30RB060-390
Air-Cooled Liquid Chillers
60 Hz

Controls, Start-Up, Operation, Service and Troubleshooting

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Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

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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 mechanics should install, start up, and service this equipment. When working on this equipment, observe precautions in the literature, and 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

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, Refrigeration 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 attempt to unbraze factory joints when servicing this equipment. Compressor oil is flammable and there is no way to detect how much oil may be in any of the refrigerant lines. Cut lines with a tubing cutter as required when performing service. 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 system. DO NOT re-use compressor oil.

⚠ CAUTION

This unit uses a microprocessor-based electronic control system. Do not use jumpers or other tools to short out components, or to bypass or otherwise depart from recommended procedures. Any short-to-ground of the control board or accompanying wiring may destroy the electronic modules or electrical components.

⚠ CAUTION

To prevent potential damage to heat exchanger tubes, always run fluid through heat exchanger when adding or removing refrigerant charge. Use appropriate anti-freeze solutions in cooler fluid loop to prevent the freezing of heat exchanger, optional hydronic section and/or interconnecting piping when the equipment is exposed to temperatures below 32 F (0 °C). Proof of flow switch and strainer (when hydronic kit is supplied) are 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 and optional hydronic system. Failure to properly protect the system from freezing may constitute abuse and may void warranty.

⚠ CAUTION

Compressors and optional hydronic system pumps 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 any other motors. Operating the unit without testing the condenser fan(s) for proper phasing could result in equipment damage.

⚠ CAUTION

Refrigerant charge must be removed slowly to prevent loss of compressor oil that could result in compressor failure.

⚠ CAUTION

This system uses Puron® refrigerant which has a higher pressures than R-22 and other refrigerants. No other refrigerant can be used in this system. Failure to use gage set, hoses, and recovery system designed to handle Puron refrigerant may result in personal injury. If you are unsure, consult the equipment manufacturer.

GENERAL

This publication contains Controls, Operation, Start-Up, Service and Troubleshooting information for the 30RB060-390 air-cooled liquid chillers with electronic controls. The 30RB chillers are equipped with *Comfort*Link™ controls and electronic expansion valves.

NOTE: Unit sizes 315-390 are modular units that are shipped in separate sections as modules A or B as noted in position 8 of the unit model number. Installation directions specific to these units are noted in these instructions. For modules 315A, 315B, 330A, 330B, 345A, 345B, and 360B, follow all general instructions as noted for unit sizes 30RB160-170. For modules, 360A, 390A, and 390B follow instructions for 30RB190. See Table 1 for a listing of unit sizes and modular combinations.

NOTE: The nameplate for modular units contains only the first two digits in the model number. For example, 315A and 315B nameplates read 31A and 31B.

Table 1 — Modular Unit Combinations

UNIT SIZE	MODULE A	MODULE B
30RBA315	30RBA160	30RBA160
30RBA330	30RBA170	30RBA160
30RBA345	30RBA170	30RBA170
30RBA360	30RBA190	30RBA170
30RBA390	30RBA190	30RBA190

NOTE: An “A” in the model number indicates the design series.

Conventions Used in This Manual — The following conventions for discussing configuration points for the local display (Scrolling Marquee or Navigator™ accessory) will be used in this manual.

Point names will be written with the mode name first, then any sub-modes, then the point name, each separated by an arrow symbol (→). Names will also be shown in bold and italics. As an example, the Lead/Lag Circuit Select Point, which is located in the Configuration mode, Option sub-mode, would be written as ***Configuration →OPTN→LLCS***.

This path name will show the user how to navigate through the local display to reach the desired configuration. The user would scroll through the modes and sub-modes using the ▲ and ▼ keys. The arrow symbol in the path name represents pressing ENTER to move into the next level of the menu structure.

When a value is included as part of the path name, it will be shown at the end of the path name after an equals sign. If the value represents a configuration setting, an explanation will be shown in parenthesis after the value. As an example, ***Configuration→OPTN→LLCS* = 1** (Circuit A leads).

Pressing the ESCAPE and ENTER keys simultaneously will scroll an expanded text description of the point name or value across the display. The expanded description is shown in the local display tables but will not be shown with the path names in text.

The CCN (Carrier Comfort Network) point names are also referenced in the local display tables for users configuring the unit with CCN software instead of the local display. The CCN tables are located in Appendix B of the manual.

CONTROLS

General — The 30RB air-cooled liquid chillers contain the *Comfort*Link™ 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 at the very least a main base board (MBB), Scrolling Marquee display, electric expansion valve board (EXV), fan board, one Scroll Protection Module (SPM) per compressor, Emergency On/Off switch, an Enable-Off- Remote Contact switch and a reverse rotation board.

Main Base Board (MBB) — The MBB is the heart of the *Comfort*Link control system, which contains the major portion of operating software and controls the operation of the machine. See Fig. 1. The MBB continuously monitors input/output channel information received from its inputs and from all other modules. The MBB receives inputs from status and feedback switches, pressure transducers and thermistors. The MBB also controls several outputs. Some inputs and outputs to control the machine are located on other boards, but are transmitted to or from the MBB 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 TB3. For a complete description of Main Base Board inputs and outputs and their channel identifications, see Table 2.

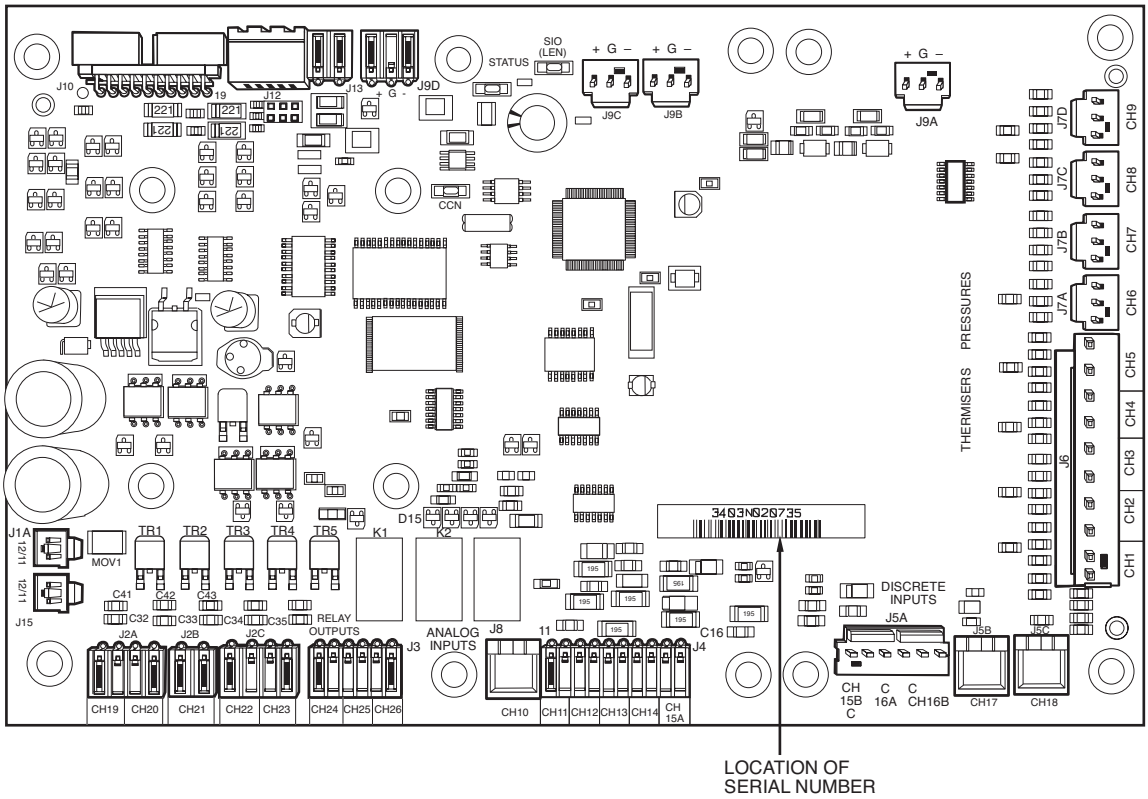


Fig. 1 — Main Base Board

Table 2 — Main Base Board Inputs and Outputs

DESCRIPTION	INPUT/OUTPUT	I/O TYPE	SCROLLING MARQUEE POINT NAME	CONNECTION POINT	
				Pin	Notation
Power (24 vac supply)	—	—	—	MBB-J1, MBB-J1A, MBB-J1B	
				11	24 vac
				12	Ground
Local Equipment Network	—	—	—	MBB-J9A, MBB-J9B, MBB-J9C	
				+	
				G	
				-	
Carrier Communication Network	—	—	—	MBB-J12	
				+	
				G	
				-	
Chilled Water Flow Switch	CWFS	Switch	***INPUTS→GEN.I→LOCK***	MBB-J5A-CH15B	
				15B	
Demand Limit Switch #1	Demand Limit SW1	Switch	***INPUT→GEN.I→DLS1***	MBB-J4-CH13	
Circuit A Discharge Pressure Transducer	DPTA	Pressure Transducer	***PRESSURE→PRC.A→DP.A***	MBB-J7A-CH6	
				5V	5 vdc Ref.
				S	Signal
				R	Return
Circuit B Discharge Pressure Transducer	DPTB	Pressure Transducer	***PRESSURE→PRC.B→DP.B***	MBB-J7C-CH8	
				5V	5 vdc Ref.
				S	Signal
				R	Return
Dual Chiller LWT Thermistor	DUAL	5k Thermistor	***TEMPERATURE→UNIT→CHWS***	MBB-J6-CH3	
Dual Set Point Input	Dual Set Point	Switch	***INPUTS→GEN.I→DUAL***	MBB-J4-CH12	
Entering Water Thermistor	EWT	5k Thermistor	***TEMPERATURE→UNIT→EWT***	MBB-J6-CH2	
Leaving Water Thermistor	LWT	5k Thermistor	***TEMPERATURE→UNIT→LWT***	MBB-J6-CH1	
Outdoor Air Thermistor	OAT	5k Thermistor	***TEMPERATURE→UNIT→OAT***	MBB-J6-CH4	
Pump #1 Interlock Pump #2 Interlock	PMP1 PMP2	Switch	***INPUTS→GEN.I→PUMP***	MBB-J5C-CH18	
				18	
				C	
External Chilled Water Pump Interlock	PMPI	Switch	***INPUTS→GEN.I→LOCK***	MBB-J4-CH15A	
Reverse Rotation Board	Reverse Rotation Board	Switch	***INPUTS→GEN.I→ELEC***	MBB-J5A-CH16B	
				16B	
Circuit A Suction Pressure Transducer	SPTA	Pressure Transducer	***PRESSURE→PRC.A→SP.A***	MBB-J7B-CH7	
				5V	5 vdc Ref.
				S	Signal
				R	Return
Circuit B Suction Pressure Transducer	SPTB	Pressure Transducer	***PRESSURE→PR.B→SP.B***	MBB-J7D-CH9	
				5V	5 vdc Ref.
				S	Signal
				R	Return
Unit Status	Remote Contact-Off-Enable	Switch	***INPUTS→GEN.I→ONOF***	MBB-J4-CH11	
Alarm Relay	ALM R	Relay	***OUTPUTS→GEN.O→ALRM***	MBB-J3-CH24	
Alert Relay	ALT R	Relay	***OUTPUTS→GEN.O→ALRT***	MBB-J3-CH25	
Cooler Heater	CL-HT	Contactor	***OUTPUTS→GEN.O→CO.HT***	MBB-J2B-CH21	
Circuit A Minimum Load Control	MLV-A	Solenoid Valve	***OUTPUTS→CIR.A→HGB.A***	MBB-J2C-CH22	
Circuit B Minimum Load Control	MLV-B	Solenoid Valve	***OUTPUTS→CIR.B→HGB.B***	MBB-J2C-CH23	
Pump #1 Starter	PMP1	Contactor	***OUTPUTS→GEN.O→PMP.1***	MBB-J2A-CH19	
Pump #2 Starter	PMP2	Contactor	***OUTPUTS→GEN.O→PMP.2***	MBB-J2A-CH20	
Ready Relay	RDY R	Relay	***OUTPUTS→GEN.O→REDY***	MBB-J3-CH26	

Scroll Protection Module (SPM) — There is one SPM per compressor and it is responsible for controlling that compressor. See Fig. 2. The device controls the compressor contactor and the compressor crankcase heater. The SPM module also monitors the compressor motor temperature, and circuit high pressure switch. The SPM responds to commands from the MBB (Main Base Board) and sends the MBB the results of the channels it monitors via the LEN (Local Equipment Network). See below for SPM board address information. See Table 3 for SPM inputs and outputs.

