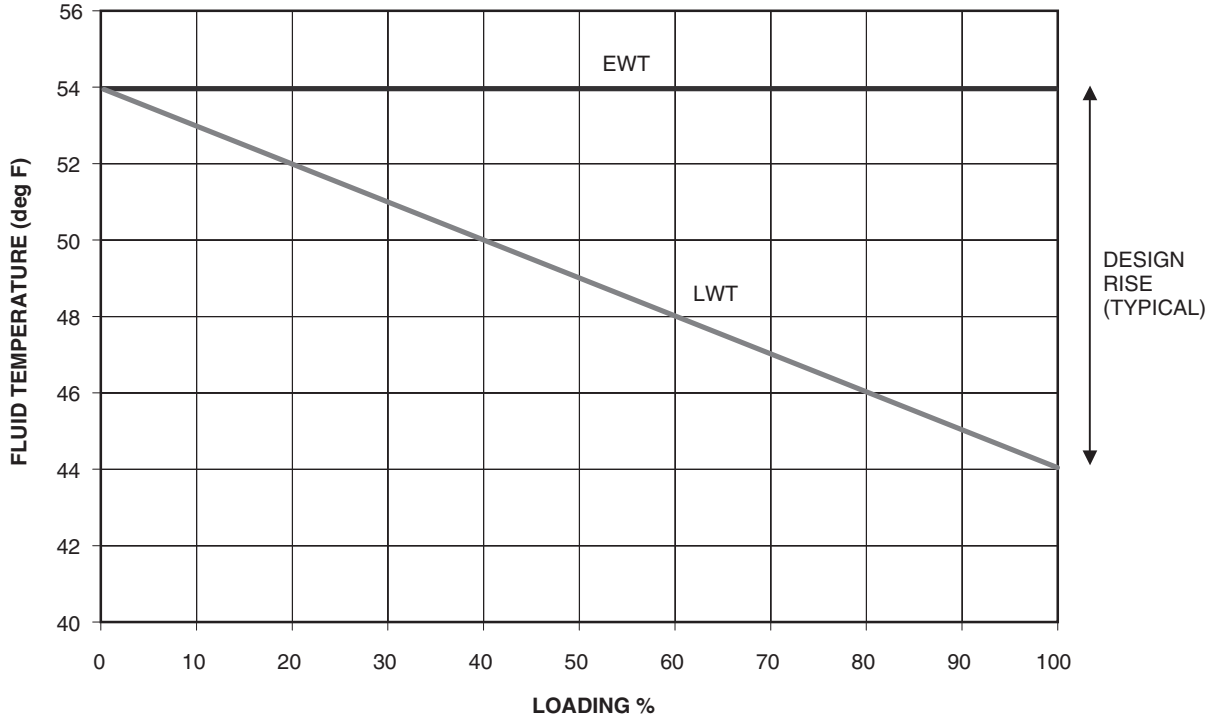


Fig. 30 — Return Water Temperature Control Load Profile

OUTSIDE AIR TEMPERATURE RESET — The control system is capable of temperature reset based on outdoor-air temperature (OAT). Typically as the outdoor temperature decreases so does building cooling load. The chilled water temperature can be reduced to lower energy usage while still meeting load demand.

To use Outdoor Air Temperature Reset, four variables must be configured: Cooling Reset Select, OAT No Reset Value (outdoor temperature at which no reset is required), OAT Full Reset Value (outdoor temperature at which full reset is required), and Cooling Reset Deg Value (the amount of temperature reset desired).

To configure this option with the Touch Pilot™ display:

DISPLAY NAME	PATH	LINE NO.	VALUE
Cooling Reset Select	Main Menu → Configuration Menu → Reset Configuration	1	1 (OAT)
OAT No Reset Value		8	Default = 14 F (–10 C)
OAT Full Reset Value		9	Default = 14 F (–10 C)
Cooling Reset Deg. Value		16	Default = 0 F (0 C)

In the example in Fig. 31, the outdoor air temperature reset provides 0° F (0° C) chilled water setpoint reset at 85 F (29.4 C) outdoor-air temperature and 15° F (8.3° C) reset at 55 F (12.8 C) outdoor-air temperature.

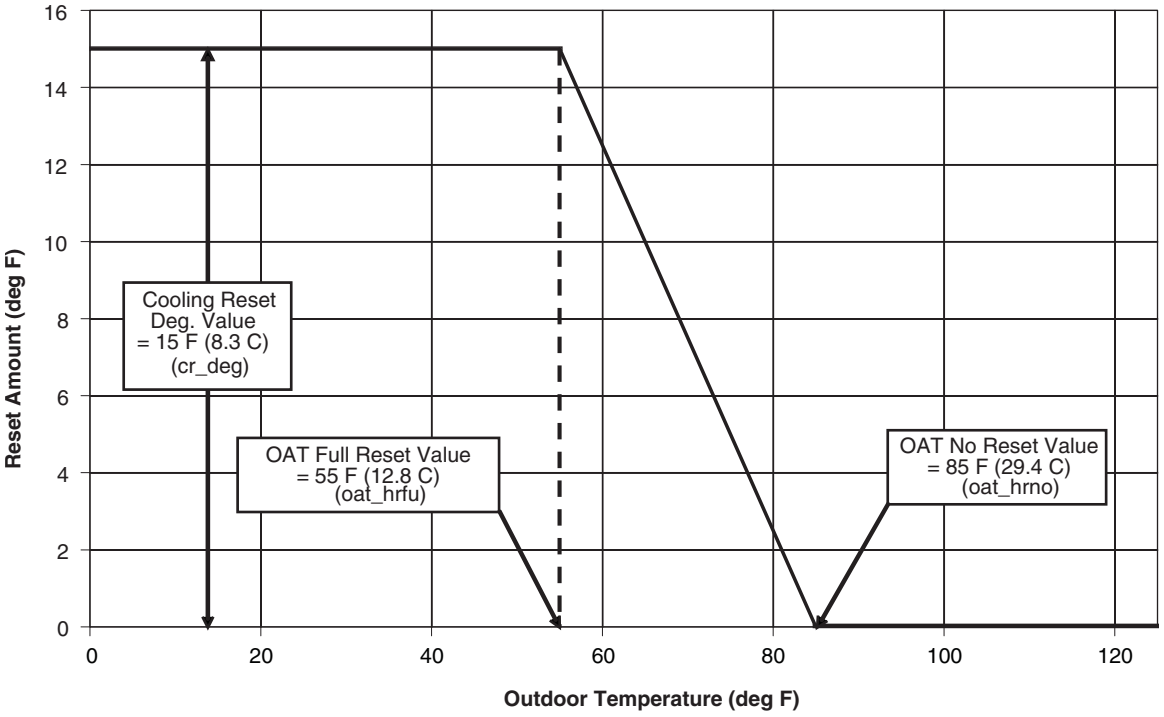


Fig. 31 — Example: OAT Temperature Reset

DELTA T RESET (RETURN WATER RESET) — The control system is also capable of performing fluid temperature reset based on cooler fluid temperature difference (Delta T), sometimes called return water reset. Because the change in temperature through the cooler is a measure of the building load, the temperature difference reset is, in effect, an average building load reset method.

Delta T Reset allows for the chilled water temperature set point to be reset upward as a function of the fluid temperature difference (building load).

NOTE: Delta T (Return Water) Temperature Reset should not be used with variable cooler flow rate systems.

To use Delta T Reset, four variables must be configured: Cooling Reset Select, Delta T No Reset Value (cooler temperature difference at which no chilled water temperature reset should occur), Delta T Full Reset Value (cooler temperature difference at which the maximum chilled water temperature reset should occur), and Cooling Reset Deg Value (the maximum amount of temperature reset desired).

To configure this option with the Touch Pilot™ display:

DISPLAY NAME	PATH	LINE NO.	VALUE
Cooling Reset Select	Main Menu → Configuration Menu → Reset Configuration	1	2 (Delta T)
Delta T No Reset Temp		10	Default = 0° F (0° C)
Delta T Full Reset Temp		11	Default = 0° F (0° C)
Cooling Reset Deg Value		16	Default = 0° F (0° C)

In the example in Fig. 32 using Return Water Temperature Reset, the chilled water temperature will be reset by 5° F (2.8° C) when the Fluid Temperature Difference is 2° F (1.1° C) and 0° F (0° C) reset when the Temperature Difference is 10° F (5.6° C).

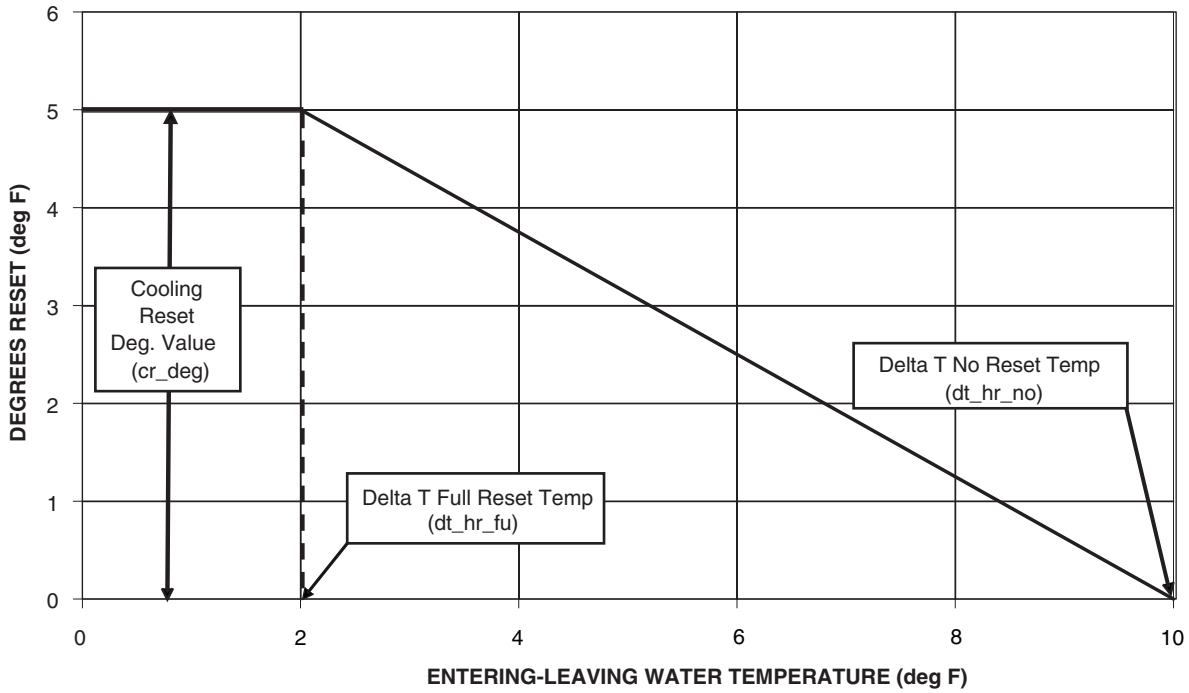


Fig. 32 — Example: Return Water Reset

4-20 mA TEMPERATURE RESET — The control system is also capable of temperature reset based on an externally powered 4 to 20 mA signal. The Energy Management Module (EMM) is required for temperature reset using a 4 to 20 mA signal.

To use 4-20 mA Temperature Reset, four variables must be configured: Cooling Reset Select, Current No Reset Value (milliamp signal at which no temperature reset is required), Current Full Reset Value (milliamp signal at which full temperature reset is required), and Cooling Reset Deg Value (the maximum amount of temperature reset desired).

To configure this option with the Touch Pilot™ display:

DISPLAY NAME	PATH	LINE NO.	VALUE
Cooling Reset Select	Main Menu → Configuration Menu → Reset Configuration	1	3 (4-20mA Control)
Current No Reset Value		12	4.0 mA Default = 0.0
Current Full Reset Value		13	20.0 mA Default = 0.0
Cooling Reset Deg Value		16	Default = 0 °F (0 °C)

In the example in Fig. 33, at 4 mA no reset takes place and at 20 mA, 5° F (2.8° C) chilled water set point reset is required.

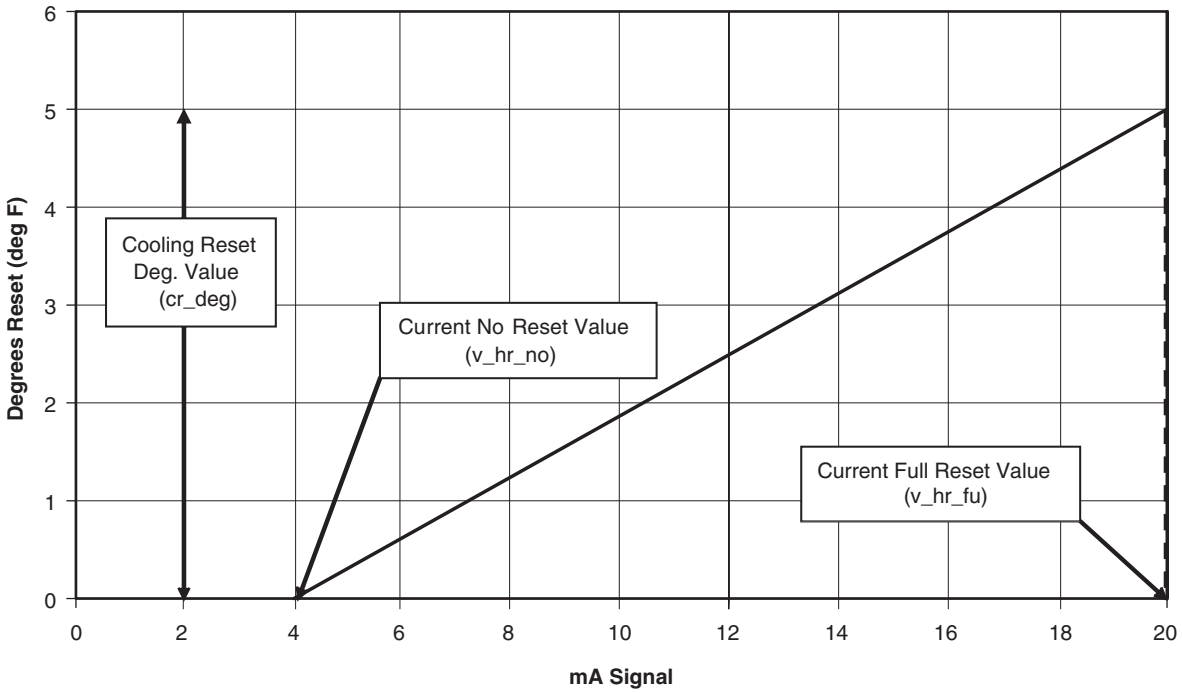


Fig. 33 — Example: 4 to 20 mA Temperature Reset

SPACE TEMPERATURE RESET — The control system is also capable of temperature reset based on space temperature. The energy management module (EMM) and accessory sensor (P/N 33ZCT55SPT) are required for temperature reset using space temperature. This sensor measures the space (room) temperature for the purpose of setpoint reset. Only units with the optional energy management module are fitted with this sensor.

To use Space Temperature Reset, four variables must be configured: Cooling Reset Select, Space T No Reset Value (space temperature at which no temperature reset is required), Space T Full Reset Value (space temperature at which full temperature reset is required), and Cooling Reset Deg Value (the maximum amount of temperature reset desired).

To configure this option with the Touch Pilot display:

DISPLAY NAME	PATH	LINE NO.	VALUE
Cooling Reset Select	Main Menu → Configuration Menu → Reset Configuration	1	4 (Space Temp)
Space T No Reset Value		14	Default = 14 F (–10 C)
Space T Full Reset Value		15	Default = 14 F (–10 C)
Cooling Reset Deg Value		16	Default = 0 °F (0 °C)

In the space temperature reset example in Fig. 34, a reset of 6° F (3.3° C) is applied when the space temperature is 68 F (20.0 C) and no reset takes place when the space temperature is 72 F (22.2 C).

Demand Limit — Demand limit is a feature that allows the unit capacity to be limited during periods of peak energy usage. This allows the owner to keep energy costs down. There are three types of demand limiting that can be configured. The first type is through switch control, which will reduce the maximum capacity to up to 3 user-configurable percentages. The second type is by 4 to 20 mA signal input which will reduce the maximum capacity linearly between 100% at a 4 mA input signal (no reduction) down to the user-configurable level at a 20 mA input signal. The third type uses the CCN Loadshed module and has the ability to limit the current operating capacity to maximum and further reduce the capacity if required. Demand limit control can be based on a calculated capacity level or by compressor current level.

NOTE: If using the compressor power level for demand limit, take into account the other power draws such as the condenser fan motors when determining the limit value desired.

SWITCH CONTROLLED DEMAND LIMIT — The control system is capable of demand limit based on a field-supplied switch for 1-step demand limit or 2 switches for 3-step demand limit. One-step demand limit is standard. The 3-step switch control of demand limiting requires the energy management module (EMM). Demand limit steps are controlled by two relay switch inputs field wired to TB5-5 and TB5-14 for Switch 1 and TB6-14 and TB6-15 for Switch 2.

For demand limit by switch control, closing the first demand limit contact will put the unit on the first demand limit level, either by capacity or compressor current. The unit will not exceed the percentage of capacity or compressor current entered as demand limit switch 1 set point. Closing contacts on the second demand limit switch prevents the unit from exceeding the demand limit entered as demand limit switch 2 set point. If both demand limit switch contacts are closed the unit will not exceed the limits set by the switch limit setpoint 3. See the table below.

CONTACT	ACTIVE DEMAND LIMIT			
	NONE	LIMIT 1	LIMIT 2	LIMIT 3
LIM_SW1	Open	Close	Open	Close
LIM_SW2	Open	Open	Close	Close

If the demand limit percentage does not match unit operation, the unit will limit capacity or current to the closest step without exceeding the value.

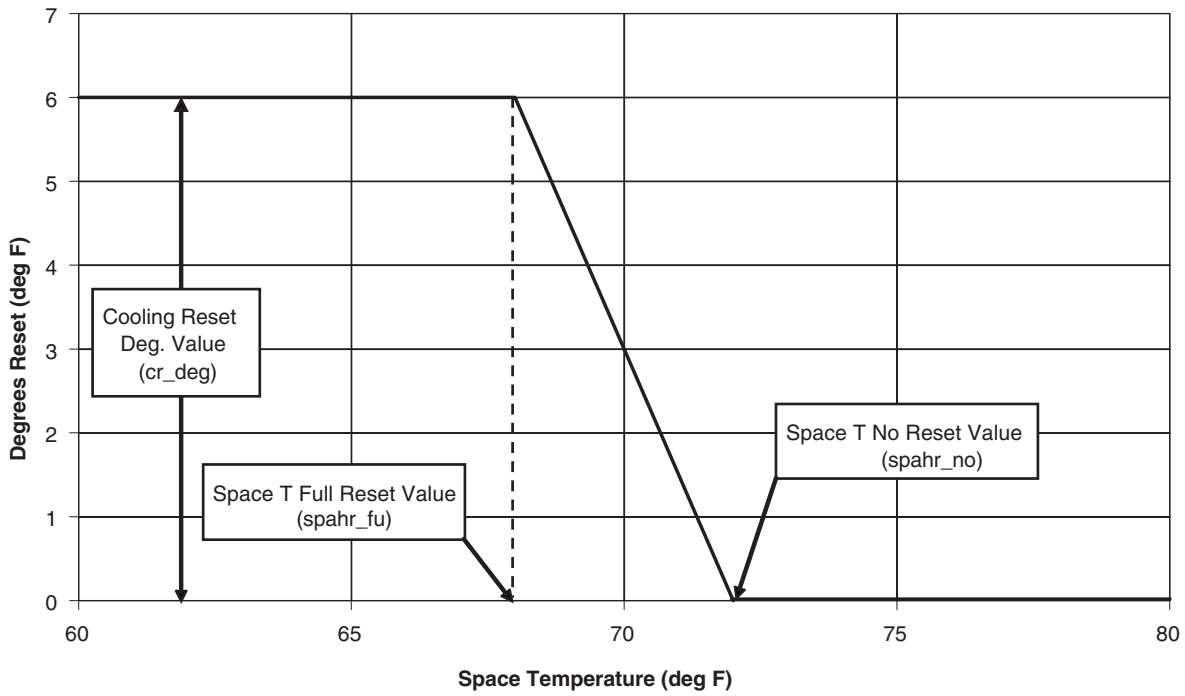


Fig. 34 — Example: Space Temperature Reset

To use demand limit, select the type of demand limiting to use by configuring the Demand Limit Select variable (Main Menu → Configuration Menu → General Configuration → Demand Limit Select) to Switch. Configure the demand limit set points based on the type selected.

Switch Controlled (Capacity Based) — If using 2 or 3-step demand limit control, an energy management module must be installed. One-step demand limit control does not require the energy management module. To configure demand limit for switch control, three parameters for 1-step switch control must be configured. For 2 or 3-step control, additional setpoint parameters must be configured. The parameters are: the type of Demand Limit Selection, the setting for Switch Limit Setpoint 1, the setting for Switch Limit Setpoint 2 (if required), the setting for Switch Limit Setpoint 3 (if required), and Power Limit Select. Power Limit Select must be set to NO.

To configure this option with the Touch Pilot™ display:

DISPLAY NAME	PATH	LINE NO.	VALUE
Demand Limit Type Select	Main Menu → Configuration Menu → General Configuration	7	1 (Switch) Default = 0 (None)
Switch Limit Setpoint 1	Main Menu → Setpoint Table	11	Default = 100%
Switch Limit Setpoint 2	Main Menu → Setpoint Table	12	Default = 100% (Not required for 1-Step Control)
Switch Limit Setpoint 3	Main Menu → Setpoint Table	13	Default = 100% (Not required for 1 or 2-Step Control)
Power Limit Select	Main Menu → Configuration Menu → General Configuration	14	No Default = No

In the following example, 2-step demand limit based on capacity is desired with the first switch closure limiting the capacity to 60%. The second switch closure is to limit the capacity to 40%. Demand Limit Switch 1 is 60% and Demand Limit Switch 2 is 40%. Since no third-step demand limit is required, Switch Limit Setpoint 3 is set at 0%.

DISPLAY NAME	VALUE
Demand Limit Type Select	1
Switch Limit Setpoint 1	60%
Switch Limit Setpoint 2	40%
Switch Limit Setpoint 3	0%
Power Limit Select	No

Switch Controlled (Power Based) — If using 2 or 3-step demand limit control, an energy management module must be installed. One-step demand limit control does not require the energy management module. To configure demand limit for current-based (power-based) switch control, four parameters for 1-step switch control must be configured. For 2 or 3-step control, additional setpoint parameters must be configured. The parameters are: the type of demand limit selected (Demand Limit Type Select), the setting for Switch Limit Setpoint 1, the setting for Switch Limit Setpoint 2 (if required), the setting for Switch Limit Setpoint 3 (if required), the Power Limit Select, and the Maximum Power Limit at 100% signal.

To configure this option with the Touch Pilot™ display:

DISPLAY NAME	PATH	LINE NO.	VALUE
Demand Limit Type Select	Main Menu → Configuration Menu → General Configuration	7	1 (Switch) Default = 0 (None)
Switch Limit Setpoint 1	Main Menu → Setpoint Table	11	Default = 100%
Switch Limit Setpoint 2	Main Menu → Setpoint Table	12	Default = 100% (Not required for 1-Step Control)
Switch Limit Setpoint 3	Main Menu → Setpoint Table	13	Default = 100% (Not required for 1 or 2-Step Control)
Power Limit Select	Main Menu → Configuration Menu → General Configuration	14	Yes (Default = No)
Maximum Power Limit	Main Menu → Configuration Menu → General Configuration	16	Default = 2000 kW

EXTERNALLY POWERED (4 to 20 mA) DEMAND LIMIT — The energy management module is required for 4 to 20 mA demand limit control. An externally powered 4 to 20 mA signal must be connected to TB6-1 and TB6-2. Typically the 4 to 20mA signal is provided by an active outdoor sensor connected to this input. This signal is read by a transducer type (0 to 5 vdc) on the EMM board via a field-installed 0.5 W 250-ohm resistor.

⚠ CAUTION

Care should be taken when interfacing with other control systems due to possible power supply differences such as a full wave bridge versus a half wave rectification. Connection of control devices with different power supplies may result in permanent damage. Touch Pilot controls incorporate power supplies with half wave rectification. A signal isolation device should be utilized if the signal generator incorporates a full wave bridge rectifier.

Externally Powered (4 to 20 mA) Current Based Demand Limit — To configure demand limit for 4 to 20 mA control based on unit capacity, two parameters must be configured. The parameters are Demand Limit Type Select and Power Limit Select. The value of the capacity limit will vary linearly for 0% to 100% based on the input signal where 4 mA is 100% and 20 mA is 0% of total unit capacity.

To configure this option with the Touch Pilot display:

DISPLAY NAME	PATH	LINE NO.	VALUE
Demand Limit Type Select	Main Menu → Configuration Menu → General Configuration	7	2 (4-20mA Control) (Default = 0 [None])
Power Limit Select		14	No (Default = No)

In the example in Fig. 35, a 4 mA signal is Demand Limit 100% and a 20 mA Demand Limit signal is 0%. The 4 to 20 mA signal is connected to TB6-1 and TB6-2. The demand limit is a linear interpolation between the two values entered. If the machine receives a 12 mA signal, the machine controls will limit the capacity to 50%.

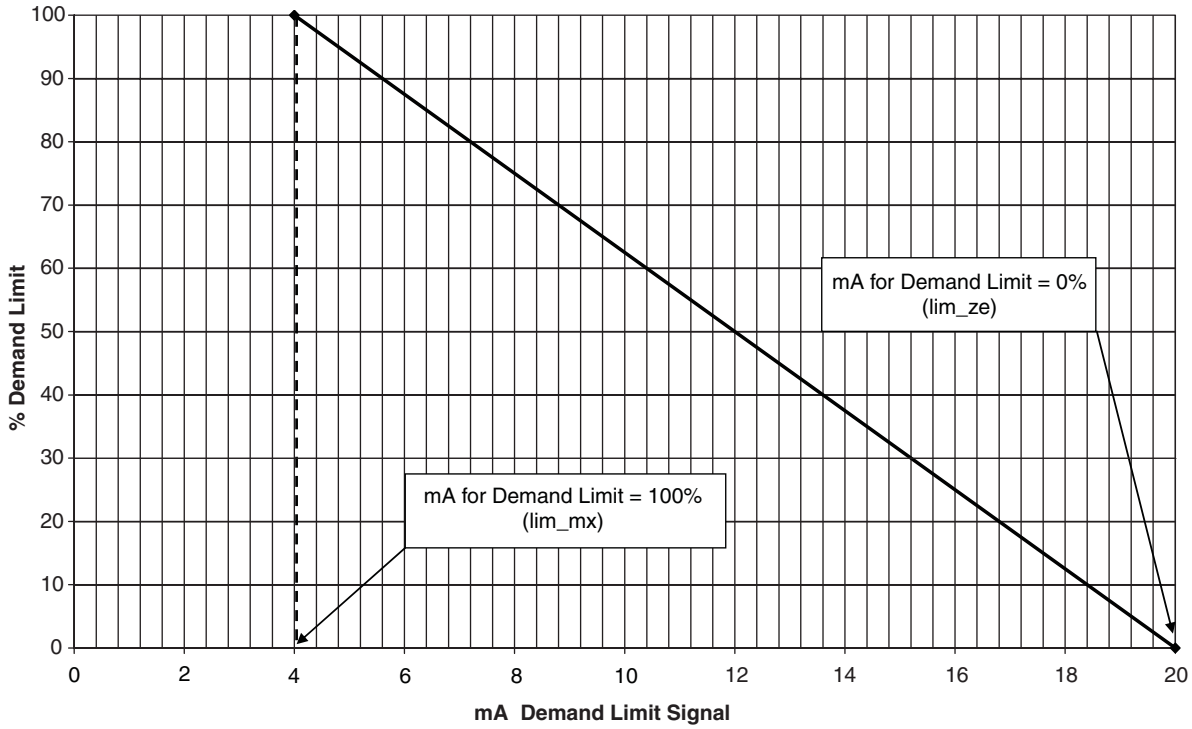


Fig. 35 — Example: 4 to 20 mA Demand Limit (Capacity)

CCN LOADSHED CONTROLLED DEMAND LIMIT — To configure Demand Limit for CCN Loadshed control, the unit Operating Type Control must be in CCN control. With the Touch Pilot™ display, the machine must be started in Network Mode.

The unit must be controlled by a Chillervisor module. The Chillervisor module can force the demand limit variable and directly control the capacity of the machine. Additionally, the unit's set point will be artificially lowered to force the chiller to load to the demand limit value.

Ice Storage Operation — Chiller operation can be configured to make and store ice. The energy management module and an Ice Done Switch are required for operation in the Ice Mode. In this configuration, the machine can operate with up to three cooling set points: Cooling Setpoint 1 is used during the Occupied period, Cooling Setpoint 2 is used during the Unoccupied period when the ice build is complete (Ice Done Switch is closed), and Cooling Ice Setpoint is used during the unoccupied period while ice is building (Ice Done Switch is open).

To configure this option with the Touch Pilot™ display:

DISPLAY NAME	PATH	LINE NO.	VALUE
Ice Mode Enable	Main Menu → Configuration Menu General Configuration	15	Yes Default = No
Cooling Ice Setpoint	Main Menu → Setpoint Table	3	Default = 44 F (6.7 C)

Broadcast Configuration — The 30XA chiller with Greenspeed® intelligence is capable of broadcasting outside-air temperature (OAT), time, date, and holiday status to all elements in the CCN system. In the stand-alone mode, broadcast must be activated to utilize holiday schedules and adjust for daylight saving time. If the chiller is to be connected to a CCN system, determine which system element is to be the network broadcaster and activate broadcast in all other system elements. Broadcast is activated and deactivated in the Touch Pilot Broadcast Menu (Main Menu → Configuration Menu → Broadcast Menu → Brocasts).

Only one element should be configured as a broadcaster. If a broadcast is activated by a device that has been designated as a network broadcaster, then broadcasted time, date, and holiday status will be updated over the CCN system. If broadcast is enabled, a broadcast acknowledger must also be enabled. The acknowledger cannot be the same machine as the broadcasting machine.

ACTIVATE — The Activate variable enables the broadcast function of the Touch Pilot controls. If this variable is set to 0, this function is not used and holiday schedules and daylight savings compensation are not possible. Setting this variable to 1 allows the machine to broadcast and receive broadcasts on the network. The following information is broadcast: the time with compensation for daylight savings, date, holiday flag, and the outdoor-air temperature.

Set this variable to 2 for stand-alone OAT broadcast. With this configuration, daylight saving time and holiday determination will be done without broadcasting through the bus.

To configure this option with the Touch Pilot™ display:

DISPLAY NAME	PATH	LINE NO.	VALUE
Activate	Main Menu → Configuration Menu → Broadcast Menu → Brocasts	1	0 = Disabled 1 = Broadcast time, date, holiday flag, and OAT 2 = OAT broadcast only (Daylight savings time and holiday determination will be done without broadcasting through the bus)

OAT BROADCAST — To enable the outside air temperature (OAT) broadcast, the unit broadcasting the temperature must be configured with its own CCN Bus and CCN Address. Leaving the parameters at the factory default of 0 for the CCN Bus and CCN Address disables the OAT Broadcast function. Once configured, the first broadcast of OAT will be within 5 minutes.

To configure this option with the Touch Pilot display:

DISPLAY NAME	PATH	LINE NO.	VALUE
Activate	Main Menu → Configuration Menu → Broadcast Menu → Brocasts	1	Range = 0 to 2 Default = 2
OAT Broadcast		3	
Bus #		4	Range = 0 to 239 Default = 0
Element #		5	Range = 0 to 239 Default = 0

BROADCAST ACKNOWLEDGER — This configuration defines if the chiller will be used to acknowledge broadcast messages on the CCN bus. One broadcast acknowledger is required per bus, including secondary buses created by the use of a bridge. The broadcast acknowledger must be configured through the Network Service Tool.

Alarm Control

ALARM ROUTING CONTROL — Alarms recorded on the chiller can be routed through the CCN. To configure this option, the Touch Pilot controls must be configured to determine which CCN elements will receive and process alarms. Input for the decision consists of eight digits, each of which can be set to either 0 or 1. Setting a digit to 1 specifies that alarms will be sent to the system element that corresponds to that digit. Setting all digits to 0 disables alarm processing. The factory default is 00000000. See Fig. 36. The default setting is based on the assumption that the unit will not be connected to a network. If the network does not contain a ComfortVIEW™, ComfortWORKS®, TeLink, DataLINK™, or BACLink module, enabling this feature will only add unnecessary activity to the CCN communication bus.

Typical configuration of the Alarm Routing variable is 11010000. This Alarm Routing status will transmit alarms to ComfortVIEW™ software, TeLink, BACLink, and DataLINK.

This option cannot be configured with the Touch Pilot display. To change the alarm control routing through the Network Service Tool, navigate to point **ALRM_CNT** in table **ALARMDEF**.

ALARM EQUIPMENT PRIORITY — The ComfortVIEW software uses the equipment priority value when sorting alarms by level. The purpose of the equipment priority value is to determine the order in which to sort alarms that have the same level. A priority of 0 is the highest and would appear first when sorted. A priority of 7 would appear last when sorted. For example, if two chillers send out identical alarms, the chiller with the higher priority would be listed first. The default is 4. This variable can only be changed when using the ComfortVIEW software, or Network Service Tool. This variable cannot be changed with the Touch Pilot display. To configure this option with the Network Service Tool, navigate to point **EQ-_TYP** in table **ALARMDEF**.

COMMUNICATION FAILURE RETRY TIME — This variable specifies the amount of time that will be allowed to elapse between alarm retries. Retries occur when an alarm is not acknowledged by a network alarm acknowledger, which may use either ComfortVIEW software or TeLink. If acknowledgement is not received, the alarm will be re-transmitted after the number of minutes specified in this decision. This variable can only be changed when using the ComfortVIEW software, or Network Service Tool. This variable cannot be changed with the Touch Pilot display. To configure this option with the Network Service Tool, navigate to point **RET-Y_TM** in table **ALARMDEF**.

RE-ALARM TIME — This variable specifies the amount of time that will be allowed to elapse between re-alarms. A re-alarm occurs when the conditions that caused the initial alarm continue to persist for the number of minutes specified in this decision. Re-alarming will continue to occur at the specified interval until the condition causing the alarm is corrected. This variable can only be changed when using the ComfortVIEW software, or Network Service Tool. This variable cannot be changed with the Touch Pilot display. To configure this option with the Network Service Tool, navigate to point **RE-_LARM** in table **ALARMDEF**.

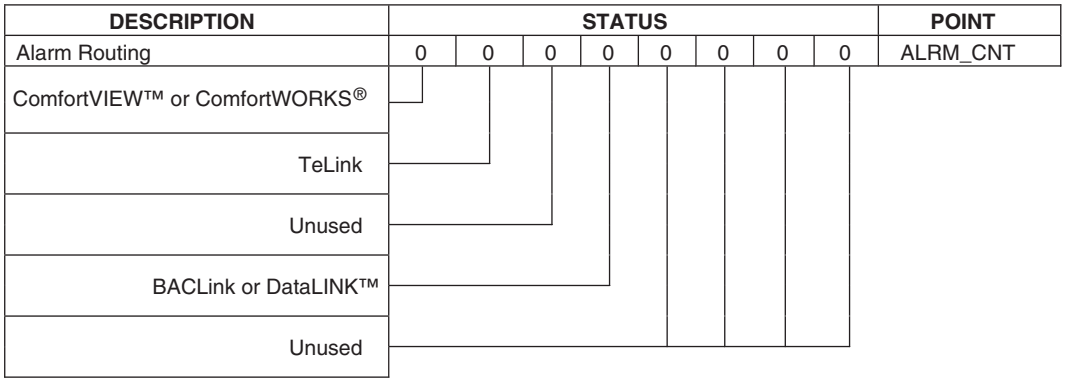


Fig. 36 — Alarm Routing Control

ALARM SYSTEM NAME — This variable specifies the system element name that will appear in the alarms generated by the unit control. The name can be up to 8 alphanumeric characters in length. This variable can only be changed when using the ComfortVIEW™ software or Network Service Tool. This variable cannot be changed with the Touch Pilot display. To configure this option with the Network Service Tool, navigate to point **ALRM_NAM** in table **ALARMDEF**.

Daylight Savings Time Configuration — The 30XA chiller with Greenspeed® intelligence control contains software which can automatically correct for daylight saving time. This software is accessible from the Touch Pilot™ display, ComfortVIEW software, or Network Service Tool.

To enable this feature, Daylight Saving Select must be set to 1. The start of daylight saving must be configured by setting the Month, Day of Week, and Week of Month. The end for Daylight Saving must also be configured. To configure this option with the Touch Pilot display, see Table 27.

Table 27 — Daylight Saving Time Configuration

DISPLAY NAME	PATH	LINE NO.	VALUE
Activate	Main Menu → Configuration Menu → Broadcast Menu → Brocasts	1	1 or 2 Default = 2
Daylight Savings Select		7	Enable Default = Dsble
Entering		8	
Month		9	Enter Starting Month for Daylight Saving
Day of Week (1=Monday)		10	Enter the Day of the Week Daylight Saving Starts
Week of Month		11	Enter Week of the Month Daylight Saving Starts
Leaving		12	
Month		13	Enter Ending Month for Daylight Saving
Day of Week (1=Monday)		14	Enter the Day of the Week Daylight Saving ends
Week of Month		15	Enter Week of the Month Daylight Saving ends

Capacity Control Overrides — The following capacity control overrides (Main Menu → Maintenance Menu → Capacity Control → Override Capacity A, B) will modify the normal operation routine. If any of the override conditions listed below is satisfied, the override will determine the capacity change instead of the normal control. Overrides are listed by priority order and are often linked to unit operating modes. See Table 28 for a list of capacity control overrides. See the Operating Modes section on page 51 for more information regarding operating modes.

Override #2: Low Suction Pressure — This override is activated when the suction saturation temperature (SST) goes below 14 F (–10 C) for water or below (14 – (34 – Brine Freeze Setpoint)) for units configured with brine. The controller at this point starts to unload the unit until the SST exceeds 34 F (1.1 C).

Override #6: EWT < Control Point —This override stops the compressors without alarms.

Override #7: Ramp Loading — No capacity increase will be made if the unit is configured for ramp loading and the rate of change of the leaving water is greater than Ramp Loading Rate.

Override # 9: Demand Limit — This override mode is active when a command to limit the capacity is received. If the current unit capacity is greater than the active capacity limit value, the unit unloads per unloading scheme. The current capacity will stop increasing when it reaches the capacity limit value minus 3%.

Override #10: Flow Switch is Open — This override prohibits compressor operation until the Cooler flow switch is closed.

Override #11: Customer Interlock is Closed — This override prohibits compressor operation until the customer interlock is opened.

Override #14: Low LWT (Leaving Water Temperature) — This override stops the compressors if LWT < freeze + freeze_ov (freeze = Main Menu → Configuration Menu → Service Parameters → Brine Freeze Setpoint; freeze_ov = Main Menu → Configuration Menu → Service Parameters → Freeze Override Offset). The goal is to stop the unit without having an alarm if the LWT goes too low so that the unit can start automatically without the need to reset alarm. For example, freeze is 34 F (1.1 C); the user can decide to add a threshold to force the compressors to stop immediately without alarm at 35 F (1.7 C).

Override #15: Compressor Disabled — This override is shown when either of the compressors are disabled through Main Menu → Configuration Menu → Compressor Enable menu.

Override #16: High Discharge Pressure — This override attempts to avoid a high pressure failure. If the saturated condensing temperature for the circuit is above the high pressure threshold the compressor is unloaded while the fan is run at maximum frequency.

Override #23: Low SST (Saturated Suction Temperature) — When the unit is configured with cooler fluid as water (Main Menu → Configuration Menu → Service Parameters → Cooler Fluid Type), this override gets activated at suction pressure (SP) < 27.7 psig (191 kPa) minus 5 psig (34.5 kPa). In this mode the circuit will not be allowed to load further until the SST goes above 34 F (1.1 C). When the unit is configured with cooler fluid as brine (Main Menu → Configuration Menu → Service Parameters → Cooler Fluid Type), this override gets activated at suction pressure (SP) < Brine Freeze Setpoint (converted to psig) (Main Menu → Configuration Menu → Service Parameters → Brine Freeze Setpoint) minus 5 psig (34.5 kPa).

Override #34: Very Low SST (Saturated Suction Temperature) — The compressor is not allowed to start if the SST is lower than –13 F (–25 C).

Override #53: ON OFF Delay — This override is activated when the unit is in off state (manually stopped or because of alarm shutdown) and is requested to start through Local On, Remote On, CCN On or after alarm shutdown reset. The "min_left" setting (Main Menu → General Parameters → Minutes Left to Start) shall provide the minutes left before unit start-up.

Override #56: Isolation Valve Opening Delay — This override mode is activated when the actuated ball valves (if equipped) on the discharge lines are opening (approximately 2-minute delay).

Override #59: Low Oil Level — This override is only effective when the circuit is not running. The override will prevent the circuit from starting up with a low oil level.

Override #62: High Compressor Motor Temperature — This override prevents the compressor motor temperature from rising above the high temperature limit, but still allows the chiller to run close to the high temperature limit by unloading the compressor. If the motor temperature is greater than 195.8 F (91 C), the compressor will not load. This override will control the loading to the compressor to maintain a motor temperature of 194 F (90 C). The circuit will come out of this mode if the motor temperature falls below 190.4 F (88 C) or if motor temperature is below 195.8 F (91 C) and water temperature is established.

Override #66: High Discharge Gas Temperature (DGT) — This override avoids high DGT tripout by either increasing compressor capacity or decreasing the capacity and stopping the compressor depending on the conditions. The increase in capacity happens when the DGT > 201 F (93.9 C) to lower DGT. The control seeks to control the DGT at 190 F and if the DGT goes below 186.4 F (85.8 C) the unit goes to normal control. The decrease in capacity followed by unit stop happens if Override 66 is activated and cooler leaving water temperature is close to the freeze point or lower than the control point. The compressor restarts if the DGT goes below 186.4 F (85.8 C) and more than 5 minutes have passed. This override has priority over almost every other one (including the Demand Limit override).

Table 28 — Capacity Control Overrides

NO.	DESCRIPTION
0	Normal Operation
2	Low Suction Pressure
6	EWT < control point
7	Ramp Loading
9	Demand Limit
10	Flow switch is open
11	Customer Interlock is closed
14	Low LWT
15	Compressor Disabled
16	High Discharge Pressure
23	Low SST
34	Very Low SST
53	ON OFF Delay
56	Cooler Heater Isolation Valve Opening Delay
59	Low Oil Level
62	High Compressor Motor Temperature
66	High Discharge Gas Temperature

Head Pressure Control — The head pressure is controlled through the Touch Pilot display by adjusting fan speed through variable speed drive(s). The command sent to the drive is at a frequency to maintain the lowest condensing temperature possible, and thus, the highest unit efficiency. The frequency command sent is based on a function of compressor capacity, OAT and leaving fluid termperature. If the capacity is stable and no overrides have occurred recently, an algorithm attempts to optimize fan frequency based on total power feedback. The optimization control can be turned on and off through the Network Service Tool (Service → Fan_CFG → Fan Optimiz? 1=xt, 2=os [xt_enable]). By default the xt_enable variable is 2 which means the optimization control is active. It can be set to 0 to deactivate the optimization. The frequency adjustment during optimization control can be adjusted through the variable os_d_amp (Service → os disturbance amp (Hz) [os_d_amp]). By default os_d_amp is 5 Hz and can be lowered to 3 Hz if the unit load demand is very steady. Lowering the frequency below 3 Hz is not recommended and could cause head pressure control instability, causing load and power draw oscillations.

Fan control continuously monitors all inputs and outputs and the transitions between the modes are defined based on continuous measurements of 2 inputs (Discharge Pressure and Discharge Gas Temperature). Fan modes of operation include the following:

- STANDARD: Normal mode of operation before using the optimum-seeking algorithm.
- WAITOPT, OPTIMZE: Trying to optimize the fan frequency during the optimum-seeking algorithm.
- FREEZE: Fan frequencies are frozen after completion of the optimum-seeking algorithm cycle. The fan control remains in this mode until the LWT, the compressor load, or the outdoor temperature changes by a defined amount. If the change conditions are met the fan control goes back to the WAITOPT mode followed by the OPTIMZE modes.
- DGT: High Discharge Gas Temperature mode. The VFD increases the speed of the fan to reduce DGT.
- DP_HIGH, DP_LOW: High Discharge Pressure Mode, Low Discharge Pressure Mode: The VFD controls the speed of the fan to bring SCT into normal operating range.
- OFF: Fans are not running.
- START: Start mode. The frequency of the fans is defined based on the OAT.

PRE-START-UP

IMPORTANT: Complete the Start-Up Checklist for 30XA Liquid Chillers at the end of this publication.

The checklist assures proper start-up of a unit, and provides a record of unit condition, application requirements, system information, and operation at initial start-up.

Do not attempt to start the chiller until the following checks have been completed.

System Check

1. Check that auxiliary components, such as the chilled fluid circulating pump, air-handling equipment, or other equipment to which the chiller supplies liquid are operational. Consult manufacturer's instructions. If the unit has field-installed accessories, be sure all are properly installed and wired correctly. Refer to unit wiring diagrams.
2. Open compressor suction service valves (if equipped).
3. Open discharge line, liquid line, oil line, and economizer (if equipped) service valves.
4. Fill the chiller fluid circuit with clean water (with recommended inhibitor added) or other non-corrosive fluid to be cooled. Bleed all air out of high points of system. If outdoor temperatures are expected to be below 32 F (0° C), sufficient inhibited propylene glycol or other suitable corrosion inhibited antifreeze should be added to the chiller water circuit to prevent possible freeze-up.

   The chilled water loop must be cleaned before the unit is connected. It is recommended that the chiller pumps be equipped with a start-up filter screen to remove particulates from the loop. The start-up filter should be replaced after 24 hours of operation
5. Check tightness of all electrical connections.
6. Electrical power source must agree with unit nameplate.

7. Oil separator heaters must be firmly seated under the oil separator, and must be energized for 24 hours prior to start-up.

START-UP

Actual Start-Up — *Actual start-up should be done only under supervision of a qualified refrigeration technician.*

1. Be sure all oil, suction valves, discharge valves (if equipped) and liquid line service valves are open.
2. Using the Touch Pilot control, set leaving-fluid set point (Main Menu → Setpoint Table → Line 1). No cooling range adjustment is necessary.
3. If optional control functions or accessories are being used, the unit must be properly configured. Refer to Configuration Options section for details.
4. Start the chilled fluid pump, if unit is not configured for pump control (Main Menu → Configuration Menu → Pump Configuration →Cooler Pumps Sequence = 0).
5. Complete the Start-Up Checklist to verify all components are operating properly.
6. Press the Start/Stop button located in the upper right corner of the Touch Pilot display and then select Local On.
7. Allow unit to operate and confirm that everything is functioning properly. After unit operation stabilizes, check to see that leaving fluid temperature agrees with leaving set-point Control Point.

Operating Limitations

TEMPERATURES — Unit operating temperature limits are listed in the table below.

TEMPERATURE	F	C
Maximum Ambient Temperature	125	52
Minimum Ambient Temperature*	32	0
Maximum Cooler EWT†	95	35
Maximum Cooler LWT	60	15
Minimum Cooler LWT	38**	3.3

LEGEND

EWT — Entering Fluid (Water) Temperature
LWT — Leaving Fluid (Water) Temperature

* Lowest allowable ambient temperature for the standard unit to start and operate is 32 F (0° C). With the inclusion of wind baffles (field fabricated and installed), the unit is capable to start as low as 5 F (–15 C) and to operate as low as –20 F (–29 C) ambient temperature.
†For sustained operation, EWT should not exceed 70 F (21.1 C).
**Unit requires brine fluid for operation below this temperature.

Low Ambient Temperature Operation — If unit operating temperatures below 32 F (0° C) are expected, the following measures are recommended:

- Consider higher loop volumes, 6 to 10 gallons per nominal ton.
- Loop freeze protection with glycol is strongly recommended to a minimum of 15° F (8.3° C) below lowest anticipated ambient temperature.
- Chilled water pump control is required.
- If wind velocity is expected to be greater than 5 mph (8 km/h) wind baffles and brackets must be field-fabricated and installed. See the 30XA Installation Instructions for more information.

VOLTAGE

Main Power Supply — Minimum and maximum acceptable supply voltages are listed in the Installation Instructions.

Unbalanced 3-Phase Supply Voltage — Never operate a motor where a phase imbalance between phases is greater than 2%.

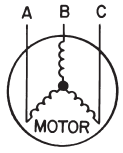
To determine percent voltage imbalance:

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from avg voltage}}{\text{average voltage}}$$

The maximum voltage deviation is the largest difference between a voltage measurement across 2 legs and the average across all 3 legs.

Example: Supply voltage is 240-3-60.

AB = 243v
BC = 236v
AC = 238v



1. Determine average voltage:

$$\text{Average voltage} = \frac{243+236+238}{3} = \frac{717}{3} = 239$$

2. Determine maximum deviation from average voltage:
   (AB) 243 – 239 = 4 v
   (BC) 239 – 236 = 3 v
   (AC) 239 – 238 = 1 v
   Maximum deviation is 4 v.
3. Determine percent voltage imbalance:

$$\% \text{ Voltage Imbalance} = 100 \times \frac{4}{239} = 1.7\%$$

This voltage imbalance is satisfactory as it is below the maximum allowable of 2%.

> IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact the local electric utility company immediately. Do not operate unit until imbalance condition is corrected.

MINIMUM FLUID LOOP VOLUME — To obtain proper temperature control, loop fluid volume must be at least 3 gallons per ton (3.25 L per kW) of chiller nominal capacity for air conditioning and at least 6 gallons per ton (6.5 L per kW) for process applications or systems that must operate at low ambient temperatures (below 32 F [0° C]). Refer to application information in Product Data literature for details.

FLOW RATE REQUIREMENTS — Standard chillers should be applied with nominal flow rates within those listed in the Minimum and Maximum Cooler Flow Rates table. Higher or lower flow rates are permissible to obtain lower or higher temperature rises. Minimum flow rates must be exceeded to assure turbulent flow and proper heat transfer in the cooler. See Table 29. See Fig. 37-40 for cooler pressure drop curves.

⚠ CAUTION

Operation below minimum flow rate could generate alarms, which could result in damage to the cooler.

Consult application data section in the Product Data literature and job design requirements to determine flow rate requirements for a particular installation.

Table 29 — 30XA Minimum and Maximum Cooler Flow Rates

ITEM					MINIMUM		MAXIMUM	
Cooler Leaving Water Temperature*					40 F (4.4 C)		60 F (15 C)	
Cooler Entering Water Temperature†					45 F (7.2 C)		70 F (21.1 C)	
30XA UNIT SIZE	Nominal Flow Rate		Cooler	Number of Passes	Minimum Flow Rate**		Maximum Flow Rate	
	(gpm)	(L/s)			(gpm)	(L/s)	(gpm)	(L/s)
140	317.8	20.1	Standard, Flooded	2	134	8.5	538	33.9
			Plus One Pass, Flooded	3	73	4.6	293	18.5
			Minus One Pass, Flooded	1	324	20.4	1296	81.8
142	303.5	19.1	DX Cooler	—	152	9.6	607	38.2
160	365.1	23	Standard, Flooded	2	165	10.4	660	41.6
			Plus One Pass, Flooded	3	98	6.2	391	24.7
			Minus One Pass, Flooded	1	354	22.3	1418	89.5
162	347	21.9	DX Cooler	—	174	10.9	694	43.7
180	409.6	25.8	Standard, Flooded	2	202	12.7	807	50.9
			Plus One Pass, Flooded	3	73	4.6	391	24.7
			Minus One Pass, Flooded	1	416	26.2	1662	104.9
182	401.7	25.3	DX Cooler	—	201	12.6	803	50.6
200	463.9	29.3	Standard, Flooded	2	223	14.1	892	56.3
			Plus One Pass, Flooded	3	98	6.2	391	24.7
			Minus One Pass, Flooded	1	458	28.9	1833	115.6
202	447.1	28.2	DX Cooler	—	224	14.1	894	56.3
220	505.9	31.9	Standard, Flooded	2	235	14.8	941	59.4
			Plus One Pass, Flooded	3	122	7.7	489	30.9
			Minus One Pass, Flooded	1	501	31.6	2004	126.4
222	493	31.1	DX Cooler	—	246	15.5	950	59.9
240	545.8	34.4	Standard, Flooded	2	266	16.8	1063	67.1
			Plus One Pass, Flooded	3	147	9.3	587	37.0
			Minus One Pass, Flooded	1	538	33.9	2151	135.7
242	530	33.5	DX Cooler	—	265	16.7	950	59.9
260	600.3	37.9	Standard, Flooded	2	257	16.2	1027	64.8
			Plus One Pass, Flooded	3	141	8.9	562	35.5
			Minus One Pass, Flooded	1	584	36.8	2334	147.3
262	583	36.8	DX Cooler	—	292	18.4	950	59.9
280	642.2	40.5	Standard, Flooded	2	293	18.5	1173	74.0
			Plus One Pass, Flooded	3	141	8.9	562	35.5
			Minus One Pass, Flooded	1	620	39.1	2481	156.5
282	627	39.5	DX Cooler	—	313	19.8	950	59.9
300	687.5	43.4	Standard, Flooded	2	327	20.6	1308	82.5
			Plus One Pass, Flooded	3	174	11	697	44.0
			Minus One Pass, Flooded	1	687	43.3	2750	173.5
302	665	42.0	DX Cooler	—	333	21.0	1331	83.9
325	733.4	46.3	Standard, Flooded	2	361	22.8	1442	91.0
			Plus One Pass, Flooded	3	211	13.3	843	53.2
			Minus One Pass, Flooded	1	724	45.7	2897	182.8
327	720	45.4	DX Cooler	—	360	22.7	1440	90.8
350	775.4	48.9	Standard, Flooded	2	379	23.9	1516	95.6
			Plus One Pass, Flooded	3	244	15.4	978	61.7
			Minus One Pass, Flooded	1	767	48.4	3068	193.6
352	757	47.8	DX Cooler	—	379	23.9	1514	95.5

LEGEND

DX — Direct Expansion

*For applications requiring cooler leaving water temperature operation at less than 40 F (4.4 C), the units require the use of antifreeze. Contact your local Carrier representative for more information.

†For applications requiring cooler entering water temperature operation at less than 45 F (7.2 C), contact your local Carrier representative for unit selection using the Carrier electronic catalog.

**For minimum cooler flow rate with brine applications, refer to E-CAT software performance.

NOTES:

1. The 30XA units will start and pull down with loop temperatures up to 95 F (35 C).
2. Nominal flow rates required at AHRI (Air-Conditioning, Heating and Refrigeration Institute) conditions: 44 F (7 C) leaving fluid temperature, 54 F (12 C) entering water temperature, 95 F (35 C) ambient. Fouling factor 0.00010 ft^2-hr-F/Btu (0.000018 m^2-K/kW).
3. To obtain proper temperature control, cooler loop fluid volume must be at least 3 gal/ton (3.23 L/kW) of chiller nominal capacity for air conditioning and at least 6 gal/ton (6.5 L/kW) for process applications or systems that must operate in low ambient temperatures (below 32 F [0° C]).