SPM-A1 DIP Switch	1	2	3	4	5	6	7	8
Address:	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF

SPM-A2 DIP Switch	1	2	3	4	5	6	7	8
Address:	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF

SPM-A3 DIP Switch	1	2	3	4	5	6	7	8
Address:	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF

SPM-B1 DIP Switch	1	2	3	4	5	6	7	8
Address:	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF

SPM-B2 DIP Switch	1	2	3	4	5	6	7	8
Address:	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF

SPM-B3 DIP Switch	1	2	3	4	5	6	7	8
Address:	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF

SPM-B4 DIP Switch	1	2	3	4	5	6	7	8
Address:	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF

SPM-C1 DIP Switch	1	2	3	4	5	6	7	8
Address:	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF

SPM-C2 DIP Switch	1	2	3	4	5	6	7	8
Address:	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF

SPM-C3 DIP Switch	1	2	3	4	5	6	7	8
Address:	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF

SPM-C4 DIP Switch	1	2	3	4	5	6	7	8
Address:	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF

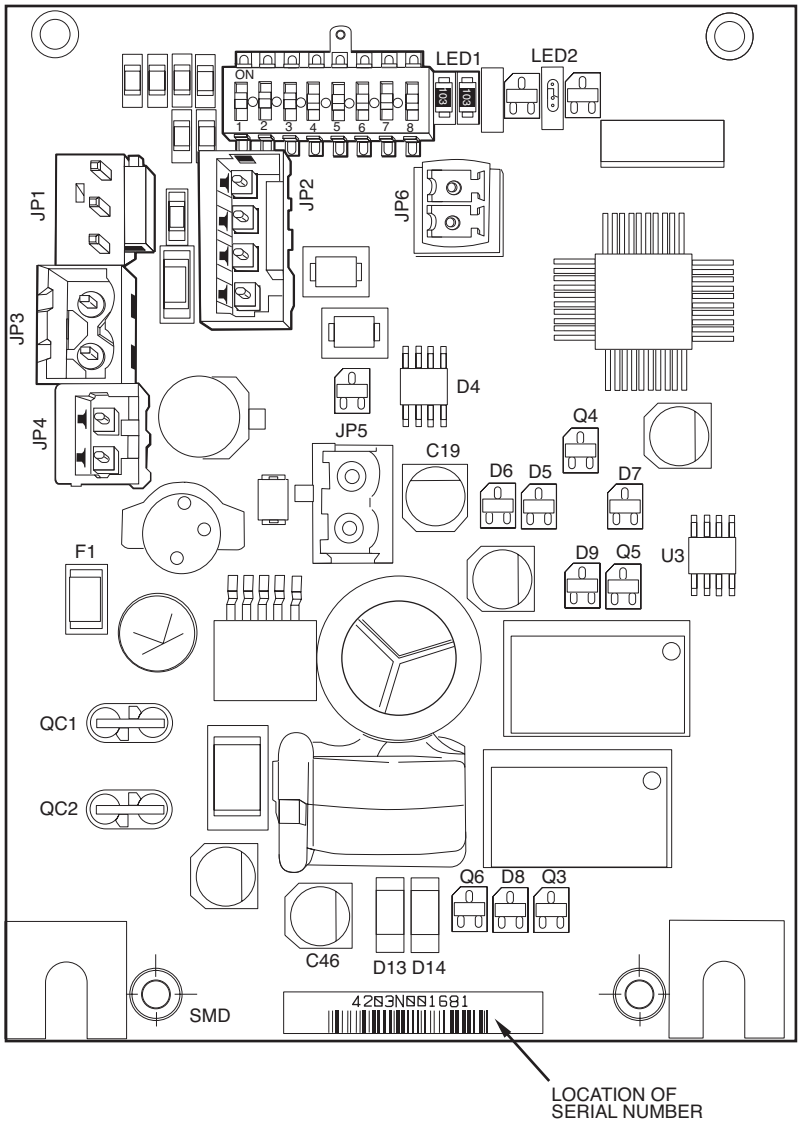


Fig. 2 — Scroll Protection Module

Table 3 — Scroll Protection Module Inputs and Outputs*

DESCRIPTION	INPUT/OUTPUT	I/O TYPE	SCROLLING MARQUEE POINT NAME	CONNECTION POINT	
				Pin	Notation
Power (24 vac supply)	—	—	—	SPM-xn-J1	
				QC1	24 vac
				QC2	Ground
Local Equipment Network	—	—	—	SPM-xn-JP1	
				1	+
				2	G
				3	-
				SPM-xn-JP2	
				2	+
				3	G
				4	-
Circuit x High Pressure Switch	HPS-x	Switch	Not available	SPM-xn-JP3	
				1	
				2	
Compressor xn Motor Temperature	MTR-xn	PTC Thermistor	Not available	SPM-xn-JP4	
				1	
				2	
Compressor xn Contactor	Cxn	Contactor	***OUTPUTS→CIR.x→CP.xn***	SPM-xn-JP5	
				1	
				2	
Crankcase Heater	CCH		***OUTPUTS→CIR.x→HT.xn***	SPM-xn-JP6	
				1	
				2	
Circuit x High Pressure Switch	HPS-x	Switch	Not available	SPM-xn-JP2	
				1	

* “x” denotes the circuit, A, B or C. “n” denotes the compressor number, 1, 2, 3, or 4.

Electronic Expansion Valve (EXV) Board — At least one EXV board is used in all machines. There is one EXV board for 2 circuit machines. Three circuit machines have two EXV boards. See Fig. 3. The board is responsible for monitoring the return gas temperature thermistors. The board also signals the EXV motors to open or close. The electronic expansion valve board responds to commands from the MBB and sends the MBB the results of the channels it monitors via the LEN (local equipment network). See below for DIP switch information for EXV1 and EXV2. See Tables 4 and 5 for EXV inputs and outputs.

EXV1 DIP Switch	1	2	3	4	5	6	7	8
Address:	ON	ON	ON	ON	ON	ON	OFF	ON

EXV2 DIP Switch	1	2	3	4	5	6	7	8
Address:	OFF	ON	ON	ON	ON	ON	OFF	ON

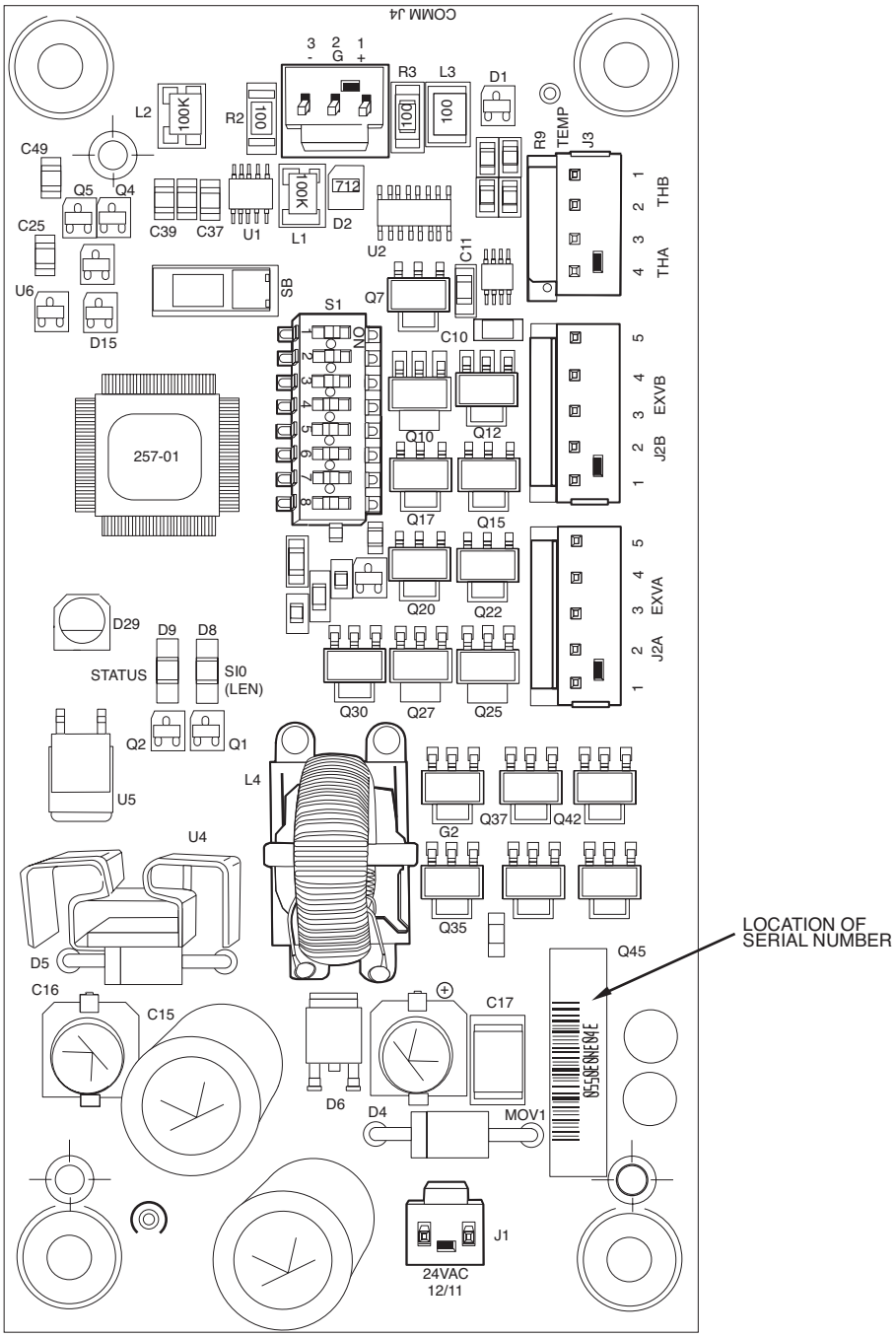


Fig. 3 — EXV Board

Table 4 — EXV1 Board Inputs and Outputs

DESCRIPTION	INPUT/OUTPUT	I/O TYPE	SCROLLING MARQUEE POINT NAME	CONNECTION POINT	
				Pin	Notation
Power (24 vac supply)	—	—	—	EXV1-J1	
				11	24 vac
				12	Ground
Local Equipment Network	—	—	—	EXV1-J4	
				1	+
				2	G
				3	–
Circuit A Suction Gas Thermistor	SGTA	5k Thermistor	***TEMPERATURE→CIR.A→SGT.A***	EXV1-J3	
				THA	
Circuit B Suction Gas Thermistor	SGTB	5k Thermistor	***TEMPERATURE→CIR.B→SGT.B***	EXV1-J3	
				THB	
Circuit A EXV	EXV-A	Stepper Motor	***OUTPUTS→CIR.A→EXV.A***	EXV1-J2A	
				1	
				2	
				3	
				4	
Circuit B EXV	EXV-B	Stepper Motor	***OUTPUTS→CIR.B→EXV.B***	EXV1-J2B	
				1	
				2	
				3	
				4	

Table 5 — EXV2 Inputs and Outputs

DESCRIPTION	INPUT/OUTPUT	I/O TYPE	SCROLLING MARQUEE POINT NAME	CONNECTION POINT	
				Pin	Notation
Power (24 vac supply)	—	—	—	EXV2-J1	
				11	24 vac
				12	Ground
Local Equipment Network	—	—	—	EXV2-J4	
				1	+
				2	G
				3	–
Circuit C Suction Gas Thermistor	SGTC	5k Thermistor	***TEMPERATURE→CIR.C→SGT.C***	EXV2J3	
				THA	
Circuit C EXV	EXV-C	Stepper Motor	***OUTPUTS→CIR.C→EXV.C***	EXV2-J2A	
				1	
				2	
				3	
				4	

NOTE: EXV2 inputs and outputs are only used on 30RB210-300.

Fan Boards — At least one fan board is installed in each unit. See Fig. 4A and 4B. There are two types of fan boards, with and without an analog output signal for the low ambient head pressure control fan speed controllers. If a unit does not have low ambient head pressure control installed, it will not have the analog connection terminals. The Fan Board responds to commands from the MBB and sends the MBB the results of the channels it monitors via the LEN. See below for fan board 1, 2 and 3 DIP switch addresses. See Tables 6-8 for inputs and outputs.

FAN BOARD 1 DIP Switch	1	2	3	4	5	6	7	8
Address:	OFF	ON	OFF	OFF	ON	OFF	ON	OFF

FAN BOARD 2 DIP Switch	1	2	3	4	5	6	7	8
Address:	ON	ON	OFF	OFF	ON	OFF	ON	OFF

FAN BOARD 3 DIP Switch	1	2	3	4	5	6	7	8
Address:	OFF	OFF	ON	OFF	ON	OFF	ON	OFF

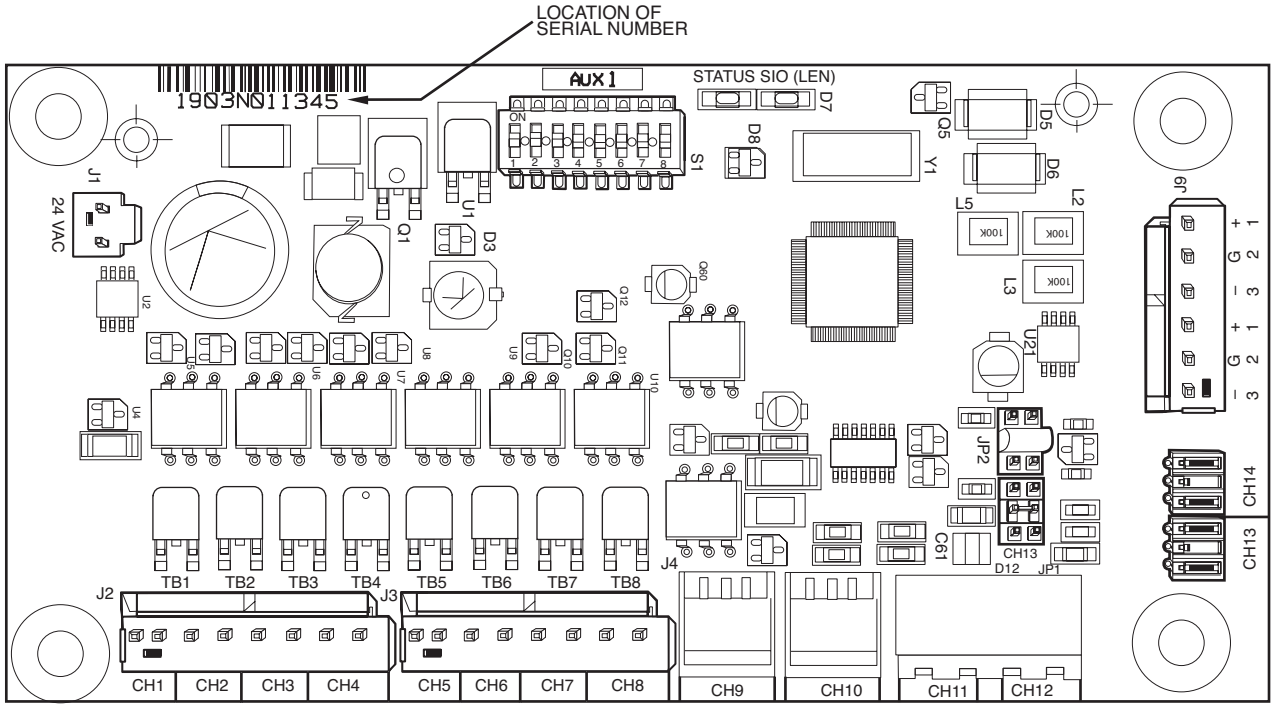


Fig. 4A — Fan Board (AUX 1) without Low Ambient Temperature Head Pressure Control

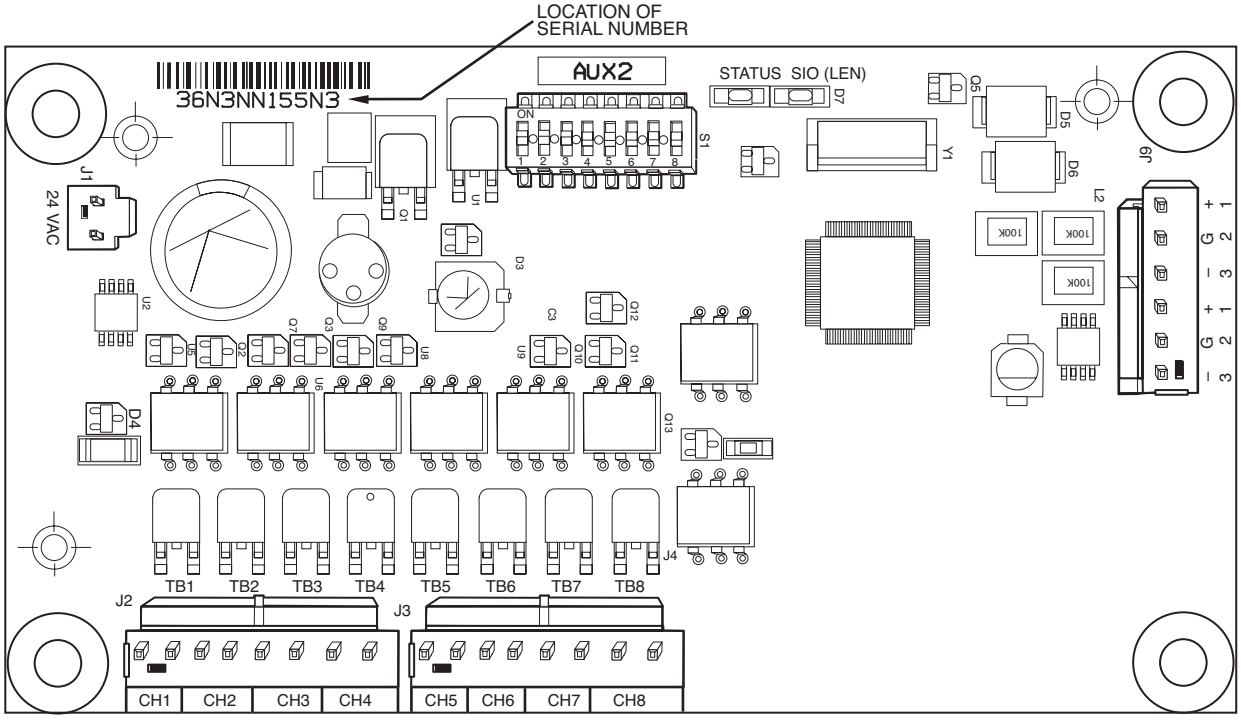


Fig. 4B — Fan Board (AUX 2) with Low Ambient Temperature Head Pressure Control

Table 6 — Fan Board 1 (AUX1*) Outputs

DESCRIPTION	INPUT/OUTPUT	I/O TYPE	SCROLLING MARQUEE POINT NAME	CONNECTION POINT	
				Pin	Notation
Power (24 vac supply)	—	—	—	FB1-J1	
				11	24 vac
				12	Ground
Local Equipment Network	—	—	—	FB1-J9	
				+	
				G	
				-	
				+	
				G	
				-	
Circuit A Low Ambient Temperature Head Pressure Control Speed Signal	MM-A†	0-10 VDC	***OUTPUTS→CIR.A→SPD.A***	FB1-CH9	
				+	
				-	
Circuit B Low Ambient Temperature Head Pressure Control Speed Signal (060-150, 210-250)	MM-B†	0-10 VDC	***OUTPUTS→CIR.B→SPD.B***	FB1-CH10	
				+	
				-	
Outdoor Fan Motor 1	OFM1	Contactor		FB1-J2-CH1	
Outdoor Fan Motor 2	OFM2	Contactor		FB1-J2-CH3 (060-150, 210-250) FB1-J2-CH4 (160-190, 275-300, 315-390)	
Outdoor Fan Motor 3	OFM3	Contactor		FB1-J2-CH2	
Outdoor Fan Motor 4	OFM4	Contactor		FB1-J3-CH4 (130-150, 210-250) FB1-J3-CH5 (060-070, 160-190, 275-300, 315-390) FB1-J3-CH6 (080-110)	
Outdoor Fan Motor 5	OFM5	Contactor		FB1-J2-CH3 (160-190, 275-300, 315-390) FB1-J3-CH5 (090-150, 210-250)	
Outdoor Fan Motor 6	OFM6	Contactor		FB1-J3-CH6 (160-190, 275-300, 315-390) FB1-J3-CH7 (090-150, 210-250)	
Outdoor Fan Motor 7	OFM7	Contactor		FB1-J3-CH6 (120-150, 210-250)	
Outdoor Fan Motor 8	OFM8	Contactor		FB1-J3-CH8 (120-150, 210-250)	

*Fan boards 1 and 2 will use the AUX2 board when the low ambient temperature head pressure control option is installed.
†Supplied on AUX2 board only

NOTE: Fan Board 1 is used on 30RB060-390.

Table 7 — Fan Board 2 (AUX1, AUX2*) Outputs

DESCRIPTION	INPUT/OUTPUT	I/O TYPE	SCROLLING MARQUEE POINT NAME	CONNECTION POINT	
				Pin	Notation
Power (24 vac supply)	—	—	—	FB2-J1	
				11	24 vac
				12	Ground
Local Equipment Network	—	—	—	FB2-J9	
				+	
				G	
				-	
				+	
				G	
				-	
Circuit B Low Ambient Temperature Head Pressure Control Speed Signal (160-190, 275-300, 315-400)	MM-B†	0-10 VDC	***OUTPUTS→CIR.B→SPD.B***	FB2-CH9	
				+	
				-	
Outdoor Fan Motor 7	OFM7†	Contactor		FB2-J2-CH1 (160-190, 275-300, 315-390)	
Outdoor Fan Motor 8	OFM8	Contactor		FB2-J2-CH3 (160-190, 315-400) FB2-J2-CH4 (275-300)	
Outdoor Fan Motor 9	OFM9	Contactor		FB2-J2-CH2 (160-190, 275-300, 315-390)	
Outdoor Fan Motor 10	OFM10	Contactor		FB2-J2-CH4 (160-170, 250, 315-345, 360B) FB2-J2-CH5 (190, 275-300, 360A, 390)	
Outdoor Fan Motor 11	OFM11	Contactor		FB2-J2-CH3 (190, 275-300, 360A, 390)	
Outdoor Fan Motor 12	OFM12	Contactor		FB2-J3-CH6 (190, 275-300, 360A, 390)	

*Fan boards 1 and 2 will use the AUX2 board when the low ambient temperature head pressure control option is installed.
†Output only on units with low ambient temperature head pressure control installed (AUX2).

NOTE: Fan Board 2 used on 30RB160-190, 275-300, 315-390.

Table 8 — Fan Board 3 (AUX2) Inputs and Outputs

DESCRIPTION	INPUT/OUTPUT	I/O TYPE	SCROLLING MARQUEE POINT NAME	CONNECTION POINT (Unit Size)	
				Pin	Notation
Power (24 vac supply)	—	—	—	FB3-J1	
				11	24 vac
				12	Ground
Local Equipment Network	—	—	—	FB3-J9	
				+	
				G	
				-	
				+	
				G	
				-	
Circuit C Discharge Pressure Transducer	DPTC	Pressure Transducer	***PRESSURE→PRC.C→DP.C***	FB3-J7-CH13	
Circuit C Suction Pressure Transducer	SPTC	Pressure Transducer	***PRESSURE→PRC.C→SP.C***	FB3-J8-CH14	
Minimum Load Value Circuit C	MLV-C	Solenoid	***OUTPUTS→CIR.C→HGB.C***	FB3-J3-CH7 (210-300)	
Circuit C Low Ambient Temperature Head Pressure Control Speed Signal (210-300)	MM-C*	0-10 VDC	***OUTPUTS→CIR.C→SPD.C***	FB3-CH9	
				+	
				-	
Outdoor Fan Motor 9	OFM9	Contactor		FB3-J2-CH1 (210-250)	
Outdoor Fan Motor 10	OFM10	Contactor		FB3-J2-CH3 (210-225) FB3-J2-CH4 (250)	
Outdoor Fan Motor 11	OFM11	Contactor		FB3-J2-CH2 (210-250)	
Outdoor Fan Motor 12	OFM12	Contactor		FB3-J2-CH4 (210-225) FB3-J3-CH5 (250)	
Outdoor Fan Motor 13	OFM13	Contactor		FB3-J2-CH1 (275-300) FB3-J2-CH3 (250)	
Outdoor Fan Motor 14	OFM14	Contactor		FB3-J2-CH3 (275) FB3-J3-CH4 (275) FB3-J3-CH6 (250)	
Outdoor Fan Motor 15	OFM15	Contactor		FB3-J2-CH2 (275-300)	
Outdoor Fan Motor 16	OFM16	Contactor		FB3-J2-CH4 (275) FB3-J3-CH5 (300)	
Outdoor Fan Motor 17	OFM17	Contactor		FB3-J2-CH3 (300)	
Outdoor Fan Motor 18	OFM18	Contactor		FB3-J3-CH6 (300)	

*Low ambient temperature head pressure control output is on AUX2 board only.

NOTE: Fan Board 3 used on 30RB210-300.

Reverse Rotation Board — The Reverse Rotation Board will monitor the three-phase electrical system to provide phase reversal and phase loss protection.

PHASE REVERSAL PROTECTION — If the control senses an incorrect phase relationship, the relay (K1) on the board will be deenergized (opening its contact). If the phase relationship is correct, the relay will be energized. The control has a self-bypass function after a pre-set time. If the control determines that the three phases stay in a correct relationship for 10 consecutive minutes, the relay will stay energized regardless of the phase sequence of three inputs as long as 24-vac control voltage is applied. This self-bypass function will be reset if all three phases are restored in a phase loss event.

PHASE LOSS PROTECTION — If the reverse rotation board senses any one of the three phase inputs has no AC voltage, the relay will be deenergized (opening its contact). This protection is always active as long as 24-vac control voltage is applied, and is not affected by the self by-pass function of the phase sequence monitoring function. However, in the event of phase loss, the relay will be re-energized only if all three phases are restored and the three phases are in the correct sequence.

A red LED is provided to indicate the function of the board. See the table below.

LED STATUS	FUNCTION
On continuously	Relay contact closed (normal operation)
Blinking	Relay contact open (phase loss or phase reversal has occurred)
Off	24 vac control power not present (off)

NOTE: Normal operation of the reverse rotation board (for example, no faults are detected) results in 24 vac being returned to the MBB (terminal J5A-16B) through the closed K1 relay contact.

Reverse Rotation Board Inputs and Outputs

DESCRIPTION	INPUT/ OUTPUT	I/O TYPE	SCROLLING MARQUEE POINT NAME	CONNECTION POINT	
				Pin	Notation
Voltage-Phase I Line 1	—	Line Voltage	—	—	L1
Voltage-Phase II Line 2	—	Line Voltage	—	—	L2
Voltage-Phase III Line 3	—	Line Voltage	—	—	L3
Control Power	—	24 vac	—	—	24 vac
Control Power Common	—	24 vac	—	—	COM
Signal Output to MBB (24 vac if no fault)	Reverse Rotation Fault	24 vac	***INPUTS→ GEN.I→ELEC_BOX***	—	CONTACTOR

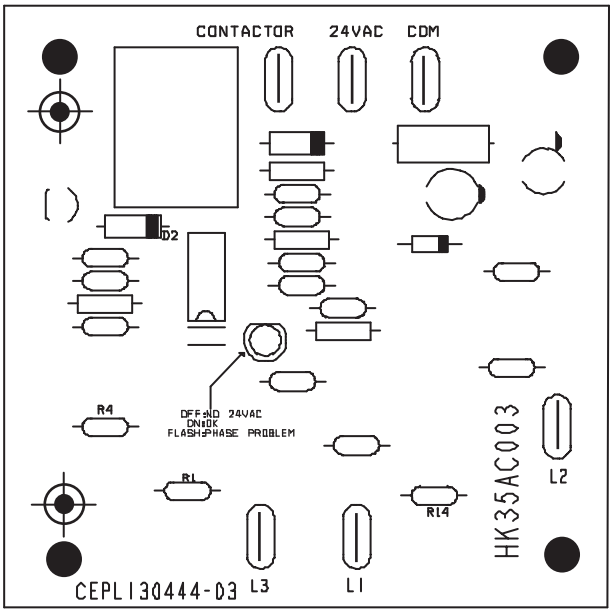


Fig. 5 — Reverse Rotation Board

Enable-Off-Remote Contact Switch — This switch is installed in all units and provides the owner and service person with a local means of enabling or disabling the machine. It is a 3-position switch used to control the chiller. When switched to the Enable position the chiller is under its own control. Move the switch to the Off position to shut the chiller down. Move the switch to the Remote Contact position and a field-installed dry contact can be used to start the chiller. The contacts must be capable of handling a 24-vac, 20-mA load. In the Enable and Remote Contact (dry contacts closed) positions, the chiller is allowed to operate and respond to the scheduling configuration, CCN configuration and set point data.

Emergency On/Off Switch — 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 the MBB, Energy Management Module, and Scrolling Marquee display 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. The EMM receives 4 to 20 mA inputs for the temperature reset, cooling set point reset 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 MBB, and the MBB adjusts the control point, capacity limit, and other functions according to the inputs received. See Table 9.

⚠ 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. *Comfort*Link™ controls use half wave rectification. A signal isolation device should be utilized if incorporating a full wave bridge rectifier signal generating device is used.

Basic Control Usage

SCROLLING MARQUEE DISPLAY — The Scrolling Marquee display is the standard interface display to the *Comfort*Link Control System for 30RB units. The display has up and down arrow keys, an ENTER key, and an ESCAPE key. These keys are used to navigate through the different levels of the display structure. Press the ESCAPE key until the highest operating level is displayed to move through the top 11 mode levels indicated by LEDs on the left side of the display. See Fig. 6.

Once within a mode or sub-mode, pressing the ENTER and ESCAPE keys simultaneously will put the Scrolling Marquee display into expanded text mode where the full meaning of all sub-modes, items and their values can be displayed for the current selection. Press the ENTER and ESCAPE keys to return the Scrolling Marquee display to its default menu of rotating display items (those items in ***Run Status→VIEW***). In addition, the password will be disabled, requiring that it be entered again before changes can be made to password protected items. Press the ESCAPE key to exit out of the expanded text mode.