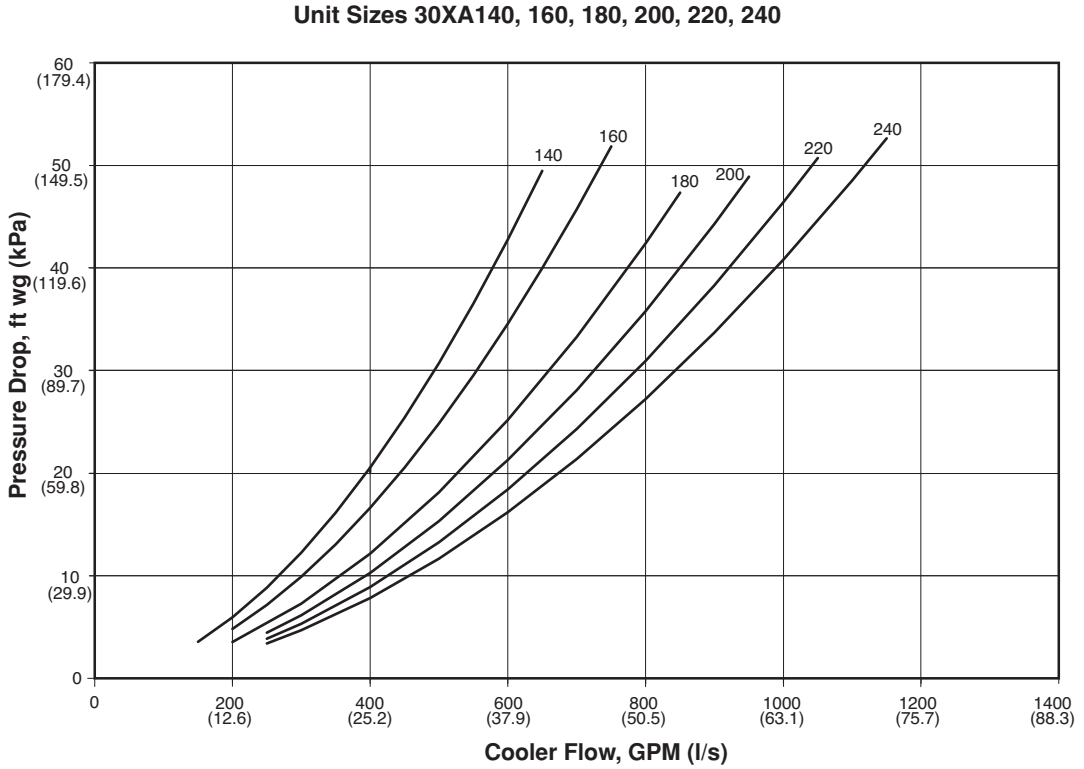


Fig. 37 — Cooler Pressure Drop Curves, Standard Pass Flooded Cooler (30XA140-240)

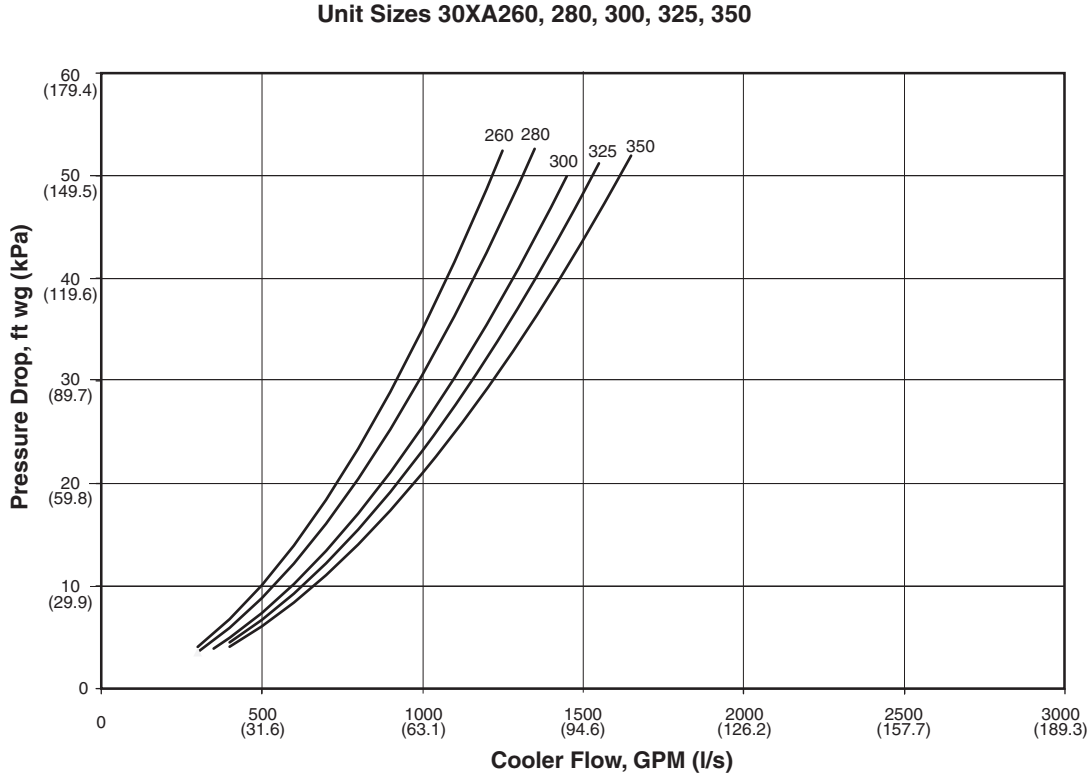


Fig. 38 — Cooler Pressure Drop Curves, Standard Pass Flooded Cooler (30XA260-350)

Unit Sizes 30XA142, 162, 182, 202

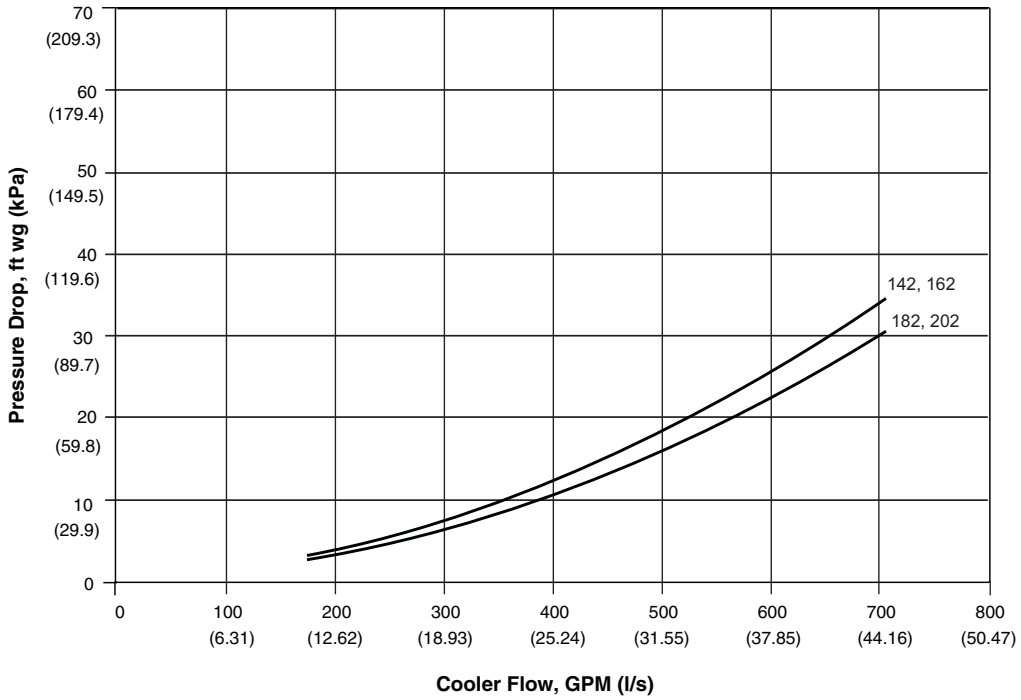


Fig. 39 — Cooler Pressure Drop Curves, DX (Direct Expansion) Cooler (30XA142,162,182,202)

Unit Sizes 30XA222, 242, 262, 282, 302, 327, 352

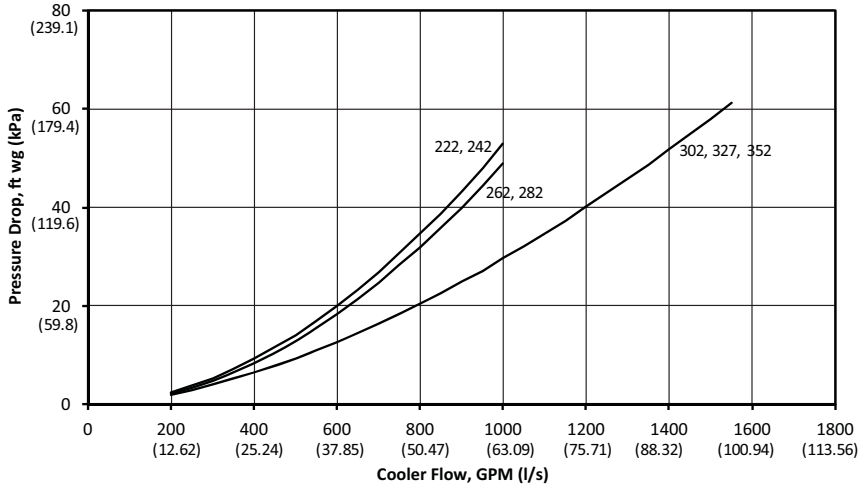


Fig. 40 — Cooler Pressure Drop Curves, DX (Direct Expansion) Cooler (30XA222,242,262,282,302,327,352)

OPERATION

Sequence of Operation — With a command to start the chiller, the cooler pump will start. After verifying water flow, the control will monitor the entering and leaving water temperature. If the need for mechanical cooling is determined, the control decides which circuit and compressor to start. The control will start the required compressor completely unloaded and deenergize the oil separator heater (if already energized). The control will continue to load this circuit by moving the slide valve and increasing the VFD frequency to satisfy cooling requirements. Once fully loaded, the control will start the second circuit to satisfy load as required. Shutdown of each circuit under normal conditions occurs in the opposite sequence to loading. Once a circuit is fully unloaded the compressor is shut off and the EXV will close completely.

ACTUATED BALL VALVE (ABV) (FLOODED COOLER ONLY) — For chillers equipped with this option (standard in most regions), either one or two discharge ABVs are located in the discharge line of each circuit of the unit. See Fig. 41 for a typical ABV assembly with enclosure. The ABV is a motorized ball valve, which is used to close the discharge line to prevent refrigerant migrating from condenser to the cooler when the circuit is off. The valve will be opened before the compressor is started and will normally close when pressure equalizes between suction and discharge lines.

The actuated ball valves are linked to the cooler heater operation in the controls. Cooler Heater option (Main Menu → Configuration Menu → Factory Menu → Cooler Heater Select → Line 8 = 2) must be enabled for the Actuated Ball Valve to operate.

See Fig. 42 for a view of a fully open ball valve with the actuator removed. The flat surface at the top of the valve shaft is parallel to the discharge line. The ball valve motor mounting plate should be perpendicular to the discharge line at all times. If not, adjust it by loosening the set screw on the side of the valve, reposition assembly and tighten set screw.

See Fig. 43 for a view of the ball valve motor mounting with a fully open valve. The motor actuator arm should be at a counterclockwise position, with the valve shaft in a parallel position. If not in a parallel position, loosen the clamping screw and push the disengagement button to rotate the actuator arm until it stops. Retighten the clamping screw.

ABV Manual Operation — The ABV can be operated manually as a discharge service valve by completing the following steps:

1. Remove the actuator cover.
2. With the compressor off hold down the Disengagement (Push) button. See Fig. 43.
3. Close the ABV by turning the shaft adapter by hand or with a wrench so that the flats on the end of the shaft are perpendicular to the discharge line.
4. Release the Push button.
5. Disconnect the control power cable to the ABV.

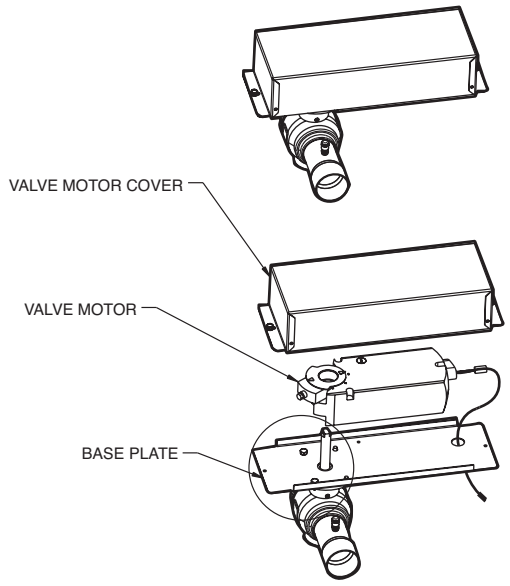


Fig. 41 —Typical ABV Assembly with Enclosure

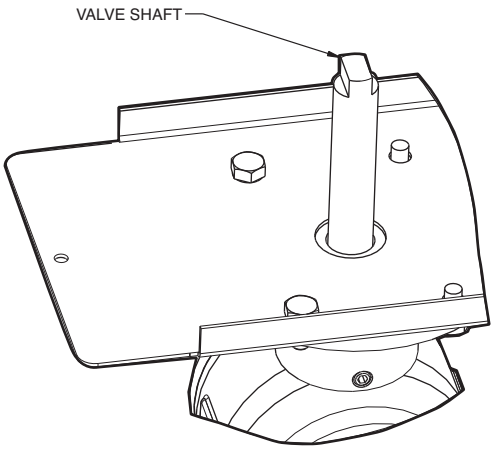


Fig. 42 — Fully Open Ball Valve with Actuator Removed

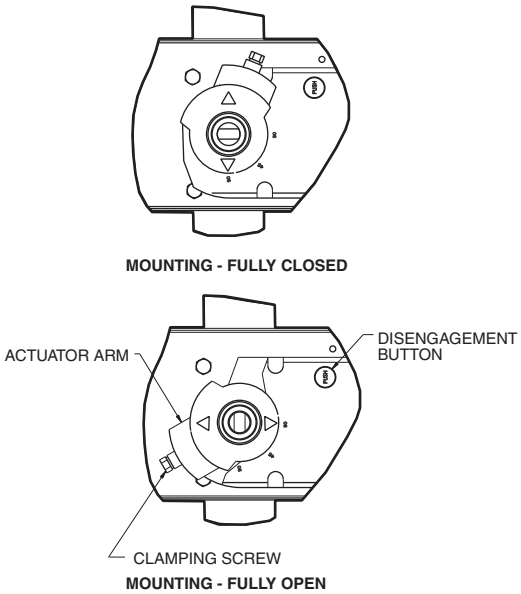


Fig. 43 —Ball Valve Motor

Dual Chiller Sequence of Operation — With a command to start the chiller, the master chiller determines which chiller will become the lead chiller based on the configuration of Lead Lag Select (**lead_sel**) and Lead/Lag Balance Delta (**ll_bal_d**). The lead chiller is always started first and the lag chiller is held at zero percent capacity by the master chiller forcing the lag demand limit value to 0%. If Lead Pulldown Time (**lead_pul**) has been configured, the lead chiller will continue to operate alone for that specified time. After the Lead Pulldown Time timer has elapsed and when the lead chiller is fully loaded, either all available compression is on or at the master demand limit value, then the lag start timer (**lstr_tim**) is initiated. When the pulldown time and lag start time have elapsed and the Combined Leaving Chilled Water Temperature is more than 3° F (1.7° C) above the set point, then the lag chiller is started. If the lag chiller's water pump was not started when the machines went into occupied mode, the lag chiller water pump will be started. The lag chiller will start with the master chiller forcing the lag chiller demand limit value (**LAG_*LIM***) to the master's demand limit value. If lead/lag capacity balance is selected, once the lag chiller has started, the master shall try to keep the difference in capacity between lead and lag less than 20%. The master shall then be responsible for water loop capacity calculation, and will determine which chiller, the lead or lag, will increase or decrease capacity. When the load reduces, the lag chiller will be the first chiller to unload. To accomplish this, the lead chiller set point is decreased by 4° F (–2.2° C) until the lag chiller unloads.

PUMP OPERATION — For parallel chiller pump operation, the lead chiller's water pump will be started. The lag chiller's water pump will be maintained off if Lag Unit Pump Control = 0 (Main Menu → Configuration Menu → Master Slave config → Lag Unit Pump Control). The internal algorithm of the lead chiller will control capacity of the lead chiller.

Operating Modes — Operating modes are override modes that affect normal operation of the equipment. More than one operating mode can be in effect at the same time. Some operating modes have corresponding capacity control overrides (see the Capacity Control Overrides section on page 44).

For the Touch Pilot™ display, the status of the operating modes can be found by accessing the Modes Menu (Main Menu → Modes). Each operating mode and its status (Yes = active, No = inactive) is listed.

See Table 30 for a list of operating modes.

Table 30 — 30XA with Greenspeed® Intelligence Operating Modes

OPERATING MODE NUMBER	Description	Status
1	Startup Delay in Effect	Yes/No
2	Second Setpoint in Use	Yes/No
3	Reset in Effect	Yes/No
4	Demand Limit Active	Yes/No
5	Cooler Pump Rotation	Yes/No
6	Pump Periodic Start	Yes/No
7	Night Low Noise Active	Yes/No
8	Master Slave Active	Yes/No
12	Ice Mode in Effect	Yes/No

STARTUP DELAY IN EFFECT — This mode is checked for when the unit is started. This mode is active when the Minutes Off Time (Unit Off to On Delay, **off_on_d**) timer is active. The unit will not start until the timer has expired. The mode will terminate when the timer expires.

SECOND SETPOINT IN USE — This mode is checked for when the unit is ON. The mode is active when Cooling Setpoint 2 (Main Menu → Setpoint Table → Cooling Setpoint 2) or Cooling Ice Setpoint (Main Menu → Setpoint Table → Cooling Ice Setpoint) is in use. While in this mode, the Current Setpoint (Main Menu → General Parameters → Current Setpoint) will show the Cooling Setpoint 2 or Cooling Ice Setpoint value.

While in this mode the unit will operate to the Cooling Setpoint 2 or Cooling Ice Setpoint. The mode will terminate when the second setpoint is no longer in use.

RESET IN EFFECT — This mode is checked for when the unit is ON. The mode will be active when Cooling Reset Select (Main Menu → Configuration Menu → Reset Configuration → Cooling Reset Select) is enabled by setting the value to 1 = Outside Air Temperature, 2 = Return Water, 3 = 4-20 mA Input, 4 = Space Temperature) and reset is active.

While in this mode, the Current Setpoint (Main Menu → General Parameters → Current Setpoint) will be modified according to the programmed information and will be displayed as the Control Point (Main Menu → General Parameters → Control Point). The mode will terminate when the Temperature Reset is not modifying the active leaving water set point, causing the Current Setpoint to equal the Control Point.

DEMAND LIMIT ACTIVE — This mode is checked for when the unit is ON. The mode is active when Demand Limit Type Select (Main Menu → Configuration Menu → General Configuration → Demand Limit Type Select) is enabled either by setting the value to 1 = Switch Control or 2 = 4-20mA Control, or setting the Night Capacity Limit (Main Menu → Configuration Menu → General Configuration → Night Capacity Limit). The Active Demand Limit Value (Main Menu → General Parameters → Active Demand Limit Value) will display the current demand limit according to the programmed information and the unit's capacity will be reduced to the amount shown or lower. The mode will terminate when the Demand Limit command has been removed.

COOLER PUMP ROTATION — This mode is checked for whether the unit is ON or OFF. The mode is active when the Cooler Pump Sequence (Main Menu → Configuration Menu → Pump Configuration → Cooler Pump Sequence) value is set to 2 = Two Pumps Automatic Changeover, and the Pump Auto Rotation Delay (Main Menu → Configuration Menu → Pump Configuration → Pump Auto Rotation Delay) has expired. The control will switch the operation of the pumps. The lead pump will operate normally. The lag pump will be started, becoming the lead, and then the original lead pump will be shut down.

This mode will terminate when the pump operation has been completed.

PUMP PERIODIC START — This mode is active when the cooler pump is started due to the periodic pump start configuration (Main Menu → Pump Configuration → Pump Sticking Protection = YES). If the pump has not run that day, a pump will be started and will run for 2 seconds at 2:00 PM. If the machine is configured for dual pumps, Pump 1 will run on even days (such as the day 2, 4, 6 of the month). Pump 2 will run on odd days (such as day 1,3, 5 of the month). The mode will terminate when the pump shuts down.

NIGHT LOW NOISE ACTIVE — This mode is active when the Night Time Low Noise Option has been configured and the current time is within the configured time frame. Programming a Night Mode Start Hour (Main Menu → Configuration Menu → General Configuration → Night Mode Start Hour) and a Night Mode End Hour (Main Menu → Configuration Menu → General Configuration → Night Mode End Hour) configures the option. The control will reduce the speed of the condenser fans, thereby reducing the sound level of the machine. Additionally, if the Night Time Low Sound Capacity Limit (Main Menu → Configuration Menu → General Configuration → Night Time Low Sound Capacity Limit) has been configured, the unit's capacity will be limited to the programmed level. This mode will terminate once the Night Mode End Hour has been reached.

MASTER SLAVE ACTIVE — This mode is checked for if the machine is ON. This mode is active if Master Slave Control has been enabled. This occurs when two machines are programmed, one as the master (Main Menu → Configuration Menu → Master Slave config → Master/Slave select = 1) and the other as a slave (Main Menu → Configuration Menu → Master Slave config → Master/Slave select = 2). Both the master and slave machines will respond to the capacity control commands issued by the master controller. This may include control point changes and demand limit commands. This mode will terminate when Master Slave Control has been disabled.

ICE MODE IN EFFECT — This mode is checked for when the unit is ON. This mode is active when the Cooling Ice Setpoint (Main Menu → Setpoint Table → Cooling Ice Setpoint) is in use. While in this mode, the Current Setpoint (Main Menu → General Parameters → Current Setpoint) will show the Cooling Ice Setpoint value and the unit will operate to that value. This mode will terminate when the Ice Cooling Ice Setpoint is no longer in use.

Sensors — The electronic control uses up to 17 thermistors to sense temperatures and up to 12 transducers to sense pressure for controlling chiller operation. These sensors are outlined below.

THERMISTORS (Tables 31-33) — Thermistors that monitor the chiller's operation include: cooler entering water, cooler leaving water, dual chiller leaving water, compressor suction gas temperature, compressor discharge gas temperature, economizer temperature, liquid line temperature, compressor motor temperature, and outdoor air temperature thermistors. These thermistors are 5,000 ohms at 77 F (25 C) and are identical in temperature versus resistance. The space temperature thermistor is 10,000 ohms at 77 F (25 C) and has a different temperature vs. resistance.

Cooler Leaving Water Sensor — On all sizes, this thermistor is installed in a friction fit well in the leaving water nozzle of the cooler. See Fig. 44 and 45.

Cooler Entering Water Sensor — On all sizes, this thermistor is factory-installed in a friction fit well in the entering water nozzle of the cooler.

Suction Gas Temperature — On all sizes, this thermistor is factory-installed in a friction fit well located on the compressor of each circuit. There is one thermistor for each circuit.

Compressor Discharge Gas Temperature — On all sizes, this thermistor is factory-installed in a friction fit well located in the discharge end of the compressor for the circuit. There is one thermistor for each circuit.

Liquid Line Temperature — This thermistor is factory-installed in a friction fit well located in the liquid line of the circuit. There is one thermistor for each circuit.

Economizer Temperature — On all sizes, this thermistor is factory-installed in a friction fit well located in the economizer line for the circuit. There is one thermistor for each circuit.

Compressor Motor Temperature — On all sizes, this thermistor is embedded in the motor windings. There are two thermistors in each compressor. One spare is provided.

Outdoor Air Temperature — This sensor is factory-installed to the back of the control box.

Remote Space Temperature — This sensor (part no. 33ZCT55SPT) is a field-installed accessory mounted in the indoor space and is used for water temperature reset. The sensor should be installed as a wall-mounted thermostat would be (in the conditioned space where it will not be subjected to either a cooling or heating source or direct exposure to sunlight, and 4 to 5 ft above the floor).

Space temperature sensor wires are to be connected to terminals in the unit main control box. See Fig. 46. The space temperature sensor includes a terminal block (SEN) and a RJ11 female connector. The RJ11 connector is used as access into the Carrier Comfort Network® (CCN) at the sensor.

To connect the space temperature sensor (see Fig. 46):

1. Using a 20 AWG (American Wire Gage) twisted pair conductor cable rated for the application, connect one wire of the twisted pair to one SEN terminal and connect the other wire to the other SEN terminal located under the cover of the space temperature sensor.
2. Connect the other ends of the wires to terminals 7 and 8 on TB6 located in the unit control box.

Units on the CCN can be monitored from the space at the sensor through the RJ11 connector, if desired. To wire the RJ11 connector into the CCN:

1. Cut the CCN wire and strip ends of the red (+), white (ground), and black (–) conductors. (If another wire color scheme is used, strip ends of appropriate wires.)
2. Insert and secure the red (+) wire to terminal 5 of the space temperature sensor terminal block.
3. Insert and secure the white (ground) wire to terminal 4 of the space temperature sensor.
4. Insert and secure the black (–) wire to terminal 2 of the space temperature sensor.
5. Connect the other end of the communication bus cable to the remainder of the CCN communication bus.

NOTE: The energy management module (EMM) is required for this accessory.

TRANSDUCERS — There are 5 pressure transducers per circuit, and two different types of transducers: low pressure (green connector) and high pressure (black connector).

Low Pressure Type: suction pressure transducer (SPT), economizer pressure transducer (EPT).

High Pressure Type: discharge pressure transducer (DPT), oil pressure transducer (OPT), liquid line pressure transducer (LPT). See Fig. 47 for transducer locations.

Table 31 — Thermistor Identification

THERMISTOR ID	DESCRIPTION	RESISTANCE AT 77 F (25 C)	CONNECTION POINT
EWT	Entering Water Thermistor	5k Ω	SIOBA-J25-AI01
LWT	Leaving Water Thermistor	5k Ω	SIOBA-J25-AI02
OAT	Outdoor Air Thermistor	5k Ω	SIOBA-J25-AI03
SGTA	Circuit A Suction Gas Thermistor	5k Ω	AUX2-J6-CH12
SGTB	Circuit B Suction Gas Thermistor	5k Ω	AUX3-J6-CH12
DGTA	Circuit A Discharge Gas Thermistor	5k Ω	AUX2-J6-CH11
DGTB	Circuit B Discharge Gas Thermistor	5k Ω	AUX3-J6-CH11
LLTA	Circuit A Liquid Line Thermistor	5k Ω	AUX2-J7-CH13
LLTB	Circuit B Liquid Line Thermistor	5k Ω	AUX3-J7-CH13
ECTA	Circuit A Economizer Thermistor	5k Ω	SIOBA-J25-AI05
ECTB	Circuit B Economizer Thermistor	5k Ω	SIOBB-J25-AI05
DUAL	Dual Chiller LWT Thermistor	5k Ω	AUX1-J6-CH11
CAMT	Circuit A Motor Temperature	5k Ω	SIOBA-J25-AI04
CBMT	Circuit B Motor Temperature	5k Ω	SIOBB-J25-AI04
SPT	Space Temperature Thermistor	10k Ω	EMM-J6-CH2

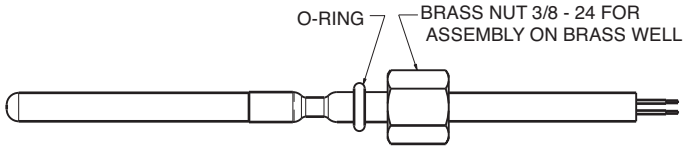


Fig. 44 — 5K Thermistor (Sensor 00PPG000008105A, Connector: HY06AM016)

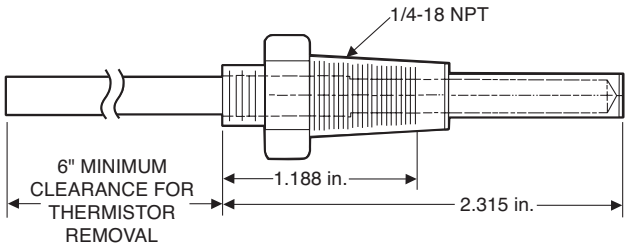


Fig. 45 — Dual Leaving Water Thermistor Well (00PPG000008000A)

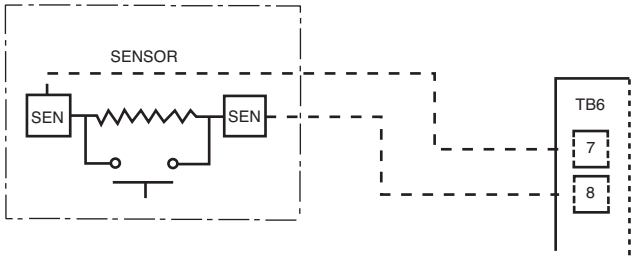


Fig. 46 — Typical Remote Space Temperature Sensor (33ZCT55SPT) Wiring

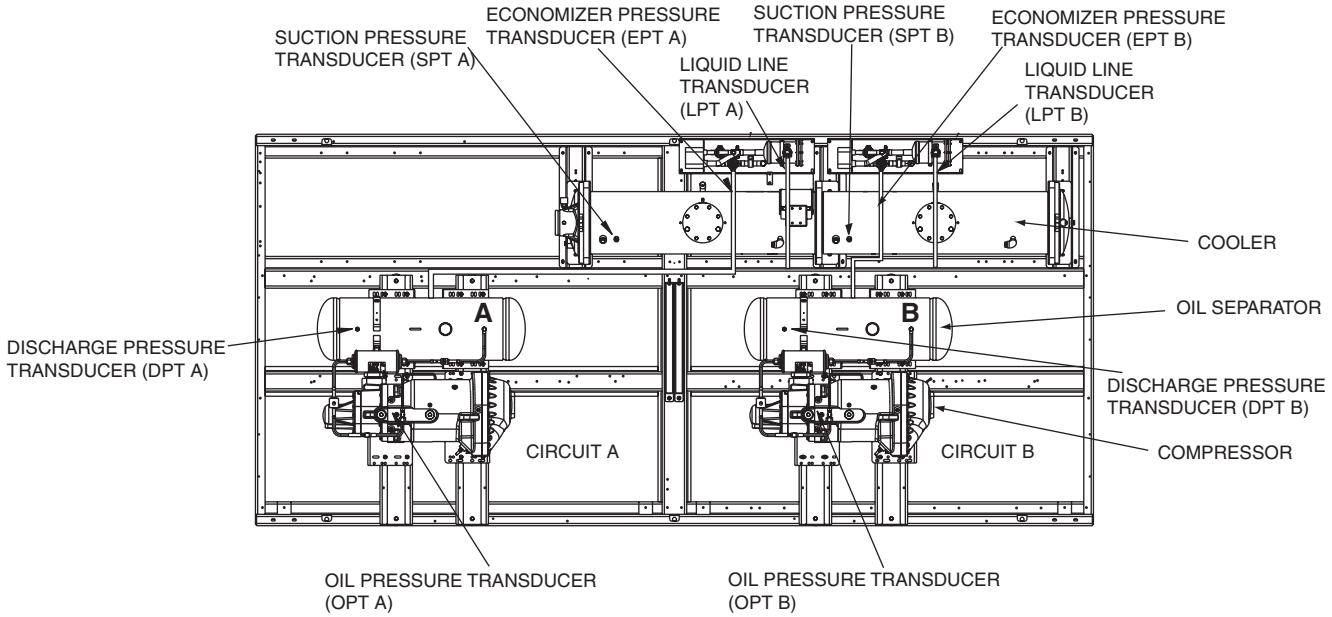


Fig. 47 — Transducer Locations

Table 32 — 5K Thermistor Temperature (°F) vs Resistance

TEMP (F)	RESISTANCE (Ohms)
–25	98,010
–24	94,707
–23	91,522
–22	88,449
–21	85,486
–20	82,627
–19	79,871
–18	77,212
–17	74,648
–16	72,175
–15	69,790
–14	67,490
–13	65,272
–12	63,133
–11	61,070
–10	59,081
–9	57,162
–8	55,311
–7	53,526
–6	51,804
–5	50,143
–4	48,541
–3	46,996
–2	45,505
–1	44,066
0	42,679
1	41,339
2	40,047
3	38,800
4	37,596
5	36,435
6	35,313
7	34,231
8	33,185
9	32,176
10	31,202
11	30,260
12	29,351
13	28,473
14	27,624
15	26,804
16	26,011
17	25,245
18	24,505
19	23,789
20	23,096
21	22,427
22	21,779
23	21,153
24	20,547
25	19,960
26	19,393
27	18,843
28	18,311
29	17,796
30	17,297
31	16,814
32	16,346
33	15,892
34	15,453
35	15,027
36	14,614
37	14,214
38	13,826
39	13,449
40	13,084
41	12,730
42	12,387
43	12,053
44	11,730
45	11,416
46	11,112
47	10,816
48	10,529
49	10,250
50	9,979
51	9,717
52	9,461
53	9,213
54	8,973
55	8,739
56	8,511
57	8,291
58	8,076
59	7,686
60	7,665
61	7,468
62	7,277
63	7,091
64	6,911
65	6,735
66	6,564
67	6,399
68	6,238
69	6,081
70	5,929
71	5,781
72	5,637
73	5,497
74	5,361
75	5,229
76	5,101
77	4,976
78	4,855
79	4,737
80	4,622
81	4,511
82	4,403
83	4,298
84	4,196
85	4,096
86	4,000
87	3,906
88	3,814
89	3,726
90	3,640
91	3,556
92	3,474
93	3,395
94	3,318
95	3,243
96	3,170
97	3,099
98	3,031
99	2,964
100	2,898
101	2,835
102	2,773
103	2,713
104	2,655
105	2,597
106	2,542
107	2,488
108	2,436
109	2,385
110	2,335
111	2,286
112	2,239
113	2,192
114	2,147
115	2,103
116	2,060
117	2,018
118	1,977
119	1,937
120	1,898
121	1,860
122	1,822
123	1,786
124	1,750
125	1,715
126	1,680
127	1,647
128	1,614
129	1,582
130	1,550
131	1,519
132	1,489
133	1,459
134	1,430
135	1,401
136	1,373
137	1,345
138	1,318
139	1,291
140	1,265
141	1,240
142	1,214
143	1,190
144	1,165
145	1,141
146	1,118
147	1,095
148	1,072
149	1,050
150	1,029
151	1,007
152	986
153	965
154	945
155	925
156	906
157	887
158	868
159	850
160	832
161	815
162	798
163	782
164	765
165	750
166	734
167	719
168	705
169	690
170	677
171	663
172	650
173	638
174	626
175	614
176	602
177	591
178	581
179	570
180	561
181	551
182	542
183	533
184	524
185	516
186	508
187	501
188	494
189	487
190	480
191	473
192	467
193	461
194	456
195	450
196	445
197	439
198	434
199	429
200	424
201	419
202	415
203	410
204	405
205	401
206	396
207	391
208	386
209	382
210	377
211	372
212	367
213	361
214	356
215	350
216	344
217	338
218	332
219	325
220	318
221	311
222	304
223	297
224	289
225	282

Table 33 — 5K Thermistor Temperature (°C) vs Resistance/Voltage

TEMP (C)	RESISTANCE (Ohms)
–32	100,260
–31	94,165
–30	88,480
–29	83,170
–28	78,125
–27	73,580
–26	69,250
–25	65,205
–24	61,420
–23	57,875
–22	54,555
–21	51,450
–20	48,536
–19	45,807
–18	43,247
–17	40,845
–16	38,592
–15	38,476
–14	34,489
–13	32,621
–12	30,866
–11	29,216
–10	27,633
–9	26,202
–8	24,827
–7	23,532
–6	22,313
–5	21,163
–4	20,079
–3	19,058
–2	18,094
–1	17,184
0	16,325
1	15,515
2	14,749
3	14,026
4	13,342
5	12,696
6	12,085
7	11,506
8	10,959
9	10,441
10	9,949
11	9,485
12	9,044
13	8,627
14	8,231

TEMP (C)	RESISTANCE (Ohms)
15	7,855
16	7,499
17	7,161
18	6,840
19	6,536
20	6,246
21	5,971
22	5,710
23	5,461
24	5,225
25	5,000
26	4,786
27	4,583
28	4,389
29	4,204
30	4,028
31	3,861
32	3,701
33	3,549
34	3,404
35	3,266
36	3,134
37	3,008
38	2,888
39	2,773
40	2,663
41	2,559
42	2,459
43	2,363
44	2,272
45	2,184
46	2,101
47	2,021
48	1,944
49	1,871
50	1,801
51	1,734
52	1,670
53	1,609
54	1,550
55	1,493
56	1,439
57	1,387
58	1,337
59	1,290
60	1,244
61	1,200

TEMP (C)	RESISTANCE (Ohms)
62	1,158
63	1,118
64	1,079
65	1,041
66	1,006
67	971
68	938
69	906
70	876
71	836
72	805
73	775
74	747
75	719
76	693
77	669
78	645
79	623
80	602
81	583
82	564
83	547
84	531
85	516
86	502
87	489
88	477
89	466
90	456
91	446
92	436
93	427
94	419
95	410
96	402
97	393
98	385
99	376
100	367
101	357
102	346
103	335
104	324
105	312
106	299
107	285

SERVICE

Economizer Assembly — Each circuit on the unit has an economizer assembly, which includes a brazed plate heat exchanger, electronic expansion valves (EXVs), and other components. See Fig. 48.

Electronic Expansion Valve (EXV) — See Fig. 49 for a cutaway view of the EXV. High-pressure liquid refrigerant enters the valve through the top. As refrigerant passes through the orifice, pressure drops and refrigerant changes to a 2-phase condition (liquid and vapor). The electronic expansion valve operates through an electronically controlled activation of a stepper motor. The stepper motor stays in position unless power pulses initiate the two discrete sets of motor stator windings for rotation in either direction. The direction depends on the phase relationship of the power pulses. The motor directly operates the spindle, which has rotating movements that are transformed into linear motion by the transmission in the cage assembly. The valve cone is a V-port type which includes a positive shut-off when closed. The large number of steps and long stroke results in very accurate control of the refrigerant flow. The stepper motor has either 3690 (main) or 2785 (economizer) steps.

MAIN EXV CONTROL — Each circuit has thermistors located in the discharge end of the compressor (DGT), compressor motor cavity (SGT) and liquid line leaving the condenser (LLT). Each circuit also has a discharge, suction, and liquid line pressure transducer. All the pressure readings as measured by the transducers are converted to saturated temperatures. The main control logic for the EXV uses liquid line subcooling, which is the difference between the liquid line saturation temperature and the liquid line temperature, to control the position of the EXV. The EXV module controls the position of the electronic expansion valve stepper motor to maintain the subcooling set point. The EXV control logic has several overrides, which are also used to control the position of the EXV.

- Normal Mode (SUBCOOL)
- Low Discharge Superheat (DSH)
- Low Suction Pressure (SPMIN)
- Maximum Suction Pressure (SPMAX)
- EXV Start (START)

Normal Mode (SUBCOOL) — This is the normal mode of operation of the EXV. Based on the operating condition and loading of the compressor, the control calculates an optimal subcooling setting to maximize the system efficiency. The EXV accordingly adjusts the EXV opening to meet this calculated subcooling setting. The range of the subcooling setting can be altered by using the Network Service Tool in the Configuration → EXV_CFG table.

Low Discharge Superheat (DSH) — The EXV control goes into the DSH mode when the DSH is below 16.2 F (–8.8 C). The EXV closes down to increase the discharge superheat beyond 16.2 F (–8.8 C) and returns to the SUBCOOL mode.

Low Suction Pressure (SPMIN) — The EXV control tries to open up the EXV to increase the suction pressure and come out of this mode. The SST setting to enter this mode is dependent on the fluid type. With water the EXV enters this mode if SST is less than 25 F (–3.9 C) in normal discharge superheat or less

than 13 F (–10.6 C) in low DSH condition. It remains in this mode until SST is greater than 34 F (1.1 C) or greater than 25 F (–3.9 C) if subcool is greater than subcool setpoint.

Maximum Suction Pressure (SPMAX) — The EXV enters this mode if the suction saturation temperature (SST) is greater than 55 F (13 C). The EXV closes down to regulate the SST at about 53.2 F (11.8 C). If the SST is less than 52.3 F (11.3 C) then the EXV returns to the normal mode of operation.

ECONOMIZER EXV CONTROL — The economizer EXV is controlled by the SIOB. An economizer gas temperature thermistor and an economizer pressure transducer are located in the line running from the economizer assembly to the compressor. The economizer pressure is converted to saturated temperature and is used to calculate economizer superheat. Economizer superheat equals economizer temperature minus saturated economizer temperature. The control system controls the economizer EXV to maintain the economizer superheat setpoint, which is approximately 18 F (–7.8 C). If the circuit capacity is less than 50%, the economizer EXV will be closed.

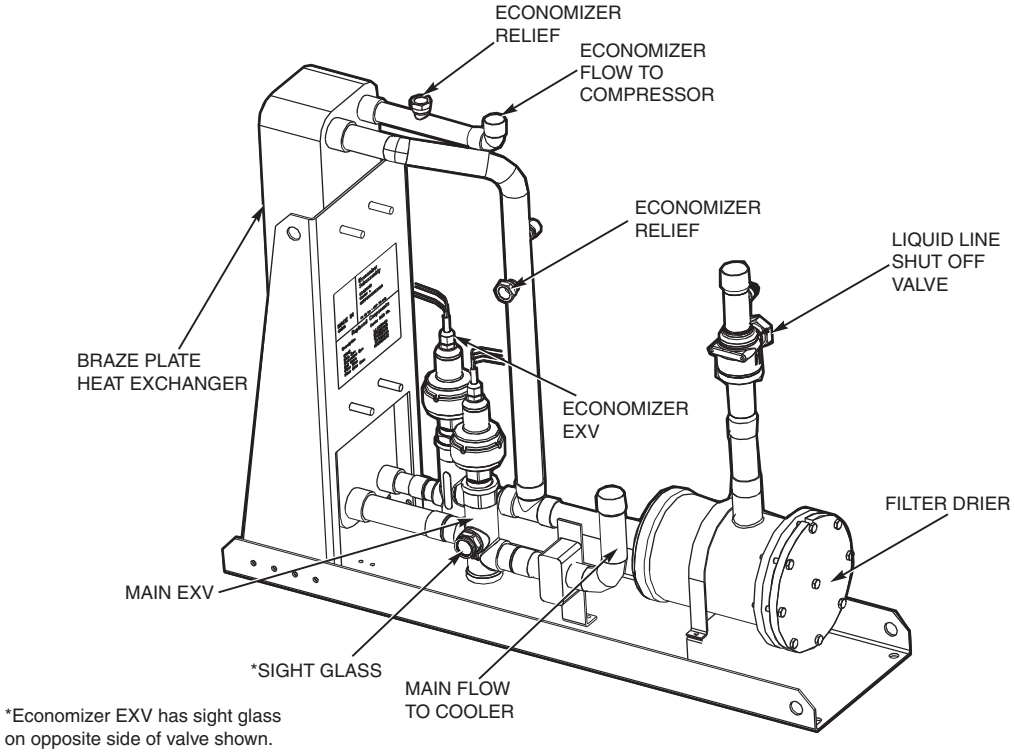


Fig. 48 — Economizer Assembly

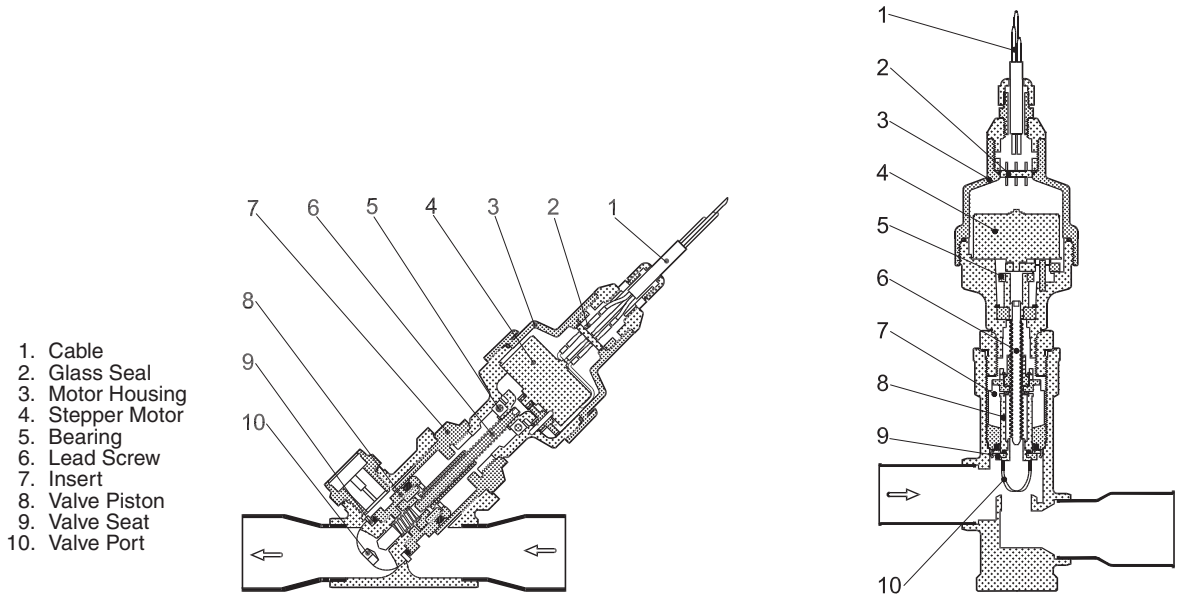


Fig. 49 — Cutaway Views of the Electronic Expansion Valve

EXV TROUBLESHOOTING PROCEDURE — There are two different economizer EXVs. Both of the economizer EXVs have a total of 2785 steps. There are three different main EXVs, which all have a total of 3690 steps. The EXV motor moves at 150 steps per second. Commanding the valve to either 0% or 100% will add an additional 160 steps to the move, to ensure the valve is open or closed completely.

⚠ CAUTION

Do not remove EXV cables from the SIOB board with the power applied to the board. Damage to the board may occur.

Follow the steps below to diagnose and correct EXV problems. Check EXV motor operation first. Switch the Enable/Off/Remote (EOR) Contact switch to the Off position.

Check the appropriate circuit EXV, EXV Position Circuit A % Open (Main Menu → Maintenance Menu → EXV Control → Line 3) or EXV Position Circuit B % Open (Main Menu → Maintenance Menu → EXV Control → Line 17). The current value of 0 will be displayed. Increase the EXV position to select 100% valve position. The actuator should be felt moving through the EXV. To close the valve, select 0%. The actuator should knock when it reaches the bottom of its stroke. See Table 34 for a list of EXV modes and submodes.

If the valve is not working properly, continue with the following test procedure:

Check the EXV output signals at appropriate terminals on the SIOB-A and SIOB-B.

Connect positive test lead to SIOB(X)-J17 terminal 12V for EXV(X) and SIOB(X)-J18 terminal 12V for economizer EXV(X). Using the Service Test procedure on page 100, move the valve output under test to 100%. DO NOT short meter leads together or pin 12V to any other pin, as board damage will occur. During the next several seconds, carefully connect the negative test lead to pins A,B,C and D in succession. Digital voltmeters will average this signal and display approximately 6 vdc. If the output remains at a constant voltage other than 6 vdc or shows 0 volts, remove the connector to the valve and recheck.

Select 0% to close the valve.

NOTE: Twelve vdc is the output from the SIOB board when the valve is stationary.

See Tables 4 and 5. If a problem still exists, replace the SIOB board. If the reading is correct, the expansion valve and EXV wiring should be checked. Check the EXV connector and interconnecting wiring.

1. Check color-coding and wire connections. Make sure they are connected to the correct terminals at the EXV board and EXV plug and that the cables are not crossed.
2. Check for continuity and tight connection at all pin terminals.

Check the resistance of the EXV motor windings. Remove the EXV module plug SIOB(X)-J17 for main EXV and SIOB(X)-J18 for economizer EXV. Check the resistance of the two windings between pins A and C for one winding and pins B and D for the other winding. The resistance should be 52 ohms (± 5.2 ohms). Also check pins A-D for any shorts to ground.

Table 34 — EXV Modes and Submodes

EXV TYPE AND CIRCUIT	PATH	LINE NO.
Circuit A EXV Position	Main Menu → Quick Test Table	3
EXV Economizer Position, Circuit A		9
Circuit B EXV Position		13
EXV Economizer Position, Circuit B		19

Inspecting/Opening Electronic Expansion Valves

IMPORTANT: Obtain replacement gaskets before opening EXV. Do not re-use gaskets.

To check the physical operation of an EXV, the following steps should be performed. Charge not isolated within the unit must be recovered using proper refrigerant recovery techniques. Follow Steps 1-3 below.

1. Isolate refrigerant within the chiller and recover remaining charge. This will allow access to internal EXV components. Closing the valves will minimize the amount of refrigerant that will need to be removed.

   For units without isolation valve option: Close the liquid line ball valve directly above the filter drier as well as the discharge line ball valves (see the Actuated Ball Valve section on page 50 for instructions). Remove any remaining refrigerant from the system low side using proper recovering techniques. The cooler liquid line inlet has an access port that can be used to remove charge from the cooler. The economizer assembly has a $^1/_4$-in. access connection which can be used to remove charge from the inlet of the EXVs. Turn off the line voltage power supply to the compressors.

   For units with isolation valve option: Close the ball valves on the liquid line directly above the filter drier, after the main EXV before the cooler, and on the economizer line to the compressor. Remove any remaining refrigerant from the economizer assembly using proper recovering techniques. The economizer assembly has a $^1/_4$-in. access connection which can be used to remove charge from the inlet of the EXVs. Turn off the line voltage power supply to the compressors.

⚠ CAUTION

Ensure refrigerant is removed from both the inlet and outlet of EXV assemblies. Equipment damage could result.

2. The expansion valve motor is hermetically sealed inside the top portion of the valve. See Fig. 49. Disconnect the EXV plug. Carefully unscrew the motor portion from the body of the valve. The EXV operator will come out with the motor portion of the device. Reconnect the EXV plug.
3. Enter the appropriate EXV test step under the Test mode (Main Menu → Quick Test Table). Locate the desired parameter for the Main EXVs: Circuit A EXV Position (Line 3), Circuit B EXV Position (Line 13) or Economizer EXVs: EXV Eco Position Cir A (Line 9), EXV Eco Position Cir B (Line 19). Change the position to 100%. Observe the operation of the lead screw. See Fig. 49. The motor should be turning, raising the operator closer to the motor. Motor actuator movement should be smooth and uniform from fully closed to fully open position. Select 0% and check open to closed operation. If the valve is properly connected to the processor and receiving correct signals, yet does not operate as described above, the sealed motor portion of the valve should be replaced.

Installing EXV Motor

IMPORTANT: Obtain replacement gasket before opening EXV. Do not re-use gaskets.

If re-installing the motor, be sure to use a new gasket in the assembly. See Fig. 50. It is easier to install the motor assembly with the piston in the fully closed position. Insert the motor into the body of the EXV. Tighten the motor to the body to 36 ft-lb (50 N-m) and then tighten the valve another 30 degrees.

Moisture Liquid Indicator — Clear flow of liquid refrigerant indicates sufficient charge in system. Bubbles in the sight glass indicate undercharged system or presence of noncondensables. Moisture in system, measured in parts per million (ppm), changes color of indicator. See Table 35. Change filter drier at first sign of moisture in system.

Table 35 — Color Indicators when Moisture is Present in Refrigerant

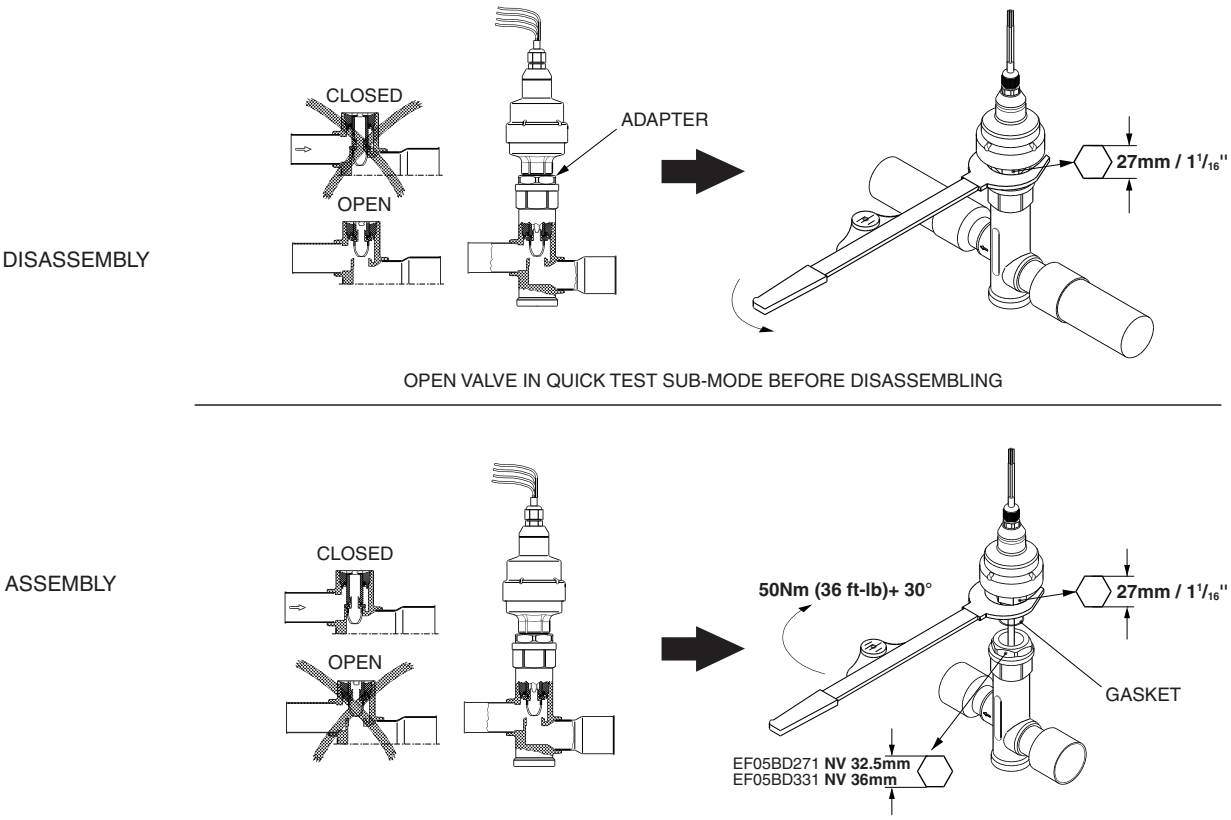
COLOR INDICATOR	R-134A, 75 F (24 C) (ppm)	R-134A, 125 F (52 C) (ppm)
Green — Dry	< 30	< 45
Yellow-green — Caution	30-100	45-170
Yellow — Wet	>100	>170

IMPORTANT: Unit must be in operation at least 12 hours before moisture indicator can give an accurate reading.

With unit running, indicating element must be in contact with liquid refrigerant to give true reading.

Filter Drier — Whenever moisture-liquid indicator shows presence of moisture, replace filter drier(s). There is one filter drier assembly on each circuit with either one or two cores. The 30XA140-162 units have two cores in circuit A and one for circuit B. The 30XA180-352 units have two cores per circuit. Refer to the Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants, for details on servicing filter driers.

Liquid Line Service Valve — This valve is located immediately ahead of filter drier, and has a $^1/_4$-in. access connection for field charging. In combination with compressor discharge service valve, each circuit can be pumped down into the high side for servicing.



NOTES:
1. Push down on valve piston to close valve before assembling.
2. After valve is assembled close valve in Quick Test sub-mode or cycle power before opening service valve.

Fig. 50 — Disassembly and Assembly of EXV Motor

Compressor Assembly — The 30XA units with Greenspeed® intelligence utilize VFD-controlled screw compressors with modulating slide valves to increase capacity until approximately 50% of total compressor capacity for each circuit in reached. See Fig. 51 for a view of a typical 06T compressor. The slide valve position is varied by opening and closing the 2 solenoid valves located on the compressor. To unload the compressor, both solenoids are deenergized. To increase capacity both solenoid valves are energized together which will cause the slide valve to slide towards the fully loaded position. To stop the loading process solenoid 2 is energized and solenoid 1 is deenergized. This will cause the slide valve to maintain its current position. There is no feedback for the position of the slide valve. The control utilizes compressor current as an indicator of the slide valve position. Once the calculated position of the slide valve reaches 100% at the lowest operating frequency (27.5 Hz), the control will keep both the solenoids energized and the slide valves will be considered fully loaded, and the circuit loading will be 50%. Further circuit capacity increase to 100% will be achieved by increasing the VFD frequency output from 27.5 Hz to 60 Hz.

VICTAULIC COUPLING INSTALLATION

1. The outside surface of the pipe, between the groove and the pipe end, must be smooth and free from indentations, projections (including weld seams), and roll marks to ensure a leak-tight seal. All oil, grease, loose paint, and dirt must be removed. The Victaulic gasket used for refrigerant system piping will have a yellow mark on one side of the gasket lips.
2. Apply a thin coat of Victaulic lubricant or silicone lubricant to the gasket sealing lips and exterior.

⚠CAUTION

Always use a compatible lubricant to prevent the gasket from pinching or tearing during installation. Failure to follow this instruction could result in joint leakage.

3. Position the gasket over the pipe end. Make sure the gasket does not overhang the pipe end.
4. Align and bring the two pipe ends together. Slide the gasket into position and center it between the grooves in each pipe end. Make sure no portion of the gasket extends into the groove in either pipe end.
5. Install the housings over the gasket. Make sure the housings' keys engage the grooves completely on both pipe ends.

⚠CAUTION

Make sure the gasket does not become rolled or pinched while installing the housings. Failure to follow this instruction could cause damage to the gasket, resulting in joint leakage.