NOTE: When the Language Selection (***Configuration→DISP→LANG***), variable is changed, all appropriate display expansions will immediately change to the new language. No power-off or control reset is required when reconfiguring languages.

When a specific item is located, the item name alternates with the value. Press the ENTER key at a changeable item and the value will be displayed. Press ENTER again and the value will begin to flash indicating that the value can be changed. Use the up and down arrow keys to change the value, and confirm the value by pressing the ENTER key.

Changing item values or testing outputs is accomplished in the same manner. Locate and display the desired item. Press ENTER so that the item value flashes. Use the arrow keys to change the value or state and press the ENTER key to accept it. Press the ESCAPE key to return to the next higher level of structure. Repeat the process as required for other items.

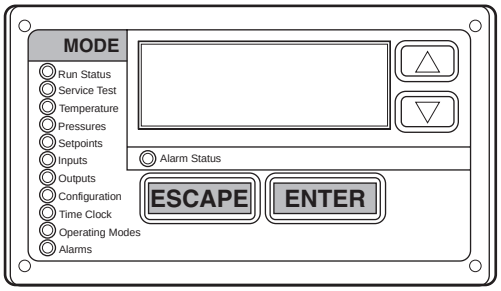


Fig. 6 — Scrolling Marquee Display

Table 9 — Energy Management Module (EMM) Inputs and Outputs

INPUT	DESCRIPTION	I/O TYPE	I/O POINT NAME	CONNECTION POINT
4-20 mA or 2-10 vac Demand Limit	4-20 mA Demand Limit	4-20 mA or 2-10 vdc	***INPUTS→GEN.I→DMND***	EMM-J7B-CH6
4-20 mA or 2-10 vac Temperature Reset/Setpoint	4-20 mA Temperature Reset/ Set point	4-20 mA or 2-10 vdc	***INPUTS→GEN.I→RSET***	EMM-J7A-CH5
Demand Limit SW2	Demand Limit Step 2	Switch Input	***INPUTS→GEN.I→DLS2***	EMM-J4-CH9
Ice Done	Ice Done Switch	Switch Input	***INPUTS→GEN.I→ICE.D***	EMM-J4-CH11A
Occupancy Override	Occupied Schedule Override	Switch Input	***INPUTS→GEN.I→OCCS***	EMM-J4-CH8
Remote Lockout Switch	Chiller Lockout	Switch Input	***INPUTS→GEN.I→RLOC***	EMM-J4-CH10
SPT	Space Temperature Thermistor	10k Thermistor	***TEMPERATURE→UNIT→SPT***	EMM-J6-CH2
OUTPUT	**DESCRIPTION**	**I/O TYPE**	**I/O POINT NAME**	**CONNECTION POINT**
% Total Capacity		0-10 vdc	***OUTPUTS→GEN.O→CATO***	EMM-J8-CH7
RUN R	Run Relay	Relay	***OUTPUTS→GEN.O→RUN***	EMM-J3-CH24
SHD R	Shutdown Relay	Relay	***OUTPUTS→GEN.O→SHUT***	EMM-J3-CH25

Items in the Configuration and Service Test modes are password protected. The words 'PASS' and 'WORD' will alternate on the display when required. The default password is 0111. Press ENTER and the 1111 password will be displayed. Press ENTER again and the first digit will begin to flash. Use the arrow keys to change the number and press ENTER to accept the digit. Continue with the remaining digits of the password. The password can only be changed through CCN operator interface software such as ComfortWORKS®, ComfortVIEW™ and Service Tool.

See Table 10 and Appendix A for further details.

ACCESSORY NAVIGATOR™ DISPLAY MODULE — The Navigator module provides a mobile user interface to the *Comfort*Link™ control system, which is only available as a field-installed accessory. The display has up and down arrow keys, an ENTER key, and an ESCAPE key. These keys are used to navigate through the different levels of the display structure. Press the ESCAPE key until 'Select a Menu Item' is displayed to move through the top 11 mode levels indicated by LEDs on the left side of the display. See Fig. 7.

Once within a Mode or sub-mode, a ">" indicates the currently selected item on the display screen. Pressing the ENTER and ESCAPE keys simultaneously will put the Navigator module into expanded text mode where the full meaning of all sub-modes, items and their values can be displayed. Pressing the ENTER and ESCAPE keys when the display says 'Select Menu Item' (Mode LED level) will return the Navigator module to its default menu of rotating display items (those items in ***Run Status→VIEW***). In addition, the password will be disabled, requiring that it be entered again before changes can be made to password protected items. Press the ESCAPE key to exit out of the expanded text mode.

NOTE: When the Language Selection (***Configuration→DISP→LANG***), variable is changed, all appropriate display expansions will immediately change to the new language. No power-off or control reset is required when reconfiguring languages.

When a specific item is located, the item name appears on the left of the display, the value will appear near the middle of the display and the units (if any) will appear on the far right of the display. Press the ENTER key at a changeable item and the value will begin to flash. Use the up and down arrow keys to change the value, and confirm the value by pressing the ENTER key.

Changing item values or testing outputs is accomplished in the same manner. Locate and display the desired item. Press ENTER so that the item value flashes. Use the arrow keys to change the value or state and press the ENTER key to accept it. Press the ESCAPE key to return to the next higher level of structure. Repeat the process as required for other items.

Items in the Configuration and Service Test modes are password protected. The words **Enter Password** will be displayed when required, with 1111 also being displayed. The default password is 0111. Use the arrow keys to change the number and press ENTER to enter the digit. Continue with the remaining digits of the password. The password can only be changed through CCN operator interface software such as ComfortWORKS, ComfortVIEW and Service Tool.

Adjusting the Contrast — The contrast of the display can be adjusted to suit ambient conditions. To adjust the contrast of the Navigator module, press the ESCAPE key until the display reads, "Select a menu item." Using the arrow keys move to the Configuration mode. Press ENTER to obtain access to this mode. The display will read:

```
> TEST OFF
METR OFF
LANG ENGLISH
```

Pressing ENTER will cause the "OFF" to flash. Use the up or down arrow to change "OFF" to "ON". Pressing ENTER will illuminate all LEDs and display all pixels in the view screen. Pressing ENTER and ESCAPE simultaneously allows the user to adjust the display contrast. The display will read:

```
Adjust Contrast
----+---------------
```

Use the up or down arrows to adjust the contrast. The screen's contrast will change with the adjustment. Press ENTER to accept the change. The Navigator module will keep this setting as long as it is plugged in to the LEN bus.

Adjusting the Backlight Brightness — The backlight of the display can be adjusted to suit ambient conditions. The factory default is set to the highest level. To adjust the backlight of the Navigator module, press the ESCAPE key until the display reads, "Select a menu item." Using the arrow keys move to the Configuration mode. Press ENTER to obtain access to this mode. The display will read:

```
> TEST OFF
METR OFF
LANG ENGLISH
```

Pressing ENTER will cause the "OFF" to flash. Use the up or down arrow keys to change "OFF" to "ON". Pressing ENTER will illuminate all LEDs and display all pixels in the view screen. Pressing the up and down arrow keys simultaneously allows the user to adjust the display brightness. The display will read:

```
Adjust Brightness
----------------+
```

Use the up or down arrow keys to adjust screen brightness. Press ENTER to accept the change. The Navigator module will keep this setting as long as it is plugged in to the LEN bus.

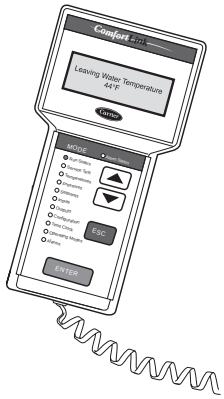


Fig. 7 — Accessory Navigator Display Module

Table 10 — *Comfort*Link™ Display Menu Structure

MODE										
RUN STATUS	**SERVICE TEST**	**TEMPERATURES**	**PRESSURES**	**SET POINTS**	**INPUTS**	**OUTPUTS**	**CONFIGURATION**	**TIME CLOCK**	**OPERATING MODES**	**ALARMS**
Auto Display (VIEW)	Manual Test Mode (TEST)	Unit Temperatures (UNIT)	Circuit A Pressures (PRC.A)	Cooling Setpoints (COOL)	General Inputs (GEN.I)	Circuit A Outputs (CIR.A)	Display Configuration (DISP)	Time of Day (TIME)	Operating Control Type (SLCT)	Reset Current Alarms (R.ALM)
Remote User Interface (R.CCN)	Quick Test Mode (QUIC)	Circuit A Temperatures (CIR.A)	Circuit B Pressures (PRC.B)	Heating Setpoints (HEAT)		Circuit B Outputs (CIR.B)	Unit Configuration (UNIT)	Day, Date (DATE)	Operating Modes (MODE)	Current Alarms (ALRM)
Machine Starts/ Hours (RUN)		Circuit B Temperatures (CIR.B)	Circuit C Pressures (PRC.C)	Misc. Setpoints (MISC)		Circuit C Outputs (CIR.C)	Service Configurations (SERV)	Schedule 1 (SCH1)		Alarm History (H.ALM)
Compressor Run Hours (HOUR)		Circuit C Temperatures (CIR.C)				General Outputs (GEN.O)	Options Configuration (OPTN)	Schedule 2 (SCH2)		
Compressor Starts (STRT)							Reset, Demand Limit, Master/Slave (RSET)	Holidays (HOLI)		
Fan Run Hours (FAN)								Service Maintenance Configuration (MCFG)		
Compressor Disable (CP.UN)										
Predictive Maintenance (MAIN)										
Software Versions (VERS)										

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 TB3.

Board Addresses — All boards (except the Main Base Board and the Energy Management Module Board) have 8-position DIP switches. Addresses for all boards are listed with the Input/Output Tables for each board.

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 blink in unison, verify that correct power is being supplied to all modules. Be sure that the Main Base Board (MBB) is supplied with the current software. If necessary, reload current software. If the problem still persists, replace the MBB. 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. See Input/Output Tables for LEN Connector designations. A 3-wire bus accomplishes communication between modules. These 3 wires run in parallel from module to module. The J9A connector on the MBB provides communication directly to the Scrolling Marquee display or the Navigator™ display module.

YELLOW LED — The MBB has one yellow LED. The Carrier Comfort Network (CCN) LED will blink during times of network communication.

Carrier Comfort Network (CCN) Interface — All 30RB units 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, that is also required for the negative and signal ground pins of each system element. Wiring connections for CCN should be made at TB3. Consult the CCN Contractor's Manual for further information. See Fig. 8.

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 11 for recommended wire manufacturers and part numbers.

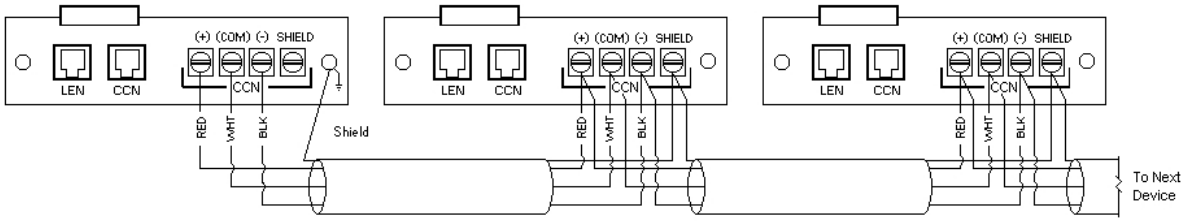


Fig. 8 — *Comfort*Link™ CCN Communication Wiring

Table 11 — 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	—

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.

Configuration Options

MINIMUM LOAD CONTROL (***Configuration→UNIT→HGBP***) reduces the capacity of the 30RB chiller below the lowest standard capacity step by use of hot gas bypass. This capacity step reduction provides more precise control of the leaving water temperature.

Minimum Load Control can be configured in three different ways. If Minimum Load Control is not used, ***HGBP*** must be set **0**. If ***HGBP*** is set to **1**, the control will activate the minimum load control valve when the machine is started only. This will be the first step of capacity. If ***HGBP*** is set to **2**, all stages of capacity can utilize the minimum load control valve. If ***HGBP*** is set to **3**, the minimum load control valve will be used only when the circuit has a high pressure override active. This will reduce the capacity of the circuit.

RAMP LOADING (***Configuration→OPTN→RL.S***), limits the rate of change of leaving fluid temperature. If the unit is in a Cooling mode and configured for Ramp Loading, the control makes 2 comparisons before deciding to change stages of capacity. The control calculates a temperature difference between the control point and leaving fluid temperature. If the difference is greater than 4° F (2.2° C) and the rate of change (°F or °C per minute) is more than the configured Cool Ramp Loading (***Setpoints→COOL→CRMP***), the control does not allow any changes to the current stage of capacity.

MINUTES OFF TIME (***Configuration→OPTN→DELY***) is a time delay added to the start when the machine is commanded ON. This is a field configurable item from 1 to 15 minutes. The factory default is 1 minute. This feature is useful when multiple units are installed. Staggering the start will reduce the inrush potential.

Dual Chiller Control — The dual chiller routine is available for the control of two parallel units supplying chilled fluid on a common loop. This control is designed for a parallel fluid flow arrangement only. One chiller must be configured as the master chiller, the other as the slave chiller. An additional leaving fluid temperature thermistor (Dual Chiller LWT) must be installed in the common chilled water piping as described in the Installation Instructions for both the master and slave chillers. See the Field Wiring section in the 30RB Installation Instructions for Dual Chiller LWT sensor control wiring. A chilled water flow switch is factory-installed for each chiller.

Parallel chiller control with dedicated pumps is recommended. Chiller must start and stop its own water pump located on its own piping. If pumps are not dedicated for each chiller, chiller isolation valves are required: each chiller must open and close its own isolation valve through the control (valve shall be connected to the pump outputs). Pump Control is enabled as described in the Cooler Pump Control section on page 31. One additional parameter is set for the dual chiller control. Lag Unit Pump Select, (***Configuration→RSET→LAGP***) allows the user to configure the control to energize the pump for the lag chiller once the unit enters an occupied time period or delay the control until the lag chiller is started. It is recommended that this parameter be set to **0**, OFF IF UNIT STOPPED.

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 it shall only verify that CCN communication with its master is present. See the Dual Chiller Sequence of Operation section on page 46.

Use dual chiller control to designate a lead chiller between the master and slave chiller. Configure the Lead/Lag Balance Select (***Configuration→OPTN→LLBL***) to **ENBL** to base the selection on the Lead/Lag Balance Delta (***Configuration→OPTN→LLBD***) between the master and slave run hours. If the run hour difference between the master and the slave remains less than ***LLBD***, 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 (***Configuration→RSET→LPUL***) provides a field configurable time delay of 0 to 60 minutes. This time delay gives the lead chiller a chance to remove the heat that the chilled water loop picked up while being inactive during an unoccupied period. The Lead Pulldown Time parameter is a one-time time delay initiated after starting the lead chiller, manually or by a schedule, before checking whether to start an additional chiller. This routine provides the lead chiller an opportunity to pull down the loop temperature before starting another chiller. The second time delay, Lead/Lag Delay (***Configuration→RSET→LLDY***) 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. See Tables 12 and 13.

Table 12 — Configuring the Master Chiller

MODE	KEYPAD ENTRY	DISPLAY	ITEM EXPANSION	COMMENT
CONFIGURATION	ENTER	**DISP**		
	↓	**UNIT**		
	↓	**SERV**		
	↓	**OPTN**		
	ENTER	CCNA	CCN Address	Confirm address of chiller. The master and slave chiller must have different addresses.
	ENTER	1		Factory default address is 1.
	ESCAPE	CCNA		
	↓	CCNB	CCN Bus Number	Confirm the bus number of the chiller. The master and slave chiller must be on the same bus.
	ENTER	0		Factory default is 0.
	ESCAPE	CCNB		
	ESCAPE	**OPTN**		
	↓	**RSET**	Reset Cool and Heat Tmp	
	ENTER	CRST	Cooling Reset Type	
	↓ x 5	MSSL	Master/Slave Select	
	ENTER	0	Disable	
	ENTER	0	Disable	Flashing to indicate Edit mode. May require Password.
	↑	1	Master	Use up arrows to change value to 1.
	ENTER	1		Accepts the change.
	ESCAPE	MSSL		
	↓	SLVA	Slave Address	
	ENTER	1		
	ENTER	1		Flashing to indicate Edit mode.
	↑	2		Use up arrows to change value to 2. This address must match the address of the slave chiller.
	ENTER	2		Accepts the change.
	ESCAPE	SLVA		
	↓	LLBL	Lead/Lag Balance Select	
	ENTER	ENBL		Factory Default is ENBL
	ESCAPE	LLBL		
	↓	LLBD	Lead/Lag Balance Delta	
	ENTER	168		Factory Default is 168.
	ESCAPE	LLBD		
	↓	LLDY	Lead/Lag Delay	
	ENTER	10		Factory Default is 10.
	ESCAPE	LLDY		
	↓	LAGP	Lag Unit Pump Select	
	ENTER	0	Off if U Stp	Factory Default is 0, Off if unit is stopped.
	ESCAPE	LAGP		
	↓	LPUL	Lead Pulldown Time	
	ENTER	0		Factory Default is 0.
	ESCAPE			
	ESCAPE			At mode level.
OPERATING MODES	ENTER	**OPER**	Operating Control Type	
	ENTER	0	Switch Control	Master chiller should be configured for job requirements, Switch Control, Time Schedule, or CCN.
	ESCAPE			At mode level.

NOTE: **Bold** values indicate sub-mode level.

Table 13 — Configuring the Slave Chiller

MODE	KEYPAD ENTRY	DISPLAY	ITEM EXPANSION	COMMENT
CONFIGURATION	ENTER	**DISP**		
	↓	**UNIT**		
	↓	**SERV**		
	↓	**OPTN**		
	ENTER	CCNA	CCN Address	Confirm address of chiller. The master and slave chiller must have different addresses.
	ENTER	1		Factory default address is 1. The slave chiller address must match what was programmed in the Master Chiller SLVA item.
	ENTER	1		Flashing to indicate Edit Mode.
	↑	2		This item must match Master Chiller SLVA item.
	ENTER	2		Accepts the change.
	ESCAPE	CCNA		
	↓	CCNB	CCN Bus Number	Confirm the bus number of the chiller. The master and slave chiller must be on the same bus.
	ENTER	0		Factory default bus number is 0.
	ESCAPE	CCNB		
	ESCAPE	**OPTN**		
	↓	**RSET**	Reset Cool and Heat Tmp	
	ENTER	CRST	Cooling Reset Type	
	↓ x 5	MSSL	Master/Slave Select	
	ENTER	0	Disable	
	ENTER	0	Disable	Flashing to indicate Edit mode. May require Password
	↑	2	Slave	Use up arrows to change value to 2.
	ENTER	2		Accepts the change.
	ESCAPE	MSSL		
	↓	SLVA	Slave Address	Not required.
	↓	LLBL	Lead/Lag Balance Select	Not required.
	↓	LLBD	Lead/Lag Balance Delta	Not required.
	↓	LLDY	Lead/Lag Delay	Not required.
	↓	LAGP	Lag Unit Pump Select	Not required.
	↓	LPUL	Lead Pulldown Time	Not required.
	ESCAPE			
	ESCAPE			At mode level
OPERATING MODES	ENTER	**OPER**	Operating Control Type	
	ENTER	0	Switch Control	
	ENTER	0		Flashing to indicate Edit Mode.
	↑	2	CCN Control	Use up arrows to change value to 2. NOTE: Must be configured for CCN.
	ENTER	2		Accepts the value.
	ESCAPE	**OPER**		
	ESCAPE			At mode level

NOTE: **Bold** values indicate sub-mode level.

Capacity Control — The control system cycles compressors and minimum load valve solenoids (if equipped) to maintain the user-configured leaving chilled fluid temperature set point. Entering fluid temperature is used by the Main Base Board (MBB) to determine the temperature drop across the cooler and is used in determining the optimum time to add or subtract capacity stages. Entering fluid temperature, space temperature (requires additional sensor), or outdoor-air temperature reset features can automatically reset the leaving chilled fluid temperature set point. It can also be reset from an external 4 to 20-mA signal (requires Energy Management Module).

The control has an automatic lead-lag feature built in for circuit and compressor starts. If enabled, the control will determine which circuit (***Configuration→OPTN→LLCS*=0**) and compressor to start to even the wear. The compressor wear factor (combination of starts and run hours) is used to determine which compressor starts.

Compressor Wear Factor = (Compressor Starts) + 0.1 *(Compressor Run Hours)*

In this case, the circuit with the lowest average compressor wear factor (the average of the wear factors of all available compressors in the circuit) is the circuit that starts first. The compressor within the circuit with the lowest wear factor is the first to start. If the automatic lead-lag function for the circuit is not enabled (***Configuration→OPTN→LLCS*=1**) (Circuit A leads), **2** (Circuit B leads), **3** (Circuit C leads), the selected circuit will be the first to start. Again, the compressor with the lowest wear factor within the circuit will be the first to start. If Minimum Load Control is enabled (***Configuration→UNIT→HGBP*=1**), the valve will be operational only during the first stage of cooling.

Once the lead compressor has been started, the lag compressors will be determined by the wear factor and loading sequence selected. If equal loading is selected, (***Configuration→OPTN→LOAD*=0**), the circuit with the lowest average wear factor for the available compressors will start next, with the compressor with the lowest wear factor starting. The control will attempt to keep all circuits at approximately the same number of compressors ON. For this option to function properly, all circuits must have the same number of compressors available. If a circuit compressor is not available due to an alarm condition or demand limit, the capacity staging will change to staged. If staged loading is selected, (***Configuration→OPTN→LOAD*=1**), the started circuit will continue to turn on compressors according to the lowest wear factor until all are on, then start the next circuit with the lowest average wear factor. If Minimum Load Control is enabled for close control (***Configuration→UNIT→HGBP*=2**), the valve will be available at all stages for better temperature control. If Minimum Load Control is enabled for high ambient control (***Configuration→UNIT→HGBP*=3**), the valve will be used only when a high pressure override is active for that circuit.

The electronic expansion valves provide a controlled start-up. During start-up, the low pressure logic in the lead circuit will be ignored for 5 minutes to allow for the transient changes during start-up. As additional stages of compression are required, the processor control will add them. The following example is based on a 30RB225 machine, which has three 25-ton compressors in each circuit. See Table 14.

Each example below has different configurations and is intended to illustrate the loading sequences possible for normal operation.

In Example 1 (Table 15), assume the following configurations are in place:

***Configuration→UNIT→HGBP*=1** . . Minimum Load Control installed and enabled for Start-Up Only

***Configuration→OPTN→LOAD*=0**. . . .Equal Circuit Loading

***Configuration→OPTN→LLCS*=0** . .Automatic Circuit Select

Since Circuit A has the lowest average wear factor, it will be the lead circuit. Within the circuit, compressor A3 has the lowest wear factor and will start first with Minimum Load Control ON. The next stage will turn OFF the minimum load control. Stage 3 will start another circuit because of the Equal Circuit Loading configuration. The next circuit with the lowest wear factor is Circuit B, and the compressor with the lowest wear factor is B2. The next stage will be a circuit C compressor. The process continues until all compressors are ON. See Table 15.

In Example 2 (Table 16), assume the compressor starts and run hours are the same as in the previous example and the following configurations are in place:

***Configuration→UNIT→HGBP*=1** . . Minimum Load Control installed and enabled for Start-Up Only

***Configuration→OPTN→LOAD*=1**. . . Staged Circuit Loading

***Configuration→OPTN→LLCS*=0** . .Automatic Circuit Select

Since Circuit A has the lowest average wear factor, it will be the lead circuit. Within the circuit, compressor A3 has the lowest wear factor and will start first with Minimum Load Control ON. The next stage will turn OFF the minimum load control. Stage 3 will start a compressor in the same circuit because of the Staged Circuit Loading configuration. Compressor A2 has the next lowest wear factor and will be started next. Compressor A3 will be next to start. Since all compressors in Circuit A are ON, the next stage will start another circuit. Of the remaining circuits, Circuit B has the lowest wear factor, and the compressor with the lowest wear factor is B2. All of the Circuit B compressors will be started in the same manner as Circuit A. Once all Circuit B compressors are ON, then Circuit C will be started. The process continues until all compressors are ON. See Table 16.

Table 14 — Compressor Starts and Run Hours

COMPRESSOR	STARTS	RUN HOURS	WEAR FACTOR	CIRCUIT AVERAGE WEAR FACTOR
A1	25	249	49.9	44.8
A2	22	237	45.7	
A3	26	128	38.8	
B1	41	453	86.3	67.6
B2	38	138	51.8	
B3	35	297	64.7	
C1	93	103	103.3	80.3
C2	57	98	66.8	
C3	61	99	70.9	

Table 15 — Compressor Stages and Circuit Cycling, Example 1

STAGE	TOTAL CAP.	CIRCUIT A					CIRCUIT B					CIRCUIT C				
		Cir. Cap.	MLC	A1	A2	A3	Cir. Cap.	MLC	B1	B2	B3	Cir. Cap.	MLC	C1	C2	C3
0	0	0					0					0				
1	8	24	X			X	0					0				
2	11	33				X	0					0				
3	22	33				X	33			X		0				
4	33	33				X	33			X		33			X	
5	44	66			X	X	33			X		33			X	
6	55	66			X	X	66			X	X	33			X	
7	66	66			X	X	66			X	X	66			X	X
8	77	100		X	X	X	66			X	X	66			X	X
9	88	100		X	X	X	100		X	X	X	66			X	X
10	100	100		X	X	X	100		X	X	X	100		X	X	X

LEGEND

MLC — Minimum Load Control

NOTES:
1. Total Cap. (Total Unit Capacity) and Cir. Cap. (Circuit Capacity) are approximate percentage values.
2. Example is to determine minimum load control, staged circuit loading, and automatic circuit select.

Table 16 — Compressor Stage and Circuit Cycling, Example 2

STAGE	TOTOL CAP.	CIRCUIT A					CIRCUIT B					CIRCUIT C				
		Cir. Cap.	MLC	A1	A2	A3	Cir. Cap.	MLC	B1	B2	B3	Cir. Cap.	MLC	C1	C2	C3
0	0	0					0					0				
1	8	24	X			X	0					0				
2	11	33				X	0					0				
3	22	66			X	X	0					0				
4	33	100		X	X	X	0					0				
5	44	100		X	X	X	33			X		0				
6	55	100		X	X	X	66			X	X	0				
7	66	100		X	X	X	100		X	X	X	0				
8	77	100		X	X	X	100		X	X	X	33				X
9	88	100		X	X	X	100		X	X	X	66			X	X
10	100	100		X	X	X	100		X	X	X	100		X	X	X

LEGEND

MLC — Minimum Load Control

NOTES:
1. Total Cap. (Total Unit Capacity) and Cir. Cap. (Circuit Capacity) are approximate percentage values.
2. Example is to determine minimum load control, staged circuit loading, and automatic circuit select.

In Example 3 (Table 17), assume the following configurations are in place:

***Configuration →UNIT →HGBP*=1** . . Minimum Load Control installed and enabled for Start-Up Only

***Configuration →OPTN →LOAD*=0** . . . Equal Circuit Loading

***Configuration →OPTN →LLCS*=2** . . . . . Circuit B Leads

Since Circuit B has been selected, it will be the lead circuit. Within the circuit, compressor B2 has the lowest wear factor and will start first with Minimum Load Control ON. The next stage will turn OFF the minimum load control. Stage 3 will start another circuit because of the Equal Circuit Loading configuration. Comparing Circuit A and C, the circuit with the lowest average wear factor is Circuit A, and the compressor with the lowest wear factor is A3. The next stage will be a circuit C compressor. The process continues until all compressors are ON. See Table 17.

In Example 4 (Table 18), assume the compressor starts and run hours are the same as in the first example and the following configurations are in place:

***Configuration →UNIT →HGBP*=1** . . Minimum Load Control installed and enabled for Start-Up Only

***Configuration →OPTN →LOAD*=1** . . Staged Circuit Loading

***Configuration →OPTN →LLCS*=3** . . . . . Circuit C Leads

Since Circuit C has been selected, it will be the lead circuit. Within the circuit, compressor C2 has the lowest wear factor and will start first with Minimum Load Control ON. The next stage will turn OFF the minimum load control. Stage 3 will start a compressor in the same circuit because of the Staged Circuit Loading configuration. Compressor C3 has the next lowest wear factor and will be started next. Compressor C1 will be next to start. Since all compressors in Circuit C are ON, the next stage will start another circuit. Of the remaining circuits, Circuit A has the lowest wear factor, and the compressor with the lowest wear factor is A3. All of the Circuit A compressors will be started in the same manner as Circuit C. Once all Circuit A compressors are ON, then Circuit B will be started. The process continues until all compressors are ON. See Table 18.