6. Install the bolts, and thread a nut finger-tight onto each bolt. For couplings supplied with stainless steel hardware, apply an anti-seize compound to the bolt threads. Make sure the oval neck of each bolt seats properly in the bolt hole.
7. Tighten the nuts evenly by alternating sides until metal-to-metal contact occurs at the bolt pads. Make sure the housings' keys engage the grooves completely. It is important to tighten the nuts evenly to prevent gasket pinching.
8. Visually inspect the bolt pads at each joint to ensure metal-to-metal contact is achieved.

COMPRESSOR OIL SYSTEM — Each compressor/circuit has its own oil system which includes an oil filter, oil solenoid, check valve, oil level switch, oil separator heater, oil pressure transducer, and an oil shut-off valve. A typical oil system is shown in Fig. 52. See Table 36 for required oil quantity per circuit, initially included from the factory.

Table 36 — Unit Oil Quantities

30XA UNIT SIZE	OIL CHARGE (gal, [liters])	
	Circuit A	Circuit B
140-162	6.25 [23.7]	5.5 [20.8]
180-202	6.25 [23.7]	6.25 [23.7]
220,222	6.75 [25.6]	6.25 [23.7]
240,242	6.75 [25.6]	6.75 [25.6]
260,262	7.50 [28.4]	6.75 [25.6]
280-302	7.50 [28.4]	6.75 [25.6]
325-352	7.50 [28.4]	7.50 [28.4]

Oil Charge — When additional oil or a complete charge is required it must meet the following specifications:

- Manufacturer . . . . . Emkarate RL220XL
- Oil Type . . . . . Inhibited polyolester-based synthetic compressor lubricant for use with screw compressors.
- ISO Viscosity Grade 220

Do not reuse drained oil or any oil that has been exposed to the atmosphere.

Oil is available in the following quantities from your local Carrier representative:

QUANTITY	TOTALINE PART NO.
1 Quart	P903-2325
1 Gallon	P903-2301
5 Gallon	P903-2305

If unsure if there is low oil charge in the system, follow the steps below:

1. If the unit shuts off repeatedly from a low oil level alert it may be an indication of inadequate oil charge; however, it could also indicate that the oil is not being reclaimed from the low-side of the system.
2. Begin running the circuit at full load for $1^1/_2$ hours.

   NOTE: An adequate load must be available.
3. After running the circuit for $1^1/_2$ hours at full load, allow the unit to restart and run normally. If low oil alarms persist, the unit is low on oil charge.

   NOTE: Also check refrigerant charge. Low refrigerant charge will also prevent oil return.

   Add oil to the oil separator using the $^1/_4$-in. access fitting that the discharge pressure transducer is mounted to.

   NOTE: To facilitate the oil charging process, ensure that the unit is not running when adding oil. The system is under pressure even when the unit is not running, so it is necessary to use a suitable pump to add oil to the system. Using a suitable pump, add $^1/_2$ gal (1.9 l) of oil to the system. Continue adding oil in $^1/_2$ gal (1.9 l) increments until the problem is resolved, up to a maximum of 1.5 gal (5.7 l).

Oil Filter Maintenance — Each circuit has one oil filter located externally to the compressor. Oil line pressure drop is monitored by the control. Oil line pressure drop is calculated by subtracting oil pressure (OP) from discharge pressure (DP). If the oil line pressure drop exceeds 30 psig (206.8 kPa) for 5 minutes the control will generate a High Oil Filter Pressure Drop alert. The High Oil Filter Pressure Drop alert will not shut down the compressor, but instead indicates that the oil filter is dirty. If oil pressure line losses exceed

50 psig (344.7 kPa) for more than 30 seconds then the control will shut down the circuit on Maximum Oil Filter Differential Pressure Failure.

⚠ CAUTION

Compressor oil is pressurized. Use proper safety precautions when relieving pressure.

Replacing the Oil Filter — Close the oil line ball valve located in front of the oil filter. Connect a charging hose to the $^1/_4$-in. access fitting port located downstream of the valve and bleed off oil trapped between the service valve and the oil solenoid valve. A quart of oil is typically removed during this process. Remove the charging hose. Unscrew the nuts from both ends of the oil filter and remove the oil filter. Remove the protective caps from the new oil filter and install, being careful not to lose or damage the new O-ring located on the new oil filter. Draw a vacuum at the Schrader port. Remove the charging hose and open the oil line ball valve. Check both fittings for leaks.

Cooler Service — The 30XA units with Greenspeed® intelligence, unit sizes ending in 0 or 5, use flooded style coolers. Unit sizes ending in 2 or 7 use direct expansion (DX) coolers. For example, 30XAB14**0** incorporates a flooded cooler, while 30XAB14**2** incorporates a DX cooler.

COOLER WATER TREATMENT — Untreated or improperly treated water may result in corrosion, scaling, erosion or algae. The services of a qualified water treatment specialist should be obtained to develop and monitor a treatment program.

⚠ CAUTION

Water must be within design flow limits, clean and treated to ensure proper machine performance and reduce the potential of tubing damage due to corrosion, scaling, and algae. Carrier assumes no responsibility for cooler damage resulting from untreated or improperly treated water.

SUCTION SERVICE VALVE (FLOODED COOLER OPTION) — The suction service valve is a factory-installed option for 30XA units. Units have a bucket-style suction service valve that is bolted between the cooler outlet and the suction flange piping. The bucket-style suction service valve shaft has a locking device located on the shaft to lock the valve in either a fully open position or a fully closed position. The locking device must be pulled out prior to moving the valve handle to a fully open or a fully closed position. See Fig. 53 and 54 for details on the bucket-style suction service valve.

ISOLATION VALVE (DX COOLER OPTION) — The isolation valve is a factory-installed option for 30XA units with DX coolers. The option includes a butterfly-style suction service valve on the suction lines, and manual ball valves on discharge, cooler inlet and economizer lines. The butterfly valve is connected to the suction line by flange connections. See Fig. 55 and 56 for details on the butterfly suction service valve operation. The valve locks into place when fully opened or fully closed.

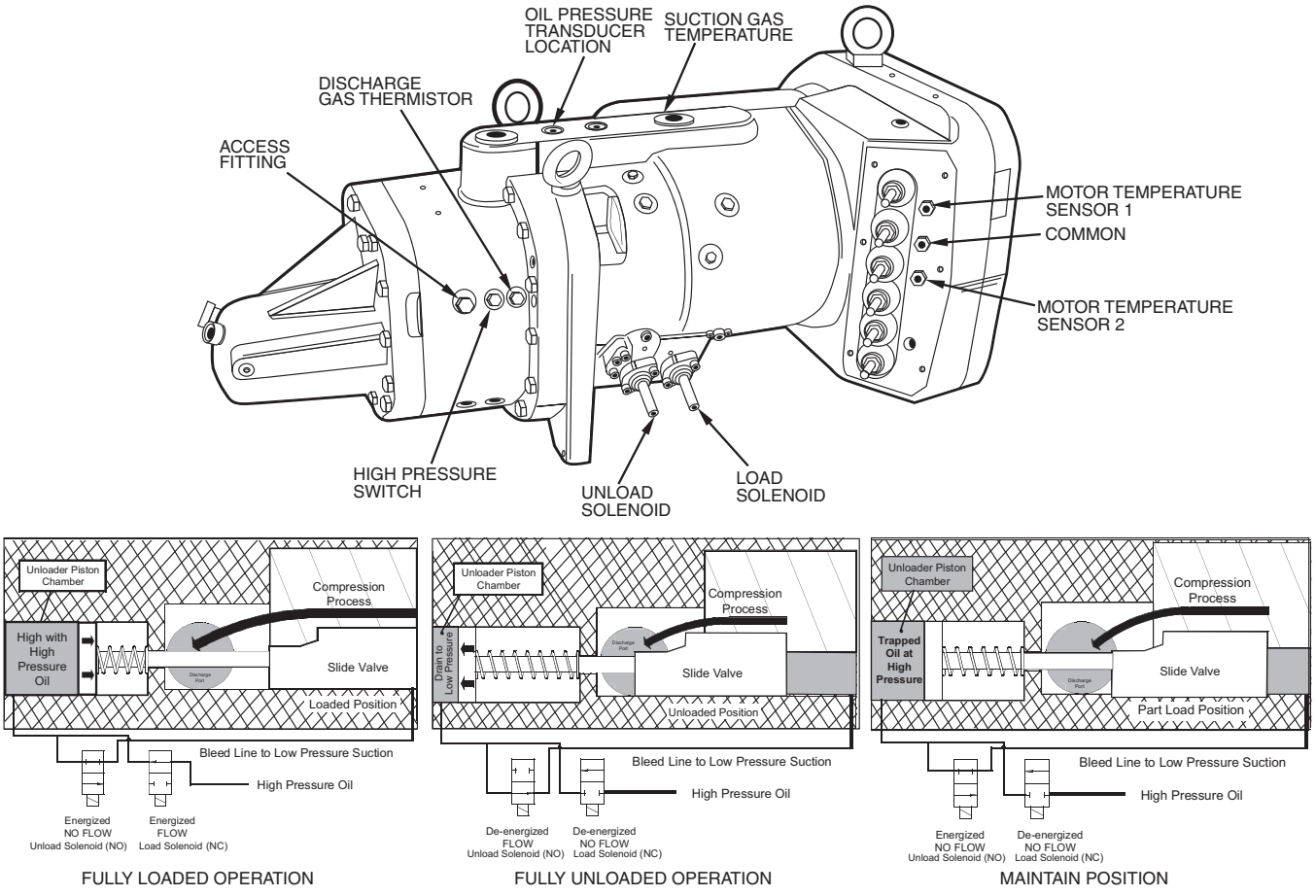


Fig. 51 — Typical 06T Compressor (All Units)

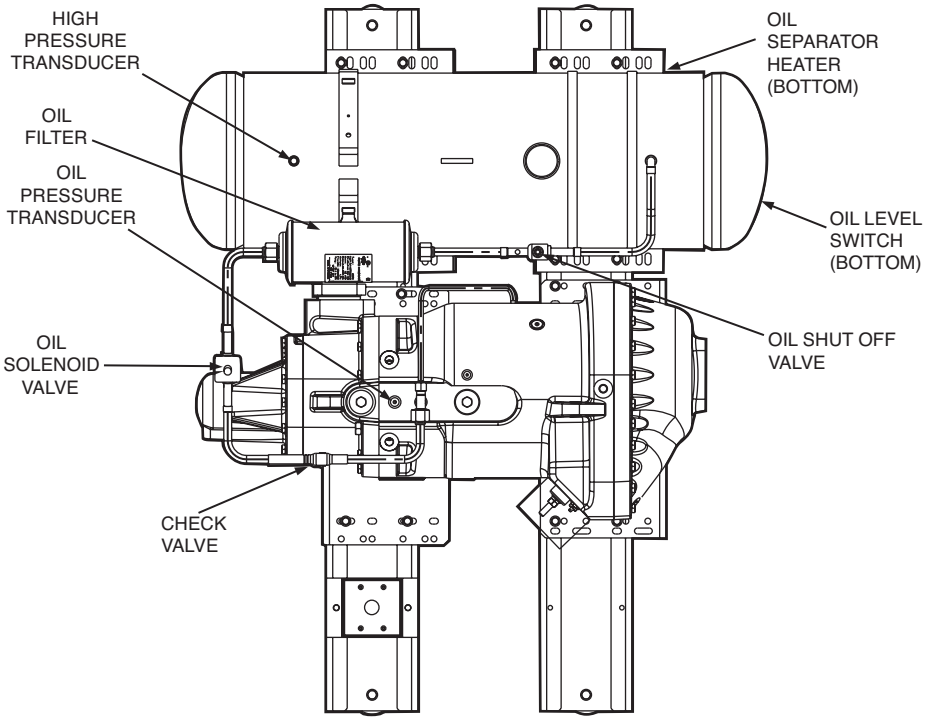


Fig. 52 — Typical Oil System (All Units)

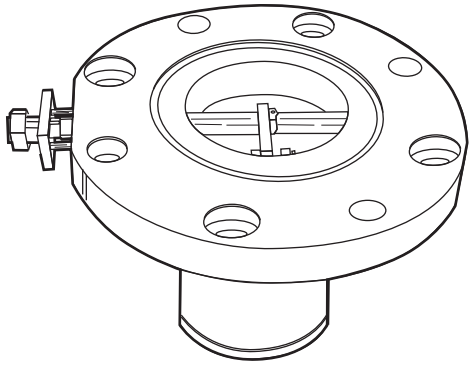


Fig. 53 — Suction Service Valve Locking Device, Closed and Unlocked (Flooded Cooler Units)

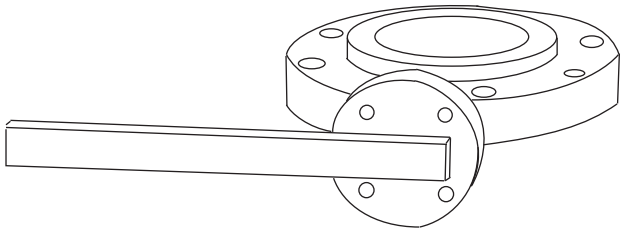


Fig. 55 — Butterfly Valve Closed (DX Cooler Units)

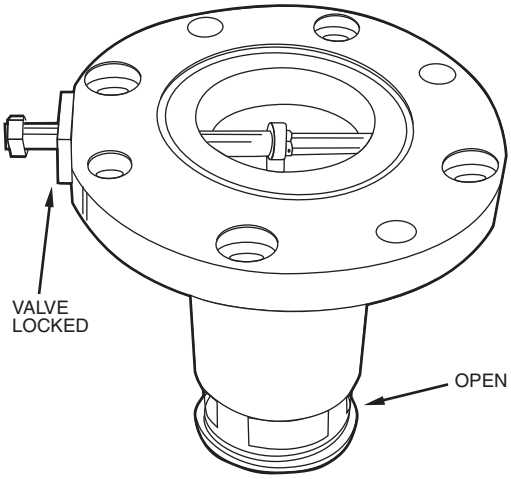


Fig. 54 — Suction Service Valve Locking Device, Open and Locked (Flooded Cooler Units)

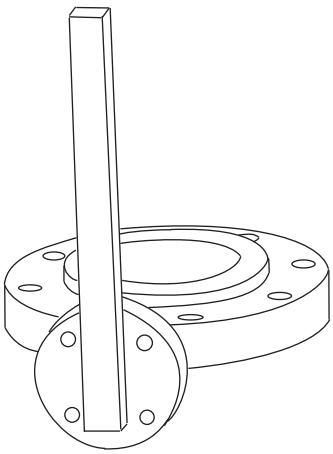


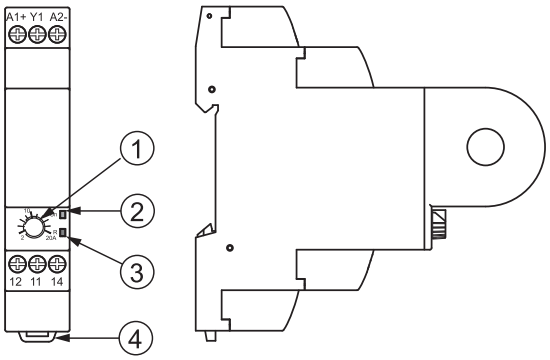
Fig. 56 — Butterfly Valve Open (DX Cooler Units)

COOLER FREEZE PROTECTION — All coolers are equipped with cooler heaters (unless removed as an option for high ambient Middle Eastern regions) that are controlled by the Touch Pilot™ controls. The control logic uses the unit status, outdoor air temperature, and the saturated suction temperatures for all circuits to decide if the cooler heater should be energized. The cooler heaters can only be energized when the state of the unit is OFF. The cooler heaters will be energized according to the following logic:

1. The Cooler Heater Setpoint is the Brine Feeze Setpoint + Cooler Heater Delta Setpoint.
2. If the outside air temperature (OAT) is below the Cooler Heater Setpoint *or* if the saturated suction temperature (SST) of any one circuit is lower than the Cooler Heater Setpoint + 6° F (3.3° C), the cooler heater is activated, or if already activated, will remain on.
3. If the SST of all circuits is higher than the Cooler Heater Setpoint + 10° F (5.5° C), *and* if OAT is higher than the Cooler Heater Setpoint + Cooler Heater Delta Setpoint, the cooler heater will be turned off, or if already off, will remain off.
4. If either condition 2 or condition 3 above is not met, the heater mode remains unchanged.

If the entering or leaving water temperature is less than the Brine Freeze Setpoint (Main Menu → Configuration Menu → Service Parameters → Brine Freeze Setpoint [Line5]) +1.0° F (0.5° C), then the heater will be turned on along with the pump.

A current sensor relay monitors the current to the cooler heaters. If a heater fails, the reduction in current will switch the relay and produce a Cooler Freezer Alarm (COOLER_FREEZE, 10001). In addition, the pump signal will energize. See Appendix G for relay set points. See Fig. 57 for cooler heater sensor set point adjustment location.



LEGEND

1 — Overcurrent Adjusting Potentiometer
2 — Power Supply Status LED (green)
3 — Relay Output Supply Status LED (yellow)
4 — 35 mm Rail Clip-in Spring

Fig. 57 — Cooler Heater Set Point Adjustment

To configure this option with the TouchPilot controls:

Display Name	PATH	Line No.	VALUE
Cooler Heater Select	Main Menu → Configuration Menu → Factory Menu	8	0 = No Cooler Heater 1 = Cooler Heater without current sensor 2 = Cooler heater with current sensor

NOTE: Cooler Heater Select must be configured to 1 or 2 for the motorized ball valves (ABV) to operate.

IMPORTANT: If unit is installed in an area where ambient temperatures fall below 32 F (0° C), a suitable corrosion-inhibited antifreeze solution or cooler heater must be used in the chilled water circuit.

LOW FLUID TEMPERATURE — The Touch Pilot control is programmed to shut chiller down if leaving fluid temperature drops below 34 F (1.1 C) for cooler fluid type water or below the Brine Freeze Setpoint (Main Menu → Configuration Menu → Service Parameters → Line 5) for the cooler fluid type brine. When fluid temperature rises to 6° F (3.3° C) above the leaving fluid set point, the alarm will reset and the chiller restarts. Reset is automatic as long as this is the first occurrence. For repeat occurrences within 24 hours the alarm must be manually reset.

LOSS OF FLUID FLOW PROTECTION — All 30XA machines include an integral flow switch that protects the cooler against loss of cooler flow.

Flooded Cooler Units

TUBE PLUGGING — A leaky tube can be plugged until retubing can be done. The number of tubes plugged determines how soon the cooler must be retubed. All tubes in the cooler may be removed. Loss of unit capacity and efficiency as well as increased pump power will result from plugging tubes. Failed tubes should be replaced as soon as possible. Up to 10% of the total number of tubes can be plugged before retubing is necessary. Figure 58 shows an Elliott tube plug and a cross-sectional view of a plug in place. See Tables 37 and 38 for plug components. If the tube failure occurs in both circuits using tube plugs will not correct the problem. Contact your local Carrier representative for assistance.

⚠ CAUTION

Use extreme care when installing plugs to prevent damage to the tube sheet section between the holes.

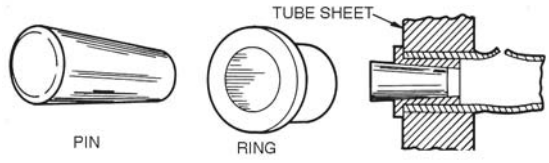


Fig. 58 — Elliott Tube Plug

Table 37 — Plug Component Parts (Cooler Units Only)

COMPONENT	PART NUMBER
For Tubes	
Brass Pin	853103-1*
Brass Ring	853002-640 or 657* (measure tube ID before ordering)
For Holes without tubes	
Brass Pin	853103-1A
Brass Ring	85102-738
Loctite	No. 675 †
Locquic	"N"†
Roller Extension	S82-112/11

*Order directly from Elliot Tool Technologies, Dayton, OH or RCD.
†Can be obtained locally.

Table 38 — Cooler Tube Components

COMPONENT	SIZE	
	in.	mm
Tube sheet hole diameter	0.756	19.20
Tube OD	0.750	19.05
Tube ID after rolling (includes expansion due to clearance.)	0.650 to 0.667	16.51 to 16.94

NOTE: Tubes replaced along heat exchanger head partitions must be flush with tube sheet (both ends).

COOLER RETUBING — When retubing is required, obtain the service of qualified personnel experienced in boiler maintenance and repair. Most standard procedures can be followed when retubing the coolers. An 8% crush is recommended when rolling replacement tubes into the tube sheet. Place one drop of Loctite No. 675 or equivalent on top of tube prior to rolling. This material is intended to "wick" into the area of the tube that is not rolled into the tube sheet, and prevent fluid from accumulating between the tube and the tube sheet. New tubes must also be rolled into the center tube sheet to prevent circuit to circuit leaks.

TIGHTENING COOLER HEAD BOLTS

Preparation — When reassembling cooler heads, always check the condition of the O-rings first. The O-ring should be replaced if there are visible signs of deterioration, cuts or damage. Apply a thin film of grease to the O-ring before installation. This will aid in holding the O-ring in the groove while the head is installed. Torque all bolts to the following specification and in sequence:

$^3/_4$-in. Diameter Perimeter Bolts (Grade 5). . . . 200 to 225 ft-lb (271 to 305 N-m)

1. Install all bolts finger tight.
2. Bolt tightening sequence is outlined in Fig. 59. Follow the numbering or lettering sequence so that pressure is evenly applied to O-ring.
3. Apply torque in one-third steps until required torque is reached. Load *all* bolts to each one-third step before proceeding to next one-third step.
4. No less than one hour later, retighten all bolts to required torque values.
5. After refrigerant is restored to system, check for refrigerant leaks using recommended industry practices.
6. Replace cooler insulation.

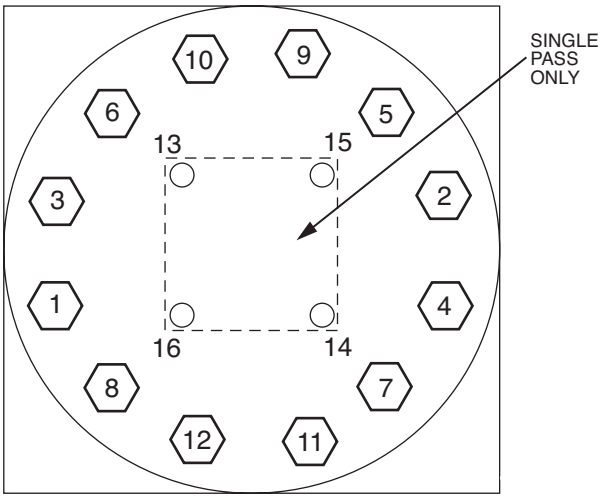


Fig. 59 — Flooded Cooler Unit Head Recommended Bolt Torque Sequence

INSPECTING/CLEANING HEAT EXCHANGERS — Inspect and clean cooler tubes at the end of the first operating season. Because these tubes have internal ridges, a rotary-type tube cleaning system is necessary to fully clean the tubes. Tube condition in the cooler will determine the scheduled frequency for cleaning, and will indicate whether water treatment is adequate in the chilled water/brine circuit. Inspect the entering and leaving water thermistor wells for signs of corrosion or scale. Replace the well if corroded or remove any scale if found.

⚠ CAUTION

Hard scale may require chemical treatment for its prevention or removal. Consult a water treatment specialist for proper treatment procedures.

DX Cooler Units

DX COOLER TUBE PLUGGING — A leaky tube can be plugged until retubing can be done. The number of tubes plugged determines how soon the cooler must be retubed. If several tubes require plugging, check with a local Carrier representative to find out how the number and location of tubes can affect unit capacity. Fig. 58 shows an Elliott tube plug and a cross-sectional view of a plug in place. See Tables 39 and 40 for plug components.

⚠ CAUTION

Use extreme care when installing plugs to prevent damage to the tube sheet section between the holes.

Table 39 — DX Cooler Unit Plug Component Part Numbers

COMPONENTS FOR PLUGGING	PART NUMBER
For Tubes	
Brass Pin	853103-312*
Brass Ring	853002-322*
For Holes without tubes	
Brass Pin	853103-375
Brass Ring	853002-377
Loctite	No. 675 †
Locquic	"N" †

*Order directly from Elliot Tube Company, Dayton, OH or RCD.
†Can be obtained locally.

Table 40 — DX Cooler Unit Plug Component Dimensions

PLUG COMPONENT	SIZE	
	in.	mm
Tube sheet hole diameter	0.377-0.382	9.58-9.70
Tube OD	0.373-0.377	9.47-9.58
Tube ID after rolling (includes expansion due to clearance)	0.328	8.33

NOTE: Tubes next to gasket webs must be flush with tube sheet (both ends).

For the 30XA models with DX coolers, the pass partition has a perforated distribution plate in the inlet pass to distribute the refrigerant more uniformly as it enters the tubes of the cooler. The perforated distribution plate is on the tube sheet side of the pass partition. A tube plug will interfere with the installation of pass partition. The tube plug must be flush with the tube sheet to prevent this interference. The pass partition is symmetrical, meaning the partition plate can be rotated 180 degrees; however, the performance of the machine will be affected if the pass partition is installed incorrectly.

DX COOLER RETUBING — When retubing is required, obtain service from qualified personnel experienced in boiler maintenance and repair. Most standard procedures can be followed when retubing the coolers. An 8% crush is recommended when rolling replacement tubes into the tube sheet.

The following Elliott Co. tube rolling tools are required:
- Expander Assembly
- Cage
- Mandrel
- Rolls

Place one drop of Loctite No. 675 or equivalent on top of tube prior to rolling. This material is intended to "wick" into the area of the tube that is not rolled into the tube sheet, and prevent fluid from accumulating between the tube and the tube sheet.

DX COOLER TIGHTENING COOLER HEAD BOLTS (Fig. 60-62)

Gasket Preparation — When reassembling cooler heads, always use new gaskets. Gaskets are neoprene-based and are brushed with a light film of compressor oil. *Do not soak gasket or gasket deterioration will result*. Use new gaskets within 30 minutes to prevent deterioration. Reassemble cooler nozzle end or plain end cover of the cooler with the gaskets. Torque all cooler bolts to the following specification and sequence:

$^{5}/_{8}$-in. Diameter Perimeter Bolts (Grade 5). . . . 150 to 170 ft-lb (201 to 228 N-m)

$^{1}/_{2}$-in. Diameter Flange Bolts (Grade 5) . . . . . 70 to 90 ft-lb (94 to 121 N-m)

$^{1}/_{2}$-in. Diameter Center Stud (Grade 5). . . . . 70 to 90 ft-lb (94 to 121 N-m)

1. Install all bolts finger tight, except for the suction flange bolts. Installing these flanges will interfere with tightening the center stud nuts.
2. Bolt tightening sequence is outlined in Fig. 60-62. Follow the numbering or lettering sequence so that pressure is evenly applied to gasket.
3. Apply torque in one-third steps until required torque is reached. Load *all* bolts to each one-third step before proceeding to next one-third step.
4. No less than one hour later, retighten all bolts to required torque values.
5. After refrigerant is restored to system, check for refrigerant leaks using recommended industry practices.
6. Replace cooler insulation.

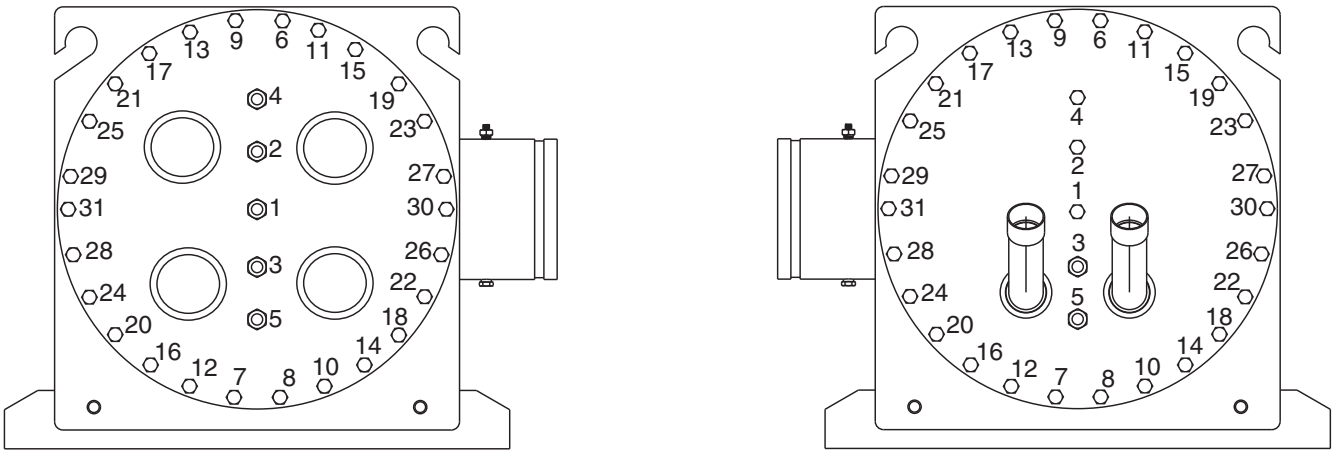


Fig. 60 — Bolt Tightening Sequence, 30XA142,162,182,202

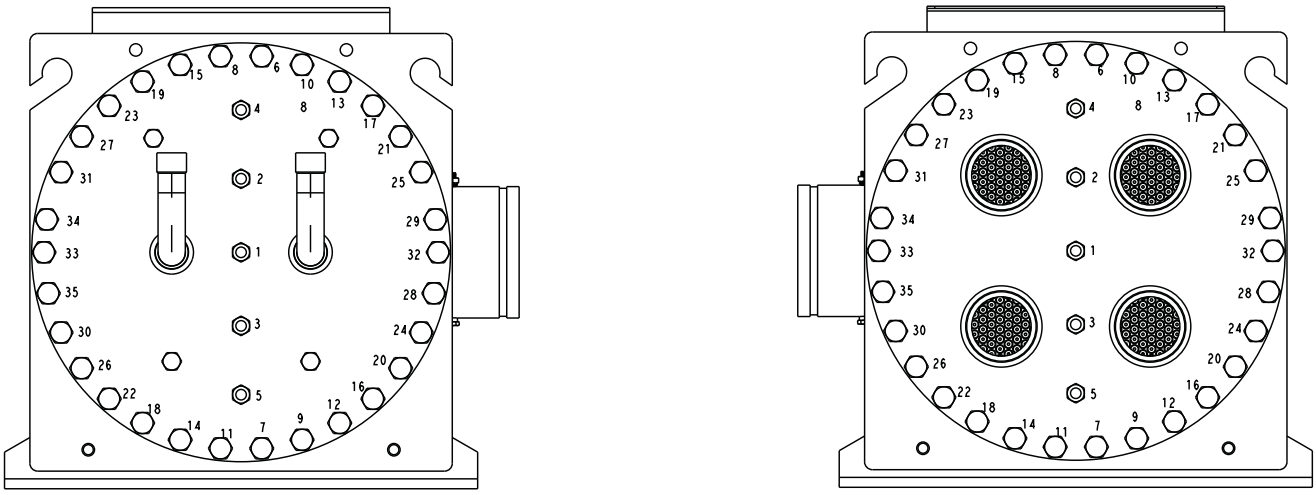


Fig. 61 — Bolt Tightening Sequence, 30XA222, 242, 262, 282

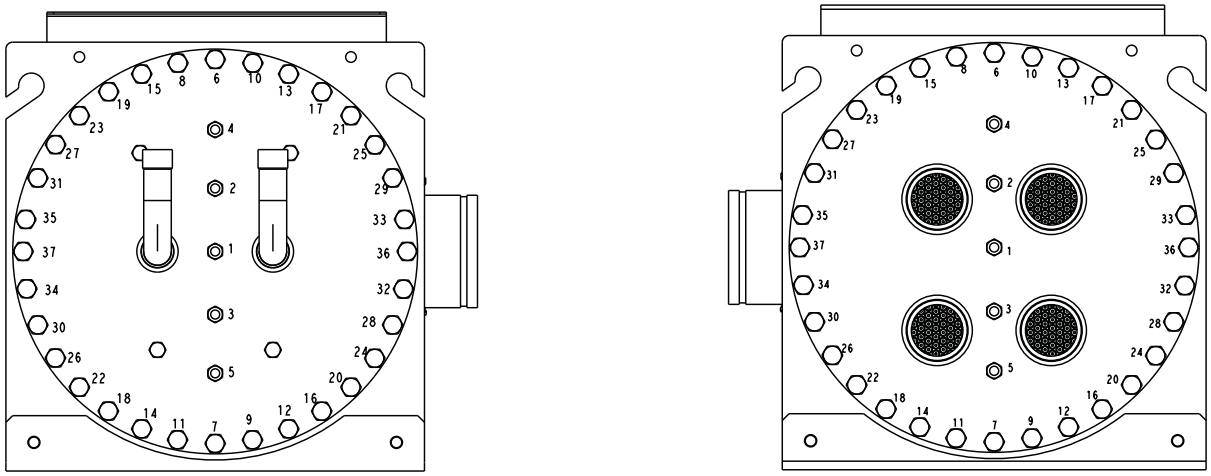


Fig. 62 — Bolt Tightening Sequence, 30XA302, 327, 352

DX COOLER CHILLED WATER FLOW SWITCH — A thermal-dispersion flow switch is factory-installed in the entering water nozzle for all machines. See Fig. 63 and 64. Figure 63 shows typical installation. If nuisance trips of the sensor are occurring, follow the steps below to correct:

1. Check to confirm that all strainers are clean, valves are open and pumps are running. For the case of variable frequency drive (VFD) controlled pumps, ensure the minimum speed setting has not been changed.
2. Measure the pressure drop across the cooler. Use the cooler pressure drop curves on page 49 to calculate the flow and compare this to system requirements. The pressure drop curves are for water only.

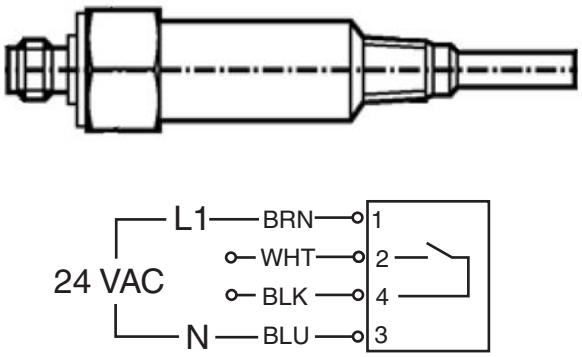


Fig. 63 — Chilled Water Flow Switch

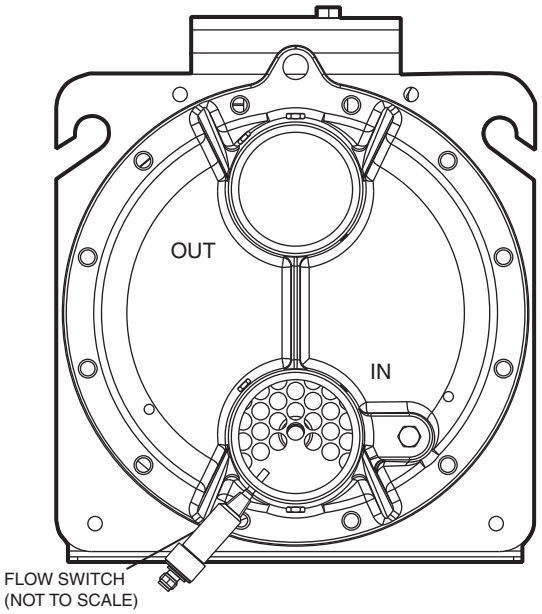


Fig. 64 — Flow Switch Location

Flooded and DX Cooler Units

FLOODED AND DX COOLER WATER TREATMENT — Untreated or improperly treated water may result in corrosion, scaling, erosion or algae. The services of a qualified water treatment specialist should be obtained to develop and monitor a treatment program.

⚠ CAUTION

Water must be within design flow limits, clean and treated to ensure proper machine performance and reduce the potential of tubing damage due to corrosion, scaling, and algae. Carrier assumes no responsibility for cooler damage resulting from untreated or improperly treated water.

PREPARATION FOR WINTER SHUTDOWN — If the unit is not operational during the winter months, at the end of cooling season complete the following steps.

⚠ CAUTION

Failure to remove power before draining heater equipped coolers and hydronic packages can result in heater tape and insulation damage.

Cooler to be drained for winter shutdown

1. Draining the fluid from the system is highly recommended. If cooler is drained, open the circuit breaker for the heater (CB-13) or shut off power during off-season shutdown. To prepare the system for winter shutdown, isolate the cooler from the rest of the system with water shutoff valves. Be sure to de-energize heaters (if installed) to prevent damage if the cooler is drained.
2. Remove the cooler drain plug. If the unit is equipped with a hydronic package, there are additional drains in the pump housing and strainer that must be opened to allow for all of the fluid to drain. Follow all local codes and regulations regarding the fluid disposal.
3. Once fully drained, replace the drain plug(s) and completely fill the cooler, and hydronic package if equipped, with suitable corrosion-inhibited antifreeze solution such as propylene glycol. The concentration should be adequate to provide freeze protection to 15° F (8.3° C) below the expected low ambient temperature conditions. Antifreeze can be added through the vent on top of the cooler head for flooded units or the vent on the top of the cooler shell for DX units. Cooler fluid volumes can be found in the Installation Instructions for the unit.
4. Leave the cooler filled with the antifreeze solution for the winter to provide corrosion protection during the off season. The cooler may be drained if desired. Follow all local codes and regulations regarding the fluid disposal.
5. At the beginning of the next cooling season, be sure that there is refrigerant pressure in each circuit before refilling cooler, add recommended inhibitor, and reset the circuit breaker for the heater (CB-13) if opened or restore power.

Cooler to remain filled for winter shutdown

1. If the cooler will not be drained, do not shut off power disconnect during off-season shutdown.
2. If the chilled water loop is not protected with a suitable corrosion-inhibited antifreeze solution such as propylene glycol, the unit must have cooler pump control. In the event of a power failure with sub-freezing temperatures, the unit will not have any cooler freeze protection and may be subject to damage.

⚠ CAUTION

Operation or winter shutdown with fresh water is not fail-safe should there be a loss of power to the chiller or to the circulating pump. Freeze damage due to power loss or disabling chiller pump control in fresh water systems will impair or otherwise negatively affect the warranty.

3. It is recommended that the loop be protected with a suitable corrosion-inhibited antifreeze solution such as propylene glycol. The concentration should be adequate to provide freeze protection to 15° F (8.3° C) below the expected low ambient temperature conditions. Cooler heaters will not protect the cooler from freeze-up in the event of power loss.

Microchannel Heat Exchanger (MCHX) Condenser Coil Maintenance and Cleaning Recommendations — Routine cleaning of coil surfaces is essential to maintain proper operation of the unit. Elimination of contamination and removal of harmful residues will greatly increase the life of the coil and extend the life of the unit. The following steps should be taken to clean MCHX condenser coils:

⚠ CAUTION

Do not apply any chemical cleaners to MCHX condenser coils. These cleaners can accelerate corrosion and damage the coil.

1. Remove any foreign objects or debris attached to the coil face or trapped within the mounting frame and brackets.
2. Put on personal protective equipment including safety glasses and/or face shield, waterproof clothing and gloves. Full coverage clothing is recommended.
3. Start high pressure water sprayer and purge any soap or industrial cleaners from sprayer before cleaning condenser coils. Only clean potable water is authorized for cleaning condenser coils.
4. Clean condenser face by spraying the coil steady and uniformly from top to bottom while directing the spray straight toward the coil. Do not exceed 900 psig (6205 kPa) or 30 degree angle. The nozzle must be at least 12 in. (304.8 mm) from the coil face. Reduce pressure and use caution to prevent damage to air centers.

⚠ CAUTION

Excessive water pressure will fracture the braze between air centers and refrigerant tubes.

RTPF (Round Tube Plate Fin) Condenser Coil Maintenance and Cleaning Recommendations — Routine cleaning of coil surfaces is essential to maintain proper operation of the unit. Elimination of contamination and removal of harmful residues will greatly increase the life of the coil and extend the life of the unit. The following maintenance and cleaning procedures are recommended as part of the routine maintenance activities to extend the life of the coil.

REMOVE SURFACE LOADED FIBERS — Surface loaded fibers or dirt should be removed with a vacuum cleaner. If a vacuum cleaner is not available, a soft non-metallic bristle brush may be used. In either case, the tool should be applied in the direction of the fins. Coil surfaces can be easily damaged (fin edges can be easily bent over and damage to the coating of a protected coil) if the tool is applied across the fins.

NOTE: Use of a water stream, such as a garden hose, against a surface loaded coil will drive the fibers and dirt into the coil. This will make cleaning efforts more difficult. Surface loaded fibers must be completely removed prior to using low velocity clean water rinse.

PERIODIC CLEAN WATER RINSE — A periodic clean water rinse is very beneficial for coils that are applied in coastal or industrial environments. However, it is very important that the water rinse is made with very low velocity water stream to avoid damaging the fin edges. Monthly cleaning as described below is recommended.

ROUTINE CLEANING OF RTPF COIL SURFACE — Routine cleaning with Totaline® environmentally balanced coil cleaner is essential to extend the life of coils. This cleaner is available from Carrier Replacement Parts division as part number P902-0301 for a one gallon container, and part number P902-0305 for a five gallon container. It is recommended that all coils, including the standard copper tube aluminum fin, precoated fin, copper fin, or e-coated coils be cleaned with the Totaline environmentally balanced coil cleaner as described below. Coil cleaning should be part of the unit's regularly scheduled maintenance procedures to ensure long life of the coil. Failure to clean the coils may result in reduced durability in the environment. Avoid the use of:

- coil brighteners
- acid cleaning prior to painting
- high pressure washers
- poor quality water for cleaning

Totaline environmentally balanced coil cleaner is non-flammable, hypoallergenic, nonbacterial, and a USDA accepted biodegradable agent that will not harm the coil or surrounding components such as electrical wiring, painted metal surfaces, or insulation. Use of non-recommended coil cleaners is strongly discouraged since coil and unit durability could be affected.

Totaline Environmentally Balanced Coil Cleaner Application Equipment

- $2^1/_2$ gallon garden sprayer
- Water rinse with low velocity spray nozzle

⚠ CAUTION

Harsh chemicals, household bleach or acid or basic cleaners should not be used to clean outdoor or indoor coils of any kind. These cleaners can be very difficult to rinse out of the coil and can accelerate corrosion at the fin/tube interface where dissimilar materials are in contact. If there is dirt below the surface of the coil, use the Totaline environmentally balanced coil cleaner as described above.

⚠ CAUTION

High velocity water from a pressure washer, garden hose, or compressed air should never be used to clean a coil. The force of the water or air jet will bend the fin edges and increase airside pressure drop. Reduced unit performance or nuisance unit shutdown may occur.

Totaline Environmentally Balanced Coil Cleaner Application Instructions

1. Proper eye protection such as safety glasses is recommended during mixing and application.
2. Remove all surface loaded fibers and dirt with a vacuum cleaner as described above.
3. Thoroughly wet finned surfaces with clean water and a low velocity garden hose, being careful not to bend fins.
4. Mix Totaline environmentally balanced coil cleaner in a $2^1/_2$ gallon garden sprayer according to the instructions

included with the cleaner. The optimum solution temperature is 100 F.

NOTE: Do NOT USE water in excess of 130 F (54.4 C), as the enzymatic activity will be destroyed.

5. Thoroughly apply Totaline environmentally balanced coil cleaner solution to all coil surfaces including finned area, tube sheets and coil headers.
6. Hold garden sprayer nozzle close to finned areas and apply cleaner with a vertical, up-and-down motion. Avoid spraying in horizontal pattern to minimize potential for fin damage.
7. Ensure cleaner thoroughly penetrates deep into finned areas.
8. Interior and exterior finned areas must be thoroughly cleaned.
9. Finned surfaces should remain wet with cleaning solution for 10 minutes.
10. Ensure surfaces are not allowed to dry before rinsing. Reapply cleaner as needed to ensure 10-minute saturation is achieved.
11. Thoroughly rinse all surfaces with low velocity clean water using downward rinsing motion of water spray nozzle. Protect fins from damage from the spray nozzle.

Condenser Fans — A formed metal mount bolted to the fan deck supports each fan and motor assembly. A shroud and a wire guard provide protection from the rotating fan. See Fig. 65. To remove the fan a special puller (RCD part no. 30RB680082) is required. The exposed end of the fan motor shaft is protected from weather by grease. If fan motor must be removed for service or replacement, be sure to regrease fan shaft and reinstall fan guard. The fan motor has a step in the motor shaft. For proper performance, fan should be positioned such that it is securely seated on this step. Loctite 680 should be applied to the shaft fan keyways during reassembly. Due to the high-strength nature of this product, it must be used *only in the keyways*. Applying it to the shaft and/or hub bore may result in parts that cannot be disassembled in the future. Tighten the bolt to 24 ft lb ± 2.0 (32.5 Nm ± 2.7 Nm).

Refrigerant Circuit

LEAK TESTING — Units are shipped with complete operating charge of refrigerant R-134a (see Physical Data tables supplied in the 30XA installation instructions) and should be under sufficient pressure to conduct a leak test. If there is no pressure in the system, introduce enough nitrogen to search for the leak. Repair the leak using good refrigeration practices. After leaks are repaired, system must be evacuated and dehydrated.

REFRIGERANT CHARGE — Refer to Physical Data tables supplied in the 30XA installation instructions. Immediately ahead of filter drier in each circuit is a factory-installed liquid line service valve. Each valve has a $^1/_4$-in. access connection for charging liquid refrigerant.

Charging with Unit Off and Evacuated — Close liquid line service valve before charging. Weigh in charge shown on unit nameplate. Open liquid line service valve; start unit and allow it to run several minutes fully loaded. Check for a clear sight glass. Be sure clear condition is liquid and not vapor.

Charging with Unit Running — If charge is to be added while unit is operating, all condenser fans and compressors must be operating. It may be necessary to block condenser coils at low ambient temperatures to raise condensing pressure to approximately 198 psig (1365 kPa) to turn all condenser fans on. Do not totally block a coil to do this. Partially block all coils in uniform pattern. Charge each circuit until sight glass shows clear liquid, and has a liquid line temperature of 103 F (39 C).

Add 3 to 5 lb (1.36 to 2.27 kg), depending on unit size and coil type, of liquid charge into the fitting located on the tube entering the cooler. This fitting is located between the electronic expansion valve (EXV) and the cooler.

Allow the system to stabilize and then recheck the liquid temperature. If needed, add additional liquid charge, 3 to 5 lb at a time, allowing the system to stabilize between each charge addition. Slowly add charge as the sight glass begins to clear to avoid overcharging.

> IMPORTANT: When adjusting refrigerant charge, circulate fluid through cooler continuously to prevent freezing and possible damage to the cooler. Do not overcharge, and never charge liquid into the low-pressure side of system.

Safety Devices — The 30XA chillers contain many safety devices and protection logic built into the electronic control. Following is a description of the major safeties.

COMPRESSOR PROTECTION

Motor Overload — The compressor VFD fuses and drive logic protect each compressor against overcurrent.

All compressors have factory-installed high-pressure switches. See Table 41. Each high-presssure switch is connected directly to its associated VFD. If the switch opens during operation, the compressor will be shut down. Manual reset of the high pressure switch and the control is required to restart the compressor. The VFD will restart automatically when the high pressure switch closes.

Table 41 — High-Pressure Switch Settings

UNIT	SWITCH SETTING	
	psig	kPa
30XA	304.5 ±7.25	2099 ±50

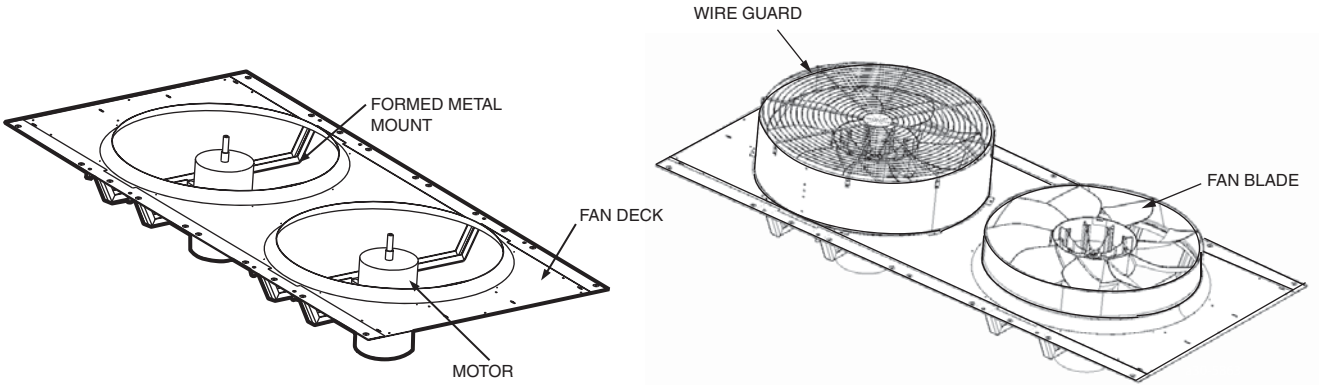


Fig. 65 — Fan Mounting

OIL SEPARATOR HEATERS — Each oil separator circuit has a heater mounted on the underside of the vessel. The heater is deenergized any time the compressor is on. If the compressor is off and outdoor-air temperature (OAT) is greater than 100 F (37.8 C) the heater is deenergized. The heater will also be deenergized if OAT – SST > 30 F (16.7 C) and the OAT – LWT > 30 F (16.7 C).

COOLER PROTECTION

Low Water Temperature — The controller is programmed to shut the chiller down if the leaving fluid temperature drops below 34 F (1.1 C) for water and below minimum fluid temperature configured (Main Menu → Configuration Menu → Service Parameters → Brine Minimum fluid temp) for Fluid Type other than water (Main Menu → Configuration Menu → Service Parameters → Cooler Fluid Type). When the fluid temperature rises 6° F (3.3° C) above the leaving fluid set point, the safety resets and the chiller restarts. Reset is automatic as long as this is the first occurrence of the day.

IMPORTANT: If unit is installed in an area where ambient temperatures fall below 32 F (0° C), a suitable corrosion-inhibited antifreeze solution or cooler heater must be used in the chilled water circuit.

Relief Devices — Fusible plugs are located in each circuit between the condenser and the liquid line shutoff valve.

PRESSURE RELIEF VALVES — Valves are installed in each circuit and are located on the coolers and oil separators. These valves are designed to relieve if an abnormal pressure condition arises. Relief valves on all coolers relieve at 220 psig (1517 kPa). Relief valves on oil separators relieve at 350 psig (2413 kPa). These valves should not be capped. If a valve relieves, it should be replaced. If the valve is not replaced, it may relieve at a lower pressure, or leak due to trapped dirt from the system which may prevent resealing. See Table 42. Some local building codes require that relieved gases be exhausted to a specific location. This connection allows conformance to this requirement.

Table 42 — Relief Valve Connection Specifications

LOCATION	CONNECTION SIZES
Oil Separator	3/8 SAE Flare
DX Cooler Option	5/8 SAE Flare
Flooded Cooler Option	3/4 in. NPT Female

Inspection and Maintenance — The relief valves on this chiller protect the system against the potentially dangerous effects of overpressure. To ensure against damage to the equipment and possible injury to personnel, these devices must be kept in peak operating condition. As a minimum, the following maintenance is required:

1. At least once a year, disconnect the vent piping at the valve outlet if equipped. Inspect the vent piping for corrosion, a restriction or blockage. If any is found, clean or replace the affected vent piping.
2. Carefully inspect the valve body and mechanism for any evidence of internal corrosion or rust, dirt, scale, leakage, etc. If corrosion or foreign material is found, do not attempt to repair or recondition; replace the valve.
3. If the chiller is installed in a corrosive atmosphere or the relief valves are vented into a corrosive atmosphere, inspect relief valves and piping at more frequent intervals.

Variable Frequency Drives (VFDs) — The 30XA units with Greenspeed® intelligence are equipped with variable frequency drives (VFDs) to control the compressors and condenser fans. The Danfoss VLT* HVAC drives each include a user interface with LCD display. However, all necessary functions and statuses can be accessed from within the Touch Pilot™ menus. The VFDs are configured through the Touch Pilot controls, and parameters should not be changed manually.

COMPRESSOR DRIVES — Each unit is equipped with two VFDs to control the compressor operation, one for each circuit. The VFDs work together with the slide valves to optimize efficient operation. The VFDs vary the operating speed of the compressors by changing the input power frequency between 27.5 Hz and 60 Hz. The compressor VFDs should not be operated below 27.5 Hz, to ensure adequate oil return on the unit. When looking at the end of the unit, the Ckt A drive is on the right and the Ckt B drive is on the left.

The VFDs for the TT and TU size compressors are equipped with an aluminum enclosure to protect the drive from outdoor conditions (the drives for the TS size compressors do not require an additional enclosure). The cover must be removed to access the display module or to service the drive. The cover is secured with 6 screws. See Fig. 66 for details on how to remove or reinstall the drive.

⚠ CAUTION

If the compressor VFD enclosure is removed for service it MUST be reinstalled to protect the drive from water intrusion. If the cover is not properly installed the VFD will not be covered under warranty.

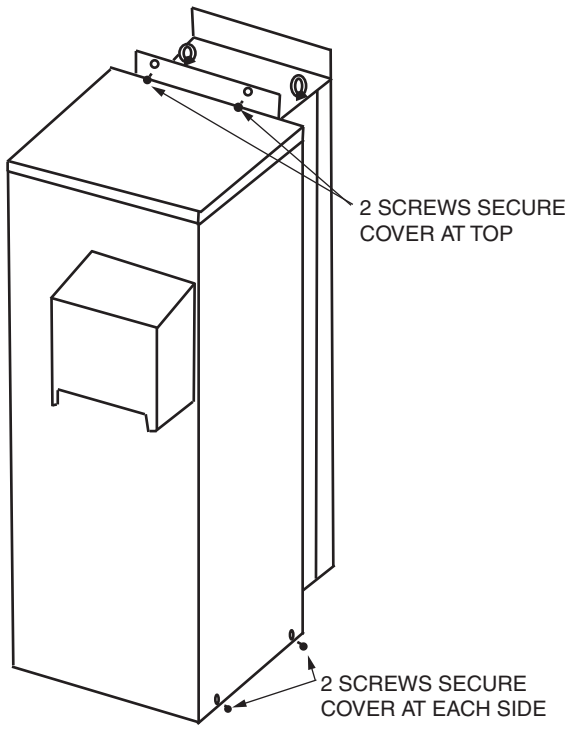
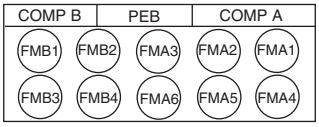


Fig. 66 — Compressor VFD Cover Attachment

CONDENSER FAN DRIVES — The condenser fans on each circuit are controlled by one or two VFDs. The fans on each circuit all operate together at the same frequency, ranging from 5 to 60 Hz. Table 43 shows which condenser fans are controlled by each drive. When looking at the end of the unit, the Ckt A fan drive 1 is on the left, Ckt A fan drive 2 (if equipped) is in the center, and the Ckt B fan drive 1 is on the right.

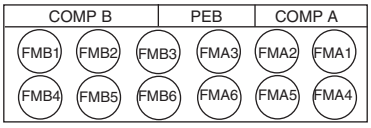
*Registered trademark of Danfoss Group Global.