If the circuit capacity is to be reduced, the compressor with the highest wear factor will be shut off first (in most cases). With Equal Circuit Loading, stages will be removed from each circuit, following the same criteria used in the loading sequence, but in the opposite order. Shown in Table 18 based on the current wear factor in the opposite to the loading sequence shown above, the compressor with the highest wear factor will be removed first. When Staged Circuit Loading is selected, the capacity from the last lag circuit will be removed first.

Table 17 — Compressor Stage and Circuit Cycling, Example 3

STAGE	TOTAL CAP.	CIRCUIT A					CIRCUIT B					CIRCUIT C				
		Cir. Cap.	MLC	A1	A2	A3	Cir. Cap.	MLC	B1	B2	B3	Cir. Cap.	MLC	C1	C2	C3
0	0	0					0					0				
1	8	0	X				24	X		X		0				
2	11	0					33			X		0				
3	22	33				X	33			X		0				
4	33	33				X	33			X		33			X	
5	44	33				X	66			X	X	33			X	
6	55	66			X	X	66			X	X	33			X	
7	66	66			X	X	66			X	X	66			X	X
8	77	66			X	X	100		X	X	X	66			X	X
9	88	100		X	X	X	100		X	X	X	66			X	X
10	100	100		X	X	X	100		X	X	X	100		X	X	X

LEGEND

MLC — Minimum Load Control

NOTES:
1. Total Cap. (Total Unit Capacity) and Cir. Cap. (Circuit Capacity) are approximate percentage values.
2. Example is to determine minimum load control, staged circuit loading, and automatic circuit select.

Table 18 — Compressor Stage and Circuit Cycling, Example 4

STAGE	TOTAL CAP.	CIRCUIT A					CIRCUIT B					CIRCUIT C				
		Cir. Cap.	MLC	A1	A2	A3	Cir. Cap.	MLC	B1	B2	B3	Cir. Cap.	MLC	C1	C2	C3
0	0	0					0					0				
1	8	0					0					24	X			X
2	11	0					0					33				X
3	22	0					0					66			X	X
4	33	0					0					100		X	X	X
5	44	33				X	0					100		X	X	X
6	55	66			X	X	0					100		X	X	X
7	66	100		X	X	X	0					100		X	X	X
8	77	100		X	X	X	33			X		100		X	X	X
9	88	100		X	X	X	66			X	X	100		X	X	X
10	100	100		X	X	X	100		X	X	X	100		X	X	X

LEGEND

MLC — Minimum Load Control

NOTES:
1. Total Cap. (Total Unit Capacity) and Cir. Cap. (Circuit Capacity) are approximate percentage values.
2. Example is to determine minimum load control, staged circuit loading, and automatic circuit select.

The capacity control algorithm runs every 30 seconds. The algorithm attempts to maintain the Control Point at the desired set point. Each time it runs, the control reads the entering and leaving fluid temperatures. The control determines the rate at which conditions are changing and calculates 2 variables based on these conditions. Next, a capacity ratio (SM2) is calculated using the 2 variables to determine whether or not to make any changes to the current stages of capacity. This ratio value ranges from –100 to +100%. If the next stage of capacity is a compressor, the control starts (stops) a compressor when the ratio reaches +100% (–100%). If the next stage of capacity is the Minimum Load Control, the control energizes (deenergizes) the Minimum Load Control when the ratio reaches +60% (–60%). If installed, the minimum load valve solenoid will be energized with the first stage of capacity. The control will also use the minimum load valve solenoid as the last stage of capacity before turning off the last compressor. If the close control feature (***Configuration→UNIT→HGBP*=2**) is enabled the control will use the minimum load valve solenoid whenever possible to fine tune leaving fluid temperature control. A delay of 90 seconds occurs after each capacity step change with Minimum Load Control. A delay of 3 minutes occurs after each compressor capacity step change.

CAPACITY CONTROL OVERRIDES — The following overrides will modify the normal operation routine. If any of the following override conditions listed below is satisfied, it shall determine the capacity change instead of the normal control. Overrides are listed by priority order.

Override #1: Cooler Freeze Protection — This override attempts to avoid the freeze protection alarm. If the Leaving Water Temperature is less than Brine Freeze Set Point (***Configuration→SERV→LOSP***) + 2.0° F (1.1° C) then remove a stage of capacity.

NOTE: The freeze set point is 34 F (1.1 C) for fresh water systems (***Configuration→SERV→FLUD*=1**). The freeze set point is Brine Freeze Set Point (***Configuration→SERV →LOSP***), for Medium Temperature Brine systems (***Configuration→SERV→FLUD*=2**).

Override #2: Circuit A Low Saturated Suction Temperature in Cooling

Override #3: Circuit B Low Saturated Suction Temperature in Cooling

Override #4: Circuit C Low Saturated Suction Temperature in Cooling — These overrides attempt to avoid the low suction temperature alarms. This override is active only when more than one compressor in a circuit is ON. If the Saturated Suction Temperature is less than Brine Freeze Set Point (***Configuration→SERV→LOSP***) –18.0 F (–10 C) for 90 seconds, or the Saturated Suction Temperature is less than –4 F (–20 C), a compressor in the affected circuit will be turned off.

Override #5: Low Temperature Cooling — This override removes one stage of capacity when the difference between the Control Point (***Run Status→VIEW→CTPT***) and the Leaving Water Temperature (***Run Status→VIEW→LWT***) reaches a predetermined limit and the rate of change of the water is 0 or still decreasing.

Override #6: Low Temperature Cooling — This override removes two stages of capacity when the Entering Water Temperature (***Run Status→VIEW→EWT***) is less than the Control Point (***Run Status→VIEW→CTPT***.)

Override #7: Ramp Loading — If the unit is configured for ramp loading (***Configuration→OPTN→RL.S=ENBL***) and if the difference between the Leaving Water Temperature and the Control Point is greater than 4º F (2.2º C) and the rate of change of the leaving water is greater than Cool Ramp Loading Rate (***Setpoints→COOL→CRMP***) then no capacity stage increase will be made. Operating mode 5 (MD05) will be in effect.

Override #8: Service Manual Test Override — The manual test consists in adding a stage of capacity every 30 seconds, until the control enables all of the requested compressors and Minimum Load Control selected in the *Comfort*Link™ display Service Test menu. All safeties and higher priority overrides are monitored and acted upon.

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, a stage is removed. If the current capacity is lower than the capacity limit value, the control will not add a stage that will result in the new capacity being greater then the capacity limit value. Operating mode 4 (MD04) will be in effect.

Override #10: Cooler Interlock Override — This override prohibits compressor operation until the Cooler Interlock (***Inputs→GEN.I→LOCK***) is closed.

Override #11: High Temperature Cooling — This override algorithm runs once when the unit is switched to ON. If the difference between the Leaving Water Temperature (***Run Status →VIEW→LWT***) and the Control Point (***Run Status →VIEW→CTPT***) exceeds a calculated value and the rate of change of the water temperature is greater than –0.1º F/min, a stage will be added.

Override #12: High Temperature Cooling — This override runs only when Minimum Load Control is Enabled, (***Configuration→UNIT→HGBP***) is **1**, **2** or **3**. This override will add a stage of capacity if the next stage is Minimum Load Control, when the difference between the Leaving Water (***Temperature Run Status→VIEW→LWT***) and the Control Point (***Run Status→VIEW→CTPT***) exceeds a calculated value and the rate of change of the water temperature is greater than a fixed value.

Override #13: Minimum On/Off and Off/On Time Delay — Whenever a capacity step change has been made, either with Minimum Load Control or a compressor, the control will remain at this capacity stage for the next 90 seconds. During this time, no capacity control algorithm calculations will be made. If the capacity step is a compressor, an additional 90-second delay is added to the previous hold time (see Override #22). This override allows the system to stabilize before another capacity stage is added or removed. If a condition of a higher priority override occurs, the higher priority override will take precedence.

Override #14: Slow Change Override — This override prevents compressor stage changes when the leaving temperature is close to the control point and slowly moving towards the control point.

Override #15: System Manager Capacity Control — If a Chillervisor module is controlling the unit and the Chillervisor module is controlling multiple chillers, the unit will add a stage to attempt to load to the demand limited value.

Override #37: Circuit A Low Superheat
Override #38: Circuit B Low Superheat
Override #39: Circuit C Low Superheat — This override attempts to avoid liquid slugging for the running compressors. No capacity steps will be added to the affected circuit until a superheat greater than 5º F (2.8º C) is established. If the capacity of the machine must be increased, the control will look to another circuit for additional capacity.

Override #16: Circuit A High Pressure Override
Override #17: Circuit B High Pressure Override
Override #18: Circuit C High Pressure Override — This override attempts to avoid a high pressure failure. The algorithm is run every 4 seconds. At least one compressor must be on in the circuit. If the Saturated Condensing Temperature for the circuit is above the High Pressure Threshold (***Configuration→ SERV→HP.TH***) then a compressor for that circuit will be removed. If Minimum Load Control was enabled for High Ambient (***Configuration→UNIT→HGBP*=3**), then the Minimum Control Valve will be energized.

Override #19: Standby Mode — This override algorithm will not allow a compressor to run if the unit is in Stand-By mode, (***Run Status→VIEW→HC.ST*=2**).

Override #22: Minimum On Time Delay — In addition to Override #13 Minimum On/Off and Off/On Time Delay, for compressor capacity changes, an *additional* 90-second delay will be added to Override #13 delay. No compressor will be deenergized until 3 minutes have elapsed since the last compressor has been turned ON. When this override is active, the capacity control algorithm calculations will be performed, but no capacity reduction will be made until the timer has expired. A control with higher precedence will override the Minimum On Time Delay.

Override #23: Circuit A Low Saturated Suction Temperature in Cooling
Override #24: Circuit B Low Saturated Suction Temperature in Cooling
Override #25: Circuit C Low Saturated Suction Temperature in Cooling — If the circuit is operating in an area close to the operational limit of the compressor, the circuit capacity will remain at the same point or unload to raise the saturated suction temperature. This algorithm will be active if at least 1 compressor in the circuit is on and one of the following conditions is true:

1. Saturated Suction Temperature is less than Brine Freeze (***Configuration→SERV→LOSP***) – 6º F (3.3º C).
2. Saturated Suction Temperature is less than Brine Freeze (***Configuration→SERV→LOSP***) and the circuit approach (Leaving Water Temperature – Saturated Suction Temperature) is greater than 15º F (8.3º C) and the Circuit Superheat (Return Gas Temperature – Saturated Suction Temperature) is greater than 15º F (8.3º C).

   NOTE: The freeze set point is 34 F (1.1 C) for fresh water systems (***Configuration→SERV→FLUD*=1**). The freeze set point is Brine Freeze Set Point (***Configuration →SERV→LOSP***), for Medium Temperature Brine systems (***Configuration→SERV→FLUD*=2**).

If any of these conditions are met, the appropriate operating mode, 21 (Circuit A), 22 (Circuit B) or 23 (Circuit C) will be in effect.

Override #34: Circuit A Low Refrigerant Charge
Override #35: Circuit B Low Refrigerant Charge
Override #36: Circuit C Low Refrigerant Charge — The capacity override attempts to protect the compressor from starting with no refrigerant in the circuit. This algorithm runs only when the circuit is not operational, (no compressors ON). There are several criteria that will enable this override:

1. The Saturated Suction Temperature or Saturated Discharge Temperature is less than –13 F (–10.6 C).
2. All of these conditions must be true:
   a. The Saturated Suction Temperature or Saturated Discharge Temperature is less than Leaving Water Temperature by more than 5.4° F (3.0° C).
   b. Saturated Suction Temperature or Saturated Discharge Temperature is less than 41 F (5 C).
   c. Outdoor Air Temperature is less than 32 F (0° C).
   d. Saturated Suction Temperature or Saturated Discharge Temperature is less than the Outdoor Air Temperature by more than 5.4° F (3.0° C).
3. All of these conditions must be true:
   a. The Saturated Suction Temperature or Saturated Discharge Temperature is less than Leaving Water Temperature by more than 5.4° F (3.0° C).
   b. Saturated Suction Temperature or Saturated Discharge Temperature is less than 41 F (5 C).
   c. Saturated Suction Temperature or Saturated Discharge Temperature is less than the Brine Freeze Point (***Configuration→SERV→LOSP***) by more than 6° F (3.3° C).

   NOTE: The freeze set point is 34 F (1.1 C) for fresh water systems (***Configuration→SERV→FLUD*=1**). The freeze set point is Brine Freeze Set Point (***Configuration→SERV→LOSP***), for Medium Temperature Brine systems (***Configuration→SERV→FLUD*=2**).
4. All of these conditions must be true:
   a. The Saturated Suction Temperature or Saturated Discharge Temperature is less than Leaving Water Temperature by more than 5.4° F (3.0° C).
   b. Saturated Suction Temperature or Saturated Discharge Temperature is less than 41 F (5 C).
   c. Saturated Suction Temperature or Saturated Discharge Temperature is less than the Outdoor Air Temperature by more than 9° F (5° C).

If any of these conditions 1, 2, 3 or 4 are met, the appropriate operating mode, 21 (Circuit A), 22 (Circuit B) or 23 (Circuit C) will be in effect.

Head Pressure Control — The main base board (MBB) controls the condenser fans to maintain the lowest condensing temperature possible, and thus the highest unit efficiency. The MBB uses the saturated condensing temperature input from the discharge pressure transducer to control the fans. Head pressure control is maintained through a calculated set point which is automatically adjusted based on actual saturated condensing and saturated suction temperatures so that the compressor(s) is (are) always operating within the manufacturer's specified envelope (see Fig. 9). Each time a fan is added the calculated head pressure set point will be raised 25° F (13.9° C) for 35 seconds to allow the system to stabilize. The control will automatically reduce the unit capacity as the saturated condensing temperature approaches an upper limit. See capacity overrides 16-18. The control will indicate through an operating mode that high ambient unloading is in effect. If the saturated condensing temperature in a circuit exceeds the calculated maximum, the circuit will be stopped. For these reasons, there are no head pressure control methods or set points to enter. The control will turn off a fan stage when the condensing temperature is below the minimum head pressure requirement for the compressor. Fan sequences are shown in Fig. 9.

LOW AMBIENT TEMPERATURE HEAD PRESSURE CONTROL OPTION — For low-ambient operation, the lead fan on a circuit can be equipped with low ambient temperature head pressure control option or accessory. The controller adjusts fan speed to maintain the calculated head pressure set point.

LOW AMBIENT TEMPERATURE HEAD PRESSURE CONTROL OPERATING INSTRUCTIONS — The 30RB low ambient control is a variable speed drive (VFD) that varies the speed of the lead condenser fan in each circuit to maintain the calculated head pressure control setpoint. The fan speed varies in proportion to the 0 to 10 vdc analog signal produced by the AUX2 fan board. The display indicates motor speed in Hz by default.

Operation — The low ambient temperature head pressure controller is pre-configured to operate from a 0 to 10 vdc analog input signal present on terminals 3(AIN+) and 4(AIN–). Jumpers between terminals 2 and 4 and terminals 5 and 8 are required for proper operation. The drive is enabled based on an increase in the analog input signal above 0 vdc. Output is varied from 0 Hz to 60 Hz as the analog signal increases from 0 vdc to 10 vdc. When the signal is at 0 vdc the drive holds the fan at 0 rpm. The head pressure control set point is not adjustable. The MBB determines the control set point as required.

Replacement — If the controller is replaced the parameters in Table 19 must be configured. See Fig. 10 and 11.

Table 19 — Head Pressure Control Parameters

PARAMETER	VALUE	DESCRIPTION
P0010	1	Enter Quick Commissioning
P0311	1140	Rated Motor Speed
P3900	1	End of Quick Commissioning
P0003*	3	User Access Level
P1210 *	6	Automatic Restart

*Remove jumper from terminals 5 and 8 before configuring parameter. Reinstall jumper after configuration is complete.

DIP switch settings:

DIP switch 1 is not used.

DIP switch 2 is the motor frequency. (OFF = 50 Hz, ON = 60 Hz)

Drive Programming — Parameter values can be altered via the operator panel. The operator panel features a five-digit, seven-segment display for displaying parameter numbers and values, alarm and fault messages, set points, and actual values. See Fig. 12 and 13. See Table 20 for additional information on the operator panel.

NOTE: The operator panel motor control functions are disabled by default. To control the motor via the operator panel, parameter P0700 should be set to 1 and P1000 set to 1. The operator panel can be fitted to and removed from the drive while power is applied. If the operator panel has been set as the I/O control (P0700 = 1), the drive will stop if the operator panel is removed.

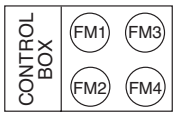
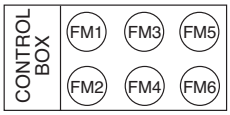
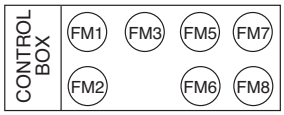
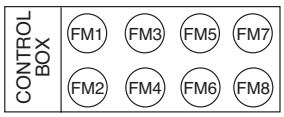
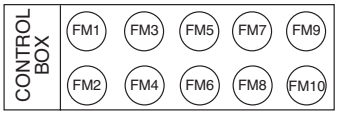
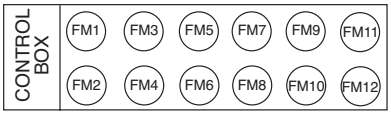
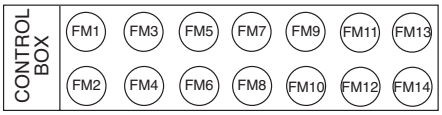
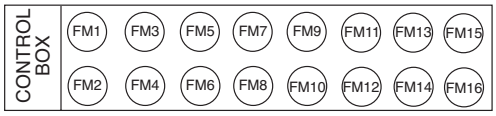
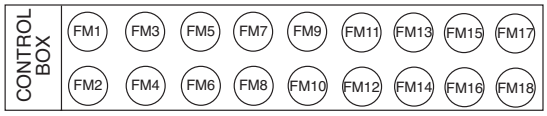
	MODEL	CIRCUIT	LOCATION	FAN STAGE					
				1	2	3	4	5	6
 30RB060,070,080	060,070	A	Fan Number	1	3	2	—	—	—
			Fan Board/Channel	FB1/CH1	FB1/CH2	FB1/CH3	—	—	—
		B	Fan Number	4	—	—	—	—	—
			Fan Board/Channel	FB1/CH5	—	—	—	—	—
	080	A	Fan Number	1	2	—	—	—	—
			Fan Board/Channel	FB1/CH1	FB1/CH2	—	—	—	—
		B	Fan Number	3	4	—	—	—	—
			Fan Board/Channel	FB1/CH5	FB1/CH6	—	—	—	—
 30RB090,100,110	090,100, 110	A	Fan Number	1	3	2	—	—	—
			Fan Board/Channel	FB1/CH1	FB1/CH2	FB1/CH3	—	—	—
		B	Fan Number	5	4	6	—	—	—
			Fan Board/Channel	FB1/CH5	FB1/CH6	FB1/CH7	—	—	—
 30RB120	120	A	Fan Number	1	3	2	—	—	—
			Fan Board/Channel	FB1/CH1	FB1/CH3/2	FB1/CH2/3	—	—	—
		B	Fan Number	5	7	6	8	—	—
			Fan Board/Channel	FB1/CH5	FB1/CH6	FB1/CH7	FB1/CH8	—	—
 30RB130,150	130,150	A	Fan Number	1	3	2	4	—	—
			Fan Board/Channel	FB1/CH1	FB1/CH2	FB1/CH3	FB1/CH4	—	—
		B	Fan Number	5	7	6	8	—	—
			Fan Board/Channel	FB1/CH5	FB1/CH6	FB1/CH7	FB1/CH8	—	—
 30RB160,170	160,170	A	Fan Number	1	3	5	2	4	6
			Fan Board/Channel	FB1/CH1	FB1/CH2	FB1/CH3	FB1/CH4	FB1/CH5	FB1/CH6
		B	Fan Number	7	9	8	10	—	—
			Fan Board/Channel	FB2/CH1	FB2/CH2	FB2/CH3	FB2/CH4	—	—
 30RB190,210,225	190	A	Fan Number	1	3	5	2	4	6
			Fan Board/Channel	FB1/CH1	FB1/CH2	FB1/CH3	FB1/CH4	FB1/CH5	FB1/CH6
		B	Fan Number	7	9	11	8	10	12
			Fan Board/Channel	FB2/CH1	FB2/CH2	FB2/CH3	FB2/CH4	FB2/CH5	FB2/CH6
	210,225	A	Fan Number	1	3	2	4	—	—
			Fan Board/Channel	FB1/CH1	FB1/CH2	FB1/CH3	FB1/CH4	—	—
		B	Fan Number	5	7	6	8	—	—
			Fan Board/Channel	FB1/CH5	FB1/CH6	FB1/CH7	FB1/CH8	—	—
		C	Fan Number	9	11	10	12	—	—
			Fan Board/Channel	FB3/CH1	FB3/CH2	FB3/CH3	FB3/CH4	—	—
 30RB250	250	A	Fan Number	1	3	2	4	—	—
			Fan Board/Channel	FB1/CH1	FB1/CH2	FB1/CH3	FB1/CH4	—	—
		B	Fan Number	5	7	6	8	—	—
			Fan Board/Channel	FB1/CH5	FB1/CH6	FB1/CH7	FB1/CH8	—	—
		C	Fan Number	9	11	13	10	12	14
			Fan Board/Channel	FB3/CH1	FB3/CH2	FB3/CH3	FB3/CH4	FB3/CH5	FB3/CH6
 30RB275	275	A	Fan Number	1	3	5	2	4	6
			Fan Board/Channel	FB1/CH1	FB1/CH2	FB1/CH3	FB1/CH4	FB1/CH5	FB1/CH6
		B	Fan Number	7	9	11	8	10	12
			Fan Board/Channel	FB2/CH1	FB2/CH2	FB2/CH3	FB2/CH4	FB2/CH5	FB2/CH6
		C	Fan Number	13	15	14	16	—	—
			Fan Board/Channel	FB3/CH1	FB3/CH2	FB3/CH3	FB3/CH4	—	—
 30RB300	300	A	Fan Number	1	3	5	2	4	6
			Fan Board/Channel	FB1/CH1	FB1/CH2	FB1/CH3	FB1/CH4	FB1/CH5	FB1/CH6
		B	Fan Number	7	9	11	8	10	12
			Fan Board/Channel	FB2/CH1	FB2/CH2	FB2/CH3	FB2/CH4	FB2/CH5	FB2/CH6
		C	Fan Number	13	15	17	14	16	18
			Fan Board/Channel	FB3-CH1	FB3-CH2	FB3/CH3	FB3/CH4	FB3/CH5	FB3/CH6

Fig. 9 — Condenser Fan Staging

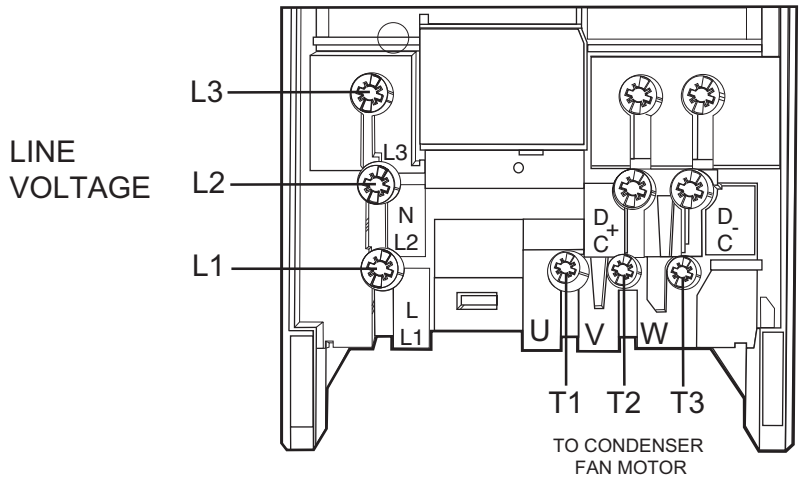


Fig. 10 — Low Ambient Temperature Control Power Wiring

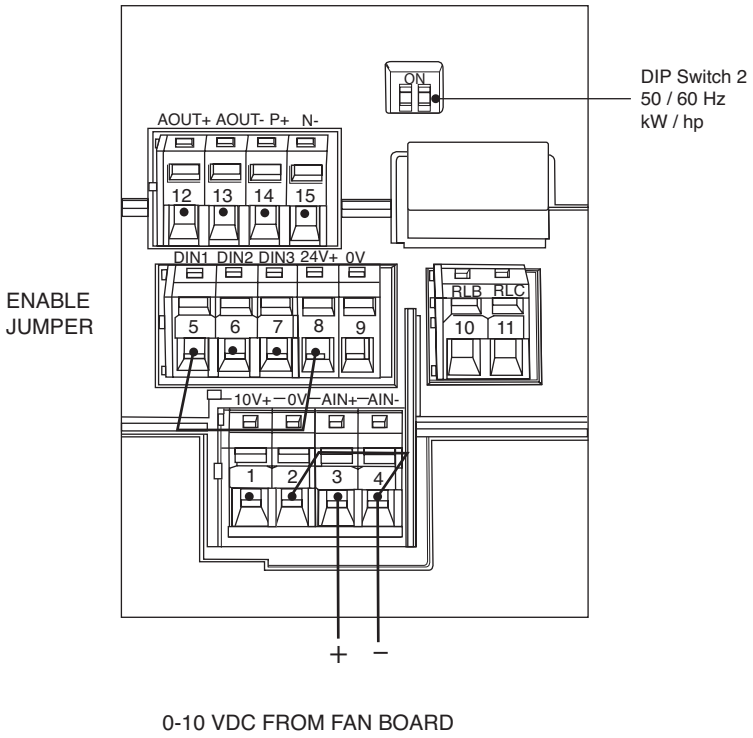


Fig. 11 — Low Ambient Temperature Control Signal Wiring

Fig. 12 — Low Ambient Temperature Controller

Changing Parameters with the Operator Panel — See Fig. 13 for the procedure for changing the value of parameter P0004. Modifying the value of an indexed parameter is illustrated in Fig. 13 using the example of P0719. Follow the same procedure to alter other parameters using the operator panel.

NOTE: In some cases when changing parameter values the display on the operator panel displays **P - - - -** . This means the drive is busy with tasks of higher priority.

Changing Single Digits in Parameter Values — For changing the parameters value rapidly, the single digits of the display can be changed by performing the following actions:

Ensure the operator panel is in the parameter value changing level as described in the Changing Parameters with the Operator Panel section.

1. Press Fn (function button), which causes the farthest right digit to blink.
2. Change the value of this digit by pressing ▲ or ▼ .
3. Pressing Fn (function button) again to cause the next digit to blink.
4. Perform steps 2 to 4 until the required value is displayed.
5. Press P (parameter button) to exit the parameter value changing level.

NOTE: The function button may also be used to acknowledge a fault condition.

Quick Commissioning (P0010=1) — It is **important** that parameter P0010 is used for commissioning and P0003 is used to select the number of parameters to be accessed. The P0010 parameter allows a group of parameters to be selected that will enable quick commissioning. Parameters such as motor settings and ramp settings are included. At the end of the quick commissioning sequences, P3900 should be selected, which, when set to 1, will carry out the necessary motor calculations and clear all other parameters (not included in P0010=1 to the default settings. This will only occur in Quick Commissioning mode. See Fig. 14.

Reset to Factory Default — To reset all parameters to the factory default settings; the following parameters should be set as follows:

1. Set P0010=30.
2. Set P0970 =1.

NOTE: The reset process can take up to 3 minutes to complete.

CHANGING P0004 — PARAMETER FILTER FUNCTION

STEP	RESULT ON DISPLAY
1 Press P to access parameters	r0000
2 Press ▲ until P0004 is displayed	P0004
3 Press P to access the parameter value level	0
4 Press value ▲ or ▼ to the required	7
5 Press value P to confirm and store the	P0004
6 Only the command parameters are visible to the user.	