Table 43 — Condenser Fan Drive Arrangement



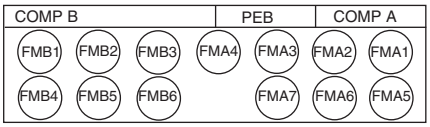
30XA140-162

CIRCUIT											
30XA140-162 (ALL VOLTAGES)											
A	VFD Designation	A1									
	Fan position	FMA1	FMA2	FMA3	FMA4	FMA5	FMA6				
B	VFD Designation	B1									
	Fan position	FMB1	FMB2	FMB3	FMB4						



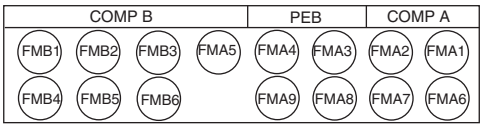
30XA180-202

CIRCUIT											
30XA180-202 (ALL VOLTAGES)											
A	VFD Designation	A1									
	Fan position	FMA1	FMA2	FMA3	FMA4	FMA5	FMA6				
B	VFD Designation	B1									
	Fan position	FMB1	FMB2	FMB3	FMB4	FMB5	FMB6				



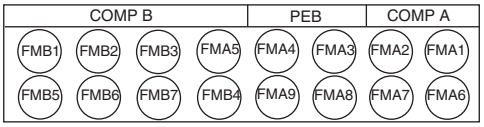
30XA220-242

CIRCUIT											
30XA220-242 (ALL VOLTAGES)											
A	VFD Designation	A1									
	Fan position	FMA1	FMA2	FMA3	FMA4	FMA5	FMA6	FMA7			
B	VFD Designation	B1									
	Fan position	FMB1	FMB2	FMB3	FMB4	FMB5	FMB6				



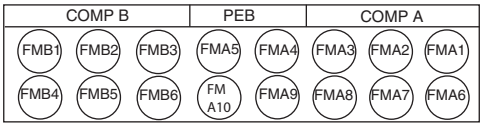
30XA260,262

CIRCUIT											
30XA 260,262 (380V/575V))											
A	VFD Designation	A1					A2				
	Fan position	FMA3	FMA4	FMA5	FMA8	FMA9	FMA1	FMA2	FMA6	FMA7	
B	VFD Designation	B1									
	Fan position	FMB1	FMB2	FMB3	FMB4	FMB5	FMB6				
30XA 260,262 (460V))											
A	VFD Designation	A1									
	Fan position	FMA1	FMA2	FMA3	FMA4	FMA5	FMA6	FMA7	FMA8	FMA9	
B	VFD Designation	B1									
	Fan position	FMB1	FMB2	FMB3	FMB4	FMB5	FMB6				



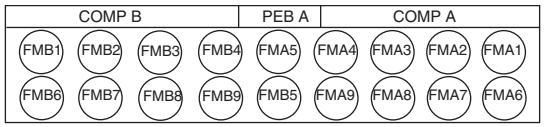
30XA280,282

CIRCUIT											
30XA 280,282 (380V/575V)											
A	VFD Designation	A1					A2				
	Fan position	FMA3	FMA4	FMA5	FMA8	FMA9	FMA1	FMA2	FMA6	FMA7	
B	VFD Designation	B1									
	Fan position	FMB1	FMB2	FMB3	FMB4	FMB5	FMB6	B7			
30XA 280,282 (460V)											
A	VFD Designation	A1									
	Fan position	FMA1	FMA2	FMA3	FMA4	FMA5	FMA6	FMA7	FMA8	FMA9	
B	VFD Designation	B1									
	Fan position	FMB1	FMB2	FMB3	FMB4	FMB5	FMB6	B7			



30XA300,302

CIRCUIT											
30XA300,302 (ALL VOLTAGES)											
A	VFD Designation	A1						A2			
	Fan position	FMA3	FMA4	FMA5	FMA8	FMA9	FMA10	FMA1	FMA2	FMA6	FMA7
B	VFD Designation	B1									
	Fan position	FMB1	FMB2	FMB3	FMB4	FMB5	FMB6				



30XA325-352

CIRCUIT											
30XA325-352 (380V/575V)											
A	VFD Designation	A1					A2				
	Fan position	FMA3	FMA4	FMA5	FMA8	FMA9	FMA1	FMA2	FMA6	FMA7	
B	VFD Designation	B1					B2				
	Fan position	FMB3	FMB4	FMB5	FMB8	FMB9	FMB1	FMB2	FMB7	FMB7	
30XA325-352 (460V)											
A	VFD Designation	A1									
	Fan position	FMA1	FMA2	FMA3	FMA4	FMA5	FMA6	FMA7	FMA8	FMA9	
B	VFD Designation	B1									
	Fan position	FMB1	FMB2	FMB3	FMB4	FMB5	FMB6	FMB7	FMB8	FMB9	

LEGEND

COMP — Compressor
FM — Fan Motor
PEB — Power Electrical Box

VFD DISPLAY NAVIGATION

IMPORTANT: The VFDs are configured through the Touch Pilot controls, and parameters should not be changed manually. This section is included for information and troubleshooting purposes only.

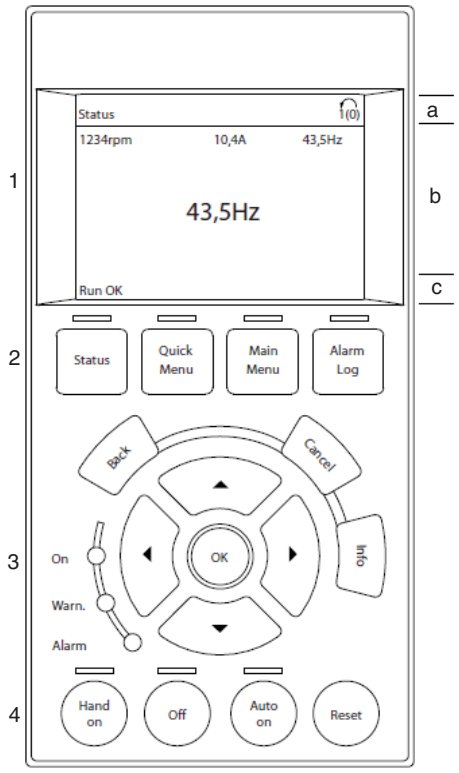
NOTE: The following instructions apply to the Danfoss VLT variable frequency drive (VFD).

The VFD can be operated in 2 ways:
- Graphical Local Control Panel (GLCP)
- RS-485 serial communication for PC connection

Graphical Local Control Panel (GLCP) — The LCD display is divided into 4 functional groups:

1. Graphical display with Status lines
2. Menu keys and indicator lights (LEDs) — selecting mode, changing parameters and switching between display functions
3. Navigation keys and indicator lights (LEDs)
4. Operation keys and indicator lights (LEDs)

See Fig. 67.



LEGEND

1 — Graphical display with status lines
2 — Menu keys and indicator lights
3 — Navigation keys and indicator lights
4 — Operation keys and indicator lights
a — Status line
b — Operator data lines
c — Status messages

Fig. 67 — VFD Graphical Local Control Panel

The display is backlit with a total of 6 alpha-numeric lines. All data is displayed on the GLCP, which can show up to 5 operating variables while in Status mode.

The display lines (see items a-c in Fig. 67) function as follows:

a. The Status line at the top of the display shows VFD status when in [Status] mode or up to 2 variables when not in [Status] mode, or in case of an alarm or warning (alert).

b. The operator data line in the middle section shows up to 5 variables with their related units, regardless of status. In the case of an alarm or warning, the warning is shown instead of the variables.

c. The status line in the bottom section always shows the state of the VFD in Status mode.

The operator can toggle among 3 status read-out screens by pressing the Status key. Several values or measurements can be linked to each of the displayed operating variables. The values/measurements to be displayed can be defined via 0-20 Display Line 1.1 Small, 0-21 Display Line 1.2 Small, 0-22 Display Line 1.3 Small, 0-23 Display Line 2 Large and 0-24 Display Line 3 Large. The settings are accessed by selecting QUICK MENU → Q3 Function Setups → Q3-1 General Settings → Q3-13 Display Settings. Each value/measurement readout parameter selected in 0-20 Display Line 1.1 Small to 0-24 Display Line 3 Large has its own scale and number of digits after a possible decimal point. Larger numeric values are displayed with fewer digits after the decimal point. For example, a current readout might be 5.25 A,15.2 A, or 105 A.

Status Display I is standard after start-up or initialization. Press [INFO] to obtain information about the value/measurement linked to the displayed operating variables 1.1, 1.2, 1.3, 2, and 3). See the operating variables shown in the display in Fig. 68. Variables 1.1, 1.2, and 1.3 are shown in small size. Variables 2 and 3 are shown in medium size.

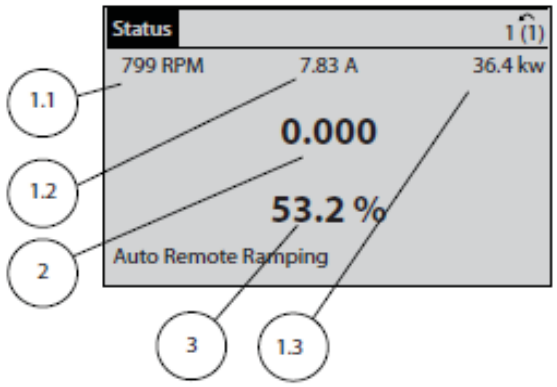


Fig. 68 — Status Display I

Status Display II shows the operating variables 1.1, 1.2, 1.3 and 2. In the example shown in Fig. 69, Speed, Motor Current, Motor Power, and Frequency are selected as variables in the first and second lines. Variables 1.1, 1.2, and 1.3 are shown in small size. Variable 2 is shown in large size.

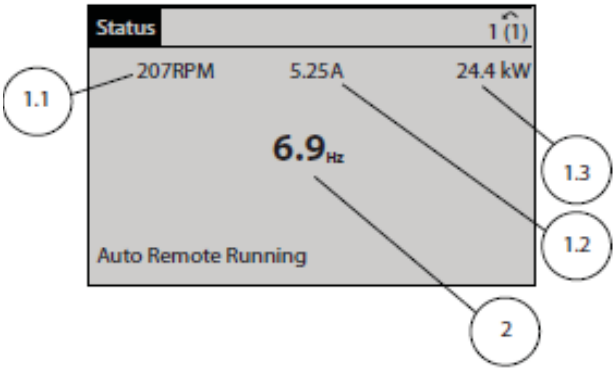


Fig. 69 — Status Display II

Status Display III shows events and actions of the Smart Logic Control. Fig. 70 shows an example.

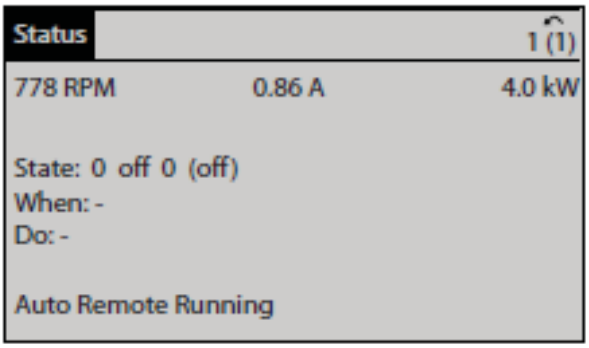


Fig. 70 — Status Display III

The operator can adjust the display brightness by pressing Status and ▲ to darken the display or ▼ to lighten it.

Indicator lights (LEDs) indicate whether the unit is on and warning or alarm conditions:

- Green LED (On): Control section is working. The On LED is activated when the VFD receives power from mains voltage, a DC bus terminal, or an external 24 V supply. At the same time, the back light is on.
- Yellow LED (Warn.): Indicates a warning.
- Flashing Red LED (Alarm): Indicates an alarm.

The warning and/or alarm LEDs light up if certain threshold values are exceeded. A status message and alarm text also appear on the control panel. See Fig. 71.

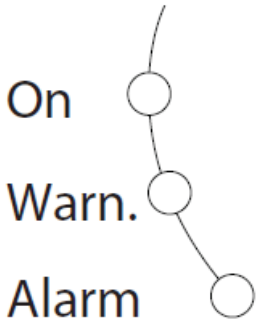


Fig. 71 — Indicator Lights

The menu keys below the display and indicator lights include Status, Quick Menu, Main Menu, and Alarm Log. The Status menu indicates the status of the frequncy converter and/or the motor. Three display modes are available (see Fig. 68-70). Use the Status key for selecting mode of display or for changing back to display mode from the Quick Menu Mode, the Main Menu Mode, or the Alarm Log mode. The operator can also use the Status key to toggle bewteen single or double read-out mode.

The Quick Menu key allows quick set-up of the frequency converter. The most common HVAC functions can be programmed here. Menu options include:

- My Personal Menu
- Quick Set-up
- Function Set-up
- Changes Made
- Loggings

The Function Set-up option provides quick and easy access to all parameters required for most HVAC applications including most variable and constant air volume supply and return fans, cooling tower fans, primary, secondary and condenser water pumps, and other pump, fan and compressor applications. Among other features it also includes parameters for selecting which variables to display on the local control panel, digital preset speeds, scaling of analog references, closed loop single-zone and multi-zone applications, and specific functions related to fans, pumps and compressors.

The Quick Menu parameters can be accessed immediately unless a password has been created via 0-60 Main Menu Password, 0-61 Access to Main Menu w/o Password, 0-65 Personal Menu Password, or 0-66 Access to Personal Menu w/o Password. It is possible to switch directly between Quick Menu mode and Main Menu mode.

The Main Menu key is used for programming all parameters. These can be accessed immediately unless a password has been created via 0-60 Main Menu Password, 0-61 Access to Main Menu w/o Password, 0-65 Personal Menu Password, or 0-66 Access to Personal Menu w/o Password. For most HVAC applications it is not necessary to access the Main Menu parameters but instead use the Quick Menu. Quick Set-up and Function Set-up provides the simplest and quickest access to the typical required parameters.

It is possible to switch directly between Main Menu mode and Quick Menu mode. The parameter shortcut can be carried out by pressing the Main Menu key for 3 seconds. The parameter shortcut allows direct access to any parameter.

Press Alarm Log to display a list of the 10 latest alarms (numbered A1-A10). To obtain additional details about an alarm, press the navigation keys to reach the alarm number and press OK. Information is displayed about the condition of the frequency converter before it enters the alarm mode. The Alarm Log key also provides access to a Maintenence log.

At the middle part of the local control panel, the Back key reverts to the previous step or layer in the navigation structure. The Cancel key cancels the last change or command as long as the display has not changed. The Info Key displays information about a command, parameter, or function in any display window, providing detailed information when needed. The four arrow keys are used among menu options by moving the cursor in the direction indicated. Press OK to select a parameter marked by the cursor or to enable a parameter change.

Operation keys for local control are found at the bottom of the control panel (see Fig. 67). Hand On enables control of the frequency converter via the local control panel. Hand On also starts the motor, and it is possible to enter the motor speed data by means of the navigation keys. The key can be selected as [1] Enable or [0] Disable via 0-40 Hand On Key on the local control panel. The following control signals are still active when Hand On is activated:

- Hand On - Off - Auto On
- Reset
- Coasting stop inverse
- Reversing
- Set-up select lsb - Set-up select msb
- Stop command from serial communication
- Quick stop
- DC brake

NOTE: External stop signals activated by means of control signals or a serial bus override a start command via the local control panel.

The Off key stops the connected motor. If no external stop function is selected and Off key is inactive, the motor can only be stopped by disconnecting the mains supply.

Auto On enables the frequency converter to be controlled via the control terminals and/or serial communication. When a start signal is applied on the control terminals and/or the bus, the frequency converter starts.

NOTE: An active HAND-OFF-AUTO signal via digital inputs has higher priority than the local control keys Hand On –Auto On.

The Reset key resets the frequency converter after an alarm (trip).

RS-485 Serial Bus Connection — One or more frequency converters can be connected to a controller (or master) using the RS-485 standard interface. Terminal 68 is connected to the P signal (TX+, RX+), while Terminal 69 is connected to the N signal (TX-,RX-). If more than one frequency converter is connected to a master, use parallel connections. See Fig. 72 for an example.

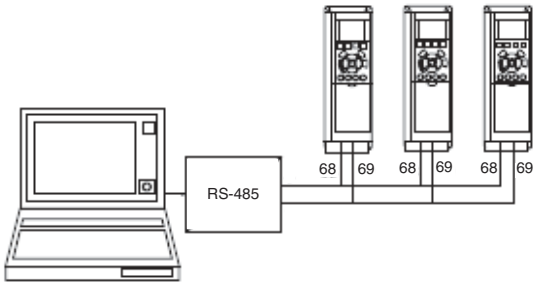


Fig. 72 — RS-485 Connection Example

To avoid potential equalizing currents in the screen, ground the cable screen via terminal 61, which is connected to the frame via an RC-link. The RS-485 bus must be terminated by a resistor network at both ends. If the frequency converter is the first or the last device in the RS-485 loop, set the switch S801 on the control card for ON.

VFD STATUS — The current operating status and conditions of the VFDs can be viewed with the Touch Pilot™ controls.

Compressor VFD Status — To view the operating status of the compressor VFDs, follow the Touch Pilot path: Main Menu → Maintenance Menu → VLT Drive Maintenance. This menu shows current operating conditions for both drives: Drive Power, Amps, Voltage, Speed, Frequency, Torque, DC Link Voltage, Heat Sink Temperature, Control Card Temperature, Heater Status, and Communication Status.

Fan VFD Status — To view the operating status of the fan VFDs, follow the Touch Pilot path: Main Menu → Maintenance Menu → Fan Drive Maintenance. This menu shows current operating conditions for both drives: Drive Power, Amps, Voltage, Speed, Frequency, Torque, DC Link Voltage, Heat Sink Temperature and Control Card Temperature.

VFD CONFIGURATION TABLES — The configuration parameters for the VFDs are stored in the control system and are automatically sent to the drives when addressed. The parameters should not need to be changed, but are included as a reference for verification and troubleshooting. See Table 44 for compressor usage. See Tables 45-48 for compressor and fan VFD parameters.

Table 44 — Compressor Usage

30XA UNIT SIZE	COMPRESSOR MODELS	
	CKT A	CKT B
140, 142	TT1	TS2
160, 162	TT2	TS3
180, 182	TT1	TT1
200, 202	TT2	TT2
220, 222	TT3	TT2
240, 242	TT3	TT3
260, 262	TU2	TT2
280, 282	TU2	TT3
300, 302	TU3	TT3
325, 327	TU2	TU2
350, 352	TU3	TU2

Table 45 — Compressor VFD Parameters for 380 V/60 Hz Units

PARAMETER NO.	DESCRIPTION	STATUS	COMPRESSOR (380 V/60 Hz)						
			TS2	TS3	TT1	TT2	TT3	TU2	TU3
0-40	Hand on button	Disabled	0	0	0	0	0	0	0
1-03	Torque profile	Voltage opt CT	2	2	2	2	2	2	2
1-20	Motor kW	Size dependent	70	84	120	134	156	215	243
1-22	Motor volts	Motor dependent	380	380	380	380	380	380	380
1-23	Motor Frequency	60 Hz	60	60	60	60	60	60	60
1-24	Motor Amperage	Size dependent	119	142	199	223	260	353	400
1-25	Motor rpm	Size dependent	3550	3550	3550	3540	3530	3540	3530
1-78	Starting frequency	25 Hz	25	25	25	25	25	25	25
1-79	Comp start max time to trip	5 seconds	5	5	5	5	5	5	5
1-80	Function at stop	Coast	0	0	0	0	0	0	0
3-02	Min reference	0	0	0	0	0	0	0	0
3-03	Max reference	60 Hz	60	60	60	60	60	60	60
3-13	Type reference	Remote	1	1	1	1	1	1	1
3-15	SRC reference #1	No function	0	0	0	0	0	0	0
3-16	SRC reference #2	No function	0	0	0	0	0	0	0
3-41	Ramp up	100 seconds	100	100	100	100	100	100	100
3-42	Ramp down	100 seconds	100	100	100	100	100	100	100
3-82	Starting ramp time	3 seconds	3	3	3	3	3	3	3
4-10	Motor speed direct	Clockwise	0	0	0	0	0	0	0
4-12	Motor speed low limit	27 Hz	27.5	27.5	27.5	27.5	27.5	27.5	27.5
4-14	Motor speed high limit	60 Hz	60	60	60	60	60	60	60
4-16	Torque limit	Size dependent	150	150	150	150	150	150	150
4-18	Current limit	Size dependent	110	110	110	110	110	110	110
5-12	DI #27	ZERO	8	0	0	0	0	0	0
5-19	DI #37 Safe stop	Safe stop alarm	1	1	1	1	1	1	1
5-40[0]	Relay 1	Control word bit 11	36	36	36	36	36	36	36
8-01	Control site	Control word only	2	2	2	2	2	2	2
8-02	Control source	FC port = RS485	1	1	1	1	1	1	1
8-03	Time out time	10 seconds	10	10	10	10	10	10	10
8-04	Time out function	Stop	2	2	2	2	2	2	2
14-01	Switching frequency	3 kHz	4	4	4	4	4	4	4
14-03	Overmodulation	No	0	0	0	0	0	0	0
14-10	Main failure	Alarm	6	6	6	6	6	6	6
14-11	Mains voltage at Mains fault	300 V	300	300	300	300	300	300	300
14-50	RFI filter	On	1	1	1	1	1	1	1
14-60	Function at overtemp	Derate	1	1	1	1	1	1	1
14-61	Inverter overload	Derate	1	1	1	1	1	1	1

Table 46 — Compressor VFD Parameters for 460 V/60 Hz Units

PARAMETER NO.	DESCRIPTION	STATUS	COMPRESSOR (460 V/60 Hz)						
			TS2	TS3	TT1	TT2	TT3	TU2	TU3
0-40	Hand on button	Disabled	0	0	0	0	0	0	0
1-03	Torque profile	Voltage opt CT	2	2	2	2	2	2	2
1-20	Motor kW	Size dependent	70	84	120	134	156	215	244
1-22	Motor volts	Motor dependent	460	460	460	460	460	460	460
1-23	Motor Frequency	60 Hz	60	60	60	60	60	60	60
1-24	Motor Amperage	Size dependent	98	117	166	187	217	293	332
1-25	Motor rpm	Size dependent	3550	3550	3550	3540	3530	3540	3530
1-78	Starting frequency	25 Hz	25	25	25	25	25	25	25
1-79	Comp start max time to trip	5 seconds	5	5	5	5	5	5	5
1-80	Function at stop	Coast	0	0	0	0	0	0	0
3-02	Min reference	0	0	0	0	0	0	0	0
3-03	Max reference	60 Hz	60	60	60	60	60	60	60
3-13	Type reference	Remote	1	1	1	1	1	1	1
3-15	SRC reference #1	No function	0	0	0	0	0	0	0
3-16	SRC reference #2	No function	0	0	0	0	0	0	0
3-41	Ramp up	100 seconds	100	100	100	100	100	100	100
3-42	Ramp down	100 seconds	100	100	100	100	100	100	100
3-82	Starting ramp time	3 seconds	3	3	3	3	3	3	3
4-10	Motor speed direct	Clockwise	0	0	0	0	0	0	0
4-12	Motor speed low limit	27 Hz	27.5	27.5	27.5	27.5	27.5	27.5	27.5
4-14	Motor speed high limit	60 Hz	60	60	60	60	60	60	60
4-16	Torque limit	Size dependent	150	150	150	150	150	150	150
4-18	Current limit	Size dependent	110	110	110	110	110	110	110
5-12	DI #27	ZERO	0	0	0	0	0	0	0
5-19	DI #37 Safe stop	Safe stop alarm	1	1	1	1	1	1	1
5-40[0]	Relay 1	Control word bit 11	36	36	36	36	36	36	36
8-01	Control site	Control word only	2	2	2	2	2	2	2
8-02	Control source	FC port = RS485	1	1	1	1	1	1	1
8-03	Time out time	10 seconds	10	10	10	10	10	10	10
8-04	Time out function	Stop	2	2	2	2	2	2	2
14-01	Switching frequency	3 kHz	4	4	4	4	4	4	4
14-03	Overmodulation	No	0	0	0	0	0	0	0
14-10	Main failure	Alarm	6	6	6	6	6	6	6
14-11	Mains voltage at Mains fault	345 V	345	345	345	345	345	345	345
14-50	RFI filter	On	1	1	1	1	1	1	1
14-60	Function at overtemp	Derate	1	1	1	1	1	1	1
14-61	Inverter overload	Derate	1	1	1	1	1	1	1

Table 47 — Compressor VFD Parameters for 575 V/60 Hz Units

PARAMETER NO.	DESCRIPTION	STATUS	COMPRESSOR (575 V/60 Hz)						
			TS2	TS3	TT1	TT2	TT3	TU2	TU3
0-40	Hand on button	Disabled	0	0	0	0	0	0	0
1-03	Torque profile	Voltage opt CT	2	2	2	2	2	2	2
1-20	Motor kW	Size dependent	70	84	120	134	156	215	244
1-22	Motor volts	Motor dependent	575	575	575	575	575	575	575
1-23	Motor Frequency	60 Hz	60	60	60	60	60	60	60
1-24	Motor Amperage	Size dependent	78	94	120	139	166	226	269
1-25	Motor rpm	Size dependent	3550	3550	3550	3540	3530	3540	3530
1-78	Starting frequency	25 Hz	25	25	25	25	25	25	25
1-79	Comp start max time to trip	5 seconds	5	5	5	5	5	5	5
1-80	Function at stop	Coast	0	0	0	0	0	0	0
3-02	Min reference	0	0	0	0	0	0	0	0
3-03	Max reference	60 Hz	60	60	60	60	60	60	60
3-13	Type reference	Remote	1	1	1	1	1	1	1
3-15	SRC reference #1	No function	0	0	0	0	0	0	0
3-16	SRC reference #2	No function	0	0	0	0	0	0	0
3-41	Ramp up	100 seconds	100	100	100	100	100	100	100
3-42	Ramp down	100 seconds	100	100	100	100	100	100	100
3-82	Starting ramp time	3 seconds	3	3	3	3	3	3	3
4-10	Motor speed direct	Clockwise	0	0	0	0	0	0	0
4-12	Motor speed low limit	27 Hz	27.5	27.5	27.5	27.5	27.5	27.5	27.5
4-14	Motor speed high limit	60 Hz	60	60	60	60	60	60	60
4-16	Torque limit	Size dependent	150	150	150	150	150	150	150
4-18	Current limit	Size dependent	110	110	110	110	110	110	110
5-12	DI #27	ZERO	0	0	0	0	0	0	0
5-19	DI #37 Safe stop	Safe stop alarm	1	1	1	1	1	1	1
5-40[0]	Relay 1	Control word bit 11	36	36	36	36	36	36	36
8-01	Control site	Control word only	2	2	2	2	2	2	2
8-02	Control source	FC port = RS485	1	1	1	1	1	1	1
8-03	Time out time	10 seconds	10	10	10	10	10	10	10
8-04	Time out function	Stop	2	2	2	2	2	2	2
14-01	Switching frequency	3 kHz	4	4	4	4	4	4	4
14-03	Overmodulation	No	0	0	0	0	0	0	0
14-10	Main failure	Alarm	6	6	6	6	6	6	6
14-11	Mains voltage at Mains fault	491 V	491	491	491	491	491	491	491
14-50	RFI filter	On	1	1	1	1	1	1	1
14-60	Function at overtemp	Derate	1	1	1	1	1	1	1
14-61	Inverter overload	Derate	1	1	1	1	1	1	1

Table 48 — Fan VFD Parameters

PARAMETER NO.	DESCRIPTION	ITEM	NUMBER OF FANS PER CIRCUIT (380v)					NUMBER OF FANS PER CIRCUIT (460v)					NUMBER OF FANS PER CIRCUIT (575v)				
			4	5	6	7	9	4	5	6	7	9	4	5	6	7	9
1-20	Motor kW	kW	10.4	13	15.6	18.2	23.4	10.4	13	15.6	18.2	23.4	10.4	13	15.6	18.2	23.4
1-22	Motor Volts	V	380	380	380	380	380	460	460	460	460	460	575	575	575	575	575
1-23	Motor Frequency	Hz	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
1-24	Motor Intensity	A	26	32.5	39	45.5	58.5	21.6	27	32.4	37.8	48.6	17.2	21.5	25.8	30.1	38.7
1-25	Motor rpm	RPM	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140	1140
1-73	Flying restart	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-80	Function at stop	Coast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-90	Motor Temp Protection	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-03	Max reference	Hz	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
3-13	Type reference	Hand/Auto	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-15	SRC ref #1	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-16	SRC ref #2	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-41	Ramp up	20 seconds	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
3-42	Ramp down	20 seconds	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
4-10	Motor speed direct	Clockwise	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-12	Motor speed low limit	5 Hz	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
4-14	Motor speed high limit	60 Hz	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
4-16	Torque limit	150%	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
4-18	Current limit	110%	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
5-12	DI #27	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8-01	Control site	Digital and Control Word	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8-02	Control source	FC port = RS485	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8-03	Control Timeout time	10 seconds	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
8-04	Control Timeout function	STOP	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
14-00	Pattern	60 AVM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-01	Switching frequency	kHz	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
24-90	Missing Motor		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
24-91			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-92			3.3260	4.0000	4.9890	6.0000	8.0000	3.0300	3.6000	4.5040	5.4000	7.2000	2.4740	3.0000	3.7110	4.5000	5.9000
24-93			–0.0058	–0.0069	–0.0087	–0.0104	–0.0139	–0.0270	–0.0323	–0.0404	–0.0485	–0.0647	–0.0175	–0.0210	–0.0262	–0.0315	–0.0419
24-94			7.7216	9.2660	11.5820	13.8990	18.5320	5.0040	6.0050	7.5060	9.0070	12.0090	5.1780	6.2100	7.7670	9.3203	12.4300
24-95	Locked Rotor		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
24-96			0.0431	0.0539	0.0647	0.0755	0.0970	0.0287	0.0360	0.0430	0.0500	0.0600	0.0287	0.0360	0.0430	0.0500	0.0650
24-97			1.2370	1.5460	1.8560	2.1650	2.7830	0.8926	1.1158	1.3389	1.5621	2.0084	0.8926	1.1158	1.3389	1.5621	2.0084
24-98			0.0701	0.0877	0.1052	0.1227	0.1578	0.0467	0.0580	0.0700	0.0800	0.1100	0.0467	0.0580	0.0700	0.0820	0.1050
24-99			28.635	31.290	33.953	36.610	41.930	25.240	27.050	28.860	30.670	34.290	22.240	27.050	28.860	30.670	34.290

VFD ALARM RESET — As long as communication is established between the Touch Pilot™ controls and the VFD, all alarms can be reset directly through the chiller control system.

VFD REPLACEMENT PROCEDURE — If required, VFDs can be replaced and programmed with the following procedures:

1. Disconnect power from unit. Wait a minimum of 20 minutes before continuing.

⚠ WARNING

After unit power is disconnected, wait at least 20 minutes for the VFD capacitors to discharge before opening drive. Failure to do so presents an electrical shock hazard and may result in personal injury.

2. Disconnect electrical power and communication connections from drive. For TT and TU compressor drives, remove the aluminum enclosure.
3. Unbolt and remove drive from support brackets, taking care to support drive at all times during the procedure. Larger drives are equipped with lifting lugs which must be used to support the load.

⚠ CAUTION

Use all proper rigging procedures and precautions when moving VFDs to avoid damage to the equipment.

4. Lift, position, and fasten replacement drive to support structure. Tighten all bolts securely.
5. Connect power, control, and high pressure switch wiring to drive. For wiring details for fan drives see Fig 73. Use the same knockout openings on new drive as on drive being replaced. For compressor drives, the high-pressure switch and heater wiring also need to be connected. See Fig. 74 for wiring details for TS compressor drives and Fig. 75 for TT and TU compressor drives. For compressor drives, remove the blank gland plate from the new drive and install the pre-punched gland plate from the drive being replaced. Torque connections are shown in Table 49.

IMPORTANT: Ensure high pressure switch (HPS) is connected to compressor VFD. Compressor will not run without HPS connected.

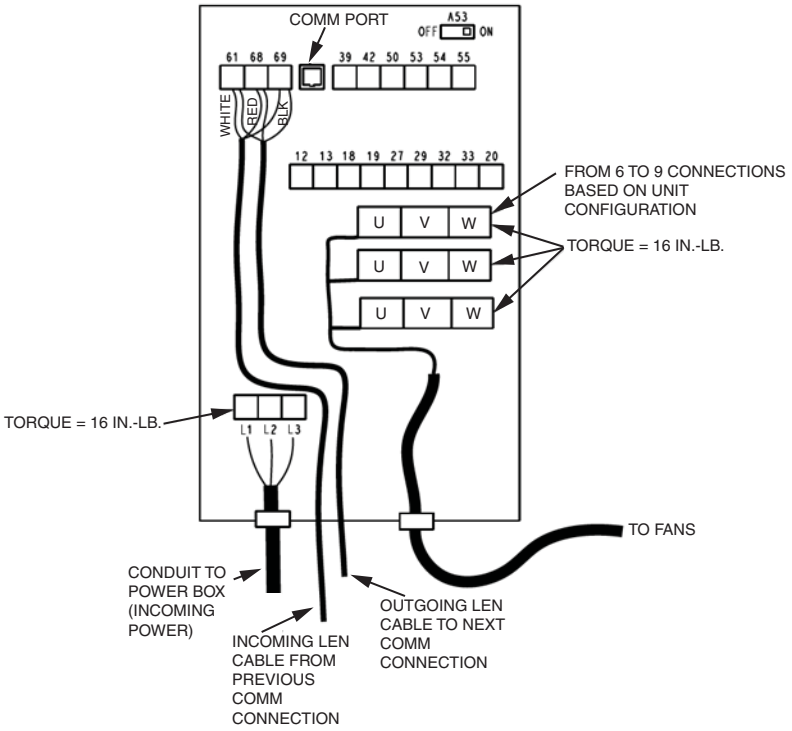


Fig. 73 — Fan Drive Wiring

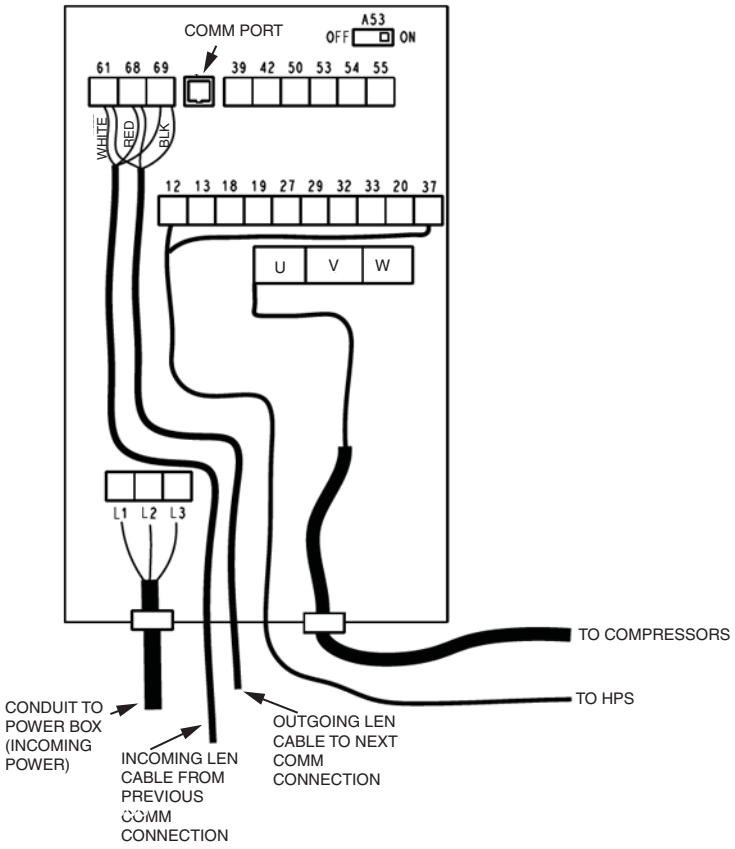


Fig. 74 — Compressor Drive Wiring, TS Compressors

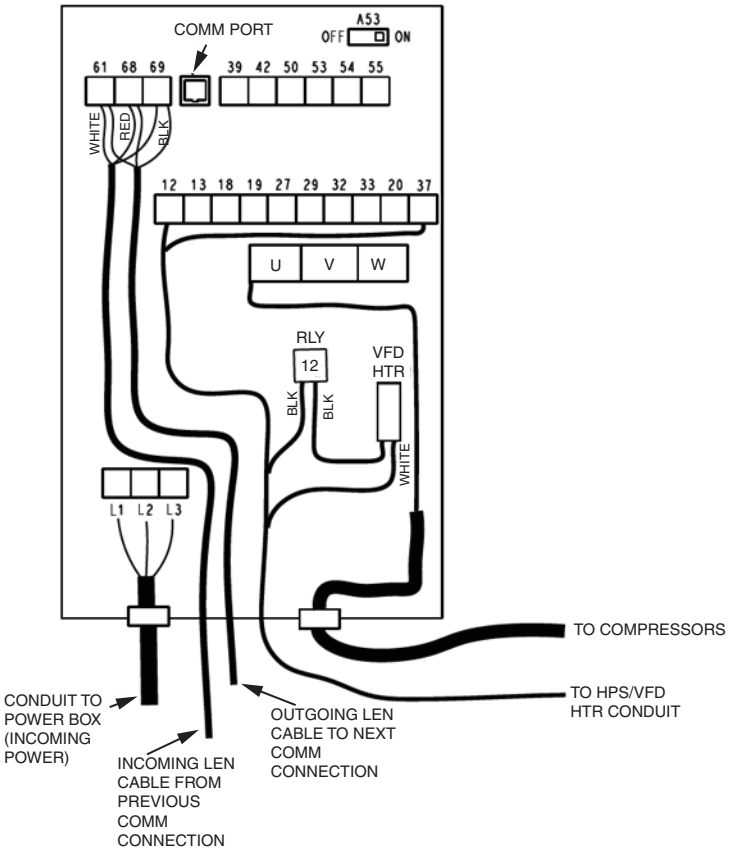


Fig. 75 — Compressor Drive Wiring, TU and TT Compressors

Table 49 — Power Connection Torque Values

COMPRESSOR DRIVES		
CARRIER PART NO.	LINE/MOTOR POWER (in.-lb)	GROUND (in.-lb)
HR46ZY001	89	27
HR46ZY002	89	27
HR46ZY003	124	27
HR46ZY004	124	27
HR46ZY005	168	75
HR46ZY006	168	75
HR46ZY007	168	75
HR46ZY008	168	75
HR46ZY009	168	75
HR46ZY010	168	75
HR46ZY011	168	75
HR46ZY012	168	75
HR46ZY013	168	75
FAN DRIVES		
HR46ZT002	16	27
HR46ZT003	16	27
HR46ZU002	16	27
HR46ZU003	16	27
HR46ZV001	22	27
HR46ZV002	22	27
HR46ZW001	22	27
HR46ZW002	22	27

6. Turn on power to the unit and allow the drive screen to become active. The drive will need to be manually addressed for the control system to export the correct parameters. Use this procedure to address the VFDs:
   a. Using the display interface on the VFD drive, press the Main Menu button twice. Navigate to menu item 8-30 and confirm that the LEN option is selected: Using the UP/DOWN arrows and OK button, follow the path: 8-** (Command Options) → 8-3* (FC Port Settings) → 8-30 (Protocol). If LEN is not selected, press the OK button and use the arrow keys to scroll through the options and select it. If no LEN option appears, LEN communication is not enabled on the drive. Follow the process below to enable LEN, and then complete the addressing procedure.
   b. Navigate to menu item 8-31 on the VFD display and enter the address for the drive being configured: Follow the path: 8-** (Command Options) → 8-3* (FC Port Settings) → 8-31 (Address). Press the OK button and use the UP/DOWN arrow keys to select the drive address. See Table 50 to determine the correct address. For fan drives, if 2 fan drives are present for a circuit, the A1 or B1 drive is closest to the power box on the center of the unit and the A2 or B2 drive is closer to the end of the unit. For compressor drives, the Ckt A Compressor Drive is on the RIGHT and the Ckt B Compressor Drive is on the LEFT.

Table 50 — VFD Drive Addresses

DRIVE	ADDRESS
Ckt A Compressor	181
Ckt B Compressor	182
Ckt A Fan Drive 1	184
Ckt A Fan Drive 2	185
Ckt B Fan Drive 1	187
Ckt B Fan Drive 2	188

   c. Turn the chiller power off and then on again. Cycling the power will cause the control system to send the correct configuration data files to the new drive.
   d. Verify that communication with the new drive has been established. For fan drives follow the Touch Pilot™ path: Main Menu → Maintenance Menu → Fan Drive Addressing and confirm that the relevant Comm Fan Drive Xn status is Yes. For compressor drives follow the path: Main Menu → Maintenance Menu → VLT Drive Maintenance and confirm that the relevant Comm with Drive X status is Yes.

Enable LEN Communication — If the replacement drive received does not have LEN as an option under menu item 8-30 on the VFD display, LEN will need to be manually enabled before the drive can be addressed. To enable the LEN communication option:

1. Enable access to the hidden Typecode Parameter by navigating to menu item 14-29 on the VFD display: press the Main Menu button and then follow the path 14-** (Special Functions) → 14-2* (Reset Functions) → 14-29 (Service Code). Set the 14-29 parameter to 00006100. Setting this parameter will enable access to hidden parameter 14-23 (Typecode Setting). Press OK.
2. Navigate to menu item 14-23: Press the BACK button and use the UP arrow to reach 14-23 (Typecode Setting). Press the OK button once. A cursor will appear on the value [00] just below the parameter number and name. Increase this value by pressing the UP key until the parameter has a value of [12] and the display shows "[nnn] SXXX {std. sw)." Press OK and use the UP/DOWN buttons to change the value to "[231] S009 {Special sw)." Press OK again. Press the UP button until the value is [20]. Press the OK button once, and change the displayed value to [1] (Save to EEPROM) using the arrow key. Press OK again.
3. The drive should display an alarm A251 New Type Code. Power down the drive by pressing the OFF button. Restart the drive with the AUTO ON button.
4. Proceed with the Addressing VFD instruction above to complete the configuration process.

LONG TERM STORAGE — If the unit is to be stored for long periods of time without use, special procedures must be performed to ensure the safe and efficient operation of the VFD capacitor banks. If the unit has been stored for more than 3 years without power applied to the drives, contact Danfoss directly to obtain information and instructions for reforming the capacitor banks.

MAINTENANCE

Recommended Maintenance Schedule — The following are only recommended guidelines. Jobsite conditions may dictate that maintenance tasks be performed more often than recommended.

Routine:

For machines with e-coat condenser coils:

- Check condenser coils for debris; clean as necessary with Carrier approved coil cleaner.
- Periodic clean water rinse, especially in coastal and industrial applications.

Every month (for all machines):

- Check condenser coils for debris; clean as necessary with Carrier approved coil cleaner.
- Check moisture indicating sight glass for possible refrigerant loss and presence of moisture.

Every 3 months (for all machines):

- Check refrigerant charge.
- Check all refrigerant joints and valves for refrigerant leaks; repair as necessary.
- Check chilled water flow switch operation.
- Check all condenser fans for proper operation.
- Check oil filter pressure drop.
- Check oil separator heater operation.
- Inspect pump seal, if equipped with a hydronic pump package.

For all machines:

- Check air filters located on the front panel of the TT and TU compressor VFD drives by opening the plastic grilles; replace clogged filters.
- Check the back of all the compressor and fan drives for any debris. If present clean it off by blowing air from top to bottom.

Every 12 months (for all machines):

- Check all electrical connections; tighten as necessary.
- Inspect all contactors and relays; replace as necessary.
- Check accuracy of thermistors; replace if greater than ±2° F (1.2° C) variance from calibrated thermometer.
- Check accuracy of transducers; replace if greater than ±5 psig (34.47 kPa) variance.
- Check to be sure that the proper concentration of antifreeze is present in the chilled water loop, if applicable.
- Verify that the chilled water loop is properly treated.
- Check refrigerant filter driers for excessive pressure drop; replace as necessary.
- Check chilled water strainers, clean as necessary.
- Check cooler heater operation.
- Check condition of condenser fan blades and that they are securely fastened to the motor shaft.
- Perform Service Test to confirm operation of all components.
- Check for excessive cooler approach (Leaving Chilled Water Temperature – Saturated Suction Temperature) which may indicate fouling. Clean cooler vessel if necessary.
- Obtain oil analysis; change as necessary.

TROUBLESHOOTING

Alarms and Alerts — The integral control system constantly monitors the unit and generates warnings when abnormal or fault conditions occur. Alarms may cause either a circuit (Alert) or the whole machine (Alarm) to shut down. Alarms and Alerts are assigned codes as described in Table 51.

To view information about current and past alarms or to reset alarms, press the Alarm bell button in the top right corner of the Touch Pilot™ display. A solid gray icon is present during normal operation. The bell icon is red if there is an alarm or alert. A blinking red bell icon indicates that there is an alarm, but the unit is still running. A solid red highlighted bell icon indicates that the unit is shut down due to a detected fault.

CURRENT ALARMS — To access the current alarms view, press the Alarm bell button in the top right corner of the Touch Pilot display, and then select Current Alarms. This screen displays up to 10 current alarms with the time and date as well as a one line description of each alarm. See Table 51 for a list of possible alarms sorted alphabetically by description.

RESETTING ALARMS — The alarms can be reset without stopping the machine. The controller generates two types of alarms. Automatic reset alarms will reset without any intervention if the condition that caused the alarm corrects itself. Manual reset alarms require the service technician to check for the alarm cause and reset the alarm.

To reset any active alarms, press the Alarm button and then press the Reset Alarms icon. For Alarm Reset on line 1 select Yes and select the Force lightening bolt button. When resetting the alarm manually, the reset can be performed through the Touch Pilot display or remotely through the web interface (Reset Alarms menu).

Only logged-in users can access the Reset Alarms menu. The menu displays up to five alarm codes which are currently active on the unit, corresponding to the first five items displayed in the Current Alarms menu. Each alarm is also described by a numeric code. See Tables 52 and 53 for lists of alarms by code.

In the event of a power supply interrupt, the unit restarts automatically without the need for an external command. However, any faults active when the supply is interrupted are saved and may in certain cases prevent a circuit or a unit from restarting.

Before resetting any alarm, first determine the cause of the alarm and correct it. Do not reset the chiller at random without first investigating and correcting the cause(s) of the failure.

ALARM HISTORY — Once the cause of the alarm has been identified and corrected, it will be displayed in the alarm history. Information regarding resolved alarms is stored in the Alarm history menu, which is divided into 50 recent alarms and 50 recent major alarms. General alarms indicate pumps failure, transducers faults, network connection problems, etc. Major alarms indicate process failure.

To access the Alarm history menu, press the Alarm button and select Alarm Historic or Major Alarm Historic. The 50 most recent alarms of each type are stored in memory, and are replaced on a first-in first-out basis.

Table 51 — Alarm Reference Lists

BY NAME

ALARM NAME	CODE
Circ A - High Condensing temperature out of map compressor	Alarm 10037
Circ A - High saturated temperature out of map compressor	Alarm 10101
Circ B - High Condensing temperature out of map compressor	Alarm 10038
Circ B - High saturated temperature out of map compressor	Alarm 10102
Circuit A Compressor Motor Thermistor	Alarm 15033
Circuit A Condenser Subcooling Liquid Pressure Transducer	Alarm 12031
Circuit A Condenser Subcooling Liquid Thermistor	Alarm 15018
Circuit A Discharge Gas Thermistor	Alarm 15015
Circuit A Discharge Transducer	Alarm 12001
Circuit A Economizer Gas Thermistor	Alarm 15024
Circuit A Economizer Pressure Transducer	Alarm 12013
Circuit A High Discharge Gas Temperature	Alarm 10078
Circuit A High Oil Filter Drop Pressure	Alarm 10084
Circuit A Low Oil Level	Alarm 10075
Circuit A Low Oil Pressure	Alarm 10067
Circuit A Low Suction Temperature	Alarm 10005
Circuit A Max Oil Filter Differential Pressure	Alarm 10070
Circuit A Oil Pressure Transducer	Alarm 12010
Circuit A Suction Gas Thermistor	Alarm 15012
Circuit A Suction Transducer	Alarm 12004
Circuit A Suction Valve closed	Alarm 10081
Circuit B Compressor Motor Thermistor	Alarm 15034
Circuit B Condenser Subcooling Liquid Pressure Transducer	Alarm 12032
Circuit B Condenser Subcooling Liquid Thermistor	Alarm 15019
Circuit B Discharge Gas Thermistor	Alarm 15016
Circuit B Discharge Transducer	Alarm 12002
Circuit B Economizer Gas Thermistor	Alarm 15025
Circuit B Economizer Pressure Transducer	Alarm 12014
Circuit B High Discharge Gas Temperature	Alarm 10079
Circuit B High Oil Filter Drop Pressure	Alarm 10085
Circuit B Low Oil Level	Alarm 10076
Circuit B Low Oil Pressure	Alarm 10068
Circuit B Low Suction Temperature	Alarm 10006
Circuit B Max Oil Filter Differential Pressure	Alarm 10071
Circuit B Oil Pressure Transducer	Alarm 12011
Circuit B Suction Gas Thermistor	Alarm 15013
Circuit B Suction Transducer	Alarm 12005
Circuit B Suction Valve closed	Alarm 10082
Compressor A High Pressure Switch protection	Alarm 1103
Compressor A Motor temperature too high	Alarm 1101
Compressor B High Pressure Switch protection	Alarm 2103
Compressor B Motor temperature too high	Alarm 2101
Compressor VFD Error, Circuit	Alarm 17nnn
Compressor VFD Error, Circuit A	Alarm 35nnn
Compressor VFD Error, Circuit B	Alarm 18nnn
Compressor VFD Error, Circuit B	Alarm 36nnn
Cooler Entering Fluid Thermistor	Alarm 15001
Cooler Flow Switch Failure	Alarm 10091
Cooler Flow Switch Setpoint Configuration Failure	Alarm 10090
Cooler Freeze Protection	Alarm 10001
Cooler Leaving Fluid Thermistor	Alarm 15002
Cooler Pump #1 fault	Alarm 10032
Cooler Pump #2 fault	Alarm 10033
Customer Interlock failure	Alarm 10014
Database module failure	Alarm 55001

Table 51 — Alarm Reference Lists (cont)

BY NAME (cont)

ALARM NAME	CODE
Fan A1 VFD Error, Circuit A	Alarm 20nnn
Fan A1 VFD Error, Circuit A	Alarm 38nnn
Fan A2 VFD Error, Circuit A	Alarm 21nnn
Fan A2 VFD Error, Circuit A	Alarm 39nnn
Fan B1 VFD Error, Circuit B	Alarm 23nnn
Fan B1 VFD Error, Circuit B	Alarm 41nnn
Fan B2 VFD Error, Circuit B	Alarm 24nnn
Fan B2 VFD Error, Circuit B	Alarm 42nnn
Illegal configuration	Alarm 7001
Lenscan module failure	Alarm 56001
Loss of Communication with Auxiliary # 1	Alarm 4501
Loss of Communication with Auxiliary # 2	Alarm 4502
Loss of Communication with Auxiliary # 3	Alarm 4503
Loss of communication with Energy Management NRCP2 Board	Alarm 4603
Loss of Communication with Fan Drive Board #4	Alarm 4704
Loss of Communication with Fan Drive Board #5	Alarm 4705
Loss of Communication with Fan Drive Board #7	Alarm 4707
Loss of Communication with Fan Drive Board #8	Alarm 4708
Loss of Communication with SIOB Board Number 1	Alarm 4901
Loss of Communication with SIOB Board Number 2	Alarm 4902
Loss of Communication with VLT Drive Board #1	Alarm 4701
Loss of Communication with VLT Drive Board #2	Alarm 4702
Master/Slave Alarms	Alarm 90nn
No Factory Configuration	Alarm 8000
OAT Thermistor Failure	Alarm 15010
Space Temperature Thermistor	Alarm 15021
Unit is in Emergency Stop	Alarm 10031
Water Exchanger Temperature Sensors Swap	Alarm 10097

Table 51 — Alarm Reference Lists (cont)

BY CODE

CODE	ALARM NAME
Alarm 10001	Cooler Freeze Protection
Alarm 10005	Circuit A Low Suction Temperature
Alarm 10006	Circuit B Low Suction Temperature
Alarm 10014	Customer Interlock failure
Alarm 10031	Unit is in Emergency Stop
Alarm 10032	Cooler Pump #1 fault
Alarm 10033	Cooler Pump #2 fault
Alarm 10037	Circ A - High Condensing temperature out of map compressor
Alarm 10038	Circ B - High Condensing temperature out of map compressor
Alarm 10067	Circuit A Low Oil Pressure
Alarm 10068	Circuit B Low Oil Pressure
Alarm 10070	Circuit A Max Oil Filter Differential Pressure
Alarm 10071	Circuit B Max Oil Filter Differential Pressure
Alarm 10075	Circuit A Low Oil Level
Alarm 10076	Circuit B Low Oil Level
Alarm 10078	Circuit A High Discharge Gas Temperature
Alarm 10079	Circuit B High Discharge Gas Temperature
Alarm 10081	Circuit A Suction Valve closed
Alarm 10082	Circuit B Suction Valve closed
Alarm 10084	Circuit A High Oil Filter Drop Pressure
Alarm 10085	Circuit B High Oil Filter Drop Pressure
Alarm 10090	Cooler Flow Switch Setpoint Configuration Failure
Alarm 10091	Cooler Flow Switch Failure
Alarm 10097	Water Exchanger Temperature Sensors Swap
Alarm 10101	Circ A - High saturated temperature out of map compressor
Alarm 10102	Circ B - High saturated temperature out of map compressor
Alarm 1101	Compressor A Motor temperature too high
Alarm 1103	Compressor A High Pressure Switch protection
Alarm 12001	Circuit A Discharge Transducer
Alarm 12002	Circuit B Discharge Transducer
Alarm 12004	Circuit A Suction Transducer
Alarm 12005	Circuit B Suction Transducer
Alarm 12010	Circuit A Oil Pressure Transducer
Alarm 12011	Circuit B Oil Pressure Transducer
Alarm 12013	Circuit A Economizer Pressure Transducer
Alarm 12014	Circuit B Economizer Pressure Transducer
Alarm 12031	Circuit A Condenser Subcooling Liquid Pressure Transducer
Alarm 12032	Circuit B Condenser Subcooling Liquid Pressure Transducer
Alarm 15001	Cooler Entering Fluid Thermistor
Alarm 15002	Cooler Leaving Fluid Thermistor
Alarm 15010	OAT Thermistor Failure
Alarm 15012	Circuit A Suction Gas Thermistor
Alarm 15013	Circuit B Suction Gas Thermistor
Alarm 15015	Circuit A Discharge Gas Thermistor
Alarm 15016	Circuit B Discharge Gas Thermistor
Alarm 15018	Circuit A Condenser Subcooling Liquid Thermistor
Alarm 15019	Circuit B Condenser Subcooling Liquid Thermistor
Alarm 15021	Space Temperature Thermistor
Alarm 15024	Circuit A Economizer Gas Thermistor
Alarm 15025	Circuit B Economizer Gas Thermistor
Alarm 15033	Circuit A Compressor Motor Thermistor
Alarm 15034	Circuit B Compressor Motor Thermistor
Alarm 17nnn	Compressor VFD Error, Circuit A
Alarm 18nnn	Compressor VFD Error, Circuit B
Alarm 20nnn	Fan A1 VFD Error, Circuit A
Alarm 2101	Compressor B Motor temperature too high
Alarm 2103	Compressor B High Pressure Switch protection

Table 51 — Alarm Reference Lists (cont)

BY CODE (cont)

CODE	ALARM NAME
Alarm 21nnn	Fan A2 VFD Error, Circuit A
Alarm 23nnn	Fan B1 VFD Error, Circuit B
Alarm 24nnn	Fan B2 VFD Error, Circuit B
Alarm 35nnn	Compressor VFD Error, Circuit A
Alarm 36nnn	Compressor VFD Error, Circuit B
Alarm 38nnn	Fan A1 VFD Error, Circuit A
Alarm 39nnn	Fan A2 VFD Error, Circuit A
Alarm 41nnn	Fan B1 VFD Error, Circuit B
Alarm 42nnn	Fan B2 VFD Error, Circuit B
Alarm 4501	Loss of Communication with Auxiliary # 1
Alarm 4502	Loss of Communication with Auxiliary # 2
Alarm 4503	Loss of Communication with Auxiliary # 3
Alarm 4603	Loss of communication with Energy Management NRCP2 Board
Alarm 4701	Loss of Communication with VLT Drive Board #1
Alarm 4702	Loss of Communication with VLT Drive Board #2
Alarm 4704	Loss of Communication with Fan Drive Board #4
Alarm 4705	Loss of Communication with Fan Drive Board #5
Alarm 4707	Loss of Communication with Fan Drive Board #7
Alarm 4708	Loss of Communication with Fan Drive Board #8
Alarm 4901	Loss of Communication with SIOB Board Number 1
Alarm 4902	Loss of Communication with SIOB Board Number 2
Alarm 55001	Database module failure
Alarm 56001	Lenscan module failure
Alarm 7001	Illegal configuration
Alarm 8000	No Factory Configuration
Alarm 90nn	Master/Slave Alarms

LEGEND

OAT — Outdoor Air Temperature
SIOB — Standard Input Output Board
VFD — Variable Frequency Drive

NOTE: For VFD alarms, “nnn” corresponds to the alarm code listed in Table 55.

Table 52 — Alarm Details by Code

ALARM CODE	ALARM NAME	CRITERIA FOR TRIP	ACTION TAKEN BY CONTROL	RESET METHOD	POSSIBLE CAUSES/CORRECTIVE ACTIONS
10001	Cooler Freeze Protection	Alarm will trip if the cooler entering or leaving water temperatures are below the Brine Freeze Setpoint	Unit will be shut down. The cooler pump shall continue to run until the alarm resets.	Automatic, if the cooler leaving fluid temperature is 6° F (3.3° C) above the Brine Freeze Setpoint OR Manual, if the alarm has occurred once in the previous 24 hours	If this condition is encountered, check the following items for faults: - entering and leaving fluid thermistors for accuracy - water flow rate - loop volume - low loop volume at nominal flow rates can in extreme cases bypass cold water to the cooler - freezing conditions - heater tape and other freeze protection items for proper operation - glycol concentration and adjust unit freeze point as necessary (Main Menu → Configuration Menu → Service Parameters → Line 1 Cooler Fluid Type and Line 5 Brine Freeze Setpoint) - if the Leaving Water Set Point is above 40 F (4.4 C) and there is glycol in the loop, consider using the Medium Temperature Brine option to utilize the brine freeze set-point instead of 34 F (1.1 C) for fresh water
10005	Circuit A Low Suction Temperature	Tested only when the circuit is ON. The alarm will trip if one of these conditions is met: 1.) If the circuit is running and SST < –22 F (–30 C) for more than 10 seconds 2.) If sst < –13 F (–25 C) for 30 seconds 3.) If SST < Brine Freeze Setpoint – 6 F for more than 10 minutes 4.) If SST < Brine Freeze Setpoint – 6 F, if capacity is =20%(minimum load), set a timer to 3 minutes, else set it to 90 seconds. At the end of timer, if capacity is at 20% (min_load) or if slide valve calculated position is at -100% for more than 2 minutes, set the alarm.	Circuit A shuts down	Automatic, first occurance in 24 hours OR Manual, if the alarm has occurred in the previous 24 hours	If this condition is encountered, check the following items for faults: - sensor wiring to SIOB board - board for faulty channel - faulty suction transducer - cooler water flow switch - loop volume - EXV operation / blocked - liquid line refrigerant restriction, filter drier, service valve, etc. - refrigerant charge - if the Leaving Water Set Point is above 40 F (4.4 C) and there is glycol in the loop, consider using the Medium Temperature Brine option to utilize the brine freeze set-point instead of 34 F (1.1 C) for fresh water (Main Menu → Configuration Menu → Service Parameters → Line 1 Cooler Fluid Type and Line 5 Brine Freeze Setpoint)
10006	Circuit B Low Suction Temperature		Circuit B shuts down		
10014	Customer Interlock Failure	Tested only if EMM option is configured. The alarm will trip if REM_LOCK is closed, and the unit is running	Unit shuts down	Automatic, first occurance in 24 hours OR Manual, if the alarm has occurred in the previous 24 hours	If this condition is encountered, check the following items for faults: - remote lockout switch is closed (Connection EMM-J4-CH10)
10031	Unit is in emergency stop	Tested when the unit is On and Off The alarm will trip when the CCN command for an Emergency Stop is sent across the network	Unit shuts down	Automatic after the CCN variable EMSTOP returns to normal. The unit shall be normally restarted.	If this condition is encountered, check the following items for faults: - CCN Emergency Stop command
10032	Cooler pump #1 fault	Tested only when the unit is On If the cooler flow switch is failed after the Off to On Delay period (m_delay = Yes) while the pump is commanded to be on then, the alarm shall be tripped.	The pump and the unit shall be stopped.	Manual	If this condition is encountered, check the following items for faults: - interlock wiring circuit - control signal to pump controller - cooler pump contactor for proper operation - conrol voltage for proper voltage - open chilled water flow switch
10033	Cooler pump #2 fault				

LEGEND

CCN — Carrier Comfort Network®
EMM — Energy Management Module
EWT — Entering Water Temperature
EXV — Electronic Expansion Valve
LEN — Local Equipment Network
LWT — Leaving Water Temperature
MOP — Maximum Operating Pressure
OAT — Outdoor Air Temperature
SIOB — Standard Input Output Board
SST — Saturated Suction Temperature
VFD — Variable Frequency Drive

Table 52 — Alarm Details by Code (cont)

ALARM CODE	ALARM NAME	CRITERIA FOR TRIP	ACTION TAKEN BY CONTROL	RESET METHOD	POSSIBLE CAUSES/CORRECTIVE ACTIONS
10037	Circ A - High Condensing temperature out of map compressor	The alarm shall trip if discharge pressure (DP_A) > 312 psi (2150 kPa)	Circuit A will be shut down immediately.	Manual	If this condition is encountered, check the following items for faults: - noncondensables in the refrigerant circuit - condenser air recirculation - proper refrigerant charge (undercharged) - EXV operation - operation beyond the limits of the machine - condenser coils for debris or restriction - condenser fans and motors for proper rotation and operation - the discharge service valves to be sure that they are open - check the discharge pressure transducer for accuracy - confirm unit configuration
10038	Circ B - High Condensing temperature out of map compressor	The alarm shall trip if discharge pressure (DP_B) > 312 psi (2150 kPa)	Circuit B will be shut down immediately.	Manual	
10067	Circuit A Low Oil Pressure	Tested only when the compressor is ON The alarm will trip if the compressor has been running for more than 60s and oil pressure is lower that the required level for more than than 15s OR The alarm will trip if the oil transducer out of range for 5s (see oil transducer alarms 12010 and 12011)	Circuit A will be shut down.	Manual	If this condition is encountered, check the following items for faults: - sensor wiring to SIOB board - board for faulty channel - faulty transducer - plugged oil filter - faulty oil solenoid valve coil - stuck oil solenoid valve - stuck check valve - confirm manual shut off valve is fully open - confirm unit configuration
10068	Circuit B Low Oil Pressure		Circuit B will be shut down.	Manual	
10070	Circuit A Max Oil Filter Differential Pressure	Tested when compressor is running: The alarm will trip if the discharge gas temperature is higher than 212 F (100 C) for more than 90s OR higher than 221 F (105 C) for any period of time	Circuit A will be shut down.	Manual	If this condition is encountered, check the following items for faults: - discharge and oil sensor wiring to SIOB board - boards for a faulty channel - faulty transducer - plugged oil filter - faulty oil solenoid valve - stuck oil solenoid valve - stuck check valve - confirm manual shut off valve is fully open
10071	Circuit B Max Oil Filter Differential Pressure		Circuit B will be shut down.	Manual	
10075	Circuit A Low Oil Level	When the compressor is running or off. The alarm will trip if the compressor is running and the oil level switch is opened for more than 45 seconds NOTE: When the units starts the oil level switch is verified when sdt>cond_lwt for 2 minutes. When the circuit compressor capacity changes to 15% or from 15% load, then the oil level switch is not verified for two minutes.	Circuit A will be shut down.	Automatic, first or second occurance in 24 hours OR Manual, if the alarm has occurred more than 3 times in the previous 24 hours	If this condition is encountered, check the following items for faults: - oil level in the oil separator - oil level switch wiring to the SIOB board - board for a faulty channel - faulty oil level switch - oil solenoid valve stuck open
10076	Circuit B Low Oil Level		Circuit B will be shut down.		

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SST — Saturated Suction Temperature
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Table 52 — Alarm Details by Code (cont)

ALARM CODE	ALARM NAME	CRITERIA FOR TRIP	ACTION TAKEN BY CONTROL	RESET METHOD	POSSIBLE CAUSES/CORRECTIVE ACTIONS
10078	Circuit A High Discharge Gas Temperature	Tested when compressor is running: The alarm will trip if the discharge gas temperature is higher than 212 F (100 C) for more than 90s OR higher than 221 F (105 C) for any period of time	Circuit A will be shut down	Manual	If this condition is encountered, check the following items for faults: - noncondensables in the refrigerant circuit - condenser air recirculation - proper refrigerant charge (undercharged) - EXV operation - operation beyond the limits of the machine - condenser coils for debris or restriction - condenser fans and motors for proper rotation and operation - the discharge service valves to be sure that they are open - check the discharge pressure transducer for accuracy - confirm unit configuration
10079	Circuit B High Discharge Gas Temperature		Circuit B will be shut down	Manual	
10081	Circuit A Suction Valve closed	Tested when compressor is running. The alarm will trip if economizer pressure < suction pressure -14 psi (96.52 KPa) during startup	Circuit A will be shut down	Manual	If this condition is encountered, check the following items for faults: - confirm suction service valve is fully open (if equipped) - compressor strainer for debris - sensor wiring
10082	Circuit B Suction Valve closed		Circuit B will be shut down	Manual	
10084	Circuit A High Oil Filter Drop Pressure	Tested only when compressor running: The alarm will trip if the difference between the Circuit Discharge Pressure and the Compressor Oil Pressure is greater than 30 psi (206.8 kPa) for more than 5 minutes	No action on the unit	Manual	If this condition is encountered, check the following items for faults: - sensor wiring to SIOB board - board for faulty channel - faulty transducer - plugged oil filter - faulty oil solenoid valve coil - stuck oil solenoid valve - stuck check valve - confirm manual shut off valve is fully open
10085	Circuit B High Oil Filter Drop Pressure				
10090	Cooler Flow Switch Setpoint Configuration Failure	This configuration is not supported. Check unit configuration.	The chiller is not allowed to start.	Manual	This configuration is not supported. Check unit configuration.
10091	Cooler Flow Switch Failure	Tested when the unit is ON: The alarm will trip if the cooler flow switch fails to close within the Off to On Delay (m_delay = Yes) OR if the cooler flow switch is opened during normal operation Tested when the unit is OFF: The alarm will trip if the cooler pump control (cpump_seq > 0) and cooler_ pump_loc (PUMPCONF tables) are enabled and the cooler flow switch is closed after the cooler pump command is OFF for more than 2 minutes OR if the cooler flow switch fails to close within the Off to On Delay	The unit and cooler pump shall be stopped immediately.	Automatic, first occurance in 24 hours OR Manual, if the alarm has occurred in the previous 24 hours	If this condition is encountered, check the following items for faults: - a faulty flow switch - flow switch wiring - SIOB board for a faulty channel

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Table 52 — Alarm Details by Code (cont)

ALARM CODE	ALARM NAME	CRITERIA FOR TRIP	ACTION TAKEN BY CONTROL	RESET METHOD	POSSIBLE CAUSES/CORRECTIVE ACTIONS
10097	Water Exchanger Temperature Sensors Swap	Tested only when the unit is running. The alarm will trip if the leaving water temperature is higher than the entering water temperature for more than 1 minute.	The unit shall be stopped	Manual	If this condition is encountered, check the following items for faults: - check LWT and EWT wiring at SIOB board - check for faulty entering or leaving water temperature sensors - check cooler nozzles for proper water temperature sensor locations
10101	Circ A - High saturated temperature out of map compressor	The alarm is tripped when saturated suction temperature exceeds a certain value for an extended period of time per the following logic: A timer tallies the elapsed minutes that saturated suction temperature is higher than MOP (55 F=12.77 C). If SST is higher than MOP + 9°F, then the timer is increased by 2 x the elapsed minutes. When saturated suction temperature is lower than MOP or the circuit is OFF, the timer is decreased by the elapsed minutes. The alarm is tripped when the timer reached a value higher than 90 minutes.	Circuit A will be shut down	Manual	If this condition is encountered, check the following items for faults: - wiring of suction temperature thermistor - accuracy of thermistor
10102	Circ B - High saturated temperature out of map compressor		Circuit B will be shut down	Manual	
1101	Compressor A Motor temperature too high	Tested when the compressor is ON or OFF. The alarm is set if compressor motor temperature CP_TMP_A or CP_TMP_B > 243 F (117 C) , and motor temperature was previously > 212 F (100 C) for 10 seconds, and between 212 F and 230 F (100 C and 110 C) for at least 2 seconds.	Circuit A will be shut down	Manual	If this condition is encountered, check the following items for faults: - faulty wiring and loose plugs - faulty SIOB board - faulty compressor temperature thermistor
1103	Compressor A High Pressure Switch protection	Tested when the compressor is ON or OFF. The alarm is set when the Safe Stop DI-37 of the compressor drive is opened (terminal 37 on the compressor VFD).	Circuit A will be shut down	Manual	If this condition is encountered, check the following items for faults: - condenser fans and motors for proper rotation and operation - compressor operating beyond the limits of the operating envelope - faulty high pressure switch or wiring (terminals 12 and 37 in VFD)

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Table 52 — Alarm Details by Code (cont)

ALARM CODE	ALARM NAME	CRITERIA FOR TRIP	ACTION TAKEN BY CONTROL	RESET METHOD	POSSIBLE CAUSES/CORRECTIVE ACTIONS
12001	Circuit A Discharge Transducer	Tested when the unit is On or Off Alarm will trip if the pressure transducer reads below –7 psi (–48 kPa)	Circuit will be shut down immediately	Automatic, if transducer reading returns to normal. Affected circuit will be restarted normally.	If this condition is encountered, check the following items for faults: - sensor wiring to the SIOB board - faulty channel on the board - Sensor accuracy See the Transducer section on page 52 for sensor description and connections
12002	Circuit B Discharge Transducer				
12004	Circuit A Suction Transducer	Tested when compressor is Off Alarm will trip if the pressure transducer reading is below –7 psi (–48 kPa) or SST-EWT > 0 and unit is in cooling mode and EXV opening<40% for 60 seconds	Circuit will be shut down immediately	Automatic, if transducer reading returns to normal OR Manual, if the alarm has occurred 3 times within th elast 24 hours.	
12005	Circuit B Suction Transducer				
12010	Circuit A Oil Pressure Transducer	Tested when the unit is On or Off Alarm will trip if pressure transducer reading is below –7 psi (–48 kPa)	Circuit will be shut down immediately	Automatic, if transducer reading returns to normal. Affected circuit will be restarted normally.	
12011	Circuit B Oil Pressure Transducer				
12013	Circuit A Economizer Pressure Transducer	Tested when the unit is On or Off Alarm will trip if pressure transducer reading is below –7 psi (–48 kPa)	Circuit will be shut down immediately	Automatic, if transducer reading returns to normal. Affected circuit will be restarted normally.	
12014	Circuit B Economizer Pressure Transducer				
12031	Circuit A Condenser Subcooling Liquid Pressure Transducer	Tested when the unit is On or Off Alarm will trip if pressure transducer reading is below –7 psi (-48 kPa)	Circuit will be shut down immediately	Automatic, if transducer reading returns to normal. Affected circuit will be restarted normally.	
12032	Circuit B Condenser Subcooling Liquid Pressure Transducer				
15001	Cooler Entering Fluid Thermistor	Tested when the unit is On or Off Alarm will trip if the temperature measured by the cooler entering fluid sensor is outside the range of –40 to 240 F (–40 to 116 C)	Unit is shut down normally or not allowed to start	Automatic, if thermistor reading returns to normal	If this condition is encountered, check the following items for faults: - sensor wiring to the SIOB board - faulty channel on the board - sensor accuracy See the Thermistors section on page 52 for thermistor description and connections
15002	Cooler Leaving Fluid Thermistor	Tested when the unit is On or Off Alarm will trip if the temperature measured by the cooler entering fluid sensor is outside the range of –40 to 240 F (–40 to 116 C)	Unit is shut down normally or not allowed to start	Automatic, if thermistor reading returns to normal	
15010	OAT Thermistor Failure	Tested when the unit is On or Off Alarm will trip if the temperature measured by the cooler entering fluid sensor is outside the range of -40 to 240 F (–40 to 116 C)	Unit is shut down normally or not allowed to start	Automatic, if thermistor reading returns to normal	
15012	Circuit A Suction Gas Thermistor	Tested when the circuit is On or Off Alarm will trip if the circuit suction gas sensor reading is outside the range of –40 to 240 F (–40 to 116 C)	Circuit will be shut down immediately	Automatic, if thermistor reading returns to normal. Affected circuit will be restarted normally.	
15013	Circuit B Suction Gas Thermistor				

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Table 52 — Alarm Details by Code (cont)

ALARM CODE	ALARM NAME	CRITERIA FOR TRIP	ACTION TAKEN BY CONTROL	RESET METHOD	POSSIBLE CAUSES/CORRECTIVE ACTIONS
15015	Circuit A Discharge Gas Thermistor	Tested when the circuit is On or Off Alarm will trip if the discharge gas sensor reading is outside the range of –40 to 240 F (–40 to 116 C)	Circuit will be shut down immediately	Automatic, if thermistor reading returns to normal. Affected circuit will be restarted normally.	If this condition is encountered, check the following items for faults: - sensor wiring to the SIOB board - faulty channel on the board - sensor accuracy See the Thermistors section on page 52 for thermistor description and connections
15016	Circuit B Discharge Gas Thermistor				
15018	Circuit A Condenser Subcooling Liquid Thermistor	Tested when the circuit is On or Off Alarm will trip if the condenser subcooling liquid sensor reading is outside the range of –40 to 240 F (–40 to 116 C)	Circuit will be shut down immediately	Automatic, if thermistor reading returns to normal. Affected circuit will be restarted normally.	
15019	Circuit B Condenser Subcooling Liquid Thermistor				
15021	Space Temperature Thermistor	Tested when the circuit is On or Off Alarm will trip if the space temperature sensor reading is outside the range of –40 to 240 F (–40 to 116 C)	No action on the unit	Automatic, if thermistor reading returns to normal	
15024	Circuit A Economizer Gas Thermistor	Tested when the circuit is On or Off Alarm will trip if the sensor reading is outside the range of –40 to 240 F (–40 to 116 C)	Circuit will be shut down immediately	Automatic, if thermistor reading returns to normal	
15025	Circuit B Economizer Gas Thermistor				
15033	Circuit A Compressor Motor Thermistor	Tested when the circuit is On or Off Alarm will trip if the motor temperature sensor reading is outside the range of –40 to 240 F (–40 to 116 C)	Circuit will be shut down immediately	Automatic, if thermistor reading returns to normal. Affected circuit will be restarted normally.	
15034	Circuit B Compressor Motor Thermistor				
17nnn	Compressor VFD Error, Circuit A	Compressor VFD Circuit A fault (see VFD Alarms and Alerts section)	Circuit A will be shut down	Manual	See Tables 55 and 56 for VFD Alarm and Alert Codes
18nnn	Compressor VFD Error, Circuit B	Compressor VFD Circuit B fault (see VFD Alarms and Alerts section)	Circuit B will be shut down	Manual	See Tables 55 and 56 for VFD Alarm and Alert Codes
20nnn	Fan A1 VFD Error, Circuit A	Fan A1 VFD Circuit A fault (see VFD Alarms and Alerts section)	Circuit A will be shut down	Manual	See Tables 55 and 56 for VFD Alarm and Alert Codes
21nnn	Fan A2 VFD Error, Circuit A	Fan A2 VFD Circuit A fault (see VFD Alarms and Alerts section)	Circuit A will be shut down	Manual	See Tables 55 and 56 for VFD Alarm and Alert Codes
2101	Compressor B Motor temperature too high	Tested when the compressor is ON or OFF. The alarm is set if compressor motor temperature CP_TMP_A or CP_TMP_B > 243 F (117 C) , and motor temperature was previously > 212 F (100 C) for 10 seconds, and between 212 F and 230 F (100 C and 110 C) for at least 2 seconds.	Circuit B will be shut down	Manual	If this condition is encountered, check the following items for faults: - faulty wiring and loose plugs - faulty SIOB board - faulty compressor temperature thermistor
2103	Compressor B High Pressure Switch protection	Tested when the compressor is ON or OFF. The alarm is set when the Safe Stop DI-37 of the compressor drive is opened (terminal 37 on the compressor VFD).	Circuit B will be shut down	Manual	If this condition is encountered, check the following items for faults: - condenser fans and motors for proper rotation and operation - compressor operating beyond the limits of the operating envelope - faulty high pressure switch or wiring (terminals 12 and 37 in VFD)

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Table 52 — Alarm Details by Code (cont)

ALARM CODE	ALARM NAME	CRITERIA FOR TRIP	ACTION TAKEN BY CONTROL	RESET METHOD	POSSIBLE CAUSES/CORRECTIVE ACTIONS
23nnn	Fan B1 VFD Error, Circuit B	Fan B1 VFD Circuit B fault (see VFD Alarms and Alerts section on page 95)	Circuit B will be shut down	Manual	See Tables 55 and 56 for VFD Alarm and Alert Codes
24nnn	Fan B2 VFD Error, Circuit B	Fan B2 VFD Circuit B fault (see VFD Alarms and Alerts section on page 95)	Circuit B will be shut down	Manual	See Tables 55 and 56 for VFD Alarm and Alert Codes
35nnn	Compressor VFD Error, Circuit A	Compressor VFD Circuit A fault (see VFD Alarms and Alerts section on page 95)	No action unless sub-code = 013: over current 204: locked rotor in which case circuit will shut down	Automatic	See Tables 55 and 56 for VFD Alarm and Alert Codes
36nnn	Compressor VFD Error, Circuit B	Compressor VFD Circuit B fault (see VFD Alarms and Alerts section on page 95)			
38nnn	Fan A1 VFD Error, Circuit A	Fan A1 VFD Circuit A fault (see VFD Alarms and Alerts section on page 95)			
39nnn	Fan A2 VFD Error, Circuit A	Fan A2 VFD Circuit A fault (see VFD Alarms and Alerts section on page 95)			
41nnn	Fan B1 VFD Error, Circuit B	Fan B1 VFD Circuit B fault (see VFD Alarms and Alerts section on page 95)			
42nnn	Fan B2 VFD Error, Circuit B	Fan B2 VFD Circuit B fault (see VFD Alarms and Alerts section on page 95)			
4501	Loss of Communication with Auxiliary # 1	Alarm will trip if communication with AUX Board 1 is lost	No action on the unit	Automatic when the communication is reestablished	If this condition is encountered, check the following items for faults: - power supply to the Aux board - local equipment network (LEN) wiring
4502	Loss of Communication with Auxiliary # 2	Alarm will trip if communication with AUX Board 2 is lost	Circuit A will be shut down immediately	Automatic when the communication is reestablished	
4503	Loss of Communication with Auxiliary # 3	Alarm will trip if communication with AUX Board 3 is lost	Circuit B will be shut down immediately	Automatic when the communication is reestablished	
4603	Loss of communication with Energy Management NRCP2 Board	Alarm will trip if communication with Energy Management Module (EMM) Board is lost	No action on the unit, EMM functions will not operate	Automatic when the communication is reestablished	If this condition is encountered, check the following items for faults: - the EMM is installed (Main Menu → Configuration Menu → Factory Parameters → Line 6 Energy Management Module = Yes) - power supply to EMM - address of the EMM - local equipment network (LEN) wiring If no EMM board is installed: - confirm unit configuration to be sure that no options requiring

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Table 52 — Alarm Details by Code (cont)

ALARM CODE	ALARM NAME	CRITERIA FOR TRIP	ACTION TAKEN BY CONTROL	RESET METHOD	POSSIBLE CAUSES/CORRECTIVE ACTIONS
4701	Loss of Communication with VLT Drive Board #1	Alarm will trip if communication with Circuit A Compressor VFD is lost	Circuit A will be shut down immediately	Automatic when the communication is reestablished	If this condition is encountered, check the following items for faults: - power supply to the compressor or fan drive board - local equipment network (LEN) wiring
4702	Loss of Communication with VLT Drive Board #2	Alarm will trip if communication with Circuit B Compressor VFD is lost	Circuit B will be shut down immediately	Automatic when the communication is reestablished	
4704	Loss of Communication with Fan Drive Board #4	Alarm will trip if communication with Circuit A Fan A1 VFD is lost	Circuit A will be shut down immediately	Automatic when the communication is reestablished	
4705	Loss of Communication with Fan Drive Board #5	Alarm will trip if communication with Circuit A Fan A2 VFD is lost	Circuit A will be shut down immediately	Automatic when the communication is reestablished	
4707	Loss of Communication with Fan Drive Board #7	Alarm will trip if communication with Circuit B Fan B1 VFD is lost	Circuit B will be shut down immediately	Automatic when the communication is reestablished	
4708	Loss of Communication with Fan Drive Board #8	Alarm will trip if communication with Circuit B Fan B2 VFD is lost	Circuit B will be shut down immediately	Automatic when the communication is reestablished	
4901	Loss of Communication with SIOB Board Number 1	Alarm will trip if communication with SIOB-A Board is lost	Unit shall be stopped immediately	Automatic when the communication is reestablished	If this condition is encountered, check the following items for faults: - power supply to the SIOB board - local equipment network (LEN) wiring - confirm unit configuration
4902	Loss of Communication with SIOB Board Number 2	Alarm will trip if communication with SIOB-B Board is lost	Circuit B will be shut down immediately	Automatic when the communication is reestablished	
55001	Database module failure	Tested when the unit is ON or OFF. If database module returns an error alarm shall be tripped	Unit shall be stopped	Automatic	Software malfunction. Power cycle the display.
56001	Lenscan module failure	Tested when the unit is ON or OFF. If lenscan module returns an error alarm shall be tripped	Unit shall be stopped	Automatic	Software malfunction. Power cycle the display.
7001	Illegal configuration	Tested when the unit Off. The alarm shall be tripped if the unit size or configuration parameters are not found.	Unit shall be prevented from starting	Automatic if unit configuration is corrected	If this condition is encountered, confirm unit configuration
8000	No Factory Configuration	Alarm will trip if the Factory configuration parameter Unit Capacity = 0	Unit shall be prevented from starting	Automatic if unit capacity parameter is different from 0	If this condition is encountered, confirm unit configuration
90nn	Master/Slave Alarms	Tested when the unit is On and Off. The alarm from 9001 to 9016 shall be tripped if the unit is in Master or Slave operating type and a master/s;ave configuration error (ms_error) is detected. See Table 53 for alarm descriptions.	Master/Slave functions are deactivated. Both chillers shall operate as standalone units.	Automatic when the master/slave configuration returns to normal or if the unit is no longer in Master operating type	If this condition is encountered, check the following items for faults: - CCN wiring - control power to each SIOB board, master and slave - confirm correct configuration

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Table 53 — Master/Slave Alarm Codes

ALARM CODE	ALARM DESCRIPTION
9001	Lag_pump control is selected while pump configuration is disabled
9002	Master and Slave have the same address
9003	No Slave configured
9004	Slave Lag_pump is selected while slave pump configuration is disabled
9005	Master and Slave shall have the same water control type
9006	Master and Slave shall have the same water control type
9007	Master lag pump control is configured
9008	Master lag pump control is not configured
9009	The slave demand_limit or chil_s_s or control point or setpoint is forced with force < 4 (chilstat == 3 updated by fsm_sub(), set M_MSTSLV maintenance table master slave error = 4 and slave_enable to FALSE and UNIT NOT FAILED)
9010	The slave demand_limit or chil_s_s or control point or setpoint is forced with force < 4 (chilstat == 3 updated by fsm_sub(), set M_MSTSLV maintenance table master slave error = 4 and slave_enable to FALSE and UNIT FAILED)
9011	Unit is not in CCN mode
9012	Communication between Master and Slave has been lost for more than 2 minutes
9013	Master and Slave Heat/Cool selection conflict
9014	Master and Slave parallel and series selection conflict
9015	Master and Slaev EWT option in conflict with chiller in series
9016	Slave EWT option in conflict with chiller in series

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VFD ALARMS AND ALERTS — Alarms and alerts associated with the VFD function follow a different naming convention than general unit faults. These alarms and alerts can be viewed and reset following the procedures outlined in the sections Current Alarms and Resetting Alarms on page 81. Table 54 lists the VFD alarm and alert naming conventions, while Tables 55 and 56 list the Danfoss codes associated with the alarms and alerts. These represent the most common alarms and alerts associated with VFD malfunction. Refer to the appropriate Danfoss documentation for more information on other alarms.

Table 54 — VFD Alarm/Alert Naming Conventions

VFD ALARMS AND ALERTS	ALARM FORMAT*	ALERT FORMAT*
Compressor A	17nnn	35nnn
Compressor B	18nnn	36nnn
Fan A1	20nnn	38nnn
Fan A2	21nnn	39nnn
Fan B1	23nnn	41nnn
Fan B2	24nnn	42nnn

* The Danfoss Alarm/Alert code is represented by nnn. See Tables 55 and 56.

Table 55 — VFD Alarms

ALARM CODE	DESCRIPTION	ACTION TO BE TAKEN
002	Live zero fault	Contact Carrier Service
004	Mains phase loss	Check the VFD supply voltage and the phase balance (±3%)
007	Overvoltage	Contact Carrier Service
008	Undervoltage	Contact Carrier Service
009	Inverter overloaded	Check the VFD output current/compressor current
010	Motor overtemperature	Check the motor temperature
011	Motor thermistor	Contact Carrier Service
012	Torque limit exceeded	Check the VFD output current/compressor current
013	Overcurrent	Check the VFD output current/compressor current
014	Earth fault	Check if an earth fault exists
016	Motor short-circuit	Check if there is a short-circuit at the VFD terminals
017	Serial communication timeout	Check the connections and the shielding of the serial communication cable
023	Internal fan fault	Check the internal fan rotation
025	Brake resistor short-circuited	Contact Carrier Service
026	Brake resistor power limit	Contact Carrier Service
028	Brake verification	Contact Carrier Service
029	VFD temperature too high	Ambient temperature too high or check VFD ventilation fans for obstruction or damage
030	Motor phase U missing	Check wiring of phase U
031	Motor phase V missing	Check wiring of phase V
032	Motor phase W missing	Check wiring of phase W
033	Inrush fault	Current demand too high: Let the VFD cool down for 20 minutes before starting it again
034	Fieldbus communication fault	Check the connections and the shielding of the serial communication cable
036	Mains failure	Check the VFD supply voltage and the phase balance (±3%)
038	Internal fault	Contact Carrier Service
047	24 V supply low	Contact Carrier Service
048	1.8 V supply low	Contact Carrier Service
057	AMA timeout	Contact Carrier Service
065	Control board overtemperature	Check the space temperature and the VFD fan
067	Option configuration has changed	Contact Carrier Service
068	Emergency stop	Contact Carrier Service
071	PTC 1 emergency stop	Contact Carrier Service
072	Emergency stop	Contact Carrier Service
080	Drive initialized to default value	Contact Carrier Service
094	End of curve	Contact Carrier Service
095	Torque loss	Contact Carrier Service
243	IGBT defective	Contact Carrier Service
251	New parts detached	Contact Carrier Service

LEGEND

AMA — Automatic Motor Adaptation
IGBT — Insulated Gate Bipolar Transistor
PTC — Positive Temperature Coefficient
VFD — Variable Frequency Drive

Table 56 — VFD Alerts

ALERT CODE	DESCRIPTION	ACTION TO BE TAKEN
001	10 V low	Contact Carrier Service
002	Live zero error	Contact Carrier Service
003	No motor	Check the motor connections
004	Mains phase loss	Check the VFD supply voltage and the phase balance (±3%)
005	DC link voltage high	Check the VFD supply voltage and the phase balance (±3%)
006	DC link voltage low	Check the VFD supply voltage and the phase balance (±3%)
007	DC overvoltage	Contact Carrier Service
008	DC undervotlage	Contact Carrier Service
009	Inverter overload	Check the VFD output current/compressor current
010	Motor overtemperature	Check the motor temperature
011	Motor thermistor	Contact Carrier Service
012	Torque limit exceeded	Check the VFD output current/compressor current
013	Overcurrent	Check the VFD output current/compressor current
014	Earth fault	Check if an earth fault exists
017	Control word timeout	Check the connections and the shielding of the serial communication cable
023	Internal fan fault	Check the internal fan rotation
025	Brake resistor short-circuited	Contact Carrier Service
026	Brake resistor power limit	Contact Carrier Service
028	Brake verification	Contact Carrier Service
034	Fieldbus communication fault	Check the connections and the shielding of the serial communication cable
036	Mains failure	Check the VFD supply voltage and the phase balance (±3%)
047	24 V supply low	Contact Carrier Service
049	Motor speed limit exceeded	Contact Carrier Service
059	Current limit exceeded	Check the VFD output current/compressor current
062	Output frequency at maximum limit	Check the VFD output current/compressor current
064	Voltage limit	Supply voltage too low
065	Control board overtemperature	Check the space temperature and the VFD fan
066	Heat sink temperature low	Space temperature too low
071	PTC1 emergency stop	Contact Carrier Service
072	Emergency stop	Contact Carrier Service
090	Encoder loss	Contact Carrier Service
094	End of curve	Contact Carrier Service
095	Torque loss	Contact Carrier Service
096	Start delayed	Contact Carrier Service
097	Stop delayed	Contact Carrier Service
098	Clock fault	Contact Carrier Service
243	IGBT defective	Contact Carrier Service
247	Capacity board temperature	Contact Carrier Service

LEGEND

IGBT — Insulated Gate Bipolar Transistor
PTC — Positive Temperature Coefficient
VFD — Variable Frequency Drive

Troubleshooting — The Touch Pilot™ software offers several tools to assist with troubleshooting unit issues.

BLACK BOX FUNCTION — The control system is equipped with a "black box" function that continuously stores operating parameters in the onboard memory every 5 seconds. For each alarm event that is triggered, the system collects up to 180 records (15 minutes) of data, with approximately 14 minutes of data recorded before the alarm is triggered and 1 minute of data after. The black box function is capable of storing 20 events of data on a rotating basis (first in first out). After all records for an event are stored, a .csv file is generated. This file can be accessed by using Carrier's Service software and opened in software such as Microsoft Excel for analysis. Table 57 shows the operating parameters that are recorded by the black box function. Table 58 shows a list of alarms that can be collected by the black box function.

Table 57 — Black Box Function Recorded Parameters

DESCRIPTION	POINT NAME
Capacity Running Circuit A	cap_pc_a
Capacity Running Circuit B	cap_pc_b
Capacity Control State A	capmoda
Capacity Control State B	capmodb
Compressor Temperature A	CP_TMP_A
Compressor Temperature B	CP_TMP_B
Control Point	CTRL_PNT
Cooler Entering Temperature	COOL_EWT
Cooler Leaving Temperature	COOL_LWT
Cooler Flow switch	FLOW_SW
Demand limit	dem_lim
Discharge Gas Temperature A	DGT_A
Discharge Gas Temperature B	DGT_B
Discharge Superheat Temperature A	DSH_A
Discharge Superheat Temperature B	DSH_B
Drive Frequency A	drv_F_a
Drive Frequency B	drv_F_b
Drive Frequency A	drv_I_a
Drive Frequency B	drv_I_b
EXV Override A	ov_exv_a
EXV Override B	ov_exv_b
EXV Position A	EXV_A
EXV Position B	EXV_B
EXV State A	state_a
EXV State B	state_b
Fan Drive Frequency A1	fd_Fa1
Fan Drive Frequency A2	fd_Fa2
Fan Drive Frequency B1	fd_Fb1
Fan Drive Frequency B2	fd_Fb2
Fan Freq Cir A	wfan_f_a
Fan Freq Cir B	wfan_f_b
Fan State A	state_a
Fan State B	state_b
Liquid Gas Temperature A	LIQ_T_A
Liquid Gas Temperature B	LIQ_T_B
Oil Pressure Circuit A	OP_A
Oil Pressure Circuit B	OP_B
Outdoor Air Temperature	OAT
Override Capacity A	overrida
Override Capacity B	overridb
Saturated Condensing Temperature A	SCT_A
Saturated Condensing Temperature B	SCT_B
Saturated Suction Temperature A	SST_A
Saturated Suction Temperature B	SST_B
Saturated Liquid Temperature A	SLT_A
Saturated Liquid Temperature B	SLT_B
Suction Temperature A	SUCT_A
Suction Temperature B	SUCT_B

LEGEND

A — Circuit A
B — Circuit B
EXV — Electronic Expansion Valve

Table 58 — Black Box Function Alarms Collected

ALARM CODE	ALARM TEXT DESCRIPTION AND CCN MESSAGE
12004	Circuit A Suction Transducer (during operation only)
12005	Circuit B Suction Transducer (during operation only)
10001	Cooler Freeze Protection
10005	Circuit A Low Suction Temperature
10006	Circuit B Low Suction Temperature
10008	Circuit A High Superheat
10009	Circuit B High Superheat
10011	Circuit A Low Suction Temperature
10012	Circuit B Low Suction Temperature
10014	Customer Interlock Failure
10030	Master/Slave communication Failure
10067	Circuit A Low Oil Pressure
10068	Circuit B Low Oil Pressure
10070	Circuit A Max Oil Filter Differential Pressure
10071	Circuit B Max Oil Filter Differential Pressure
10084	Circuit A High Oil Filter Drop Pressure
10085	Circuit B High Oil Filter Drop Pressure
10075	Circuit A Low Oil level
10076	Circuit B Low Oil level
8000	Illegal factory configuration Number #1 to nn
7001	Illegal factory configuration Number #1 to nn
10028	Electrical Box Thermostat or Electrical Interlock failure
10032	Cooler pump #1 fault
10033	Cooler pump #2 fault
10037	Circuit A High Condensing Out Of Map compressor
10038	Circuit B High Condensing Out Of Map compressor
10050	Refrigerant Leakage Detection
10073	Condenser pump #1 fault
10074	Condenser pump #2 fault

ALARM CODE	ALARM TEXT DESCRIPTION AND CCN MESSAGE
10078	Circuit A High Discharge Gas Temperature
10079	Circuit B High Discharge Gas Temperature
10081	Circuit A Low economizer pressure or suction valve closed
10082	Circuit A Low economizer pressure or suction valve closed
10090	Cooler Flow Switch Setpoint Configuration Failure
10091	Cooler Flow Switch Failure
10097	Water Exchanger Temperature Sensors Swapped
17001	Circuit A Compressor VFD Failure
18001	Circuit B Compressor VFD Failure
20001	Circuit A Fan VFD 1 Failure
21001	Circuit A Fan VFD 2 Failure
22001	Circuit A Fan VFD 3 Failure
23001	Circuit B Fan VFD 1 Failure
24001	Circuit B Fan VFD 2 Failure
25001	Circuit B Fan VFD 3 Failure
35001	Circuit A Compressor VFD Warning
36001	Circuit B Compressor VFD Warning
38001	Circuit A Fan VFD 1 Warning
39001	Circuit A Fan VFD 2 Warning
40001	Circuit A Fan VFD 3 Warning
41001	Circuit B Fan VFD 1 Warning
42001	Circuit B Fan VFD 2 Warning
43001	Circuit B Fan VFD 3 Warning
1101	Compressor A Motor temperature too high
2101	Compressor B Motor temperature too high
1103	Compressor A High Pressure Switch protection
2103	Compressor B High Pressure Switch protection
55001	Database Module Failure
56001	Lenscan Module Failure

LEGEND

VFD — Variable Frequency Drive

TROUBLESHOOTING GUIDE — Table 59 shows potential unit issues and possible solutions. This table is meant only as a guide, and is not exhaustive in issues or solutions.

Table 59 — Troubleshooting

SYMPTOM	POSSIBLE CAUSE	POSSIBLE REMEDY
Unit Does Not Run	Check for power to unit	• Check overcurrent protection device. • Check non-fused disconnect (if equipped). • Restore power to unit. • Check Active Capacity Override, CAPA_override.
	Wrong or incorrect unit configuration	Check unit configuration.
	Active alarm	Check Alarm status. See the Alarms and Alerts section and follow troubleshooting instructions.
	Active operating mode	Check for Operating Modes. See the Operating Modes section and follow troubleshooting instructions.
	High pressure switch (HPS) open	• Recheck high pressure switch. • Check HPS wiring in compressor VFD.
Unit Operates Too Long or Continuously	Low refrigerant charge	Check for leak and add refrigerant.
	Air in chilled water loop	Purge water loop.
	Non-condensables in refrigerant circuit	Remove refrigerant and recharge.
	Inoperative EXV	• Check EXV, clean or replace. • Check EXV cable, replace if necessary. • Check EXV board for output signal.
	Load too high	Unit may be undersized for application.
Circuit Does Not Run	Active alarm	Check Alarm status. See the Alarms and Alerts section and follow troubleshooting instructions. Check Active Capacity Override, CAPA_override.
	Active operating mode	Check for Operating Modes. See the Operating Modes section and follow troubleshooting instructions.Check Active Capacity Override, CAPA_override.
Circuit Does Not Load	Active alarm	Check Alarm status. See the Alarms and Alerts section and follow troubleshooting instructions.
	Active operating mode	Check for Operating Modes. See the Operating Modes section and follow troubleshooting instructions.
	Low saturated suction temperature	See Capacity Control Overrides #23 and #24.
	High circuit suction superheat	The circuit capacity is not allowed increase if circuit superheat is greater than 36° F (20° C). • Check for faulty suction transducer or wiring. • Check for restriction in liquid line (filter drier, service valve, etc.). • Check EXV operation. • Checkfor proper refrigerant charge.
	Low suction superheat	The circuit capacity is not allowed to increase if the circuit superheat is less than 18° F (10° C). • Check for faulty suction transducer or wiring. • Check for restriction in liquid line (filter drier, service valve, etc.). • Check EXV operation. • Checkfor proper refrigerant charge.
Compressor or Fans Do Not Run	Active alarm	Check Alarm status. See the Alarms and Alerts section and follow troubleshooting instructions.
	Active operating mode	Check for Operating Modes. See the Operating Modes section and follow troubleshooting instructions.
	VFD fuses blown	Check compressor and fan VFD fuses and replace if necessary
Chilled Water Pump is ON, but the Machine is OFF	Cooler freeze protection	Chilled water loop temperature too low. Check cooler heater.

LEGEND

EXV — Electronic Expansion Valve
HPS — High Pressure Switch
VFD — Variable Frequency Drive

Electrical Schematics — Control and power schematics for 30XA units with Greenspeed® intelligence are shown in Figs. 76-83.

Service Test (Quick Test) — Main power and control circuit power must be on for Service Test. The Touch Pilot™ Quick Test function is used to verify proper operation of various devices within the chiller, such as condenser fans, automated isolation valves, EXVs, and remote alarm relays. This is helpful during the start-up procedure to determine if devices are installed correctly.

To use the Quick Test mode, the Enable/Off/Remote Contact switch must be in the OFF position. To reach the Quick Test menu, follow the path: Main Menu → Quick Test. The unit must be in Local Off mode to adjust parameters in the table. The Quick Test function is not available remotely, and can only be used from the Touch Pilot display. See the Start-Up Checklist at the end of this document, page CL-5, for a list of the parameters in the Quick Test Table.

Example: Test the function of the Ckt A condenser fans

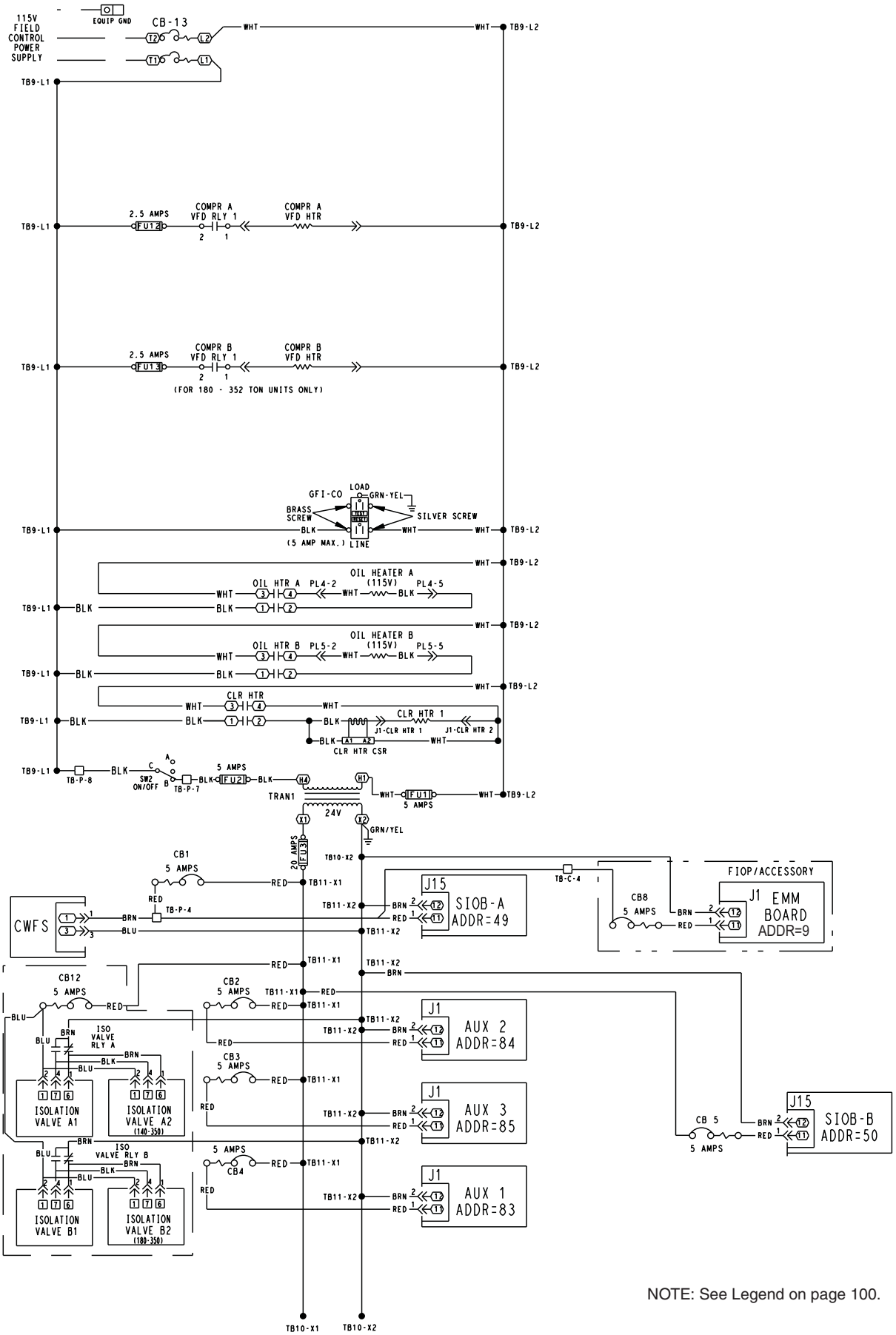
- Power must be applied to the unit. The Enable/Off/Remote Contact switch must be in the OFF position.
- Press the Start/Stop button and ensure the unit is in Local Off.
- Navigate to the Quick Test table and set line 2 Quick Test Enable to Enable.
- Set line 12, VariFan Speed A, to 100%. Confirm all fans are running.

Test component function by turning the item values from OFF to ON or adjusting the actuated percentage. These discrete outputs are then turned off if there is no keypad activity for 10 minutes.

NOTE: There may be up to a one-minute delay before the selected item is energized.

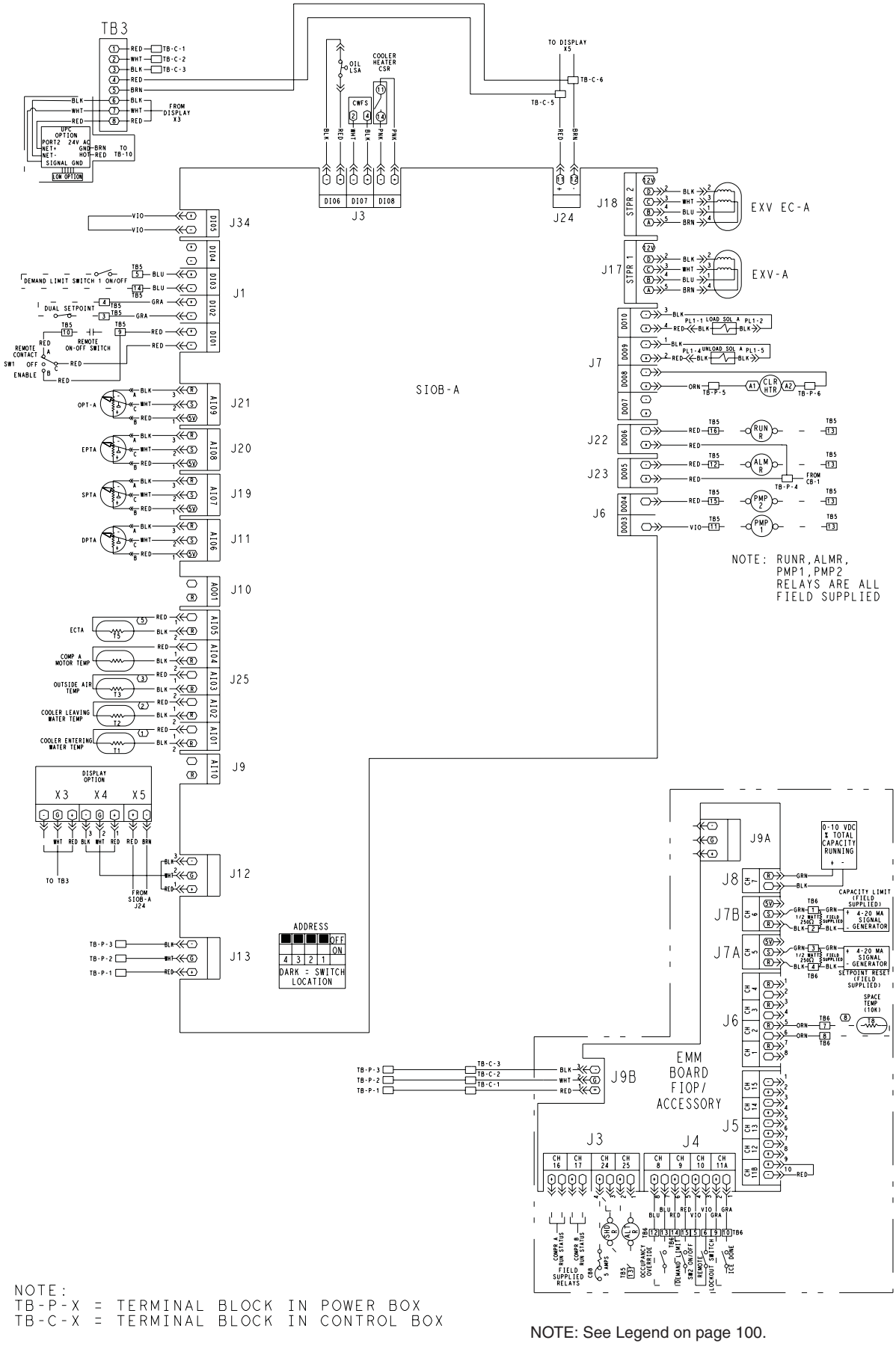
LEGEND FOR FIG. 76-83

ALM	— Alarm	**GFI-CO**	— Ground Fault Interrupter - Convenience Outlet
AUX	— Auxiliary	**GND**	— Ground
ALT	— Alert	**HPS**	— High-Pressure Switch
CB	— Circuit Breaker	**HTR**	— Heater
CLR	— Cooler	**LIQ**	— Liquid
COMPR	— Compressor	**NEC**	— National Electrical Code
CSR	— Current Sensing Relay	**OPT**	— Oil Pressure Transducer
CWFS	— Chilled Water Flow Switch	**PMP**	— Pump
DGT	— Discharge Gas Temnperature	**SGT**	— Saturated Gas Temperature
DPT	— Discharge Pressure and Temperature	**SHD**	— Loadshed
ECTA	— Economizer A Temp	**SIOB**	— Standard Input/Output Board
ECTB	— Economizer B Temp	**SPT**	— Space Temperature
EMM	— Energy Management Module	**TB**	— Terminal Block
EPT	— Economizer Pressure Transducer	**TRAN**	— Transformer
EXV	— Electronic Expansion Valve	**VFD**	— Variable Frequency Drive
FIOP	— Factory-Installed Option	**UPC**	— Universal Protocol Converter
FM	— Fan Motor	**XL**	— Across the Line
FU	— Fuse		



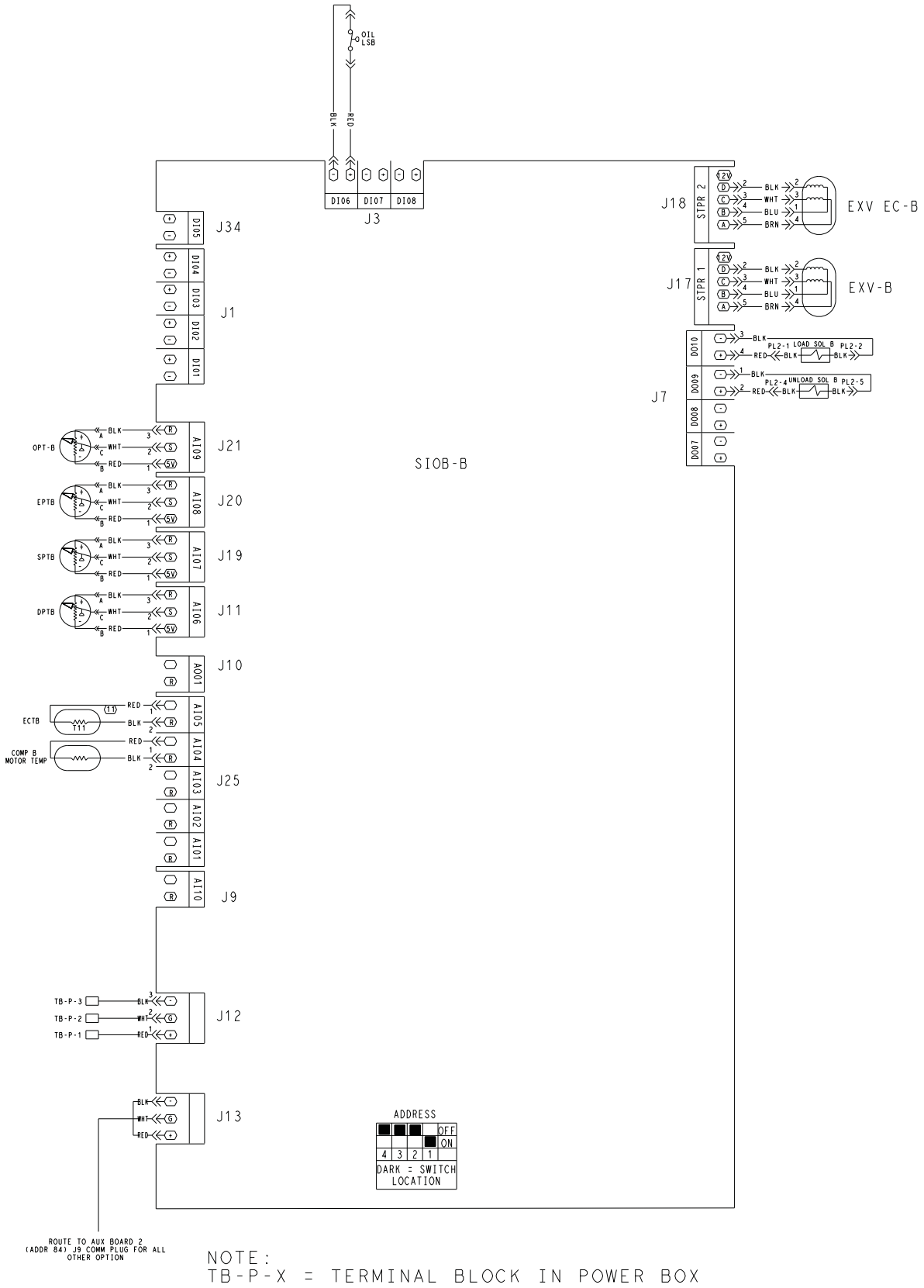
NOTE: See Legend on page 100.

Fig. 76 — 30XA with Greenspeed® Intelligence Control Schematic



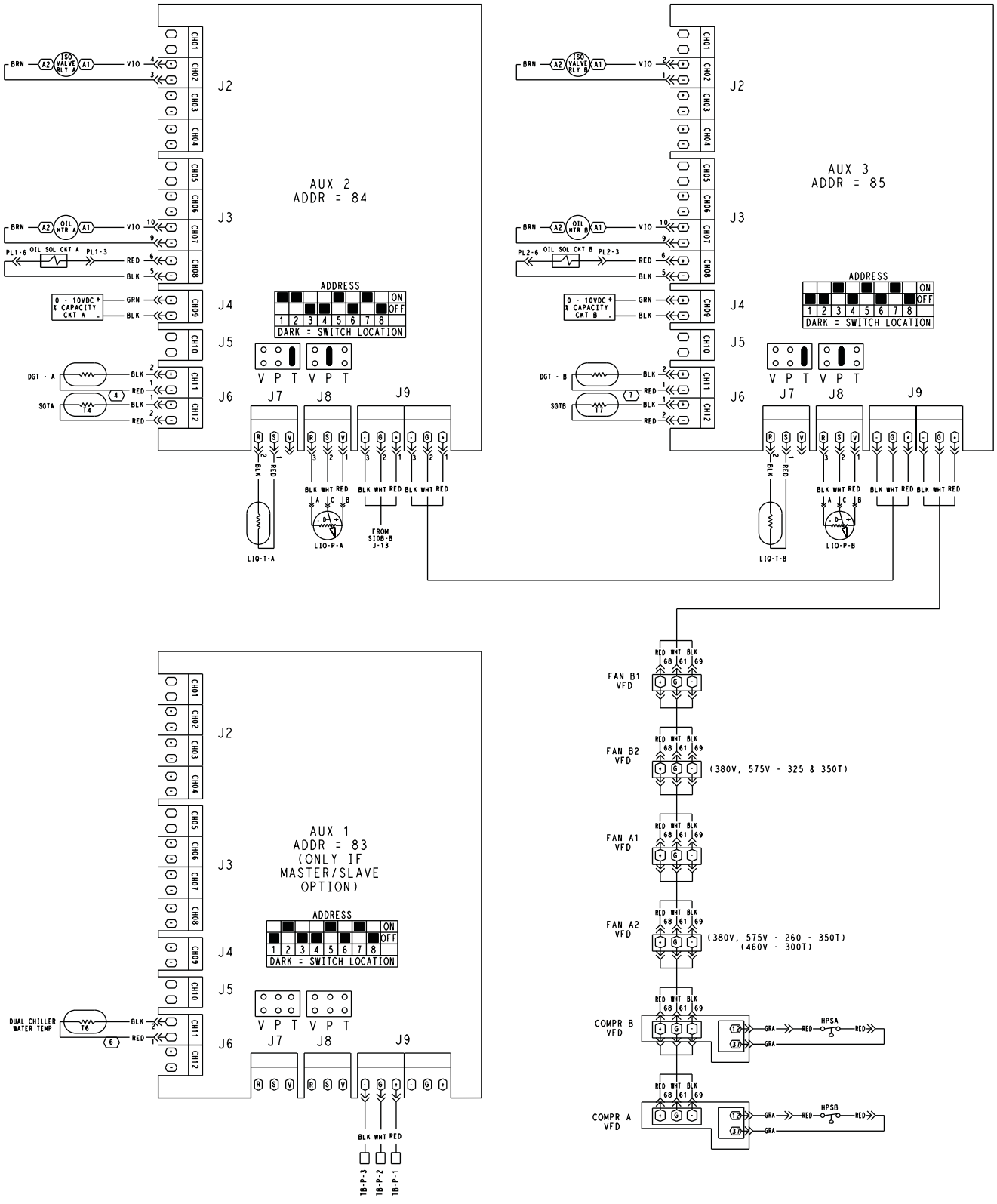
NOTE: See Legend on page 100.

Fig. 77 — 30XA with Greenspeed® Intelligence Low Voltage Control Schematic, SIOB-A



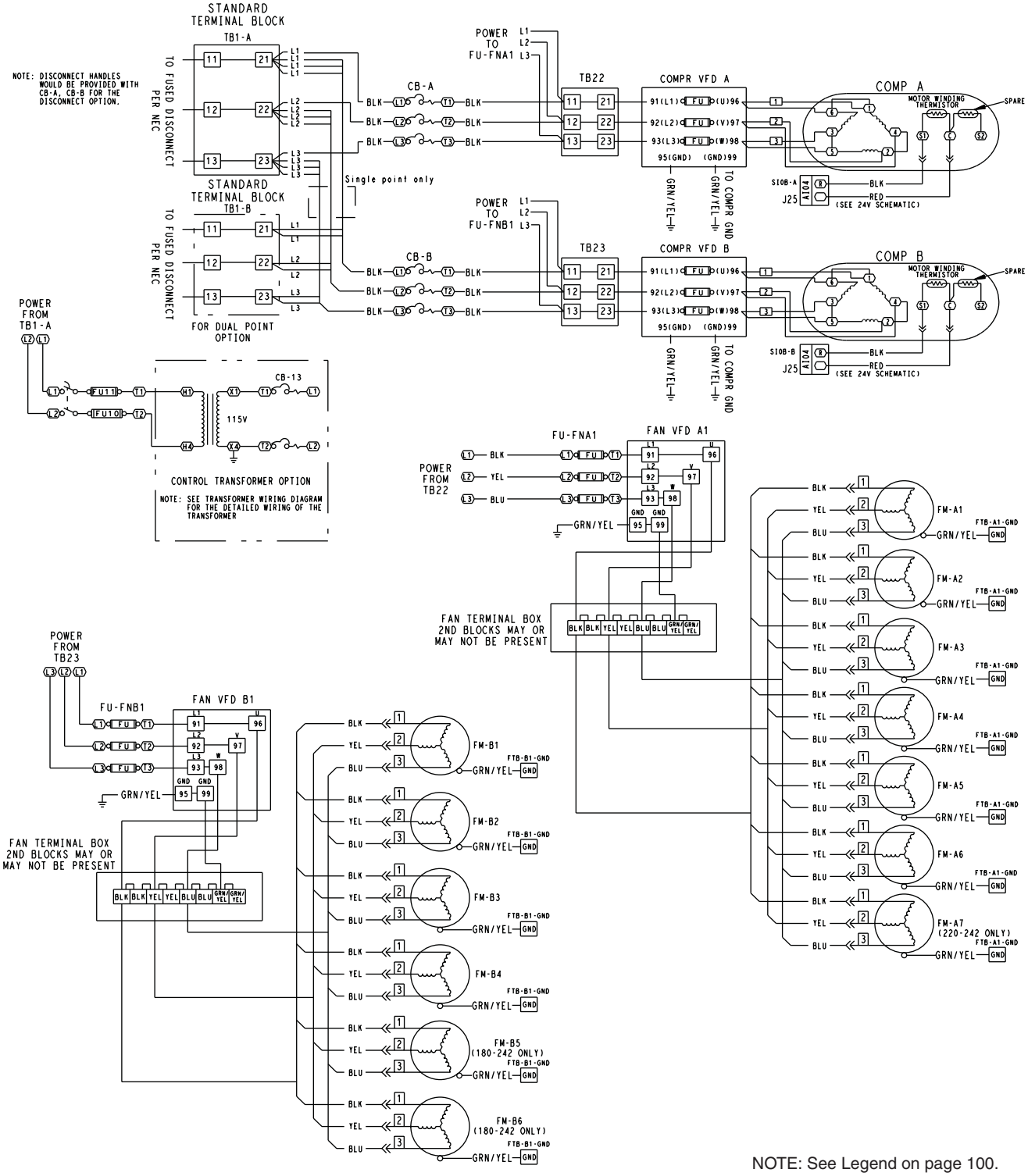
NOTE: See Legend on page 100.

Fig. 78 — 30XA with Greenspeed® Intelligence Low Voltage Control Schematic, SIOB-B



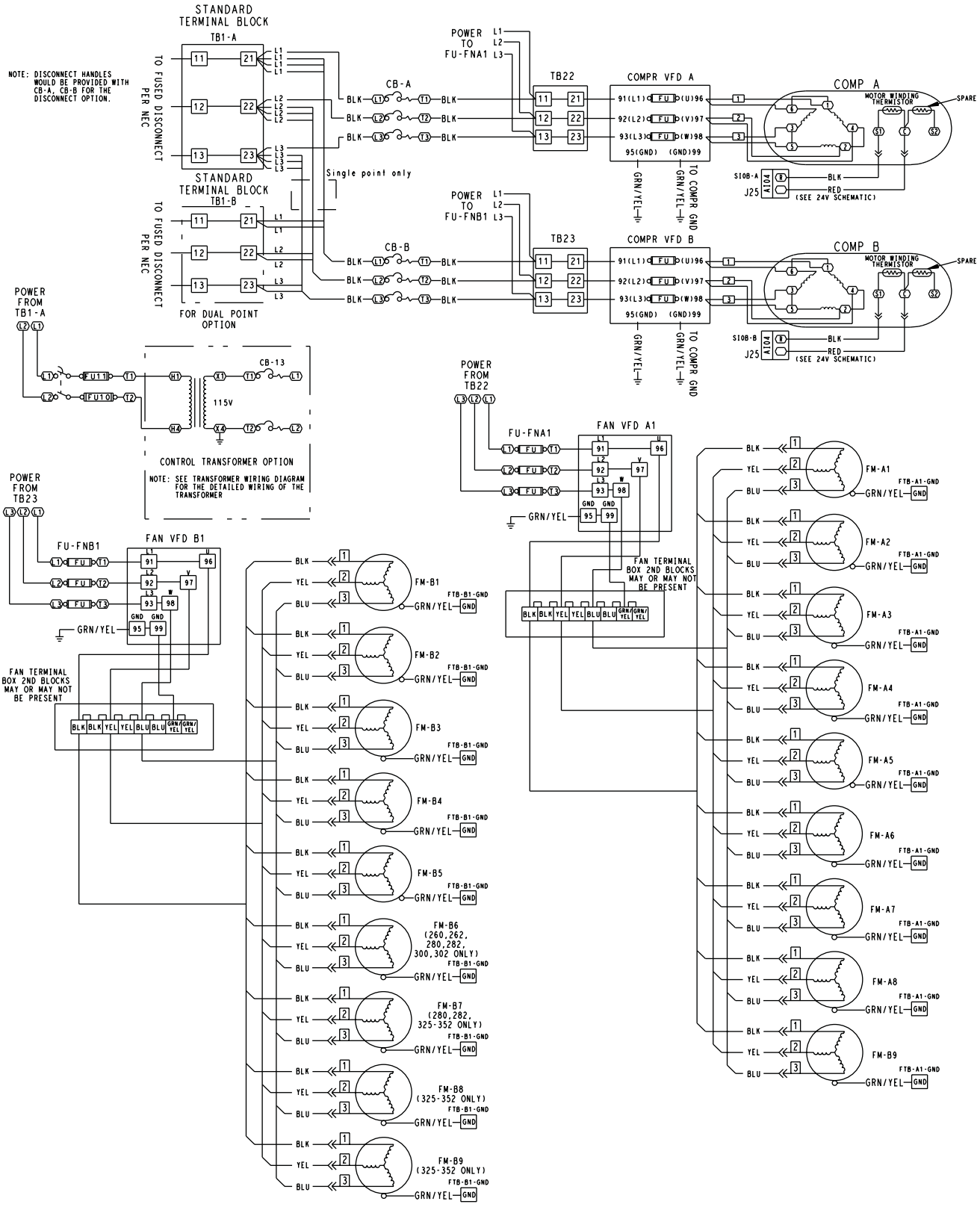
NOTE: See Legend on page 100.

Fig. 79 — 30XA with Greenspeed® Intelligence Low Voltage Control Schematic, Auxiliary Boards



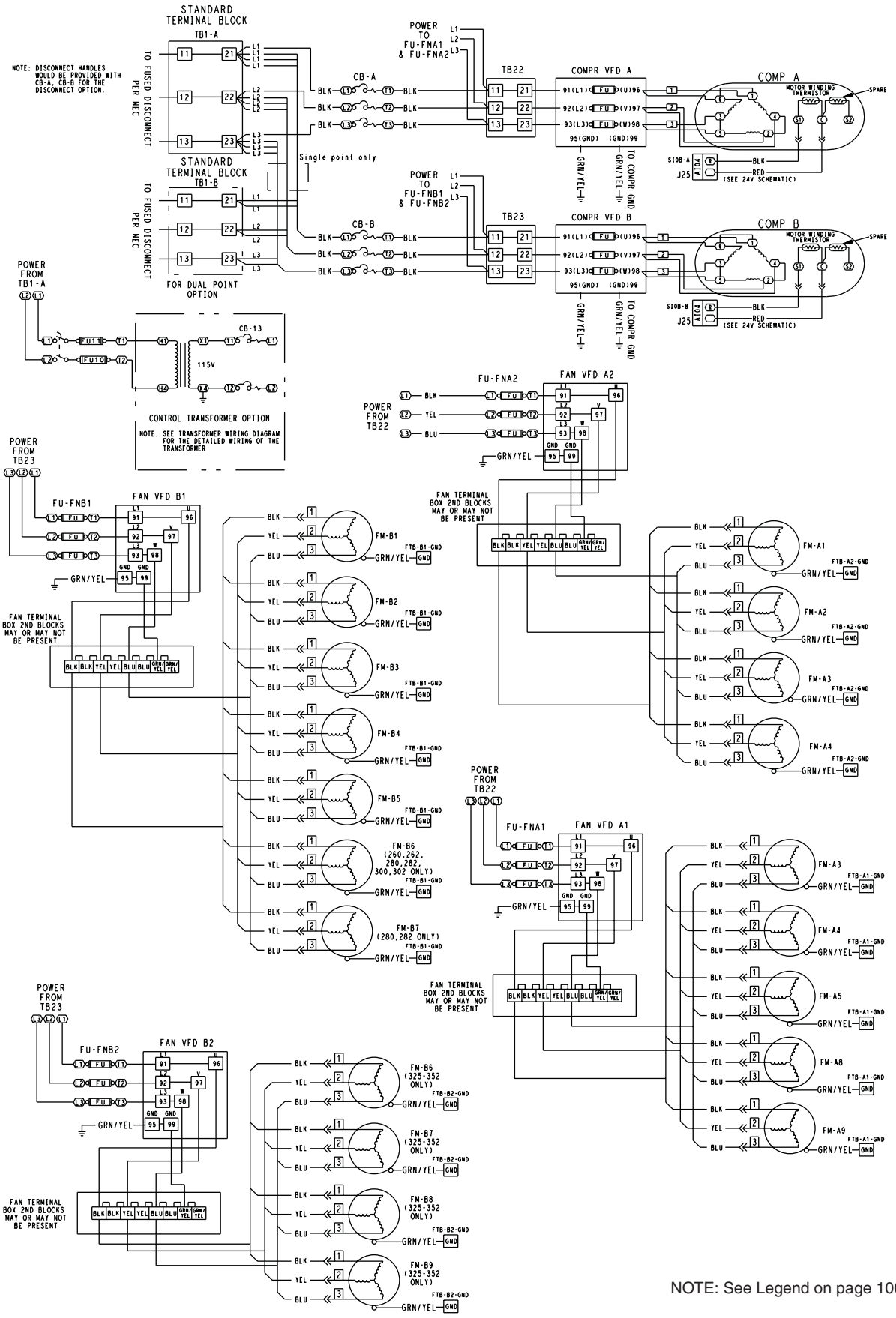
NOTE: See Legend on page 100.

Fig. 80 — 30XA with Greenspeed® Intelligence 140-242 Ton Power Schematic (380/460/575v)



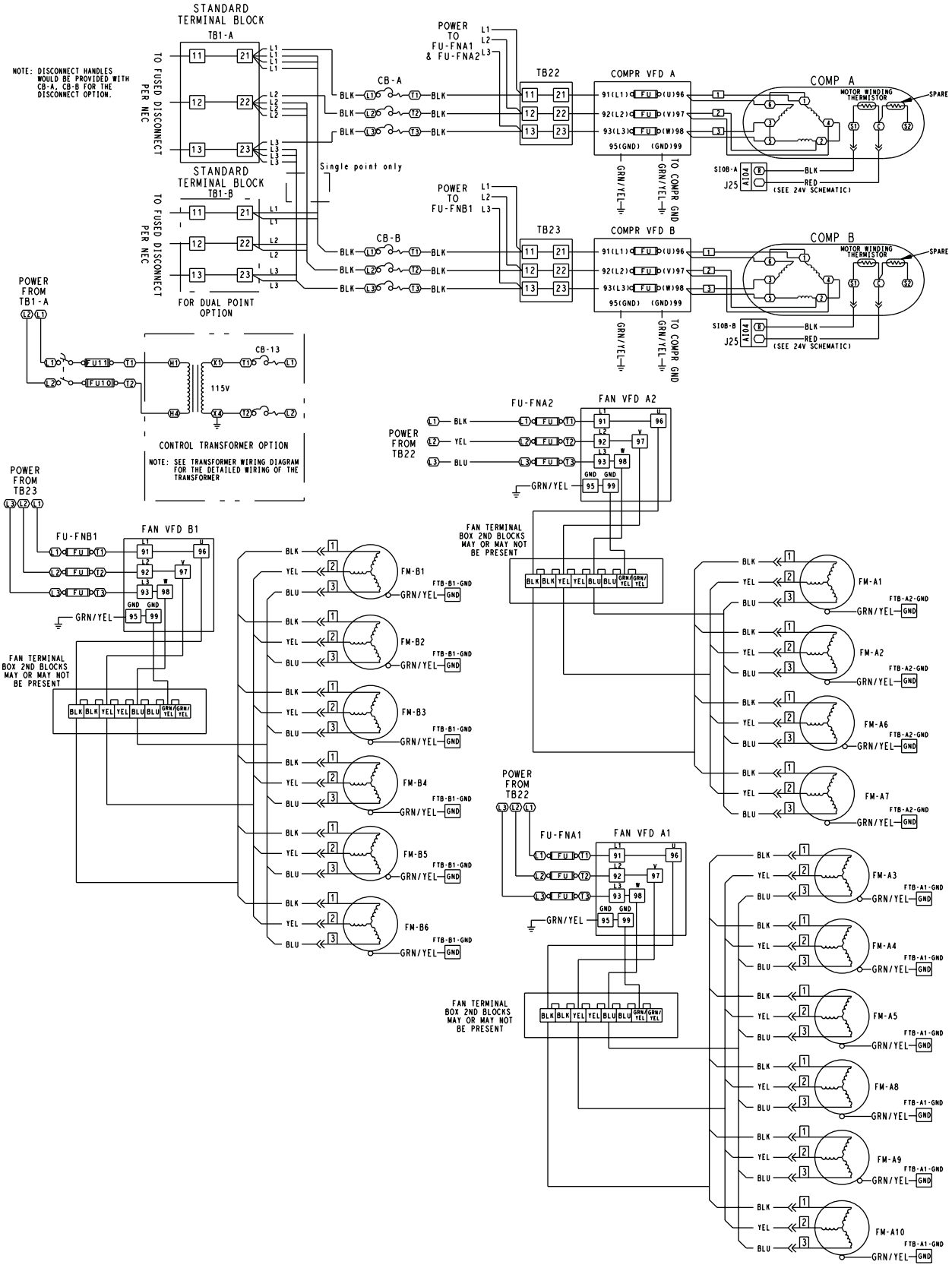
NOTE: See Legend on page 100.

Fig. 81 — 30XA with Greenspeed® Intelligence 260-282, 325-352 Ton Power Schematic (460v)



NOTE: See Legend on page 100.

Fig. 82 — 30XA with Greenspeed® Intelligence 260-282, 325-352 Ton Power Schematic (380/575v)



NOTE: See Legend on page 100.

Fig. 83 — 30XA with Greenspeed® Intelligence 300 Ton Power Schematic (380/460/575v)

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES

GENERAL PARAMETERS

CCN TABLE NAME: GENUNIT

TABLE TYPE: 11H

TOUCH PILOT PATH: Main Menu → General Parameters

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Local=0 Net.=1 Remote=2	CTRL_TYP	0 to 3			RO
2	Run Status	STATUS				RO
3	Net.: Cmd Start/Stop	CHIL_S_S	0 to 1			RO
4	Net.: Cmd Occupied	CHIL_OCC	0 to 1			RO
5	Minutes Left for Start	min_left			min	RO
6	Heat/Cool status	HEATCOOL				RO
7	Heat/Cool Select	HC_SEL	0 to 2	0		RO
8	0=Cool. 1=Heat. 2=Auto		text 8 char			
9	Setpoint Select	SP_SEL	0 to 2	0		RW
10	0=Auto. 1=Spt1. 2=Spt2		text 8 char			
11	Setpoint Occupied?	SP_OCC	0 to 1			RO
12	Percent Total Capacity	CAP_T			%	RO
13	Current Setpoint	SP			°F	RO
14	Control Point	CTRL_PNT	–4.0 to 153.0		°F	RO
15	Actual Chiller Current	TOT_CURR			amp	RO
16	Chiller Power Limit	POW_LIM	0 to 2000		kW	RO
17	Cool. Power (kit hydro)*	COOL_POW			kW	RO
18	Emergency Stop	EMSTOP	0 to 1			RO
19	Active Demand Limit Val	DEM_LIM	0 to 100		%	RO

GENERAL CONFIGURATION

CCN TABLE NAME: GEN_CONF

TABLE TYPE: 12H

TOUCH PILOT PATH: Main Menu → Configuration Menu → General Configuration

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Cir Priority Sequence	prio_cir	0 to 2	0		RW
2	0=Auto, 1=A Prio					
3	2=B Prio					
4	Staged Loading Sequence*	seq_typ*	0 to 1	0		RW
5	Ramp Loading Select	ramp_sel	No/Yes	0 (No)		RW
6	Unit Off to On Delay	off_on_d	1 to 15	1	min.	RW
7	Demand Limit Type Select	lim_sel	0 to 2	0		RW
8	0 = None					
9	1 = Switch Control					
10	2 = 4 to 20mA Control					
11	Night Mode Start Hour	nh_start		0		RW
12	Night Mode End Hour	nh_end		0		RW
13	Night Capacity Limit	nh_limit	0 to 100	100	%	RW
14	Power Limit select	pow_sel	0 to 1	0		RW
15	Ice Mode Enable	ice_cnfg	0 to 1	0		RW
16	Maximum Power Limit	pow_max	0 to 2000	2000	kW	RW
17	Short Cycle Management	shortcyc	0 to 1	0		RW

*Not currently active

LEGEND

RO — Read Only
RW — Read/Write

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

PUMP CONFIGURATION

CCN TABLE NAME: PUMPCONF
TABLE TYPE: 10H
TOUCH PILOT PATH: Main Menu → Configuration Menu → Pump Configuration

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Cooler Pumps Sequence	cpumpseq	0 to 4	0		RW
2	0 = No Pump					
3	1 = One Pump Only					
4	2 = Two Pumps Auto					
5	3 = Pump#1 Manual					
6	4 = Pump#2 Manual					
7	Pump Auto Rotation Delay	pump_del	24 to 3000	48	hours	RW
8	Pump Sticking Protection	pump_per	No/Yes	0 (No)		RW
9	Stop Pump During Standby	pump_sby	No/Yes	0 (No)		RW
10	Flow Checked If Pump Off	pump_loc	No/Yes	1 (Yes)		RW
11	Cooler Pump Off In Heat	stopheat	No/Yes	0 (No)		RW
12	Cond Pump Off In Cool	stopcool	No/Yes	0 (No)		RW
13	VSPump regulation config	varipump	1 to 3	1		RW
14	Kit Hydro Pump Type	pumptype	1			RW

USER CONFIGURATION

CCN TABLE NAME: USERCONF
TABLE TYPE: 10H
TOUCH PILOT PATH: Main Menu → Configuration Menu → User Configuration

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	User Password	use_pass	1 to 9999	11		RW

RESET CONFIGURATION

CCN TABLE NAME: RESETCFG
TABLE TYPE: 10H
TOUCH PILOT PATH: Main Menu → Configuration Menu → Reset Configuration

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Cooling Reset Select	cr_sel	0 to 4	0		RW
2	Heating Reset Select	hr_sel	0 to 4	0		RW
3	0 = Non, 1 = OAT					
4	2 = Delta T, 4 = Space Temp					
5	3 = 4 to 20 mA control					
6						
7	Cooling					
8	OAT No Reset Value	oat_crno	14 to 125	14 (–10)	°F (°C)	RW
9	OAT Full Reset Value	oat_crfu	14 to 125	14 (–10)	°F (°C)	RW
10	Delta T No Reset Value	dt_cr_no	0 to 25	0	^F (^C)	RW
11	Delta T Full Reset Value	dt_cr_fu	0 to 25	0	^F	RW
12	Current No Reset Value	v_cr_no	0 to 20	0	mA	RW
13	Current Full Reset Value	v_cr_fu	0 to 20	0	mA	RW
14	Space T No Reset Value	spacr_no	14 to 125	14 (–10)	°F (°C)	RW
15	Space T Full Reset Value	spacr_fu	14 to 125	14 (–10)	°F (°C)	RW
16	Cooling Reset Deg. Value	cr_deg	–30 to 30	0	°F (°C)	RW
17						
18	Heating					
19	OAT No Reset Value	oat_crno	14 to 125	14 (–10)	°F (°C)	RW
20	OAT Full Reset Value	oat_crfu	14 to 125	14 (–10)	°F (°C)	RW
21	Delta T No Reset Value	dt_cr_no	0 to 25	0	^F (^C)	RW
22	Delta T Full Reset Value	dt_cr_fu	0 to 25	0	^F (^C)	RW
23	Current No Reset Value	v_cr_no	0 to 20	0	mA	RW
24	Current Full Reset Value	v_cr_fu	0 to 20	0	mA	RW
25	Space T No Reset Value	spacr_no	14 to 125	14 (–10)	°F (°C)	RW
26	Space T Full Reset Value	spacr_fu	14 to 125	14 (–10)	°F (°C)	RW
27	Heating Reset Deg. Value	hr_deg	–30 to 30	0	°F (°C)	RW

LEGEND

RO — Read Only
RW — Read/Write

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

TEMPERATURES

CCN TABLE NAME: TEMP
TABLE TYPE: 11H
TOUCH PILOT PATH: Main Menu → Temperatures

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Cooler Entering Fluid	COOL_EWT			°F (°C)	RO
2	Cooler Leaving Fluid	COOL_LWT			°F (°C)	RO
3	Outdoor Air Temperature	OAT			°F (°C)	RO
4	Saturated Cond Tmp cir A	SCT_A			°F (°C)	RO
5	Saturated Suction Temp A	SST_A			°F (°C)	RO
6	Saturated Liquid Temp A	SLT_A			°F (°C)	RO
7	Compressor Suction Tmp A	SUCT_A			°F (°C)	RO
8	Discharge Gas Temp cir A	DGT_A			°F (°C)	RO
9	Motor Temperature cir A	CP_TMP_A			°F (°C)	RO
10	EXV Eco. Tmp cir A	ECO_T_A			°F (°C)	RO
11	Liquid Temperature A	LIQ_T_A			°F (°C)	RO
12	Saturated Cond Tmp cir B	SCT_B			°F (°C)	RO
13	Saturated Suction Temp B	SST_B			°F (°C)	RO
14	Saturated Liquid Temp B	SLT_B			°F (°C)	RO
15	Compressor Suction Tmp B	SUCT_B			°F (°C)	RO
16	Discharge Gas Temp cir B	DGT_B			°F (°C)	RO
17	Motor Temperature cir B	CP_TMP_B			°F (°C)	RO
18	EXV Eco. Tmp cir B	ECO_T_B			°F (°C)	RO
19	Liquid Temperature B	LIQ_T_B			°F (°C)	RO
20	Optional Space Temp	SPACETMP			°F (°C)	RO
21	CHWS Temperature	CHWSTEMP			°F (°C)	RO
22	Cooler Heater Temp	T_HEATER			°F (°C)	RO

PRESSURES

CCN TABLE NAME: PRESSURE
TABLE TYPE: 11H
TOUCH PILOT PATH: Main Menu → Pressures

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Discharge Pressure A	DP_A			psi (kPa)	RO
2	Main Suction Pressure A	SP_A			psi (kPa)	RO
3	Oil Pressure A	OP_A			psi (kPa)	RO
4	Oil Pressure DifferenceA	DOP_A			psi (kPa)	RO
5	Economizer Pressure A	ECO_P_A			psi (kPa)	RO
6	Liquid Pressure A	LIQ_P_A			psi (kPa)	RO
7	Discharge Pressure B	DP_B			psi (kPa)	RO
8	Main Suction Pressure B	SP_B			psi (kPa)	RO
9	Oil Pressure B	OP_B			psi (kPa)	RO
10	Oil Pressure DifferenceB	DOP_B			psi (kPa)	RO
11	Economizer Pressure B	ECO_P_B			psi (kPa)	RO
12	Liquid Pressure B	LIQ_P_B			psi (kPa)	RO
13	Entering Water Pressure	WATPRES1			psi (kPa)	RO
14	Leaving Water Pressure	WATPRES2			psi (kPa)	RO
15	Water pressure 3	WATPRES3			psi (kPa)	RO
16	Water pressure 4	WATPRES4			psi (kPa)	RO

LEGEND

RO — Read Only
RW — Read/Write

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

INPUTS STATUS

CCN TABLE NAME: INPUTS
TABLE TYPE: 11H
TOUCH PILOT PATH: Main Menu → Inputs Status

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Remote On/Off Switch	ONOFF_SW	Open/Close			RO
2	Remote Setpoint Switch	SETP_SW	Open/Close			RO
3	Limit Switch 1	LIM_SW1	Open/Close			RO
4	Limit Switch 2	LIM_SW2	Open/Close			RO
5	Oil Level Input A	OIL_L_A	Open/Close			RO
6	Oil Level Input B	OIL_L_B	Open/Close			RO
7	Reset/Setpnt 4 to 20 mA Sgnl	SP_RESET			mA	RO
8	Limit 4 to 20 mA Signal	LIM_ANAL			mA	RO
9	Leakage detector 1 val	leak_v			Volts	RO
10	Leakage detector 2 val	leak_2_v			Volts	RO
11	Customer Interlock	REM_LOCK	Open/Close			RO
12	Ice Done Storage Switch	ICE_SW	Open/Close			RO
13	Occupied Override Switch	OCC_OVSW	Open/Close			RO
14	Remote Reclaim Switch	RECL_SW	Open/Close			RO
15	Electrical Box Interlock	ELEC_BOX	Open/Close			RO
16	Cooler Heater Detector	HEATR_SW	Open/Close			RO
17	BACnet Dongle	bacdongl	No/Yes			RO

OUTPUTS STATUS

CCN TABLE NAME: OUTPUTS
TABLE TYPE: 11H
TOUCH PILOT PATH: Main Menu → Outputs Status

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Compressor A	CP_A	Off/On			RO
2	Oil Solenoid Output A	OIL_SL_A	Off/On			RO
3	Slide Valve 1 Output A	SLID_1_A	Off/On			RO
4	Slide Valve 2 Output A	SLID_2_A	Off/On			RO
5	Capacity Signal Cir A	CAPT010A			Volts	RO
6	VariFan Speed A	VFAN_A			%	RO
7	Ref Iso Valve Close A	ISO_CL_A	Off/On			RO
8	Ref Iso Valve Open A	ISO_OP_A	Off/On			RO
9	Ref Iso Valve pos. A	ISO_POSA	Close/Open			RO
10	Oil Heater Output A	OIL_HT_A	Off/On			RO
11	Compressor B	CP_B	Off/On			RO
12	Oil Solenoid Output B	OIL_SL_B	Off/On			RO
13	Slide Valve 1 Output B	SLID_1_B	Off/On			RO
14	Slide Valve 2 Output B	SLID_2_B	Off/On			RO
15	Capacity Signal Cir B	CAPT010B			Volts	RO
16	VariFan Speed B	VFAN_B	Off/On		%	RO
17	Ref Iso Valve Close B	ISO_CL_B	Off/On			RO
18	Ref Iso Valve Open B	ISO_OP_B	Close/Open			RO
19	Ref Iso Valve pos. B	ISO_POSB	Off/On			RO
20	Oil Heater Output B	OIL_HT_B	Off/On			RO
21	Chiller Capacity signal	CAPT_010			Volts	RO
22	Alarm Relay Status	ALARM	Off/On			RO
23	Running Relay Status	RUNNING	Off/On			RO
24	Alert Relay State	ALERT	Off/On			RO
25	Shutdown Indicator State	SHUTDOWN	Off/On			RO
26	Cooler Heater Output	C_HEATER	Off/On			RO
27	Electrical box fan	ELECBFAN	Off/On			RO

LEGEND

RO — Read Only
RW — Read/Write

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

PUMP STATUS

CCN TABLE NAME: PUMPSTAT
TABLE TYPE: 11H
TOUCH PILOT PATH: Main Menu → Pump Status

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Cooler Flow Setpoint Out	SET_FLOW	No/Yes			RO
2	Cooler Pump #1 Command	CPUMP_1	0 to 1			RO
3	Cooler Pump #2 Command	CPUMP_2	0 to 1			RO
4	Rotate Cooler Pumps ?	ROTCPUMP	0 to 1			RO
5	Cooler Flow Switch	FLOW_SW	Open/Close			RO
6	Variable speed pump cmd	VPMP_CMD	0 to 100		%	RO
7	Cooler flow (kit hydro)	COOLFLOW			gps (Ls)	RO

RUN TIMES

CCN TABLE NAME: RUNTIME
TABLE TYPE: 11H
TOUCH PILOT PATH: Main Menu → Run Times

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Machine Operating Hours	HR_MACH			hours	RO
2	Machine Starts Number	st_mach				RO
3	Compressor A Hours	HR_CP_A			hours	RO
4	Compressor A Starts	st_cp_a				RO
5	Compressor B Hours	HR_CP_B				RO
6	Compressor B Starts	st_cp_b				RO
7	Cooler Pump #2 Hours	hr_cpum1			hours	RO
8	Cooler Pump #2 Hours	hr_cpum1			hours	RO
9	Circuit A Fan #1 Hours	hrfana1			hours	RO
10	Circuit A Fan #2 Hours	hrfana2			hours	RO
11	Circuit A Fan #3 Hours	hrfana3			hours	RO
12	Circuit A Fan #4 Hours	hrfana4			hours	RO
13	Circuit A Fan #5 Hours	hrfana5			hours	RO
14	Circuit A Fan #6 Hours	hrfana6			hours	RO
15	Circuit A Fan #7 Hours	hrfana7			hours	RO
16	Circuit A Fan #8 Hours	hrfana8			hours	RO
17	Circuit A Fan #9 Hours	hrfana9			hours	RO
18	Circuit A Fan #10 Hours	hrfana10			hours	RO
19	Circuit A Fan #11 Hours	hrfana11			hours	RO
20	Circuit A Fan #12 Hours	hrfana12			hours	RO
21	Circuit A Fan #13 Hours	hrfana13			hours	RO
22	Circuit A Fan #14 Hours	hrfana14			hours	RO
23	Circuit B Fan #1 Hours	hrfanb1			hours	RO
24	Circuit B Fan #2 Hours	hrfanb2			hours	RO
25	Circuit B Fan #3 Hours	hrfanb3			hours	RO
26	Circuit B Fan #4 Hours	hrfanb4			hours	RO
27	Circuit B Fan #5 Hours	hrfanb5			hours	RO
28	Circuit B Fan #6 Hours	hrfanb6			hours	RO
29	Circuit B Fan #7 Hours	hrfanb7			hours	RO
30	Circuit B Fan #8 Hours	hrfanb8			hours	RO
31	Circuit B Fan #9 Hours	hrfanb9			hours	RO
32	Circuit B Fan #10 Hours	hrfanb10			hours	RO
33	Circuit B Fan #11 Hours	hrfanb11			hours	RO
34	Circuit B Fan #12 Hours	hrfanb12			hours	RO
35	Circuit B Fan #13 Hours	hrfanb13			hours	RO
36	Circuit B Fan #14 Hours	hrfanb14			hours	RO

LEGEND
RO — Read Only
RW — Read/Write

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

MODES

CCN TABLE NAME: MODES
TABLE TYPE: 11H
TOUCH PILOT PATH: Main Menu → Modes

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Start Up Delay In Effect	m_delay	No/Yes			RO
2	Second Setpoint In Use	m_2stpt	No/Yes			RO
3	Reset In Effect	m_reset	No/Yes			RO
4	Demand limit active	m_demlim	No/Yes			RO
5	Cooler Pump Rotation	m_pmprot	No/Yes			RO
6	Pump Periodic Start	m_pmpper	No/Yes			RO
7	Night Low Noise Active	m_night	No/Yes			RO
8	Master Slave Active	m_slave	No/Yes			RO
9	Auto Changeover Active	m_autoch	No/Yes			RO
10	Condenser Pump Rotation	m_cpmpro	No/Yes			RO
11	Cond Pump Periodic Start	m_cpmppr	No/Yes			RO
12	Ice Mode In Effect	m_ice	No/Yes			RO

ALARMS

CCN TABLE NAME: ALARMRST
TABLE TYPE: 12H
TOUCH PILOT PATH: Alarm Button → Reset Alarms

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Alarm Reset	RST_ALM	0 to 1			R/W
2	Alarm State	ALM				RO
3	Current Alarm 1	alarm_1c				RO
4	Current Alarm 2	alarm_2c				RO
5	Current Alarm 3	alarm_3c				RO
6	Current Alarm 4	alarm_4c				RO
7	Current Alarm 5	alarm_5c				RO
8	Jbus Current Alarm 1	alarm_1				RO
9	Jbus Current Alarm 2	alarm_2				RO
10	Jbus Current Alarm 3	alarm_3				RO
11	Jbus Current Alarm 4	alarm_4				RO
12	Jbus Current Alarm 5	alarm_5				RO

LEGEND

RO — Read Only
RW — Read/Write

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

VLT [VFD] DRIVE MAINTENANCE

CCN TABLE NAME: VLT_DRV
TABLE TYPE: 12H
TOUCH PILOT PATH: Main Menu → Maintenance → VLT Drive Maintenance

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Cir A Drive Power	drv_pwra			kW	RO
2	Cir A Drive Amps	drv_Ia			amp	RO
3	Cir A Drive Voltage	drv_Va			Volts	RO
4	Cir A Drive Speed	drv_Sa			rpm	RO
5	Cir A Drive Frequency	drv_Fa			Hz	RO
6	Cir A Drive Torque	drv_Ta				RO
7	Cir A Drive DC Link Volt	drv_DCVa			Volts	RO
8	Cir A Drive Heat Sink T	drv_HSTa			°F (°C)	RO
9	Cir A Drive Ctrl Card T	drv_CCTa			°F (°C)	RO
10	Cir A Drive Heater	drv_HTRa				RO
11	Cir B Drive Power	drv_pwrb			kW	RO
12	Cir B Drive Amps	drv_Ib			amp	RO
13	Cir B Drive Voltage	drv_Vb			Volts	RO
14	Cir B Drive Speed	drv_Sb			rpm	RO
15	Cir B Drive Frequency	drv_Fb			Hz	RO
16	Cir B Drive Torque	drv_Tb				RO
17	Cir B Drive DC Link Volt	drv_DCVb			Volts	RO
18	Cir B Drive Heat Sink T	drv_HSTb			°F (°C)	RO
19	Cir B Drive Ctrl Card T	drv_CCTb			°F (°C)	RO
20	Cir B Drive Heater	drv_HTRb				RO
21	Drive A Attach	SET_DRVA	0 to 1	0		RW
22	Drive B Attach	SET_DRVB	0 to 1	0		RW
23	Comm with Drive A Ok	VLT_COMA	No/Yes			RO
24	Comm with Drive B Ok	VLT_COMB	No/Yes			RO

LAST POWER ON RESET

CCN TABLE NAME: LAST_POR
TABLE TYPE: 12H
TOUCH PILOT PATH: Main Menu → Maintenance → Last Power On Reset

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Power On 1:day-mon-year	date_on1				RO
2	Power On 1:hour-minute	time_on1				RO
3	PowerDown 1:day-mon-year	date_of1				RO
4	PowerDown 1:hour-minute	time_of1				RO
5	Power On 2:day-mon-year	date_on2				RO
6	Power On 2:hour-minute	time_on2				RO
7	PowerDown 2:day-mon-year	date_of2				RO
8	PowerDown 2:hour-minute	time_of2				RO
9	Power On 3 :day-mon-year	date_on3				RO
10	Power On 3 :hour-minute	time_on3				RO
11	PowerDown 3:day-mon-year	date_of3				RO
12	PowerDown 3:hour-minute	time_of3				RO
13	Power On 4:day-mon-year	date_on4				RO
14	Power On 4:hour-minute	time_on4				RO
15	PowerDown 4:day-mon-year	date_of4				RO
16	PowerDown 4:hour-minute	time_of4				RO
17	Power On 5:day-mon-year	date_on5				RO
18	Power On 5:hour-minute	time_on5				RO
19	PowerDown 5:day-mon-year	date_of5				RO
20	PowerDown 5:hour-minute	time_of5				RO

LEGEND
RO — Read Only
RW — Read/Write

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

EXV CONTROL

CCN TABLE NAME: EXV_CTRL

TABLE TYPE: 12H

TOUCH PILOT PATH: Main Menu → Maintenance → EXV Control

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Circuit A					
2	EXV Override Circuit A	ov_exv_a				RO
3	EXV Position Circuit A	EXV_A			%	RO
4	Discharge Superheat A	DSH_A			^F (^C)	RO
5	Suction Superheat A	SH_A			^F (^C)	RO
6	Cooler ExchangeDT Cir A	pinch_a			^F (^C)	RO
7	Pinch Filtering A	pinchfa			^F (^C)	RO
8	Cooler Pinch Ctl Point A	pinc_spa			^F (^C)	RO
9	Subcooling circuit A	subcoola			^F (^C)	RO
10	Subcooling setpoint A	subc_spa			^F (^C)	RO
11	EXV State A	state_a				RO
12	EXV Previous State A	lstate_a				RO
13	EXV Wished Position A	wpos_a				RO
14	EXV Mode A	text_a				RO
15	Circuit B					
16	EXV Override Circuit B	ov_exv_b				RO
17	EXV Position Circuit B	EXV_B			%	RO
18	Discharge Superheat B	DSH_B			^F (^C)	RO
19	Suction Superheat B	SH_B			^F (^C)	RO
20	Cooler ExchangeDT Cir B	pinch_b			^F (^C)	RO
21	Pinch Filtering B	pinchfb			^F (^C)	RO
22	Cooler Pinch Ctl Point B	pinc_spb			^F (^C)	RO
23	Subcooling circuit B	subcoolb			^F (^C)	RO
24	Subcooling setpoint B	subc_spb			^F (^C)	RO
25	EXV State B	state_b				RO
26	EXV Previous State B	lstate_b				RO
27	EXV Wished Position B	wpos_b				RO
28	EXV Mode B	text_b				RO

LEGEND

RO — Read Only
RW — Read/Write

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

QUICK TEST TABLE

CCN TABLE NAME: QCK_TEST

TABLE TYPE: 12H

TOUCH PILOT PATH: Main Menu → Quick Test Table

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Unit must be in Loff					
2	Quick test enable	QCK_TEST	0 to 1			RW
3	Circuit A EXV Position	Q_EXVA	0 to 100		%	RW
4	Circuit A Oil Solenoid	Q_OILS_A	0 to 1			RW
5	Circuit A Slide Valve 1	Q_SLI_1A	0 to 1			RW
6	Circuit A Slide Valve 2	Q_SLI_2A	0 to 1			RW
7	Capacity cirA Output	Q_010_A	0 to 1		%	RW
8	Comp A Running Output	Q_COMPA	0 to 1			RW
9	EXV Eco Position Cir A	Q_ECO_A	0 to 100		%	RW
10	Oil Heater Circuit A	Q_OILHTA	0 to 1			RW
11	Isolation valve pos. A	Q_ISOP_A	0 to 1			RW
12	VariFan Speed A	Q_VFAN_A	0 to 100		%	RW
13	Circuit B EXV Position	Q_EXVB	0 to 100		%	RW
14	Circuit B Oil Solenoid	Q_OILS_B	0 to 1			RW
15	Circuit B Slide Valve 1	Q_SLI_1B	0 to 1			RW
16	Circuit B Slide Valve 2	Q_SLI_2B	0 to 1			RW
17	Capacity cirB Output	Q_010_B	0 to 1		%	RW
18	Comp B Running Output	Q_COMPB	0 to 1			RW
19	EXV Eco Position Cir B	Q_ECO_B	0 to 100		%	RW
20	Oil Heater Circuit B	Q_OILHTB	0 to 1			RW
21	Isolation valve pos. B	Q_ISOP_B	0 to 1			RW
22	VariFan Speed B	Q_VFAN_B	0 to 100		%	RW
23	Variable speed pump cmd	Q_V_PUMP	0 to 100		%	RW
24	Cooler Heater	Q_CL_HTR	0 to 1			RW
25	Cooler Pump 1	Q_CPMP1	0 to 2			RW
26	Cooler Pump 2	Q_CPMP2	0 to 2			RW
27	Alarm Relay Status	Q_ALARM	0 to 1			RW
28	Shutdown Relay Status	Q_SHUTD	0 to 1			RW
29	Running Relay Status	Q_RUN	0 to 1			RW
30	Alert Relay Switch	Q_ALERT	0 to 1			RW
31	Set Flow Switch	Q_SETFLO	0 to 1			RW
32	Capacity Total Output	Q_CAP010	0 to 100		%	RW
33	Electrical box fan	Q_BOXFAN	0 to 1			RW

LEGEND

RO — Read Only
RW — Read/Write

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

MASTER SLAVE CONTROL

CCN TABLE NAME: M_MSTSLV

TABLE TYPE: 12H

TOUCH PILOT PATH: Main Menu → Maintenance Menu → Master Slave Control

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	MASTER/SLAVE CONTROL					RO
2	Unit is Master or Slave	mstslv				RO
3	Master Control Type	ms_ctrl				RO
4	Master/Slave Ctrl Active	ms_activ	False/True			RO
5	Lead Unit is the:	lead_sel	Master/Slave			RO
6	Slave Chiller State	slv-stat				RO
7	Slave Chiller Total Cap	slv_capt			%	RO
8	Lag Start Delay	l-strt_d			min	RO
9	Lead/Lag Hours Delta	ll_hr-d			hours	RO
10	Lead/Lag Changeover?	No/Yes				RO
11	Lead Pulldown?	No/Yes				RO
12	Master/Slave Error	ms_error				RO
13	Max Available Capacity?	cap_max	No/Yes			RO
14	Slave lagstat	lagstat				RO
15	Slave Operating Hours	slav-hr			hours	RO
16	Slave Cooler Ent. Fluid	slave_ewt			°F (°C)	RO
17	Slave Cooler Leav. Fluid	slave_lwt			°F (°C)	RO

CAPACITY CONTROL

CCN TABLE NAME: CAPACTRL

TABLE TYPE: 12H

TOUCH PILOT PATH: Main Menu → Maintenance Menu → Capacity Control

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Controlled Water Temp	ctrl_wt			°F (°C)	RO
2	Ctrl Water Temp, deg/min	cwt_rate			^F (^C)	RO
3	Current Capacity Limit	cap_lim			%	RO
4	Wished sldv duty cycle A	sldvcmda			%	RO
5	Wished Frequency cmp A	drvcmda			Hz	RO
6	Capa Ctrl State Text A	capstata				RO
7	Capacity Ctrl State A	capmoda				RO
8	Last Capa Ctrl State A	lcapmoda				RO
9	Override Capacity A	overrida				RO
10	Estimated Capacity A	cap_pc_a				RO
11	Full load current A	cur_FL_a			amps	RO
12	Wished sldv duty cycle B	sldvcmdb			%	RO
13	Wished Frequency cmp B	drvcmdb			Hz	RO
14	Capa Ctrl State Text B	capstatb				RO
15	Capacity Ctrl State B	capmodb				RO
16	Last Capa Ctrl State B	lcapmodb				RO
17	Override Capacity B	overridb				RO
18	Estimated Capacity B	cap_pc_b			%	RO
19	Full load current B	cur_FL_b			amps	RO
20	Reset Amount	reset			^F (^C)	RO
21	Circuit Running Number	CirRunNb				RO
22	State of Circuit A	StatCirA				RO
23	State of Circuit B	StatCirB				RO
24	Dual Circuit Master	DualMast				RO

LEGEND

RO — Read Only
RW — Read/Write

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

CONTROL LIMITS

CCN TABLE NAME: LIMITS

TABLE TYPE: 12H

TOUCH PILOT PATH: Main Menu → Maintenance Menu → Control Limits

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	EXV_dsh_act A	dshacta			^F (^C)	RO
2	EXV_dsh_stp A	dshstpa			^F (^C)	RO
3	EXV_lsp_act A	elspacta			psi (kPa)	RO
4	EXV_lsp_stp A	elspstpa			psi (kPa)	RO
5	Cdp_act A	dpacta			psi (kPa)	RO
6	Cdp_stp A	dpstpa			psi (kPa)	RO
7	Clsp_act A	clspacta			psi (kPa)	RO
8	Clsp_stp A	clspstpa			psi (kPa)	RO
9	Chsp_act A	chspacta			psi (kPa)	RO
10	Chsp_stp A	chspstpa			psi (kPa)	RO
11	Fan low dp_act A	fldpacta			psi (kPa)	RO
12	Fan low dp_stp A	fldpstpa			psi (kPa)	RO
13	Fan high dp_act A	fhdpacta			psi (kPa)	RO
14	Fan high dp_stp A	fhdpstpa			psi (kPa)	RO
15	Fan dgt_act A	fdgtacta			°F (°C)	RO
16	Fan dgt_stp A	fdgtstpa			°F (°C)	RO
17	EXV_dsh_act B	dshactb			^F (^C)	RO
18	EXV_dsh_stp B	dshstpb			^F (^C)	RO
19	EXV_lsp_act B	elspactb			psi (kPa)	RO
20	EXV_lsp_stp B	elspstpb			psi (kPa)	RO
21	Cdp_act B	dpactb			psi (kPa)	RO
22	Cdp_stp B	dpstpb			psi (kPa)	RO
23	Clsp_act B	clspactb			psi (kPa)	RO
24	Clsp_stp B	clspstpb			psi (kPa)	RO
25	Chsp_act B	chspactb			psi (kPa)	RO
26	Chsp_stp B	chspstpb			psi (kPa)	RO
27	Fan low dp_act B	fldpactb			psi (kPa)	RO
28	Fan low dp_stp B	fldpstpb			psi (kPa)	RO
29	Fan high dp_act B	fhdpactb			psi (kPa)	RO
30	Fan high dp_stp B	fhdpstpb			psi (kPa)	RO
31	Fan dgt_act B	fdgtactb			°F (°C)	RO
32	Fan dgt_stp B	fdgtstpb			°F (°C)	RO
33	Cool_lwt_act	clwtact			°F (°C)	RO
34	Cool_lwt_stp	clwtstp			°F (°C)	RO

LEGEND

RO — Read Only
RW — Read/Write

EXV ECO. CONTROL

CCN TABLE NAME: ECO_CTRL
TABLE TYPE: 12H
TOUCH PILOT PATH: Main Menu → Maintenance Menu → EXV Eco. Control

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Circuit A					RO
2	EXV Eco Override Cir A	ov_eco_a				RO
3	EXV Eco Position Cir A	eco_a			%	RO
4	Eco Suction Superheat A	eco_sh_a			^F (^C)	RO
5	Eco Suction SH setpt A	esh_sp_a			^F (^C)	RO
6	EXV Eco State A	state_a				RO
7	EXV Eco Previous State A	lstate_a				RO
8	EXV Eco Wished Pos A	wpos_a				RO
9	EXV Eco Mode A					RO
10	Circuit B					RO
11	EXV Eco Override Cir B	ov_eco_b				RO
12	EXV Eco Position Cir B	eco_b			%	RO
13	Eco Suction Superheat B	eco_sh_b			^F (^C)	RO
14	Eco Suction SH setpt B	esh_sp_b			^F (^C)	RO
15	EXV Eco State B	state_b				RO
16	EXV Eco Previous State B	lstate_b				RO
17	EXV Eco Wished Pos B	wpos_b				RO
18	EXV Eco Mode B	text_b				RO

FAN CONTROL

CCN TABLE NAME: FAN_CTRL
TABLE TYPE: 12H
TOUCH PILOT PATH: Main Menu → Maintenance Menu → Fan Control

LINE	MENU TEXT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Fan Freq Cir A	fan_f_a			Hz	RO
2	Fan State A	state_a				RO
3	Fan Previous State A	lstate_a				RO
4	Fan Wished Freq A	wfan_f_a			Hz	RO
5	Fan Mode A	text_a				RO
6	Fan Freq Cir B	fan_f_b			Hz	RO
7	Fan State B	state_b				RO
8	Fan Previous State B	lstate_b				RO
9	Fan Wished Freq B	wfan_f_b			Hz	RO
10	Fan Mode B	text_b				RO

LEGEND

RO — Read Only
RW — Read/Write

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

FAN DRIVE MAINTENANCE

CCN TABLE NAME: FAN_DRV

TABLE TYPE: 12H

TOUCH PILOT PATH: Main Menu → Maintenance Menu → Fan Drive Maintenance

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Fan Drive Power A1	fd_pwra1			kW	RO
2	Fan Drive Amps A1	fd_Ia1			amps	RO
3	Fan Drive Voltage A1	fd_Va1			Volts	RO
4	Fan Drive Speed A1	fd_Sa1			rpm	RO
5	Fan Drive Frequency A1	fd_Fa1			Hz	RO
6	Fan Drive Torque A1	fd_Ta1				RO
7	Fan Drv DC Link Volt A1	fd_DCVa1			Volts	RO
8	Fan Drive Heat Sink T A1	fd_HSTa1			°F (°C)	RO
9	Fan Drive Ctrl Card T A1	fd_CCTa1			°F (°C)	RO
10	Fan Drive Power A2	fd_pwra2			kW	RO
11	Fan Drive Amps A2	fd_Ia2			amps	RO
12	Fan Drive Voltage A2	fd_Va2			Volts	RO
13	Fan Drive Speed A2	fd_Sa2			rpm	RO
14	Fan Drive Frequency A2	fd_Fa2			Hz	RO
15	Fan Drive Torque A2	fd_Ta2				RO
16	Fan Drv DC Link Volt A2	fd_DCVa2			Volts	RO
17	Fan Drive Heat Sink T A2	fd_HSTa2			°F (°C)	RO
18	Fan Drive Ctrl Card T A2	fd_CCTa2			°F (°C)	RO
19	Fan Drive Power A3	fd_pwra3			kW	RO
20	Fan Drive Amps A3	fd_Ia3			amps	RO
21	Fan Drive Voltage A3	fd_Va3			Volts	RO
22	Fan Drive Speed A3	fd_Sa3			rpm	RO
23	Fan Drive Frequency A3	fd_Fa3			Hz	RO
24	Fan Drive Torque A3	fd_Ta3				RO
25	Fan Drv DC Link Volt A3	fd_DCVa3			Volts	RO
26	Fan Drive Heat Sink T A3	fd_HSTa3			°F (°C)	RO
27	Fan Drive Ctrl Card T A3	fd_CCTa3			°F (°C)	RO
28	Fan Drive Power B1	fd_pwrb1			kW	RO
29	Fan Drive Amps B1	fd_Ib1			amps	RO
30	Fan Drive Voltage B1	fd_Vb1			Volts	RO
31	Fan Drive Speed B1	fd_Sb1			rpm	RO
32	Fan Drive Frequency B1	fd_Fb1			Hz	RO
33	Fan Drive Torque B1	fd_Tb1				RO
34	Fan Drv DC Link Volt B1	fd_DCVb1			Volts	RO
35	Fan Drive Heat Sink T B1	fd_HSTb1			°F (°C)	RO
36	Fan Drive Ctrl Card T B1	fd_CCTb1			°F (°C)	RO
37	Fan Drive Power B2	fd_pwrb2			kW	RO
38	Fan Drive Amps B2	fd_Ib2			amps	RO
39	Fan Drive Voltage B2	fd_Vb2			Volts	RO
40	Fan Drive Speed B2	fd_Sb2			rpm	RO
41	Fan Drive Frequency B2	fd_Fb2			Hz	RO
42	Fan Drive Torque B2	fd_Tb2				RO
43	Fan Drv DC Link Volt B2	fd_DCVb2			Volts	RO
44	Fan Drive Heat Sink T B2	fd_HSTb2			°F	RO
45	Fan Drive Ctrl Card T B2	fd_CCTb2			°F	RO
46	Fan Drive Power B3	fd_pwrb3			kW	RO
47	Fan Drive Amps B3	fd_Ib3			amps	RO
48	Fan Drive Voltage B3	fd_Vb3			Volts	RO
49	Fan Drive Speed B3	fd_Sb3			rpm	RO
50	Fan Drive Frequency B3	fd_Fb3			Hz	RO
51	Fan Drive Torque B3	fd_Tb3				RO
52	Fan Drv DC Link Volt B3	fd_DCVb3			Volts	RO
53	Fan Drive Heat Sink T B3	fd_HSTb3			°F (°C)	RO
54	Fan Drive Ctrl Card T B3	fd_CCTb3			°F (°C)	RO

LEGEND

RO — Read Only
RW — Read/Write

FAN DRIVE ADDRESSING

CCN TABLE NAME: FAN_DRV2
TABLE TYPE: 12H
TOUCH PILOT PATH: Main Menu → Maintenance Menu → Fan Drive Addressing

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Fan Drive A1 Attach	SET_FDA1	0 to 1	0		RO
2	Fan Drive A2 Attach	SET_FDA2	0 to 1	0		RO
3	Fan Drive A3 Attach	SET_FDA3	0 to 1	0		RO
4	Fan Drive B1 Attach	SET_FDB1	0 to 1	0		RO
5	Fan Drive B2 Attach	SET_FDB2	0 to 1	0		RO
6	Fan Drive B3 Attach	SET_FDB3	0 to 1	0		RO
7	Comm Fan Drive A1 Ok	FD_COMA1	No/Yes			RO
8	Comm Fan Drive A2 Ok	FD_COMA2	No/Yes			RO
9	Comm Fan Drive A3 Ok	FD_COMA3	No/Yes			RO
10	Comm Fan Drive B1 Ok	FD_COMB1	No/Yes			RO
11	Comm Fan Drive B2 Ok	FD_COMB2	No/Yes			RO
12	Comm Fan Drive B3 Ok	FD_COMB3	No/Yes			RO
13	Force fan to 0 Hz cir A	stopfana	0 to 1	0		RO
14	Force fan to 0 Hz cir B	stopfanb	0 to 1	0		RO

FACTORY MENU

CCN TABLE NAME: FACTORY
TABLE TYPE: 13H
TOUCH PILOT PATH: Main Menu → Configuration Menu → Factory Menu

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Unit Type (Heatpump = 2)	unit_typ	1 to 2	1		RW
2	Unit Capacity	unitsize	0 to 2000	0		RW
3	Power Frequency 60Hz Sel	freq_60H	No/Yes	0		RW
4	Power Supply Voltage	voltage	0 to 700	400		RW
5	Factory Password	fac_pass	0 to 9999	113		RW
6	Energy Management Module	emm_nrcp	No/Yes	0		RW
7	Master Slave Selection	mst_slv	No/Yes	0		RW
8	Cooler Heater Select	heat_sel	0 to 2	0		RW
9	Cooler Pass Number	cpass_nb	1 to 3	2		RW
10	MCHX Exchanger Select	mchx_sel	0 to 1	1		RW
11	DX Cooler Select	dxcooler	0 to 1	0		RW
12	Country 0=EU, 1=US, 2=CH	country	0 to 2	0		RW
13	Kit Hydro option	kithydro	No/Yes	0		RW
14	VSPump option	varipump	No/Yes	0		RW
15	Fan Low Noise Option	lownoise	No/Yes	0		RW
16	Leakage Charge Detection	leak_chk	No/Yes	0		RW

FACTORY2 MENU

CCN TABLE NAME: FACTORY2
TABLE TYPE: 13H
TOUCH PILOT PATH: Main Menu → Configuration Menu → Factory2 Menu

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	EXV A Maximum Steps Number	exvmax_a	0 to 10000	4260		RW
2	EXV B Maximum Steps Number	exvmax_b	0 to 10000	4260		RW
3	Economizer A Steps Number	eco_cnfa	0 to 15000	2785		RW
4	Economizer B Steps Number	eco_cnfb	0 to 15000	2785		RW
5	Nb VFD Compressor	vfd_cmp	0 to 2	2		RW
6	Nb Fan Drive cir A	vfd_fana	0 to 3	Unit Dependent		RW
7	Nb Fan Drive cir B	vfd_fanb	0 to 3	Unit Dependent		RW

LEGEND

RO — Read Only
RW — Read/Write

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

SERVICE PARAMETERS

CCN TABLE NAME: SERVICE

TABLE TYPE: 13H

TOUCH PILOT PATH: Main Menu → Configuration Menu → Service Parameters

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Cooler Fluid Type	flui_typ	1 to 4	1		RW
2	Flow Switch Sp	flow_sp	0 to 60	0		RW
3	Condenser Fluid Type	cond_typ	1 to 2	1		RW
4	Entering Fluid Control	ewt_opt	0 to 1	0		RW
5	Brine Freeze Setpoint	freezesp	–20 to 34.0	34 (1.1)	°F (°C)	RW
6	Brine Minimum fluid temp	mini_lwt	–20 to 38.0	38 (3.3)	°F (°C)	RW
7	Prop PID gain varipump	pg_vpmp	–20 to 20.0	2		RW
8	Int PID gain varipump	ig_vpmp	–5 to 5.0	0.2		RW
9	Deri PID gain varipump	dg_vpmp	–20 to 20.0	0.4		RW
10	EXV Offset circuit A	exv_of_a	–100 to 100	0	%	RW
11	EXV Offset circuit B	exv_of_b	–100 to 100	0	%	RW
12	Varipump Min Speed	min_vpmp	0.0 to 100	0	%	RW
13	Varipump Max Speed	max_vpmp	20.0 to 100.0	100	%	RW
14	Fast Capacity Recovery	fastcapr	0 to 2	0		RW
15	EWT Probe on cir A side	ewt_cirA	0 to 1	1		RW
16	Service Password	ser_pass	0 to 9999	88		RW
17	Leakage Charge Threshold	leak_thr	0.0 to 10	2.5	Volts	RW
18	Leakage Charge Timer	leak_tmr	0 to 600	60	min	RW
19	RFI Filter	RFI_conf	0 to 1	1		RW
20	Metric Units?	metric	0 to 1	1		RW
21	Send fan drive config?	fdrv_cfg	0 to 1	1		RW
22	Send comp. Drive config?	cdrv_cfg	0 to 1	1		RW
23	Cooler Heater Delta Spt	heatersp	0.0 to 6.0	2		RW
24	Fan Offset circuit A	fan_of_a	–10.0 to 10.0	0	Hz	RW
25	Fan Offset circuit B	fan_of_b	–10.0 to 10.0	0	Hz	RW
26	Freeze override offset	freez_ov	0.0 to 5.8 (0.0 to 3.2)	0	^F (^C)	RW
27	QM Code	QM_code		0		RW

LEGEND

RO — Read Only
RW — Read/Write

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

UPDATE RUNNING HOUR

CCN TABLE NAME: UPDTHOUR

TABLE TYPE: 13H

TOUCH PILOT PATH: Main Menu → Configuration Menu → Update Running Hour

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Machine Operating Hours	hr_mach	0 to 9999999	0	hours	RW
2	Machine Starts Number	st_mach	0 to 9999999	0		RW
3	Compressor A Hours	hr_cp_a	0 to 9999999	0	hours	RW
4	Compressor A Starts	st_cp_a	0 to 9999999	0		RW
5	Compressor B Hours	hr_cp_b	0 to 9999999	0	hours	RW
6	Compressor B Starts	st_cp_b	0 to 9999999	0		RW
7	Cooler Pump #1 Hours	hr_cpum1	0 to 9999999	0	hours	RW
8	Cooler Pump #2 Hours	hr_cpum2	0 to 9999999	0	hours	RW
9	Circuit A Fan #1 Hours	hrfana1	0 to 9999999	0	hours	RW
10	Circuit A Fan #2 Hours	hrfana2	0 to 9999999	0	hours	RW
11	Circuit A Fan #3 Hours	hrfana3	0 to 9999999	0	hours	RW
12	Circuit A Fan #4 Hours	hrfana4	0 to 9999999	0	hours	RW
13	Circuit A Fan #5 Hours	hrfana5	0 to 9999999	0	hours	RW
14	Circuit A Fan #6 Hours	hrfana6	0 to 9999999	0	hours	RW
15	Circuit A Fan #7 Hours	hrfana7	0 to 9999999	0	hours	RW
16	Circuit A Fan #8 Hours	hrfana8	0 to 9999999	0	hours	RW
17	Circuit A Fan #9 Hours	hrfana9	0 to 9999999	0	hours	RW
18	Circuit A Fan #10 Hours	hrfana10	0 to 9999999	0	hours	RW
19	Circuit A Fan #11 Hours	hrfana11	0 to 9999999	0	hours	RW
20	Circuit A Fan #12 Hours	hrfana12	0 to 9999999	0	hours	RW
21	Circuit A Fan #13 Hours	hrfana13	0 to 9999999	0	hours	RW
22	Circuit A Fan #14 Hours	hrfana14	0 to 9999999	0	hours	RW
23	Circuit B Fan #1 Hours	hrfanb1	0 to 9999999	0	hours	RW
24	Circuit B Fan #2 Hours	hrfanb2	0 to 9999999	0	hours	RW
25	Circuit B Fan #3 Hours	hrfanb3	0 to 9999999	0	hours	RW
26	Circuit B Fan #4 Hours	hrfanb4	0 to 9999999	0	hours	RW
27	Circuit B Fan #5 Hours	hrfanb5	0 to 9999999	0	hours	RW
28	Circuit B Fan #6 Hours	hrfanb6	0 to 9999999	0	hours	RW
29	Circuit B Fan #7 Hours	hrfanb7	0 to 9999999	0	hours	RW
30	Circuit B Fan #8 Hours	hrfanb8	0 to 9999999	0	hours	RW
31	Circuit B Fan #9 Hours	hrfanb9	0 to 9999999	0	hours	RW
32	Circuit B Fan #10 Hours	hrfanb10	0 to 9999999	0	hours	RW
33	Circuit B Fan #11 Hours	hrfanb11	0 to 9999999	0	hours	RW
34	Circuit B Fan #12 Hours	hrfanb12	0 to 9999999	0	hours	RW
35	Circuit B Fan #13 Hours	hrfanb13	0 to 9999999	0	hours	RW
36	Circuit B Fan #14 Hours	hrfanb14	0 to 999999	0	hours	RW

LEGEND

RO — Read Only
RW — Read/Write

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

MASTER/SLAVE CONTROL TABLE

CCN TABLE NAME: MST_SLV
TABLE TYPE: 13H
TOUCH PILOT PATH: Main Menu → Configuration Menu → Master Slave config

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	MASTER/SLAVE CONTROL					
2	Master/Slave Select	ms_sel	0 to 2	0		RW
3	0 = Disable					
4	1 = Master					
5	2 = Slave					
6	Master Control Type	ms_ctrl	1 to 3	1		RW
7	1 = Local Control					
8	2 = Remote Control					
9	3 = CCN Control					
10	Slave Address	slv_addr	1 to 236	2		RW
11	Lead Lag Select	lead_sel	0 to 2	0		RW
12	0 = Always Lead					
13	1 = Lag Once Failed Only					
14	2 = Lead/Lag Runtime Sel					
15	Lead/Lag Balance Delta	ll_bal_d	40 to 400	168	hours	RW
16	Lead/Lag Start Timer	lstr_tim	2 to 30	10	min	RW
17	Lead Pulldown Time	lead_pul	0 to 60	0	min	RW
18	Start if Error Higher	start_dt	3 to 18 (1.6 to 10)	4 (2.2)	^F (^C)	RW
19	Lag Minimum Running Time	lag_mini	0 to 150	0	min	RW
20	Lag Unit Pump Control	lag_pump	0 to 1	0		RW
21	0 = Stop if Unti Stops					
22	1 = Run if Unit Stops					
23	Chiller in Seris	ll_serie	No/Yes	0		RW

BACNET TABLE (Not Supported)

CCN TABLE NAME: BACNET
TABLE TYPE: 13H
TOUCH PILOT PATH: Main Menu → Configuration Menu → BACnet Parameters

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	BACnet Enable	bacena	dsable/enable	1		
2	Metric Unit	bacunit	No/Yes	1		RW
3	Network	network	1 to 9999	1601		RW
4	Identifier	ident	0 to 9999999	1600001		RW

COMPRESSOR ENABLE

CCN TABLE NAME: CP_UNABL
TABLE TYPE: 13H
TOUCH PILOT PATH: Main Menu → Configuration Menu → Compressor Enable

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	DISABLE COMPRESSORS					
2	Compressor A Disable	un_cp_a	0 to 1	0		RW
3	Compressor B Disable	un_cp_b	0 to 1	0		RW

LEGEND

RO — Read Only
RW — Read/Write

EMAIL CONFIGURATION

CCN TABLE NAME: EMAILCFG
TABLE TYPE: 13H
TOUCH PILOT PATH: Main Menu → Configuration Menu → Email Configuration

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Sender Email Part1	senderP1				RW
2	@					
3	Sender Email Part2	senderP2				RW
4	Recip1 Email Part1	recip1P1				RW
5	@					
6	Recip1 Email Part2	recip1P2				RW
7	Recip2 Email Part1	recip2P1				RW
8	@					
9	Recip2 Email Part2	recip2P2				RW
10	SMTP IP Addr Part 1	smtpP1	0 to 255	0		RW
11	SMTP IP Addr Part 2	smtpP2	0 to 255	0		RW
12	SMTP IP Addr Part 3	smtpP3	0 to 255	0		RW
13	SMTP IP Addr Part 4	smtpP4	0 to 255	0		RW
14	Account Email Part1	accP1				RW
15	@					
16	Account Email Part2	accP2				RW
17	Account Password	accPass				RW
18	Port Number	portNbr	0 to 255	25		RW
19	Server Timeout	srvTim	0 to 255	30	sec	RW
20	Server Authentication	srvAut	0 to 1	0		RW

SETPOINT TABLE

CCN TABLE NAME: SETPOINT
TABLE TYPE: 17H
TOUCH PILOT PATH: Main Menu → Setpoint Table

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Cooling Setpoint 1	csp1	–20 to 78.8 (–28.9 to 26)	44 (6.7)	°F (°C)	RW
2	Cooling Setpoint 2	csp2	–20 to 78.8 (–28.9 to 26)	44 (6.7)	°F (°C)	RW
3	Cooling Ice Setpoint	ice_sp	–20 to 78.8 (–28.9 to 26)	44 (6.7)	°F (°C)	RW
4	Cooling Ramp Loading	cramp_sp	0.2 to 20.0 (0.1 to 11.1)	1 (0.6)	^F (^C)	RW
5	Heating Setpoint 1	hsp1	80.0 to 145.4 (26.6 to 63)	100 (37.8)	°F (°C)	RW
6	Heating Setpoint 2	hsp2	80.0 to 145.4 (26.6 to 63)	100 (37.8)	°F (°C)	RW
7	Heating Ramp Loading	hramp_sp	0.2 to 20.0 (0.1 to 11.1)	1 (0.6)	^F (^C)	RW
8	Cool Changeover Setpt	cauto_sp	39.0 to 122.0 (3.9 to 50)	75 (23.9)	°F (°C)	RW
9	Heat Changeover Setpt	hauto_sp	32.0 to 115.0 (0 to 46.1)		°F (°C)	RW
10	Varipump Delta Temp Stp	vpmpdtsp	1.8 to 36 (1 to 20)	9 (5)	^F (^C)	RW
11	Switch Limit Setpoint 1	lim_sp1	0 to 100	100	%	RW
12	Switch Limit Setpoint 2	lim_sp2	0 to 100	100	%	RW
13	Switch Limit Setpoint 3	lim_sp3	0 to 100	100	%	RW

LEGEND

RO — Read Only
RW — Read/Write

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

BROADCAST MENU

CCN TABLE NAME: BROCASTS
TABLE TYPE: 14H
TOUCH PILOT PATH: Main Menu → Configuration Menu → Broadcast Menu

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Activate	ccnbroad	0 to 2	2		RW
2						
3	OAT Broadcast					
4	Bus #	oatbusn	0 to 239	0		RW
5	Element #	oatlocad	0 to 239	0		RW
6						
7	DAYLIGHT SAVING SELECT	dayl_sel	Disable/Enable	Disable		RW
8	ENTERING					
9	Month	startmon	1 to 12	3		RW
10	Day of week (1 = Monday)	startdow	1 to 7	7		RW
11	Week Number of Month	startwom	1 to 5	5		RW
12	LEAVING					
13	Month	stopmon	1 to 12	10		RW
14	Day of week (1 = Monday)	stoptdow	1 to 7	7		RW
15	Week Number of Month	stopwom	1 to 5	5		RW

HOLIDAY MENU

CCN TABLE NAME: HOLIDAY
TABLE TYPE: 14H
TOUCH PILOT PATH: Main Menu → Configuration Menu → Holiday Menu

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Holiday Start Month	HOL_MON	0 to 12	0		RW
2	Holiday Start Day	HOL_DAY	0 to 31	0		RW
3	Holiday Duration (Days)	HOL_LEN	0 to 99	0		RW

ALARM DEFINITION TABLE

CCN TABLE NAME: ALARMDEF
TABLE TYPE: 14H
TOUCH PILOT PATH: N/A

LINE	MENU TEXT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Alarm Routing Control	ALRM_CNT	0 to 11111111	0		RW
2	Alarm Equipment Priority	EQ-_TYP	0 to 7	4		RW
3	Comm Failure Retry Time	RET-Y_TM	1 to 240	10	min	RW
4	Realarm Time	RE-_LARM	1 to 255	30	min	RW
5	Alarm System Name	ALRM_NAM	8 chars	PRO_RBRQ		RW

LEGEND

RO — Read Only
RW — Read/Write

SCHEDULE MENU

CCN TABLE NAMES: OCCPC01S and OCCPC02S
TABLE TYPE: 15H
TOUCH PILOT PATH: Main Menu → Configuration Menu → Schedule Menu

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Current Mode	MODE	0/1			RW
2	Current Occup Period #	PER_NO	1 to 8			RW
3	Timed-Override in Effect	OVERLAST	Yes/No			RW
4	Timed-Override Duration	OVR_HRS	0 to 4		hours	RW
5	Current Occupied Time	STRTTIME	00:00 to 23:59			RW
6	Current Unoccupied Time	ENDTIME	00:00 to 23:59			RW
7	Next Occupied Day	NXTOCDAY	Mon to Sun			RW
8	Next Occupied Time	NXTOCTIM	00:00 to 23:59			RW
9	Next Unocupied Day	NXTUNDAY	Mon to Sun			RW
10	Next Unoccupied Time	NXTUNTIM	00:00 to 23:59			RW
11	Prev Unocupied Day	PRVUNDAY	Mon to Sun			RW
12	Prev Unoccupied Time	PRVUNTIM	00:00 to 23:59			RW

CONTROL IDENTIFICATION

CCN TABLE NAME: CTRL_ID
TABLE TYPE: 20H
TOUCH PILOT PATH: Main Menu → Configuration Menu → Control Identification

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	CCN Element Number		0-239	0		
2	CCN Bus Number		0 to 239	1		
3	CCN Baud Rate		9600 / 19200/38400	9600		
4						
5	Device Description		24 chars	30XAV		
6	Location Description		24 chars			
7	Software Part Number		16 chars	20M4A010		
8	Serial Number		12 chars			

DATE/TIME CONFIGURATION

CCN TABLE NAME: DATETIME
TABLE TYPE: 20H
TOUCH PILOT PATH: Main Menu → Configuration Menu → Date/Time Configuration

LINE	TOUCH PILOT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT	READ/ WRITE
1	Date (DD/MM/YY)		Date			RW
2	Day of week		Mon to Sun			RW
3	Time		00:00 to 23:59			RW
4	Daylight Savings Time On		No/Yes			RO
5	Today is a Holiday		No/Yes			RO
6	Tomorrow is a Holiday		No/Yes			RO

LEGEND

RO — Read Only
RW — Read/Write

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

COMPRESSOR PI PARAMETERS TABLE

CCN TABLE NAME: CMP_PI
TABLE TYPE: 13H
TOUCH PILOT PATH: N/A

LINE	MENU TEXT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT
1	Water Temp PI, Kp, cir A	wt_kp_a	–20 to 0	0	
2	Water Temp PI, Ti cir A	wt_ti_a	0 to 1000	0	sec
3	Water Temp PI, NI cir A	wt_ni_a	0.1 to 2	0.1	
4	DGT PI Kp, cir A	dgt_kp_a	0 to 20	0	
5	DGT PI, Ti cir A	dgt_ti_a	0 to 1000	0	
6	DGT PI, NI cir A	dgt_ni_a	0.1 to 2	0.1	
7	Comp Temp PI, Kp cir A	cpt_kp_a	0 to 20	0	
8	Comp Temp PI, Ti cir A	cpt_ti_a	0 to 1000	0	sec.
9	Comp Temp PI, NI cir A	cpt_ni_a	0.1 to 2	0.1	
10	Disch Press PI, Kp cir A	dp_kp_a	0 to 2	0	
11	Disch Press PI, Ti cir A	dp_ti_a	0 to 1000	0	sec
12	Disch Press PI, NI cir A	dp_ni_a	0.1 to 2	0.1	
13	Low SP PI, Kp cir A	lsp_kp_a	–2 to 0	0	
14	Low SP PI, Ti cir A	lsp_ti_a	0 to 1000	0	sec
15	Low SP PI, NI cir A	lsp_ni_a	0.1 to 2	0.1	
16	Water Temp PI, Kp, cir B	wt_kp_b	–20 to 0	0	
17	Water Temp PI, Ti cir B	wt_ti_b	0 to 1000	0	sec
18	Water Temp PI, NI cir B	wt_ni_b	0.1 to 2	0.1	
19	DGT PI Kp, cir B	dgt_kp_b	0 to 20	0	
20	DGT PI, Ti cir B	dgt_ti_b	0 to 1000	0	sec
21	DGT PI, NI cir B	dgt_ni_b	0.1 to 2	0.1	
22	Comp Temp PI, Kp cir B	cpt_kp_b	0 to 20	0	
23	Comp Temp PI, Ti cir B	cpt_ti_b	0 to 1000	0	sec
24	Comp Temp PI, NI cir B	cpt_ni_b	0.1 to 2	0.1	
25	Disch Press PI, Kp cir B	dp_kp_b	0 to 2	0	
26	Disch Press PI, Ti cir B	dp_ti_b	0 to 1000	0	sec
27	Disch Press PI, NI cir B	dp_ni_b	0.1 to 2	0.1	
28	Low SP PI, Kp cir B	lsp_kp_b	–2 to 0	0	
29	Low SP PI, Ti cir B	lsp_ti_b	0 to 1000	0	sec
30	Low SP PI, NI cir B	lsp_ni_b	0.1 to 2	0.1	

LEGEND

RO — Read Only
RW — Read/Write

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

SLIDE VALVE PI PARAMETERS TABLE

CCN TABLE NAME: SLDV_PI
TABLE TYPE: 13H
TOUCH PILOT PATH: N/A

LINE	MENU TEXT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT
1	Water Temp PI, Kp, cir A	wt_kp_a	–200 to 0	0	
2	Water Temp PI, Ti cir A	wt_ti_a	0 to 1000	0	sec
3	Water Temp PI, NI cir A	wt_ni_a	0.1 to 2	0.1	
4	Dis. Gas T PI Kp, cir A	dgt_kp_a	–200 to 0	0	
5	DGT PI, Ti cir A	dgt_ti_a	0 to 1000	0	sec
6	DGT PI, NI cir A	dgt_ni_a	0.1 to 2	0.1	
7	Comp Temp PI, Kp cir A	cpt_kp_a	0 to 200	0	
8	Comp Temp PI, Ti cir A	cpt_ti_a	0 to 1000	0	sec
9	Comp Temp PI, NI cir A	cpt_ni_a	0.1 to 2	0.1	
10	Disch Press PI, Kp cir A	dp_kp_a	0 to 200	0	
11	Disch Press PI, Ti cir A	dp_ti_a	0 to 1000	0	sec
12	Disch Press PI, NI cir A	dp_ni_a	0.1 to 2	0.1	
13	Low SP PI, Kp cir A	lsp_kp_a	–200 to 0	0	
14	Low SP PI, Ti cir A	lsp_ti_a	0 to 1000	0	sec
15	Low SP PI, NI cir A	lsp_ni_a	0.1 to 2	0.1	
16	Water Temp PI, Kp, cir B	wt_kp_b	–200 to 0	0	
17	Water Temp PI, Ti cir B	wt_ti_b	0 to 1000	0	sec
18	Water Temp PI, NI cir B	wt_ni_b	0.1 to 2	0.1	
19	Dis. Gas T PI Kp, cir B	dgt_kp_b	–200 to 0	0	
20	DGT PI, Ti cir B	dgt_ti_b	0 to 1000	0	sec
21	DGT PI, NI cir B	dgt_ni_b	0.1 to 2	0.1	
22	Comp Temp PI, Kp cir B	cpt_kp_b	0 to 200	0	
23	Comp Temp PI, Ti cir B	cpt_ti_b	0 to 1000	0	sec
24	Comp Temp PI, NI cir B	cpt_ni_b	0.1 to 2	0.1	
25	Disch Press PI, Kp cir B	dp_kp_b	0 to 200	0	
26	Disch Press PI, Ti cir B	dp_ti_b	0 to 1000	0	sec
27	Disch Press PI, NI cir B	dp_ni_b	0.1 to 2	0.1	
28	Low SP PI, Kp cir B	lsp_kp_b	–200 to 0	0	
29	Low SP PI, Ti cir B	lsp_ti_b	0 to 1000	0	sec
30	Low SP PI, NI cir B	lsp_ni_b	0.1 to 2	0.1	
31	Delay sldv to freq ctrl	sldv2hz	0 to 3600	60	sec
32	Delay freq to sldv ctrl	hz2sldv	0 to 3600	20	sec
33	Delay before stop. Unit	capastop	0 to 3600	120	sec

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

DELTA TABLE

CCN TABLE NAME: DELTA
TABLE TYPE: 13H
TOUCH PILOT PATH: N/A

LINE	MENU TEXT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT
1	water_t_hysteresys	wateesys	0.0 to 3.6 (0.0 to 2)	0.9 (0.5)	^F (^C)
2	high discharge pressure				
3	stp-dp_hysteresys	dp_hyst	0.0 to 40.0 (0.0 to 275.8)	14.5 (100)	psi (kPa)
4	map-dp_deltap_action	dp_dact	–5.0 to 40.0 (–34.4 to 275.8)	7.25 (50)	psi (kPa)
5	map-dp_deltap_setpoint	dp_dspt	0 to 40.0 (0.0 to 275.8)	14.5 (100)	psi (kPa)
6	low suction pressure				
7	stp+lsp_hysteresys	lsp_hyst	0.0 to 40.0 (0.0 to 275.8)	0 (0)	psi (kPa)
8	map+lsp_deltap_action	lsp_act	–40.0 to 40.0 (–275.8 to 275.8)	–13.75 (–94.8)	psi (kPa)
9	map+lsp_deltap_setpoint	lsp_stpt	–40.0 to 40.0 (–275.8 to 275.8)	1.73 (11.9)	psi (kPa)
10	deltap lspEXV vs lspCAPA	lsp_capa	0.0 to 40.0 (0.0 to 275.8)	8.72 (60.1)	psi (kPa)
11	high suction pressure				
12	stp-hsp_hysteresys	hsp_hyst	0.0 to 40.0 (0.0 to 275.8)	1.09 (7.5)	psi (kPa)
13	map-hsp_deltap_action	hsp_act	–5.0 to 40.0 (–34.4 to 275.8)	0 (0)	psi (kPa)
14	map-hsp_deltap_setpoint	hsp_stpt	0.0 to 40.0 (0.0 to 275.8)	0.6 (4.1)	psi (kPa)
15	max motor temperature				
16	stp-mt_hysteresys	mt_hyst	0.0 to 7.2 (0.0 to 4)	3.6 (2)	^F (^C)
17	max disch gas temp				
18	stp-dgt_hysteresys	dgt_hyst	0.0 to 7.2 (0.0 to 4)	3.6 (2)	^F (^C)
19	min cooler lwt heating				
20	stp+cool_lwt_hysteresys	coolhyst	0.0 to 7.2 (0.0 to 4)	3.6 (2)	^F (^C)
21	max disch superheat				
22	stp+dsh_hysteresys	dsh_hyst	0.0 to 7.2 (0.0 to 4)	1.8 (1)	^F (^C)
23	stp-dsh_deltat_action	dsh_act	0.0 to 7.2 (0.0 to 4)	1.8 (1)	^F (^C)
24	exv_no_dsh_delay	dshdelay	0 to 600	300	sec
25	exv_no_mop_delay	mopdelay	0 to 600	300	sec
26	fan low discharge press				
27	stp+fldp_hysteresys	fldp_hys	0.0 to 40.0 (0.0 to 275.8)	14 (96.5)	psi (kPa)
28	map+fldp_deltap_action	fldp_act	–5.0 to 40.0 (–34.4 to 275.8)	0 (0)	psi (kPa)
29	map+fldp_deltap_setpoint	fldp_spt	0 to 40.0 (0.0 to 275.8)	31.4 (216.5)	psi (kPa)
30	fan high discharge press				
31	stp-fhsp_hysteresys	fhdp_hys	0.0 to 40.0 (0.0 to 275.8)	10 (69)	psi (kPa)
32	map-fhsp_deltap_action	fhdp_act	–5.0 to 40.0 (–34.4 to 275.8)	10 (69)	psi (kPa)
33	map-fhsp_deltap_setpoint	fhdp_spt	0 to 40.0 (0.0 to 275.8)	10 (69)	psi (kPa)
34	fan max disch gas temp				
35	stp-fdgt_hysteresys	fdgt_hys	0.0 to 7.2 (0.0 to 4)	5 (2.8)	^F (^C)
36	thresh.-fdgt_deltap_act	fdgt_act	0 to 203 (0 to 127.8)	11 (6.1)	^F (^C)
37	thresh-fdgt_deltap_spt	fdgt_spt	0 to 203 (0 to 127.8)	22 (12.2)	^F (^C)
38	EXV subcooling (DX)				
39	stp+sbc_hysteresys	sbc_hys	0.0 to 27.0 (0.0 to 15)	9 (5)	^F (^C)
40	thresh.+sbc_deltap_act	sbc_act	0.0 to 18.0 (0.0 to 10)	1.8 (1)	^F (^C)
41	thresh+sbc_deltap_spt	sbc_spt	0.0 to 18.0 (0.0 to 10)	5.4 (3)	^F (^C)
42	low sst (Brine)				
43	stp+lsst_hysteresys	lsst_hys	0.0 to 36.0 (0.0 to 20)	0 (0)	^F (^C)
44	map+lsst_deltat_action	lsst_act	–36.0 to 36.0 (–20 to 20)	–18 (10)	^F (^C)
45	map+lsst_deltat_setpoint	lsst_spt	–36.0 to 36.0 (–20 to 20)	2 (1.1)	^F (^C)
46	deltat lsstEXV I lsstCAP	lsst_cap	0.0 to 36.0 (0.0 to 20)	11.7 (6.5)	^F (^C)

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

EXV PI PARAMETERS TABLE

CCN TABLE NAME: EXV_CFG
TABLE TYPE: 13H
TOUCH PILOT PATH: N/A

LINE	MENU TEXT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT
1	Fixed DSH Setpoint	fixeddsh	9.0 to 36.0 (5 to 20)	12.6 (7)	^F (^C)
2	Subcooling Setpoint	subc_sp	0.0 to 18.0 (0.0 to 10)	9 (5)	^F (^C)
3	Subcooling Setpoint min	scsp_min	0.0 to 9.0 (0.0 to 5)	3.6 (2)	^F (^C)
4	Super heat setpoint A	sh_sp_a	7.2 to 44.0	9	
5	Super heat setpoint B	sh_sp_b	7.2 to 44.0	9	
6	Pinch Control Config				
7	Sample Time 1	samplet1	1 to 100	8	sec
8	Sample Time 2	samplet2	1 to 200	50	sec
9	Minimum Pinch Change 1	dpinchm1	0.0 to 3.6 (0.0 to 2)	0.27 (0.15)	^F (^C)
10	Minimum Pinch Change 2	dpinchm2	0.0 to 3.6 (0.0 to 2)	0.9 (0.5)	^F (^C)
11	Flood Mode, stpt offset	flooddsp	0.0 to 9.0 (0.0 to 5)	0.9 (0.5)	^F (^C)
12	Flood Mode, stpt ramp	floodrmp	0.0 to 9.0 (0.0 to 5)	0.018 (0.01)	^F (^C)
13	Flood ticks delay	floodnb	1 to 100	2	
14	Flooded EXV closing	floodclo	0.0 to 10.0	1	%
15	EXV disturbance	disturb	0.3 to 5.0	1	%
16	Water Temp. Tolerance	delta_wt	0 to 36.0 (0 to 20)	1.8 (1)	^F (^C)
17	Capacity Tolerance	deltacap	0 to 100.0	8	%
18	Subcool PI, Kp cir A	sbc_kp_a	–3 to 0	0	
19	Subcool PI, Ti cir A	sbc_ti_a	0 to 1000	0	sec
20	Subcool PI, NI cir A	sbc_ni_a	0.1 to 2	0.1	
21	DSH PI, Kp cir A	dsh_kp_a	–2.0 to 0	0	
22	DSH PI, Ti cir A	dsh_ti_a	0 to 1000	0	sec
23	DSH PI, NI cir A	dsh_ni_a	0.1 to 2	0.1	
24	High SP PI, Kp cir A	hsp_kp_a	0 to 2.0	0	
25	High SP PI, Ti cir A	hsp_ti_a	0 to 1000	0	sec
26	High SP PI, NI cir A	hsp_ni_a	0.1 to 2	0.1	
27	Low SP PI, Kp cir A	lsp_kp_a	0 to 2.0	0	
28	Low SP PI, Ti cir A	lsp_ti_a	0 to 1000	0	sec
29	Low SP PI, NI cir A	lsp_ni_a	0.1 to 2	0.1	
30	Dop PI, Kp cir A	dop_kp_a	–3.0 to 0.0	0	
31	Dop PI, Ti cir A	dop_ti_a	0 to 1000	0	sec
32	Dop PI, NI cir A	dop_ni_a	0.1 to 2	0.1	
33	suction SH PI, Kp cir A	ssh_kp_a	–1.0 to 0.0	0	
34	suction SH PI, Ti cir A	ssh_ti_a	0 to 1000	0	sec
35	suction SH PI, NI cir A	ssh_ni_a	0.1 to 2	1.0	
36	Subcool PI, Kp cir B	sbc_kp_b	–3.0 to 0	0	
37	Subcool PI, Ti cir B	sbc_ti_b	0 to 1000	0	sec
38	Subcool PI, NI cir B	sbc_ni_b	0.1 to 2	1.0	
39	DSH PI, Kp cir B	dsh_kp_b	–2.0 to 0	0	
40	DSH PI, Ti cir B	dsh_ti_b	0 to 1000	0	sec
41	DSH PI, NI cir B	dsh_ni_b	0.1 to 2	0.1	
42	High SP PI, Kp cir B	hsp_kp_b	0 to 2.0	0	
43	High SP PI, Ti cir B	hsp_ti_b	0 to 1000	0	sec
44	High SP PI, NI cir B	hsp_ni_b	0.1 to 2	0.1	
45	Low SP PI, Kp cir B	lsp_kp_b	0 to 2.0	0	
46	Low SP PI, Ti cir B	lsp_ti_b	0 to 1000	0	sec
47	Low SP PI, NI cir B	lsp_ni_b	0.1 to 2	0.1	
48	Dop PI, Kp cir B	dop_kp_b	–3.0 to 0.0	0	
49	Dop PI, Ti cir B	dop_ti_b	0 to 1000	0	sec
50	Dop PI, NI cir B	dop_ni_b	0.1 to 2	0.1	
51	suction SH PI, Kp cir B	ssh_kp_b	–1.0 to 0.0	0	
52	suction SH PI, Ti cir B	ssh_ti_b	0 to 1000	0	sec
53	suction SH PI, NI cir B	ssh_ni_b	0.1 to 2	0.1	

APPENDIX A — TOUCH PILOT™ DISPLAY TABLES (cont)

FAN CONFIGURATION TABLE

CCN TABLE NAME: FAN_CFG
TABLE TYPE: 13H
TOUCH PILOT PATH: N/A

LINE	MENU TEXT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT
1	Fan Low DP PI, Kp, cir A	fldp_kpa	–20 to 0	0	
2	Fan Low DP PI, Ti cir A	fldp_tia	0 to 1000	0	sec
3	Fan Low DP PI, NI cir A	fldp_nia	0.1 to 2	0.1	
4	Fan DGT PI Kp, cir A	fdgt_kpa	–2 to 0	0	
5	Fan DGT PI Ti, cir A	fdgt_tia	0 to 1000	0	
6	Fan DGT PI Ni, cir A	fdgt_nia	0 to 2	0	
7	Fan Low DP PI, Kp, cir B	fldp_kpb	–20 to 0	0	
8	Fan Low DP PI, Ti cir B	fldp_tib	0 to 1000	0	sec
9	Fan Low DP PI, NI cir B	fldp_nib	0.1 to 2	0.1	
10	Fan DGT PI Kp, cir B	fdgt_kpb	–2 to 0	0	
11	Fan DGT PI Ti, cir B	fdgt_tib	0 to 1000	0	
12	Fan DGT PI Ni, cir B	fdgt_nib	0 to 2	0	
13	Fan max frequency	fan_hlim	20 to 60	50	Hz
14	Fan min frequency	fan_llim	0.0 to 30	0	Hz
15	Mean value samples nb	xt_m_smp	5 to 100	30	
16	input dev. tolerance	xt_in_tl	1 to 50	4	%
17	sychronizing output Kp	sync_Kp	0.1 to 3.0	0.5	
18	xtrm seeking antiwind Kp	xt_aw_KP	100 to 9999	1250	
19	xtrm seeking Ti	xt_Ti	10 to 20000	5882	
20	fan speed max change	xt_fspdc	1 to 99	10	
21	fan Freeze tolerance	xt_fr_tl	1 to 9	1	
22	Stable condition nb	xt_nb_st	1 to 6	3	
23	disturbance amp. (Hz)	xt_d_amp	1 to 9	1	Hz
24	disturbance freq (rad/s)	xt_d_frq	0.01 to 0.3	0.06	-
25	Stablility sample nb	xt_s_smp	1 to 60	20	-
26	Fan Optimiz? 1=xt,2=os	xt_enabl	0 to 2	0	-
27	os disturbance amp. (Hz)	os_d_amp	1 to 10	5	Hz
28	os disturb. period (s)	os_d_per	10 to 300	50	sec
29	os freez power tolerance	os_f_pow	0 to 100	1	%
30	xt os filter time	xtos_flt	0.1 to 100.0	10	sec

EXV ECONOMIZER PI TABLE

CCN TABLE NAME: ECO_PI
TABLE TYPE: 13H
TOUCH PILOT PATH: N/A

LINE	MENU TEXT DESCRIPTION	CCN NAME	RANGE	DEFAULT VALUE	UNIT
1	EXV Eco. SH Kp, cir A	ecsh_kpa	–1.0 to 0.0	0	
2	EXV Eco. SH Ti cir A	ecsh_tia	0 to 1000	0	sec
3	EXV Eco. SH NI cir A	ecsh_nia	0.1 to 2	0.1	
4	EXV Eco. SH Kp, cir B	ecsh_kpb	–1.0 to 0.0	0	
5	EXV Eco. SH Ti cir B	ecsh_tib	0 to 1000	0	sec
6	EXV Eco. SH NI cir B	ecsh_nib	0.1 to 2	0.1	
7	EXV Eco. Min position	eco_min	0 to 100	10	%
8	EXV Eco. Max position	eco_max	0 to 100	100	%
9	capa_lim disable eco	capa_lim	0 to 100	50	%
10	Eco superheat setpoint A	ecoshspa	0.0 to 36.0 (0.0 to 20)	18 (10)	^F (^C)
11	Eco superheat setpoint B	ecoshspb	0.0 to 36.0 (0.0 to 20)	18 (10)	^F (^C)

APPENDIX B — CCN POINT TABLE

CCN TABLE	CCN POINT NAME	DATABASE POINT NAME	TRANSLATOR ACCESSIBLE
GENUNIT	CTRL_TYP	GENUNIT_CTRL_TYP	Modbus
	STATUS	GENUNIT_STATUS	
	min_left	GENUNIT_min_left	Modbus
	HEATCOOL	GENUNIT_HEATCOOL	
	HEATCOOL	GENUNIT_HEATCOOL	
	CAP_T	GENUNIT_CAP_T	Modbus
	SP	GENUNIT_SP	Modbus
	TOT_CURR	GENUNIT_TOT_CURR	Modbus
	POW_LIM	GENUNIT_POW_LIM	Modbus
	COOL_POW	GENUNIT_COOL_POW	Modbus
TEMP	COOL_EWT	TEMP_COOL_EWT	LON, Modbus
	COOL_LWT	TEMP_COOL_LWT	LON, Modbus
	OAT	TEMP_OAT	Modbus
	SCT_A	TEMP_SCT_A	LON, Modbus
	SST_A	TEMP_SST_A	LON, Modbus
	SLT_A	TEMP_SLT_A	Modbus
	SUCT_A	TEMP_SUCT_A	Modbus
	DGT_A	TEMP_DGT_A	Modbus
	CP_TMP_A	TEMP_CP_TMP_A	Modbus
	ECO_T_A	TEMP_ECO_T_A	Modbus
	LIQ_T_A	TEMP_LIQ_T_A	Modbus
	SCT_B	TEMP_SCT_B	LON, Modbus
	SST_B	TEMP_SST_B	LON, Modbus
	SLT_B	TEMP_SLT_B	Modbus
	SUCT_B	TEMP_SUCT_B	Modbus
	DGT_B	TEMP_DGT_B	Modbus
	CP_TMP_B	TEMP_CP_TMP_B	Modbus
	ECO_T_B	TEMP_ECO_T_B	Modbus
	LIQ_T_B	TEMP_LIQ_T_B	Modbus
	SPACETMP	TEMP_SPACETMP	Modbus
	CHWSTEMP	TEMP_CHWSTEMP	Modbus
	T_HEATER	TEMP_T_HEATER	Modbus
PRESSURE	DP_A	PRESSURE_DP_A	LON, Modbus
	SP_A	PRESSURE_SP_A	Modbus
	OP_A	PRESSURE_OP_A	Modbus
	DOP_A	PRESSURE_DOP_A	Modbus
	ECO_P_A	PRESSURE_ECO_P_A	Modbus
	LIQ_P_A	PRESSURE_LIQ_P_A	Modbus
	DP_B	PRESSURE_DP_B	LON, Modbus
	SP_B	PRESSURE_SP_B	Modbus
	OP_B	PRESSURE_OP_B	Modbus
	DOP_B	PRESSURE_DOP_B	Modbus
	ECO_P_B	PRESSURE_ECO_P_B	Modbus
	LIQ_P_B	PRESSURE_LIQ_P_B	Modbus

APPENDIX B — CCN POINT TABLE (cont)

CCN TABLE	CCN POINT NAME	DATABASE POINT NAME	TRANSLATOR ACCESSIBLE
INPUTS	ONOFF_SW	INPUTS_ONOFF_SW	Modbus
	SETP_SW	INPUTS_SETP_SW	Modbus
	LIM_SW1	INPUTS_LIM_SW1	Modbus
	LIM_SW2	INPUTS_LIM_SW2	Modbus
	OIL_L_A	INPUTS_OIL_L_A	Modbus
	OIL_L_B	INPUTS_OIL_L_B	Modbus
	SP_RESET	INPUTS_SP_RESET	Modbus
	LIM_ANAL	INPUTS_LIM_ANAL	
	leak_v	INPUTS_leak_v	
	leak_2_v	INPUTS_leak_2_v	
	REM_LOCK	INPUTS_REM_LOCK	
	ICE_SW	INPUTS_ICE_SW	
	OCC_OVSW	INPUTS_OCC_OVSW	
	RECL_SW	INPUTS_RECL_SW	
	ELEC_BOX	INPUTS_ELEC_BOX	
	HEATR_SW	INPUTS_HEATR_SW	
OUTPUTS	CP_A	OUTPUTS_CP_A	
	OIL_SL_A	OUTPUTS_OIL_SL_A	
	SLID_1_A	OUTPUTS_SLID_1_A	
	SLID_2_A	OUTPUTS_SLID_2_A	
	CAPT010A	OUTPUTS_CAPT010A	
	VFAN_A	OUTPUTS_VFAN_A	
	ISO_CL_A	OUTPUTS_ISO_CL_A	
	ISO_OP_A	OUTPUTS_ISO_OP_A	
	ISO_POSA	OUTPUTS_ISO_POSA	
	OIL_HT_A	OUTPUTS_OIL_HT_A	
	CP_B	OUTPUTS_CP_B	
	OIL_SL_B	OUTPUTS_OIL_SL_B	
	SLID_1_B	OUTPUTS_SLID_1_B	
	SLID_2_B	OUTPUTS_SLID_2_B	
	CAPT010B	OUTPUTS_CAPT010B	
	VFAN_B	OUTPUTS_VFAN_B	
	ISO_CL_B	OUTPUTS_ISO_CL_B	
	ISO_OP_B	OUTPUTS_ISO_OP_B	
	ISO_POSB	OUTPUTS_ISO_POSB	
	OIL_HT_B	OUTPUTS_OIL_HT_B	
	CAPT_010	OUTPUTS_CAPT_010	
	ALARM	OUTPUTS_ALARM	LON
	RUNNING	OUTPUTS_RUNNING	LON
	ALERT	OUTPUTS_ALERT	
	SHUTDOWN	OUTPUTS_SHUTDOWN	
	C_HEATER	OUTPUTS_C_HEATER	
	ELECBFAN	OUTPUTS_ELECBFAN	
PUMPSTAT	SET_FLOW	PUMPSTAT_SET_FLOW	
	FLOW_SW	PUMPSTAT_FLOW_SW	
RUNTIME	HR_MACH	RUNTIME_HR_MACH	
	HR_CP_A	RUNTIME_HR_CP_A	
	HR_CP_B	RUNTIME_HR_CP_B	
ALARMRST	ALM	ALARMRST_ALM	
VLT_DRV	SET_DRVA	VLT_DRV_SET_DRVA	
	SET_DRVB	VLT_DRV_SET_DRVB	
EXV_CTRL	EXV_A	EXV_CTRL_EXV_A	
	DSH_A	EXV_CTRL_DSH_A	
	SH_A	EXV_CTRL_SH_A	
	EXV_B	EXV_CTRL_EXV_B	
	DSH_B	EXV_CTRL_DSH_B	
	SH_B	EXV_CTRL_SH_B	

APPENDIX B — CCN POINT TABLE (cont)

CCN TABLE	CCN POINT NAME	DATABASE POINT NAME	TRANSLATOR ACCESSIBLE
QCK_TEST	QCK_TEST	QCK_TEST_QCK_TEST	
	Q_EXVA	QCK_TEST_Q_EXVA	
	Q_OILS_A	QCK_TEST_Q_OILS_A	
	Q_SLI_1A	QCK_TEST_Q_SLI_1A	
	Q_SLI_2A	QCK_TEST_Q_SLI_2A	
	Q_010_A	QCK_TEST_Q_010_A	
	Q_COMPA	QCK_TEST_Q_COMPA	
	Q_ECO_A	QCK_TEST_Q_ECO_A	
	Q_OILHTA	QCK_TEST_Q_OILHTA	
	Q_ISOP_A	QCK_TEST_Q_ISOP_A	
	Q_VFAN_A	QCK_TEST_Q_VFAN_A	
	Q_EXVB	QCK_TEST_Q_EXVB	
	Q_OILS_B	QCK_TEST_Q_OILS_B	
	Q_SLI_1B	QCK_TEST_Q_SLI_1B	
	Q_SLI_2B	QCK_TEST_Q_SLI_2B	
	Q_010_B	QCK_TEST_Q_010_B	
	Q_COMPB	QCK_TEST_Q_COMPB	
	Q_ECO_B	QCK_TEST_Q_ECO_B	
	Q_OILHTB	QCK_TEST_Q_OILHTB	
	Q_ISOP_B	QCK_TEST_Q_ISOP_B	
	Q_VFAN_B	QCK_TEST_Q_VFAN_B	
	Q_V_PUMP	QCK_TEST_Q_V_PUMP	
	Q_CL_HTR	QCK_TEST_Q_CL_HTR	
	Q_CPMP1	QCK_TEST_Q_CPMP1	
	Q_CPMP2	QCK_TEST_Q_CPMP2	
	Q_ALARM	QCK_TEST_Q_ALARM	
	Q_SHUTD	QCK_TEST_Q_SHUTD	
	Q_RUN	QCK_TEST_Q_RUN	
	Q_ALERT	QCK_TEST_Q_ALERT	
	Q_SETFLO	QCK_TEST_Q_SETFLO	
	Q_CAP010	QCK_TEST_Q_CAP010	
	Q_BOXFAN	QCK_TEST_Q_BOXFAN	
FAN_DRV2	SET_FDA1	FAN_DRV2_SET_FDA1	
	SET_FDA2	FAN_DRV2_SET_FDA2	
	SET_FDA3	FAN_DRV2_SET_FDA3	
	SET_FDB1	FAN_DRV2_SET_FDB1	
	SET_FDB2	FAN_DRV2_SET_FDB2	
	SET_FDB3	FAN_DRV2_SET_FDB3	
PROTOCOL	CHIL_S_S	PROTOCOL_CHIL_S_S	LON, Modbus
	CPUMP_1	PROTOCOL_CPUMP_1	
	CPUMP_2	PROTOCOL_CPUMP_2	
	CTRL_PNT	PROTOCOL_CTRL_PNT	LON, Modbus
	DEM_LIM	PROTOCOL_DEM_LIM	LON, Modbus
	EMSTOP	PROTOCOL_EMSTOP	Modbus
	HC_SEL	PROTOCOL_HC_SEL	Modbus
	LAG_LIM	PROTOCOL_LAG_LIM	
	LCW_STPT	PROTOCOL_LCW_STPT	
	ROTCPUMP	PROTOCOL_ROTCPUMP	
	S_RESET	PROTOCOL_S_RESET	
	SP_OCC	PROTOCOL_SP_OCC	Modbus
	RUN_TEST	PROTOCOL_RUN_TEST	
	TEST_HP	PROTOCOL_TEST_HP	
	POW_LIM	PROTOCOL_POW_LIM	
	CHIL_OCC	PROTOCOL_CHIL_OCC	Modbus
	SP_SEL	PROTOCOL_SP_SEL	Modbus
	VPMP_CMD	PROTOCOL_VPMP_CMD	

APPENDIX B — CCN POINT TABLE (cont)

CCN TABLE	CCN POINT NAME	DATABASE POINT NAME	TRANSLATOR ACCESSIBLE
VLT_DRV	alarm1_a	VLT_DRV_alarm1_a	
	alarm2_a	VLT_DRV_alarm2_a	
	warn1_a	VLT_DRV_warning1_a	
	warn2_a	VLT_DRV_warning2_a	
	status_w_a	VLT_DRV_status_word_a	
	alarm1_b	VLT_DRV_alarm1_b	
	alarm2_b	VLT_DRV_alarm2_b	
	warn1_b	VLT_DRV_warning1_b	
	warn2_b	VLT_DRV_warning2_b	
	status_w_b	VLT_DRV_status_word_b	
LEN_SCAN	len_scan_status	LEN_SCAN_status	
DB	db_status	DB_status	
FAN_DRV	alm1_A1	FAN_DRV_alarm1_A1	
	alm2_A1	FAN_DRV_alarm2_A1	
	warn1_A1	FAN_DRV_warning1_A1	
	warn2_A1	FAN_DRV_warning2_A1	
	status_w_A1	FAN_DRV_status_word_A1	
	alm1_A2	FAN_DRV_alarm1_A2	
	alm2_A2	FAN_DRV_alarm2_A2	
	warn1_A2	FAN_DRV_warning1_A2	
	warn2_A2	FAN_DRV_warning2_A2	
	status_w_A2	FAN_DRV_status_word_A2	
	alm1_A3	FAN_DRV_alarm1_A3	
	alm2_A3	FAN_DRV_alarm2_A3	
	warn1_A3	FAN_DRV_warning1_A3	
	warn2_A3	FAN_DRV_warning2_A3	
	status_w_A3	FAN_DRV_status_word_A3	
	alm1_B1	FAN_DRV_alarm1_B1	
	alm2_B1	FAN_DRV_alarm2_B1	
	warn1_B1	FAN_DRV_warning1_B1	
	warn2_B1	FAN_DRV_warning2_B1	
	status_w_B1	FAN_DRV_status_word_B1	
	alm1_B2	FAN_DRV_alarm1_B2	
	alm2_B2	FAN_DRV_alarm2_B2	
	warn1_B2	FAN_DRV_warning1_B2	
	warn2_B2	FAN_DRV_warning2_B2	
	status_w_B2	FAN_DRV_status_word_B2	
	alm1_B3	FAN_DRV_alarm1_B3	
	alm2_B3	FAN_DRV_alarm2_B3	
	warn1_B3	FAN_DRV_warning1_B3	
	warn2_B3	FAN_DRV_warning2_B3	
	status_w_B3	FAN_DRV_status_word_B3	
UNIT	ALM	UNIT_ALM	
	STATUS	UNIT_STATUS	
RUNTEST	RTSTIP1	RUNTEST_IP_ADDR1	
	RTSTIP2	RUNTEST_IP_ADDR2	
	RTSTIP3	RUNTEST_IP_ADDR3	
	RTSTIP4	RUNTEST_IP_ADDR4	
HMI_CFG	hmi_unit	HMI_CFG_HMI_UNITS	

APPENDIX C — LON POINT TABLE, EXAMPLE CONFIGURATION

LON POINT	SNVT TYPE	POINT	READ/ WRITE	CCN POINT DESCRIPTION	CCN POINT NAME
CHLRMAP1					
nviChillerEnable	SNVT_switch	POINT01	RW	CCN Chiller Start/Stop	CHIL_S_S
nviCoolSetpt	SNVT_temp_p	POINT02	RW	Control Point	CTRL_PNT
nvoOnOff	SNVT_switch	POINT03	RO		
nvoActiveSetpt	SNVT_temp_p	POINT04	RO	Control Point	CTRL_PNT
nviCapacityLim	SNVT_lev_percent	POINT05	RW	Active Demand LImit	DEM_LIM
nviHeatSetpt	SNVT_temp_p	POINT06	RW		
nvoActualCapacity	SNVT_lev_percent	POINT07	RO	Percent Total Capacity	CAP_T
nvoCapacityLim	SNVT_lev_percent	POINT08	RO	Active Demadn Limit	DEM_LIM
nvoLvgCHWTemp	SNVT_temp_p	POINT09	RO	Cooler Leaving Fluid	COOL_LWT
nvoEntCHWTemp	SNVT_temp_p	POINT10	RO	Cooler Entering Fluid	COOL_EWT
nvoEntCNDWTemp	SNVT_temp_p	POINT11	RO		
nvoLvgCNDWTemp	SNVT_temp_p	POINT12	RO		
nvoChillerStat.run_mode	SNVT_chlr_status	POINT13	RO		
nvoChillerStat.op_mode	SNVT_chlr_status	POINT14	RO		
nvoChillerStat.in_alarm	SNVT_chlr_status	POINT15	RO		
nvoChillerStat.run_enabl	SNVT_chlr_status	POINT16	RO		
nvoChillerStat.Local	SNVT_chlr_status	POINT17	RO		
nvoChillerStat.Limited	SNVT_chlr_status	POINT18	RO		
nvoChillerStat.chw_flow	SNVT_chlr_status	POINT19	RO		
nvoChillerStat.cndw_flow	SNVT_chlr_status	POINT20	RO		
nviOccSchedule	SNVT_occupancy	POINT21	RW		
CHLRMAP2					
nviTEMP1	SNVT_temp_p	POINT22	RW		
nvoTEMP1	SNVT_temp_p	POINT23	RO	Saturated Suction Temp A	SST_A
nvoTEMP2	SNVT_temp_p	POINT24	RO	Saturated Suction Temp B	SST_B
nvoTEMP3	SNVT_temp_p	POINT25	RO		
nvoTEMP4	SNVT_temp_p	POINT26	RO	Saturated Cond Temp A	SCT_A
nvoTEMP5	SNVT_temp_p	POINT27	RO	Saturated Cond Temp B	SCT_B
nvoTEMP6	SNVT_temp_p	POINT28	RO		
nviPRESS1	SNVT_press_p	POINT29	RW		
nvoPRESS1	SNVT_press_p	POINT30	RO	Discharge Pressure A	DP_A
nvoPRESS2	SNVT_press_p	POINT31	RO	Discharge Pressure B	DP_B
nvoPRESS3	SNVT_press_p	POINT32	RO		
nvoPRESS4	SNVT_press_p	POINT33	RO		
nvIPCT1	SNVT_lev_percent	POINT34	RW		
nvIPCT2	SNVT_lev_percent	POINT35	RW		
nvoTEMPDIFF1	SNVT_temp_diff_p	POINT36	RO		
nvoTEMPDIFF2	SNVT_temp_diff_p	POINT37	RO		
nviDISCRETE1	SNVT_switch	POINT38	RW		
nviDISCRETE2	SNVT_switch	POINT39	RW		
nvoDISCRETE1	SNVT_switch	POINT40	RO	CCN Chiller Start/Stop	CHIL_S_S
nvoDISCRETE2	SNVT_switch	POINT41	RO	Running Relay Status	RUNNING
nvoDISCRETE3	SNVT_switch	POINT42	RO	Alarm Relay Status	ALARM
nvoDISCRETE4	SNVT_switch	POINT43	RO		
nvoDISCRETE5	SNVT_switch	POINT44	RO		
nvoDISCRETE6	SNVT_switch	POINT45	RO		
nviCOUNT1	SNVT_count	POINT46	RW		
nvoCOUNT1	SNVT_count	POINT47	RO		
nvoCOUNT2	SNVT_count	POINT48	RO		
nvoCOUNTinc1	SNVT_count_inc	POINT49	RO	Fan Staging Number A	FAN_ST_A
nvoCOUNTinc2	SNVT_count_inc	POINT50	RO		

LEGEND

RO — Read Only
RW — Read Write
SNVT — Standard Network Variable Type

APPENDIX D — BACnet/MODBUS TRANSLATOR POINTS

ITEM NUMBER	CCN POINT NAME	CCN POINT DESCRIPTION	READ/ WRITE	BACnet MS/ TP OBJECT AND INSTANCE	MODBUS REGISTER
POINT01	CTRL_TYP	Local=0 Net.=1 Remote=2	RO	AV_000	0X4000
POINT02	CHIL_S_S	Net.: Cmd Start/Stop	RW	BV_000	0x4001
POINT03	CHIL_OCC	Net.: Cmd Occupied	RW	BV_001	0x4002
POINT04	min_left	Minutes Left for Start	RO	AV_001	0x4003
POINT05	HC_SEL	Heat/Cool Select	RO	AV_002	0x4004
POINT06	SP_SEL	Setpoint Select	RW	AV_003	0x4005
POINT07	SP_OCC	Setpoint Occupied?	RW	BV_002	0x4006
POINT08	CAP_T	Percent Total Capacity	RO	AV_004	0x4007
POINT09	SP	Current Setpoint	RO	AV_005	0x4008
POINT10	CTRL_PNT	Control Point	RW	AV_006	0x4009
POINT11	TOT_CURR	Actual Chiller Current	RO	AV_007	0x400A
POINT12	POW_LIM	Chiller Power Limit	RO	AV_008	0x400B
POINT13	COOL_POW	Cool. Power (kit hydro)	RO	AV_009	0x400C
POINT14	EMSTOP	Emergency Stop	RW	BV_003	0x400D
POINT15	DEM_LIM	Active Demand Limit Val	RW	AV_010	0x400E
POINT16	COOL_EWT	Cooler Entering Fluid	RO	AV_011	0x400F
POINT17	COOL_LWT	Cooler Leaving Fluid	RO	AV_012	0x4010
POINT18	OAT	Outdoor Air Temperature	RO	AV_013	0x4011
POINT19	SCT_A	Saturated Cond Tmp cir A	RO	AV_014	0x4012
POINT20	SST_A	Saturated Suction Temp A	RO	AV_015	0x4013
POINT21	SLT_A	Saturated Liquid Temp A	RO	AV_016	0x4014
POINT22	SUCT_A	Compressor Suction Tmp A	RO	AV_017	0x4015
POINT23	DGT_A	Discharge Gas Temp cir A	RO	AV_018	0x4016
POINT24	CP_TMP_A	Motor Temperature cir A	RO	AV_019	0x4017
POINT25	ECO_T_A	EXV Eco. Tmp cir A	RO	AV_020	0x4018
POINT26	LIQ_T_A	Liquid Temperature A	RO	AV_021	0x4019
POINT27	SCT_B	Saturated Cond Tmp cir B	RO	AV_022	0x401A
POINT28	SST_B	Saturated Suction Temp B	RO	AV_023	0x401B
POINT29	SLT_B	Saturated Liquid Temp B	RO	AV_024	0x401C
POINT30	SUCT_B	Compressor Suction Tmp B	RO	AV_025	0x401D
POINT31	DGT_B	Discharge Gas Temp cir B	RO	AV_026	0x401E
POINT32	CP_TMP_B	Motor Temperature cir B	RO	AV_027	0x401F
POINT33	ECO_T_B	EXV Eco. Tmp cir B	RO	AV_028	0x4020
POINT34	LIQ_T_B	Liquid Temperature B	RO	AV_029	0x4021
POINT35	SPACETMP	Optional Space Temp	RO	AV_030	0x4022
POINT36	CHWSTEMP	CHWS Temperature	RO	AV_031	0x4023
POINT37	T_HEATER	Cooler Heater Temp	RO	AV_032	0x4024
POINT38	DP_A	Discharge Pressure A	RO	AV_033	0x4025
POINT39	SP_A	Main Suction Pressure A	RO	AV_034	0x4026
POINT40	OP_A	Oil Pressure A	RO	AV_035	0x4027

LEGEND

AV — Analog Value
BV — Binary Value
RO — Read Only
RW — Read Write
TS — Time Schedule

APPENDIX D — BACnet/MODBUS TRANSLATOR POINTS (cont)

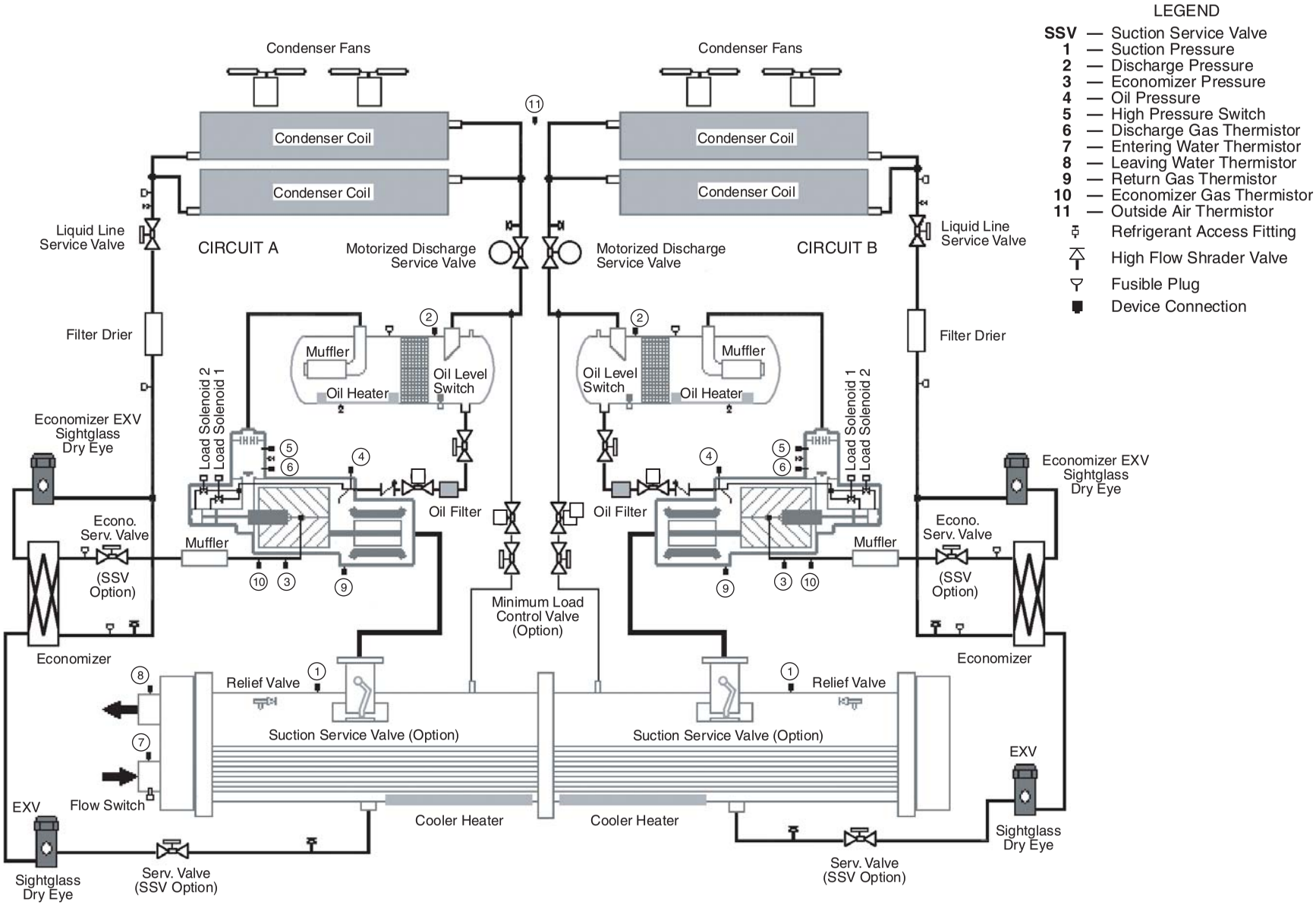
ITEM NUMBER	CCN POINT NAME	CCN POINT DESCRIPTION	READ/ WRITE	BACnet MS/ TP OBJECT AND INSTANCE	MODBUS REGISTER
POINT41	DOP_A	Oil Pressure DifferenceA	RO	AV_036	0x4028
POINT42	ECO_P_A	Economizer Pressure A	RO	AV_037	0x4029
POINT43	LIQ_P_A	Liquid Pressure A	RO	AV_038	0x402A
POINT44	DP_B	Discharge Pressure B	RO	AV_039	0x402B
POINT45	SP_B	Main Suction Pressure B	RO	AV_040	0x402C
POINT46	OP_B	Oil Pressure B	RO	AV_041	0x402D
POINT47	DOP_B	Oil Pressure DifferenceB	RO	AV_042	0x402E
POINT48	ECO_P_B	Economizer Pressure B	RO	AV_043	0x402F
POINT49	LIQ_P_B	Liquid Pressure B	RO	AV_044	0x4030
POINT50	EWATPRES	Entering water pressure	RO	AV_045	0x4031
POINT51	LWATPRES	Leaving water pressure	RO	AV_046	0x4032
POINT52	WATPRES3	Water pressure 3	RO	AV_047	0x4033
POINT53	WATPRES4	Water pressure 4	RO	AV_048	0x4034
POINT54	ONOFF_SW	Remote On/Off Switch	RO	BV_004	0x4035
POINT55	SETP_SW	Remote Setpoint Switch	RO	BV_005	0x4036
POINT56	LIM_SW1	Limit Switch 1	RO	BV_006	0x4037
POINT57	LIM_SW2	Limit Switch 2	RO	BV_007	0x4038
POINT58	OIL_L_A	Oil Level Input A	RO	BV_008	0x4039
POINT59	OIL_L_B	Oil Level Input B	RO	BV_009	0x403A
POINT60	SP_RESET	Reset/Setpnt4-20mA Sgnl	RO	AV_049	0x403B
DEFAULT SETPOINT TABLE					
SETPOINT 1	csp1	Cooling Setpoint 1	RW	AV_050	0x8000
SETPOINT 2	csp2	Cooling Setpoint 2	RW	AV_051	0x8001
SETPOINT 3	ice_sp	Cooling Ice Setpoint	RW	AV_052	0x8002
SETPOINT 4	cramp_sp	Cooling Ramp Loading	RW	AV_053	0x8003
SETPOINT 5	hsp1	Heating Setpoint 1	RW	AV_054	0x8004
SETPOINT 6	hsp2	Heating Setpoint 2	RW	AV_055	0x8005
SETPOINT 7	hramp_sp	Heating Ramp Loading	RW	AV_056	0x8006
SETPOINT 8	cauto_sp	Cool Changeover Setpt	RW	AV_057	0x8007
SETPOINT 9	hauto_sp	Heat Changeover Setpt	RW	AV_058	0x8008
SETPOINT 10	vpmpdtsp	Varipump Delta Temp Stp	RW	AV_059	0x8009
DEFAULT TIME SCHEDULE TABLE					
TIME SCHEDULE 1	OCC1P01S		RW	TS_000	0x9000
TIME SCHEDULE 2	OCC2P02S		RW	TS_001	0x9100
TIME SCHEDULE 3					

LEGEND

AV — Analog Value
BV — Binary Value
RO — Read Only
RW — Read Write
TS — Time Schedule

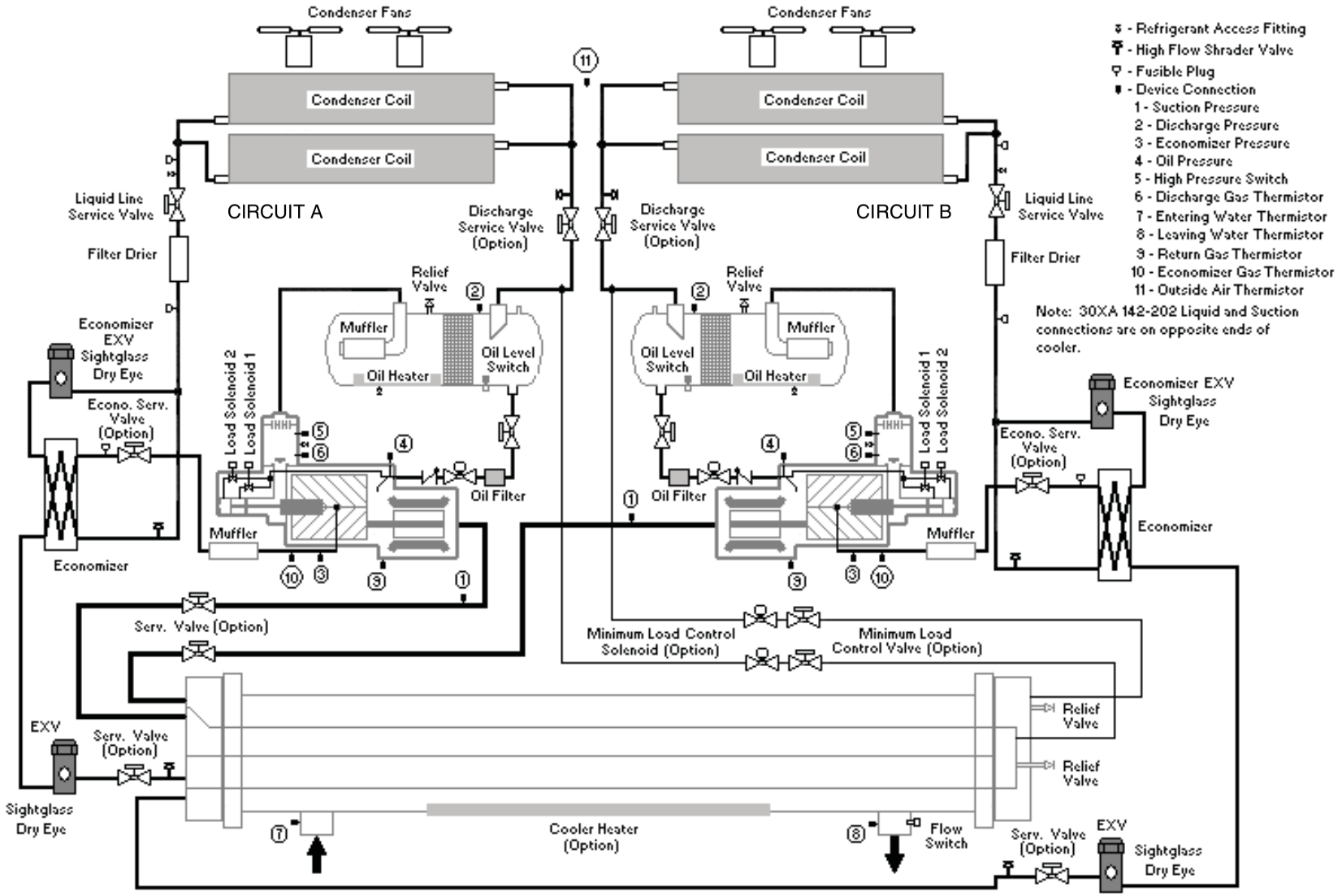
APPENDIX E — PIPING AND INSTRUMENTATION

30XA140, 160, 180, 200, 220, 240, 260, 280, 300, 325, 350 Flooded Cooler Units



APPENDIX E — PIPING AND INSTRUMENTATION (cont)

30XA142, 162, 182, 202, 222, 242, 262, 282, 302, 327, 352 DX Cooler Units



APPENDIX F — MAINTENANCE SUMMARY AND LOG SHEETS

30XA Maintenance Interval Requirements

		WEEKLY	
Compressor	Check Oil Level.	**Economizer**	None.
Cooler	None.	**Controls**	Review Alarm/Alert History.
Condenser	Inspect and clean all coils as necessary.	**Starter**	None.
		MONTHLY	
Compressor	Check Oil Level.	**Economizer**	None.
Cooler	Check moisture.	**Controls**	Check accuracy of tranducers and thermistors. Verify flow switch operation.
Condenser	Inspect and clean all coils as necessary.	**Starter**	Inspect all contactors.
		QUARTERLY	
Compressor	Check Oil Level.	**Economizer**	Check all connections for leaks.
Cooler	Check refrigerant charge. Check for leaks.	**Controls**	Perform an Automated Controls test. Run all Compressors and ensure proper operation. Verify operation of units flow switch.
Condenser	Check for leaks.	**Starter**	None.
		ANNUALLY	
Compressor	Check Oil Level. Obtain and test an oil sample.	**Economizer**	Verify proper operation of EXVs.
Cooler	Check approach on unit to determine if tubes need cleaning (flooded cooler units only). Check for temperature drop across filter drier to determine if filter needs replacement.	**Controls**	Perform an Automated Controls test. Run all Compressors and ensure proper operation.
Condenser	Check fan blades and motors for cracks and loose bolts. Tighten bolts as needed.	**Starter**	Inspect all electrical connections and tighten as needed. Measure current to each compressor and inspect contactors.

NOTE: Equipment failures caused by lack of adherence to the Maintenance Interval Requirements are not covered under warranty.

APPENDIX F — MAINTENANCE SUMMARY AND LOG SHEETS (cont)

30XA Monthly Maintenance Log

Month			1	2	3	4	5	6	7	8	9	10	11	12
Date			/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
Operator														

UNIT SECTION	ACTION	UNIT	ENTRY											
Compressor	Change Oil Filter (Screw Compressors)	yes/no	Year 1 then As Needed											
	Send Oil Sample Out for Analysis	yes/no	Annually											
	Leak Test	yes/no												
Cooler	Inspect and Clean Cooler Tubes*	yes/no	Every 3 - 5 Years											
	Inspect Cooler Heater	amps												
	Inspect Relief Valves	yes/no												
	Leak Test	yes/no												
	Record Water Pressure Differential (PSI)	PSI												
	Inspect Water Pumps	yes/no												
	Eddy Current Test	yes/no	Every 3 - 5 Years											
Condenser	Leak Test	yes/no												
	Inspect and Clean Condenser Coils	yes/no												
	Inspect Relief Valves	yes/no												
Controls	General Cleaning and Tightening Connections	yes/no	Annually											
	Check Pressure Transducers for Accuracy	yes/no												
	Verify Flow Switch Operation	yes/no												
	Confirm Accuracy of Thermistors	yes/no												
Starter	General Tightening and Cleaning Connections	yes/no	Annually											
	Inspect All Contactors	yes/no												
System	Check Refrigerant Charge	yes/no												
	Verify Operation of EXVs	yes/no												
	Record System Superheat	deg. F												

*Flooded cooler units only.

NOTE: Equipment failures caused by lack of adherence to the Maintenance Interval Requirements are not covered under warranty.

APPENDIX F — MAINTENANCE SUMMARY AND LOG SHEETS (cont)

30XA Seasonal Shutdown Log

Month		1	2	3	4	5	6	7	8	9	10	11	12
Date		/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
Operator													

UNIT SECTION	ACTION	ENTRY											
Cooler	Isolate and Drain Waterbox/Cooler												
	Add Glycol/Water Mixture to Prevent Freeze-up												
Controls	Do Not Disconnect Control Power												

NOTE: Equipment failures caused by lack of adherence to the Maintenance Interval Requirements are not covered under warranty.

APPENDIX G — COOLER HEATER SENSOR SET POINT

Cooler Heater Sensor Set Point

30XA FLOODED COOLER UNITS SIZE	AMPS
140	5.2
160	5.2
180	10.4
200	10.4
220	10.4
240	10.4
260	10.4
280	10.4
300	10.4
325	10.4
350	10.4

30XA DX COOLER UNITS SIZE	AMPS
142	6
162	6
182	12
202	12
222	6
242	6
262	12
282	12
302	12
327	12
352	12

APPENDIX H — TOUCH PILOT™ WEB AND NETWORK INTERFACE PARAMETERS

Web Interface — The Touch Pilot control can be accessed via a web browser. The layout of the web interface is similar to the Touch Pilot control interface. Connection is from a PC using a web browser with Java installed.

Only two web connections may be authorized at the same time. The two users can be connected simultaneously with no priority between them. The last modification is taken into account.

IMPORTANT: Use firewalls and VPN for a secure connection.

MINIMUM WEB BROWSER CONFIGURATION

- Internet Explorer (version 8 or higher) or Mozilla Firefox (version 26 or higher). In the browser's connection options add the unit IP address to the exceptions list. Do not use a proxy server.
- Java platform (version 6 or higher). In the control panel, clear the Keep temporary files on my computer checkbox and use a direct connection.

For more information about web browser configuration, see the section Web Connection Settings on page 148.

WEB INTERFACE ACCESS — To access the Touch Pilot control, enter the IP address of the unit in the address bar of the web browser (Fig. A). The default IP address is 169.254.0.1. For information on how to set the controller IP address, see Web Connection Settings section on page 148.

Fig. A — IP Address in Web Browser

TECHNICAL DOCUMENTATION — When the Touch Pilot control is used via a PC web browser, the user can access the technical documentation for the product.

Press the Technical document button to access a list of documents related to the unit and its components. Technical documentation includes the following documents:

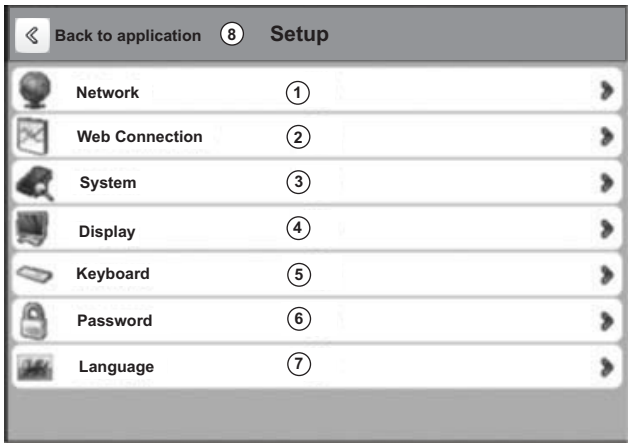
- Spare parts documentation — The list of spare parts included in the unit with reference, description and drafting.
- Misc — Documents such as electrical plans, dimension plans, unit certificates.
- PED — Pressure Equipment Directive.
- IOM — Installation, operation and maintenance manual, controls installation/maintenance manual.

Touch Pilot Interface Parameters — The Touch Pilot screen can be customized with additional parameters for connectivity and display.

⚠ CAUTION

Only parameters specified in this section can be changed by the user. Do not modify any other parameters. Changing other parameters may result in losing some of the features of the touch screen, or the screen may stop working. If in doubt, do not change anything; contact Carrier service.

SETUP MENU — The Setup Menu allows users to modify settings such as network information, web connections, and display settings. The Setup menu can be accessed at any time via the Touch Pilot interface. To access the Setup Menu, press anywhere on the Main Menu screen (excluding buttons or text fields) and hold for about 4 seconds. By default, the Setup Menu is not password-protected. (For more information about Setup Menu password settings, see page 149.) See Fig. B.



LEGEND

1 — System properties for Ethernet interface
2 — Additional network configuration properties
3 — System settings such as software version, buzzer
4 — Display settings such as contrast, backlight, timeout, rotation
5 — Keyboard: Not applicable
6 — Password for Setup Menu access
7 — Language display for Setup Menu only
8 — Select to return to application

Fig. B — Setup Menu

Once the desired parameters have been specified, return to the application by pressing the Back to application arrow in the upper left corner of the Setup Menu window. The confirmation dialog is displayed (Fig. C). Press the Save button to confirm changes or the Revert button to discard changes.

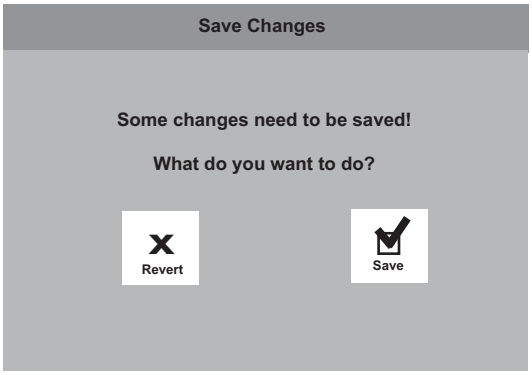


Fig. C — Save Changes Confirmation

NETWORK SETTINGS — You must request an IP address, subnet mask and default gateway from the system administrator before connecting the unit to the local Ethernet network. The Network Menu allows the user to define network parameters, including TCP/IP address. To access the menu, press the Network field in the Setup Menu. The Network Settings screen opens. See Fig. D.

NOTE: The Touch Pilot™ does not support DCHP (Dynamic Host Configuration Protocol). The unit cannot automatically obtain the network parameters via a DCHP server.

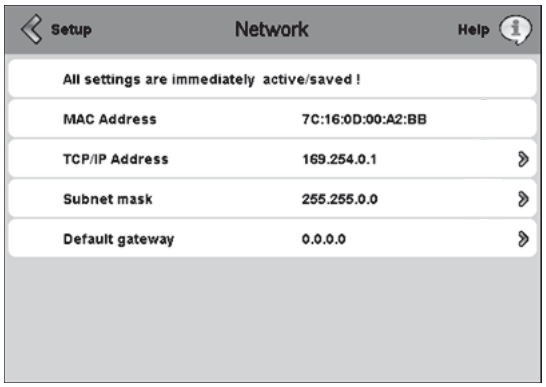


Fig. D — Network Menu

To find and modify the unit IP address, follow these steps:

1. Press Network in the Setup menu.
2. In the Network Menu, press the TCP/IP Address arrow. The TCP/IP Address dialog box is displayed. See Fig. E.

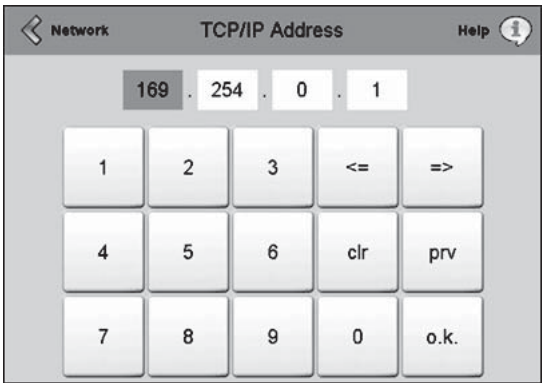


Fig. E — TCP/IP Address Dialog Box

3. Enter the correct IP address for the unit.
4. Press OK to confirm, or press the Network arrow at the top left of the screen to exit the dialog box with saving the modification.

WEB CONNECTION SETTINGS — The Startup Connection menu provides options required for accessing the Touch Pilot display from a remote network. To access the menu, press the Web Connection field in the Setup menu. The remote host IP address and remote port number can be obtained by contacting the site network administrator. See Fig. F.

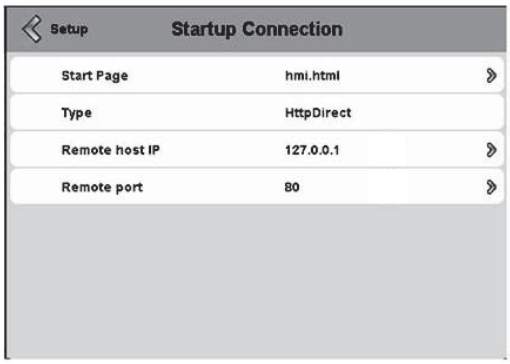
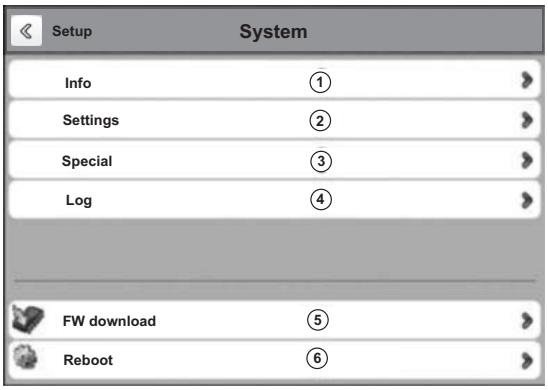


Fig. F — Web Connection Menu

SYSTEM SETTINGS — The System menu provides information regarding the installed software and allows system settings configuration. To access the menu, press the System field in the Setup Menu. The System screen opens. See Fig. G.

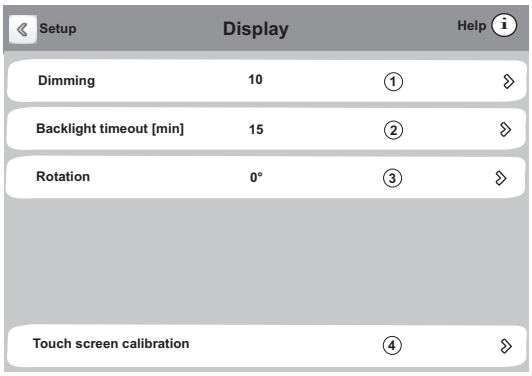


LEGEND

1 — System information
2 — System settings such as buzzer, file search option, delay during start-up, introduction screen
3 — Special options settings: DO NOT MODIFY
4 — Unit start-up history
5 — Firmware update
6 — Unit reboot

Fig. G — System Menu

DISPLAY SETTINGS — The Display menu allows users to modify a set of display parameters such as contrast, backlight timeout, and rotation. To access the menu, press the Display field in the Setup Menu. The Display screen opens. See Fig. H.



LEGEND

1 — Contrast information
2 — Backlight timeout: After the specified period the screen goes blank
3 — Screen rotation
4 — Touch screen calibration

Fig. H — Display Menu

SETUP PASSWORD SETTINGS — The Password screen provides users with the ability to control access to the Setup menu. To access the screen, press the Password field in the Setup Menu. The Password screen opens. See Fig. I. Enter the password and press OK to save, or press the Setup arrow in the upper left corner of the screen to cancel this action.

NOTE: To disable password authentication for the Setup Menu, leave the password box empty and press OK twice.

Fig. I — Setup Menu Password Screen

LANGUAGE SETTINGS — The Language screen provides a set of languages for the options in the Setup menu. To access the screen, press the Language field in the Setup Menu. The Language screen opens. See Fig. J. Select the language for the touch screen display setup options, and press the Setup arrow in the upper left corner of the screen to exit the screen.

NOTE: This selection affects only the screens available from the Setup Menu. The language choices may different from the languages available for the Touch Pilot™ interface itself. For more information about selecting a language for the interface, see Changing the Touch Pilot Display Language on page 6.

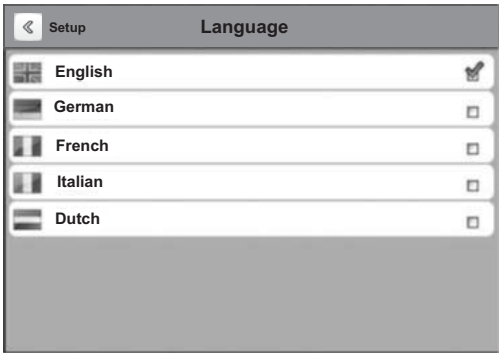


Fig. J — Setup Language Screen

Communication Diagnostics and Troubleshooting — The following sections provide basic troubleshooting support for remote connection to the Touch Pilot™ controls. For additional assistance, such as obtaining an IP Address or configuring network settings, contact the site system administrator.

WEB INTERFACE CONNECTION PROBLEMS — The intranet site address of the unit is the IP address. This address must be obtained by the site network administrator and configured in the Network menu (see the Network Settings section on page 148). Table A lists some possible web interface connection problems and solutions.

NOTE: The unit cannot automatically obtain the network parameters via a DHCP (Dynamic Host Configuration Protocol) server.

Table A — Web Interface Connection Problems

SYMPTOMS	POSSIBLE CAUSES	CONDITIONS TO CHECK	SOLUTIONS
Error after loading the start-up page.	Network property details are invalid. Ethernet network is not available.	Check the network parameters. Check that the orange LED is flashing on the unit (Ethernet connector).	Contact your system administrator. If the orange LED does not flash, check the Ethernet connection to the local network.
While accessing the unit via the web browser, the Java platform launches, but remains blocked. No file is loaded.	Proxy server problem in the local network.	Contact your system administrator.	In agreement with your system administrator, find the Java control panel and select direct connection parameters (see the Javanet Connection section on page 151) and/or disable the proxy server settings on the browser. Restart the web browser.
The application has been launched, but the screens cannot be accessed via the web browser.	A proxy server is used to access the unit. Invalid Java configuration.	Check that the web browser does not go via a proxy server to access the unit. Check that the Java application does not store the internet files on the PC.	Open the browser and in the system connection parameters add the IP address of the unit in the proxy exceptions.

NOTE: For more information about web browser configuration, see "Proxy Server and Automatic Configuration Script" on page 151.

ETHERNET/IP CONNECTION PROBLEMS — If the unit is point-to-point connected to a PC (the cable can be crossed or uncrossed) and the unit is energized, it may be necessary to check the Ethernet connection and/or configure the PC network board. See also the section Unit Is Connected to the Local Network below.

To verify the IP address of the unit, perform the following steps:

1. From the computer connected to the Touch Pilot, go to Local Area Connection Properties and select Internet Protocol (TCP/IP). See Fig. K.

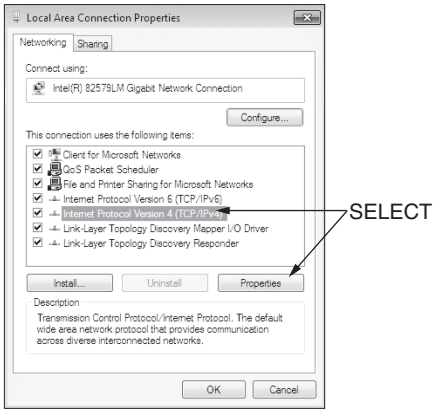


Fig. K — Local Area Connection Properties

2. Click the Properties button. The Internet Protocol Properties window opens. See Fig. L.

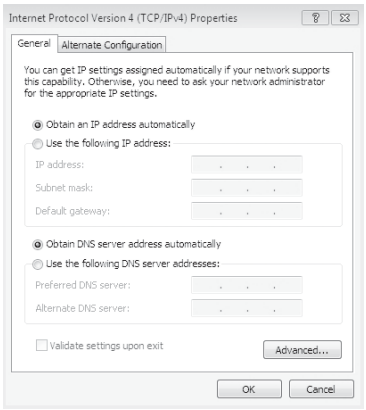


Fig. L — Internet Protocol Properties

3. Verify the IP address.

   If no IP address is configured in the General or Alternate Configuration tabs, the unit IP address must be configured to 169.254.xxx.xxx. Modify the unit IP address and restart the system.

   If the PC has a fixed IP address configured in the General or Alternate Configuration tabs, the IP address of the PC and the unit IP address must have the system and sub-system fields in common. The last part of the IP address is the host number and must be unique on the sub-system.

   For example:

   Unit address: 172.30.101.11 and PC address: 172.30.101.182. In this example 172.30 corresponds to the network, and 101 corresponds to the sub-system.

4. Carry out all the necessary modifications, and click OK to accept or Cancel to discard changes.
5. Try to access the unit again.

If it is still impossible to access the unit, ping the unit by following these steps:

1. Open a Windows command prompt using one of the following methods:
   - Press the Windows logo key + R to access the Run command. Then type the CMD command and press Enter.

   or

   - Click the Start button and then click Run. Type the CMD command and press Enter.
2. At the command prompt, type the ping command followed by the unit IP address.

In the example shown in Fig. M, the PC receives four positive responses (replies).

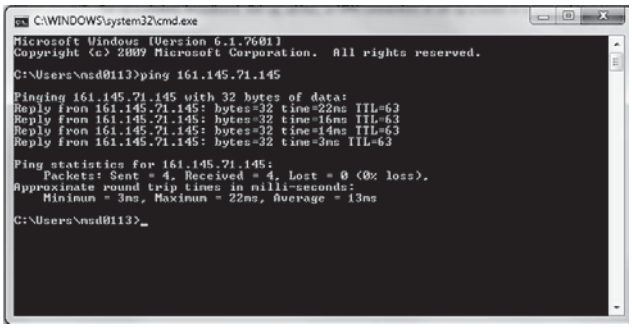


Fig. M — Ping — Positive Replies

In the example shown in Fig. N, the PC receives four negative responses (request timed out).

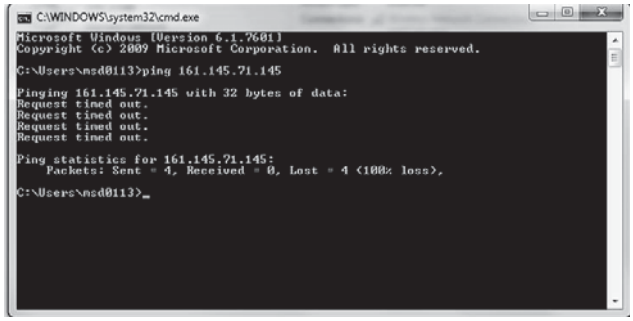


Fig. N — Ping — Negative Responses

If the PC receives four negative responses, check the web browser parameters to determine if a proxy server or an automatic configuration script has been configured (see the section Proxy Server and Automatic Configuration Script below). Additionally, Java settings may require configuration (see the section Javanet Connection below).

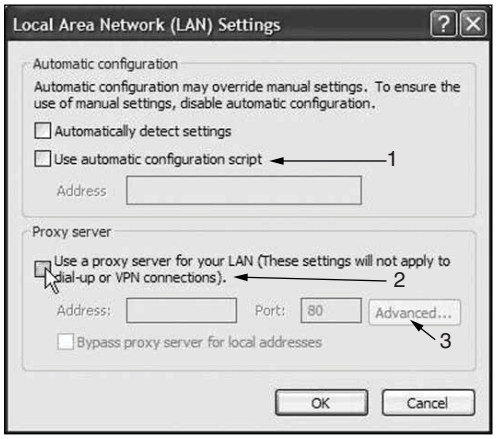
Try to access the unit again. If the PC still does not receive a response from the unit, restart the unit. Contact your system administrator.

UNIT IS CONNECTED TO THE LOCAL NETWORK — The unit is connected to the local network by an uncrossed cable, and the unit is energized. From a computer connected to the same network as the Touch Pilot, open a Windows command window (Start, Execute, type **cmd** and press Enter), then type the command **ping**, followed by the unit IP address.

If the responses are positive (see Fig. M), the web browser configuration may be faulty. Check the system parameters to determine if a proxy server or an automatic configuration script has been configured.

Proxy Server and Automatic Configuration Script — To check these parameters in a modern web browser (for example, Internet Explorer version 8 or higher), follow these steps:

1. Click the web browser Tools button and select Internet Options from the drop-down menu. The Internet Options dialog box opens.
2. Click the Connections tab, and click LAN settings on the Connections tabbed page. The Local Area Network (LAN) Settings dialog is displayed (Fig. O).



LEGEND

1 — Automatic configuration script
2 — Proxy server
3 — Advanced proxy configuration

Fig. O — Local Area Network Settings

3. Clear the Use automatic configuration script checkbox.
4. If a proxy server is used, add the unit IP address to the Exceptions list of the proxy server (click Advanced Proxy Configuration). See Fig. P.

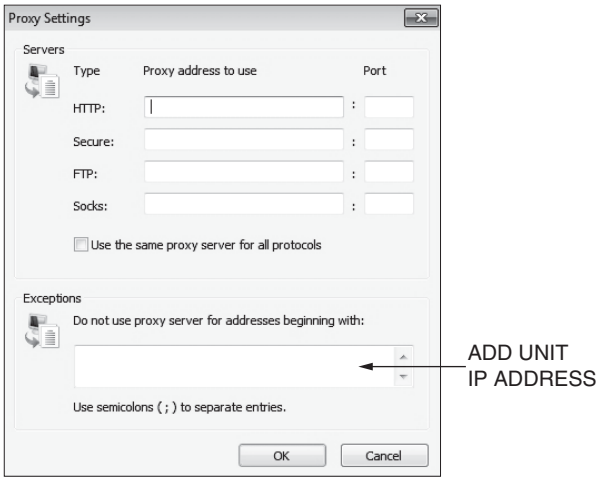


Fig. P — Proxy Settings

5. Click OK to save or Cancel to discard changes.

NOTE: For web browsers other than Internet Explorer, refer to the browser Help files for information on verifying system parameters.

Negative Response — If the response to the ping command is negative, verify the IP address of the PC and the IP address of the unit. They must have the system and sub-system in common. For example: Unit address: 172.30.101.11 and PC address: 172.30.101.182. In this example 172.30 corresponds to the network, and 101 corresponds to the sub-system.

The last part of the IP address is the host number and must be unique on the sub-system.

Ethernet Connection — To check the Ethernet connection on the PC, open the Control Panel and navigate to Network Connections. Find the system interface board and confirm that there is no red "X" on the icon.

The connection to the local network must be authorized and in the connected status. If the problem continues to occur, verify connections and if necessary repair the network connection.

Javanet Connection — To configure proxy settings for Java, follow these steps:

NOTE: If Java is not installed, a free download is available at http://www.java.com. If the Java application is installed and used by other applications, check their compatibility with the following configuration.

1. Open the PC Control Panel and select Programs.
2. In the Programs window, click the Java application icon . The Java Control Panel is displayed (Fig. Q).

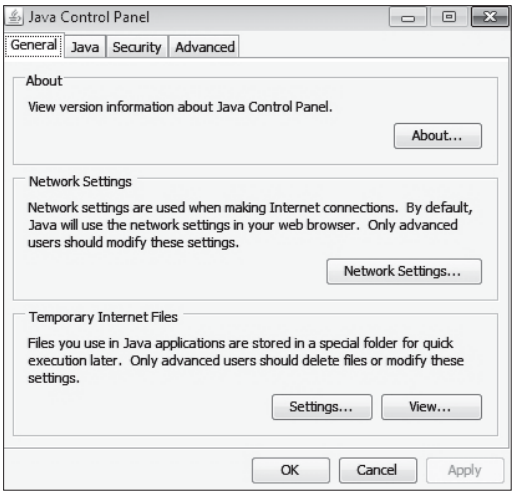


Fig. Q — Java Control Panel

3. Click Network Settings on the General tabbed page. The Network Settings dialog box opens (Fig. R).

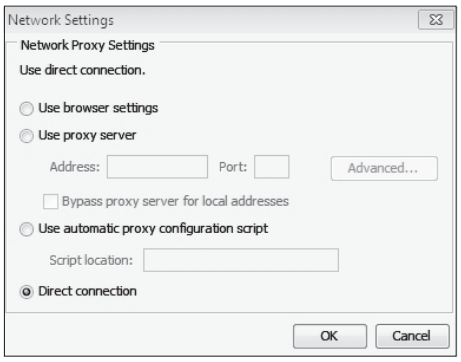


Fig. R — Java Network Settings

4. Select the Direct Connection option and click OK to save the change.
5. On the Java Control Panel—General tabbed page (see Fig. Q), click Settings under Temporary Internet Files. The Temporary Files Settings dialog box opens (Fig. S).

6. Clear the checkbox for Keep temporary files on my computer.
7. Click OK to save the change.

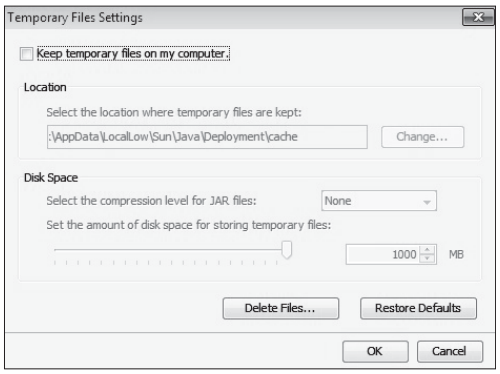


Fig. S — Java Temporary Files Settings

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Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

Catalog No. 04-53300134-01 Printed in U.S.A. Form 30XA-100T Pg 154 4-15 Replaces: New

START-UP CHECKLIST FOR 30XA LIQUID CHILLERS

A. PROJECT INFORMATION

Job Name _____ Installing Contractor_____

Address _____ Sales Office _____

City _____State ____Zip_____ Start-up Performed By_____

Design Information

	CAPACITY	EWT	LWT	FLUID TYPE	FLOW RATE	P.D.	AMBIENT
Cooler							

Unit

Model _____ Serial_____

Compressors

Compressor A

Model _____ Serial _____

Compressor B

Model _____ Serial_____

Cooler

Model _____ Serial _____

B. PRELIMINARY EQUIPMENT CHECK (This section to be completed by installing contractor)

1. Is there any physical damage? ☐ Yes ☐ No
   Will this prevent start-up? ☐ Yes ☐ No
   Description:
2. Unit is installed level as per the installation instructions. ☐ Yes ☐ No
3. Power supply agrees with the unit nameplate. ☐ Yes ☐ No
4. Correct control voltage _____vac. ☐ Yes ☐ No
5. Electrical power wiring is installed properly. ☐ Yes ☐ No
6. Unit is properly grounded. ☐ Yes ☐ No
7. Electrical circuit protection has been sized and installed properly. ☐ Yes ☐ No
8. All terminals are tight. ☐ Yes ☐ No
9. All plug assemblies are tight. ☐ Yes ☐ No
10. All cables, thermistors and transducers have been inspected for cross wires. ☐ Yes ☐ No
11. All thermistors are fully inserted into wells. ☐ Yes ☐ No
12. Oil separator heaters energized for 24 hours before start-up. ☐ Yes ☐ No
13. Relief valve vent piping per local codes. ☐ Yes ☐ No

Chilled Water System Check

1. All chilled water valves are open. ☐ Yes ☐ No
2. All piping is connected properly. ☐ Yes ☐ No
3. All air has been purged from the system. ☐ Yes ☐ No
4. Chilled water pump is operating with the correct rotation. ☐ Yes ☐ No
5. Chilled water pump starter controlled by chiller. ☐ Yes ☐ No
6. Chilled water flow switch operational. ☐ Yes ☐ No
7. Units without hydronic package, and units with hydronic package installed in open loop: inlet piping to cooler includes a 20 mesh strainer within 10 ft of unit. ☐ Yes ☐ No
8. Water loop volume greater than 3 gal/ton (40 L/kW) for air conditioning or 6 gal/ton (80 L/kW) for process cooling and low ambient operation. ☐ Yes ☐ No
9. Proper loop freeze protection provided to ____ °F (°C).
   Antifreeze type_____ Concentration _____%. ☐ Yes ☐ No

(If antifreeze solution is not utilized on 30XA machines and the minimum outdoor ambient is below 32 F (0° C) then items 10 and 11 have to be completed to provide cooler freeze protection to –20 F (–28.9 C). Refer to Installation Instructions for proper cooler winterization procedure.)

10. Outdoor piping wrapped with electric heater tape. ☐ Yes ☐ No
11. Cooler heaters installed and operational. ☐ Yes ☐ No
12. Is the Unit equipped with low ambient head pressure control? ☐ Yes ☐ No

a. If yes, are wind baffles installed? ☐ Yes ☐ No

C. UNIT START-UP

1. All liquid line service valves are open. ☐ Yes ☐ No
2. Verify actuated ball valve (ABV) operation. (Flooded Cooler Units only) ☐ Yes ☐ No
3. All suction and discharge service valves are open. ☐ Yes ☐ No
4. Economizer service valves open. (Leaving Main EXV and Leaving Brazed Plate Heat Exchanger [Economizer]) ☐ Yes ☐ No
5. Oil service valves open. ☐ Yes ☐ No
6. Leak check unit. Locate, repair and report any refrigerant leaks. ☐ Yes ☐ No
7. Voltage at terminal block is within unit nameplate range. ☐ Yes ☐ No

   Check voltage imbalance: A-B_____ A-C_____B-C_____

   Average voltage = _____ (A-B + A-C + B-C)/3

   Maximum deviation from average voltage = _____

   Voltage imbalance = _____% (max. deviation / average voltage) X 100

   Is voltage imbalance less than 2%. ☐ Yes ☐ No

   (DO NOT start chiller if voltage imbalance is greater than 2%. Contact local utility for assistance.)
8. Verify cooler flow rate

   Pressure entering cooler _____ psig (kPa)

   Pressure leaving cooler _____ psig (kPa)

   Cooler pressure drop _____ psig (kPa)

   Psig x 2.31 ft/psi = _____ ft of water

   kPa x 0.334 m/psi = _____ mm of water

   Cooler flow rate _____ gpm (l/s) (See Cooler Pressure Drop Curve)

Start and Operate Machine

1. Complete component test utilizing Quick Test Mode
2. Operate all condenser fans and verify operation and rotation.
3. Operate compressors and verify slide valve operation using manual test mode.
4. Check refrigerant and oil charge. Record charge information.
5. Record compressor and condenser fan motor current.
6. Record operating data.
7. Provide operating instructions to owner's personnel.

Refrigerant Charge

Additional charge required Circuit A _____ Circuit B _____

Oil Charge

Additional charge required Circuit A_____ Circuit B _____

Touch Pilot™ Software Version

ECG-SR-20M4A ___ ___ ___

To obtain software version, allow screen to lock out. The software number is displayed under the model number on the Welcome screen. See Fig. 1.

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE

Record Configuration Information

TOUCH PILOT™ DESCRIPTION	PATH	DEFAULT	ENTRY
Language	Login Button	English	
Units		US Imp	
Setpoint Select	Main Menu→General Parameters	0 (Auto)	
Cir Priority Sequence	Main Menu→Configuration Menu→ General Configuration	0 (Auto	
Ramp Loading Select		0 (No)	
Unit Off to On Delay		1min	
Demand Limit Type Select		0 (None)	
Night Mode Start Hour		0	
Night Mode End Hour		0	
Night Capacity Limit		100%	
Power Limit Select		0 (No)	
Ice Mode Enable		0 (No)	
Maximum Power Limit		2000 kW	
Cooler Pumps Sequence	Main Menu→Configuration Menu→ Pump Configuration	0 (No Pump)	
Pump Auto Rotation Delay		48 hours	
Pump Sticking Protection		0 (No)	
Stop Pump During Standby		0 (No)	
Flow Checked If Pump Off		1 (Yes)	
Cond Pump Off In Cool		0 (No)	
User Password	Main Menu→Configuration Menu→User Config.	11	
Cooling Reset Select	Main Menu→Configuration Menu→ Reset Configuration	0 (No reset)	
OAT No Reset Value		14° F (–10° C)	
OAT Full Reset Value		14° F (–10° C)	
Delta T No Reset Value		0 ^F (0 ^C)	
Delta T Full Reset Value		0 ^F (0 ^C)	
Current No Reset Value		0 mA	
Current Full Reset Value		0 mA	
Space T No Reset Value		14° F (–10° C)	
Space T Full Reset Value		14° F (–10° C)	
Cooling Reset Deg. Value		0° F (0° C)	
Unit Type (Heatpump = 2)	Main Menu→Configuration Menu→ Factory Menu	1 (Cooling Only)	
Unit Capacity		Unit Dependent	
Power Frequency 60Hz Sel		Unit Dependent	
Power Supply Voltage		Unit Dependent	
Factory Password		113	
Energy Management Module		0	
Master Slave Selection		0	
Cooler Pass Number		Unit Dependent	
MCHX Exchanger Select		Unit Dependent	
DX Cooler Select		Unit Dependent	
Country 0=EU, 1=US, 2=CH		Unit Dependent	
Fan Low Noise Option		0	
Leakage Charge Detection		0	
EXV A Maximum Steps Number	Main Menu→Configuration Menu→ Factory2 Menu	4260	
EXV B Maximum Steps Number		4260	
Economizer A Steps Number		2785	
Economizer B Steps Number		2785	
Number VFD compressor		2	
Number Fan Drive cir A		Unit Dependent	
Number Fan Drive cir B		Unit Dependent	

Record Configuration Information

TOUCH PILOT™ DESCRIPTION	PATH	DEFAULT	ENTRY
Cooler Fluid Type	Main Menu→Configuration Menu→ Service Parameters	1 (Water)	
Flow Switch Sp		0	
Condenser Fluid Type		1	
Entering Fluid Control		0	
Brine Freeze Setpoint		34° F (1.1° C)	
Brine Minimum fluid temp		38° F (3.3° C)	
Prop PID gain varipump		2	
Int PID gain varipump		0.2	
Deri PID gain varipump		0.4	
EXV Offset circuit A		0%	
EXV Offset circuit B		0%	
Varipump Min Speed		0%	
Varipump Max Speed		100%	
Fast Capacity Recovery		0	
EWT Probe on cir A side		1	
Service Password		88	
Leakage Charge Threshold		2.5 Volts	
Leakage Charge Timer		60 min.	
RFI Filter		1	
Metric Units?		1	
Send fan drive config?		1	
Send comp. Drive config?		1	
Cooler Heater Delta Spt		2 (Number of deg added to brine freeze setpoint to enable heater)	
Fan Offset circuit A		0 Hz	
Fan Offset circuit B		0 Hz	
Freeze override offset		0 ^F (0 ^C)	
QM Code		0	
Master/Slave Select	Main Menu→Configuration Menu→ Master Slave Config	0 (Disable)	
Master Control Type		1 (Local)	
Slave Address		2	
Lead Lag Select		0 (Always Lead)	
Lead/Lag Balance Delta		168 hours	
Lead/Lag Start Timer		10 min	
Lead Pulldown Time		0 min	
Start If Error Higher		4 ^F (2.2 ^C)	
Lag Minimum Running Time		0 min	
Lag Unit Pump Control		0 (Stop if Unit Stops)	
Chiller In Series		0 (No)	
Cooling Setpoint 1	Main Menu→Setpoint Table	44° F (6.7° C)	
Cooling Setpoint 2		44° F (6.7° C)	
Cooling Ice Setpoint		44° F (6.7° C)	
Cooling Ramp Loading		1^F (0.6 ^C)	
Switch Limit Setpoint 1		100%	
Switch Limit Setpoint 2		100%	
Switch Limit Setpoint 3		100%	

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE

Component Test — Complete the following tests to make sure all peripheral components are operational before the compressors are started.

TOUCH PILOT™ DESCRIPTION	PATH	CHECK WHEN COMPLETE
Quick Test Enable (Unit must be in Local OFF)	Main Menu→Quick Test Table	
Circuit A EXV Position		
Circuit A Oil Solenoid		
Circuit A Slide Valve 1		
Circuit A Slide Valve 2		
Capacity cirA Output		
Comp A Running Output		
EXV Eco Position Cir A		
Oil Heater Circuit A		
Isolation valve pos. A		
VariFan Speed A		
Circuit B EXV Position		
Circuit B Oil Solenoid		
Circuit B Slide Valve 1		
Circuit B Slide Valve 2		
Capacity cirB Output		
Comp B Running Output		
EXV Eco Position Cir B		
Oil Heater Circuit B		
Isolation valve pos. B		
VariFan Speed B		
Variable speed pump cmd		
Cooler Heater		
Cooler Pump 1		
Cooler Pump 2		
Alarm Relay Status		
Shutdown Relay Status		
Running Relay Status		
Alert Relay Switch		
Set Flow Switch		
Capacity Total Output		
Electrical box fan		

Operating Data:

Record the following information from the Run Status, Temperatures and Outputs Modes when machine is in a stable operating condition.

TEMPERATURES
COOLER ENTERING FLUID _____
COOLER LEAVING FLUID _____
CONTROL POINT _____
CAPACITY _____
OUTSIDE AIR TEMPERATURE _____
CHWS TEMPERATURE _____ (Dual Chiller Control Only)

CIRCUIT A		CIRCUIT B	
SATURATED COND TMP CIRC A	_____	SATURATED COND TMP CIRC B	_____
SATURATED SUCTION TEMP A	_____	SATURATED SUCTION TEMP B	_____
SATURATED LIQUID TMP A	_____	SATURATED LIQUID TMP B	
COMPRESSOR SUCTION TMP A	_____	COMPRESSOR SUCTION TMP B	_____
DISCHARGE GAS TEMP CIR A	_____	DISCHARGE GAS TEMP CIR B	_____
MOTOR TEMPERATURE CIR A	_____	MOTOR TEMPERATURE CIR B	_____
EXV ECO. TMP CIR A	_____	EXV ECO. TMP CIR B	_____
LIQUID TEMPERATURE A	_____	LIQUID TEMPERATURE B	_____

COMPRESSOR MOTOR CURRENT

	L1	L2	L3
COMPRESSOR A1	_____	_____	_____
COMPRESSOR B1	_____	_____	_____

CONDENSER FAN MOTOR CURRENT

	L1	L2	L3		L1	L2	L3
FAN MOTOR A1	____	____	____	FAN MOTOR B1	____	____	____
FAN MOTOR A2	____	____	____	FAN MOTOR B2	____	____	____
FAN MOTOR A3	____	____	____	FAN MOTOR B3	____	____	____
FAN MOTOR A4	____	____	____	FAN MOTOR B4	____	____	____
FAN MOTOR A5	____	____	____	FAN MOTOR B5	____	____	____
FAN MOTOR A6	____	____	____	FAN MOTOR B6	____	____	____
FAN MOTOR A7	____	____	____	FAN MOTOR B7	____	____	____
FAN MOTOR A8	____	____	____	FAN MOTOR B8	____	____	____
FAN MOTOR A9	____	____	____	FAN MOTOR B9	____	____	____

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE

COMMENTS:

SIGNATURES:

Start-up Technician _____Date_____

Customer Representative _____Date_____

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE

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