CHANGING P0719 AN INDEXED PARAMETER SELECTION OF COMMAND/SETPOINT SOURCE

STEP	RESULT ON DISPLAY
1 Press P to access parameters	r0000
2 Press ▲ until P0719 is displayed	P0719
3 Press P to access the parameter value level	in000
4 Press P to display current set value	0
5 Press value ▲ or ▼ to the required	12
6 Press value P to conform and store the	P0719
7 Press ▼ until r0000 is displayed	r0000
8 Press P to return the display to the standard drive display (as defined by the customer)	

Fig. 13 — Changing Parameters with the Operator Panel

Table 20 — Low Ambient Temperature Controller Operator Panel

PANEL/BUTTON	FUNCTION	DESCRIPTION
	Indicates Status	The LCD displays the settings currently used by the converter.
	Start Converter	The Start Converter button is disabled by default. To enable this button set P0700 = 1.
	Stop Converter	Press the Stop Converter button to cause the motor to come to a standstill at the selected ramp down rate. Disabled by default, to enable set P0700 = 1. Press the Stop Converter button twice (or hold) to cause the motor to coast to a standstill. This function is always enabled.
	Change Direction	Press the Change Direction button to change the direction of rotation of the motor. Reverse is indicated by a minus (–) sign or a flashing decimal point. Disabled by default, to enable set P0700 = 1.
	Jog Motor	Press the Jog Motor button while the inverter has no output to cause the motor to start and run at the preset jog frequency. The motor stops when the button is released. The Jog Motor button is not enabled when the motor is running.
	Functions	The Functions button can be used to view additional information. Press and hold the button to display the following information starting from any parameter during operation: 1. DC link voltage (indicated by d – units V). 2. Output current. (A) 3. Output frequency (Hz) 4. Output voltage (indicated by o – units V). 5. The value selected in P0005 (If P0005 is set to show any of the above [3, 4, or 5] then this will not be shown when toggling through the menu). Press the Functions button repeatedly to toggle through displayed values. **Jump Function** Press of the Fn button from any parameter (rXXXX or PXXXX) to immediately jump to R0000, when another parameter can be changed, if required. Return to R0000 and press the Functions again to return.
	Access Parameters	Allows access to the parameters.
	Increase Value	Press the Increase Value button to increase the displayed value. To change the Frequency Setpoint using the operator panel set P1000 = 1.
	Decrease Value	Press the Decrease Value button to decrease the displayed value. To change the Frequency Setpoint using the operating panel set P1000 = 1.

Troubleshooting with the Operating Panel — Warnings and faults are displayed on the operating panel with Axxx and Fxxx. The individual messages are shown in Table 21.

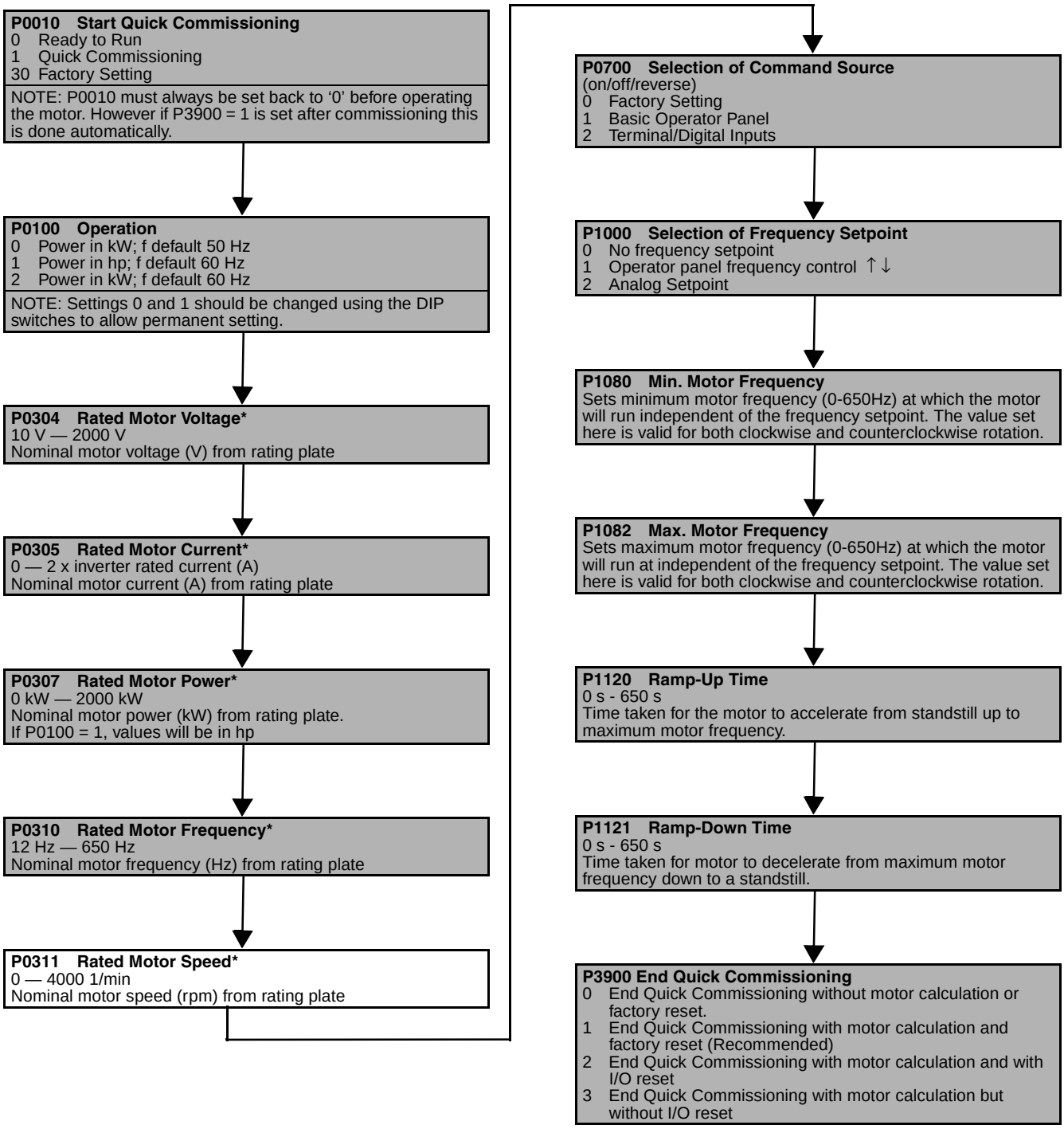
If the motor fails to start, check the following:

- Power is present on T1, T2 and T3.
- Configuration jumpers are in place.
- Control signal between 1 vdc and 10 vdc is present on terminals 3 and 4.
- P0010 = 0.
- P0700 = 2.

Fault Messages (Tables 21 and 22) — In the event of a failure, the drive switches off and a fault code appears on the display.

NOTE: To reset the fault code, one of the following methods can be used:

1. Cycle the power to the drive.
2. Press the Fn button on the operator panel.



*Motor-specific parameters — see motor rating plate.

NOTE: Shaded boxes are for reference only.

Fig. 14 — Low Ambient Temperature Controller Flow Chart Quick Commissioning

Table 21 — Low Ambient Temperature Controller Fault Messages

FAULT	POSSIBLE CAUSES	TROUBLESHOOTING
F0001 Overcurrent	• Motor power does not correspond to the inverter power • Motor lead short circuit • Ground fault	Check the following: 1. Motor power (P0307) must correspond to inverter power (P0206) 2. Motor cable and motor must have no short-circuits or ground faults 3. Motor parameters must match the motor in use 4. Motor must not be obstructed or overloaded After Steps 1-4 have been checked, increase the ramp time (P1120) and reduce the boost level (P1310, P1311, P1312).
F0002 Overvoltage	• DC-link voltage (r0026) exceeds trip level (P2172) • Overvoltage can be caused either by too high main supply voltage or if motor is in regenerative mode • Regenerative mode can be caused by fast ramp downs or if the motor is driven from an active load	Check the following: 1. Supply voltage (P0210) must lie within limits indicated on rating plate 2. DC-link voltage controller must be enabled (P1240) and have parameters set correctly 3. Ramp-down time (P1121) must match inertia of load
F0003 Undervoltage	• Main supply failed • Shock load outside specified limits	Check the following: 1. Supply voltage (P0210) must lie within limits indicated on rating plate 2. Supply must not be susceptible to temporary failures or voltage reductions
F0004 Drive Overtemperature	• Ambient temperature outside of limits • Fan failure	Check the following: 1. Fan must turn when inverter is running 2. Pulse frequency must be set to default value 3. Air inlet and outlet points are not obstructed 4. Ambient temperature could be higher than specified for the drive.
F0005 Drive I^2t	• Drive overloaded • Duty cycle too demanding • Motor power (P0307) exceeds drive power capability (P0206)	Check the following: 1. Load duty cycle must lie within specified limits 2. Motor power (P0307) must match drive power (P0206)
F0011 Motor Overtemperature I^2t	• Motor overloaded • Motor data incorrect • Long time period operating at low speeds	1. Check motor data 2. Check loading on motor 3. Boost settings too high (P1310,P1311, P1312) 4. Check parameter for motor thermal time constant 5. Check parameter for motor I^2t warning level
F0041 Stator Resistance Measurement Failure	Stator resistance measurement failure	1. Check if the motor is connected to the drive 2. Check that the motor data has been entered correctly
F0051 Parameter EEPROM Fault	Reading or writing of the non-volatile parameter storage has failed	1. Factory reset and new parameters set 2. Replace drive
F0052 Powerstack Fault	Reading of the powerstack information has failed or the data is invalid	Replace drive
F0060 Asic Timeout	Internal communications failure	1. Acknowledge fault 2. Replace drive if repeated
F0070 Communications Board Setpoint Error	No setpoint received from communications board during telegram off time	1. Check connections to the communications board 2. Check the master
F0071 No Data for USS (RS232 Link) During Telegram Off Time	No response during telegram off time via USS (BOP link)	1. Check connections to the communications board 2. Check the master
F0072 No Data from USS (RS485 Link) During Telegram Off Time	No response during telegram off time via USS (COM link)	1. Check connections to the communications board 2. Check the master
F0080 Analog Input - Lost Input Signal	• Broken wire • Signal out of limits	Check connection to analog input
F0085 External Fault	External fault is triggered via terminal inputs	Disable terminal input for fault trigger
F0101 Stack Overflow	Software error or processor failure	1. Run self test routines 2. Replace drive
F0221 PI Feedback Below Minimum Value	PID Feedback below minimum value P2268	1. Change value of P2268 2. Adjust feedback gain
F0222 PI Feedback Above Maximum Value	PID Feedback above maximum value P2267	1. Change value of P2267 2. Adjust feedback gain
F0450 (Service Mode Only) BIST Tests Failure	Fault value 1 Some of the power section tests have failed 2 Some of the control board tests have failed 4 Some of the functional tests have failed 8 Some of the IO module tests have failed 16 The Internal RAM has failed its check on power-up	1. Inverter may run but certain actions will not function correctly 2. Replace drive

LEGEND

I^2t — Current Squared Time

Table 22 — Alarm Messages

FAULT	POSSIBLE CAUSES	TROUBLESHOOTING
A0501 Current Limit	• Motor power does not correspond to the drive power • Motor leads are too short • Ground fault	1. Check whether the motor power corresponds to the drive power 2. Check that the cable length limits have not been exceeded 3. Check motor cable and motor for short-circuits and ground faults 4. Check whether the motor parameters correspond with the motor being used 5. Check the stator resistance 6. Increase the ramp-up-time 7. Reduce the boost 8. Check whether the motor is obstructed or overloaded
A0502 Overvoltage Limit	• Mains supply too high • Load regenerative • Ramp-down time too short	1. Check that mains supply voltage is within allowable range 2. Increase ramp down times NOTE: If the vdc-max controller is active, ramp-down times will be automatically increased
A0503 Undervoltage Limit	• Mains supply too low • Short mains interruption	Check main supply voltage (P0210)
A0504 Drive Overtemperature	Warning level of inverter heat-sink temperature (P0614) is exceeded, resulting in pulse frequency reduction and/or output frequency reduction (depending on parameters set (P0610)	1. Check if ambient temperature is within specified limits 2. Check load conditions and duty cycle 3. Check if fan is turning when drive is running
A0505 Drive I²t	Warning level is exceeded; current will be reduced if parameters set (P0610 = 1)	Check if duty cycle is within specified limits
A0506 Drive Duty Cycle	Heatsink temperature and thermal junction model are outside of allowable range	Check if duty cycle is within specified limits
A0511 Motor Overtemperature I²t	Motor overloaded	Check the following: 1. P0611 (motor I²t time constant) should be set to appropriate value 2. P0614 (Motor I²t overload warning level) should be set to suitable level 3. Are long periods of operation at low speed occurring 4. Check that boost settings are not too high
A0541 Motor Data Identification Active	Motor data identification (P1910) selected or running	Wait until motor identification is finished
A0600 RTOS Overrun Warning	Software error	—

LEGEND

I²t — Current Squared Time

Cooler Pump Control (*Configuration→OPTN→PUMP*) — The 30RB units can be configured for cooler pump control. Cooler Pumps Sequence is the variable that must be confirmed in the field. Proper configuration of the cooler pump control is required to provide reliable chiller operation. The factory default setting for Cooler Pumps Sequence is ***PUMP*=0** (No Pump), for units without the factory-installed hydronic package. For units with the hydronic package, the factory default setting for Cooler Pumps Sequence is ***PUMP*=1** (1 pump only) for single pump units, or ***PUMP*=2** (2 pumps auto) for dual pump units. For dual pump hydronic option units, three control options exist. If the Cooler Pumps Sequence (***PUMP***) is set to 2, the control will start the pumps and automatically alternate the operation of the pumps to even the wear of the pumps. If a flow failure is detected, the other pump will attempt to start. Two manual control options also exist. When the Cooler Pumps Sequence is set to ***PUMP*=3** Cooler Pump 1 will always operate. When the Cooler Pumps Sequence is set to ***PUMP*=4** Cooler Pump 2 will always operate.

It is recommended for all chillers that the cooler pump control be utilized unless the chilled water pump runs continuously or the chilled water system contains a suitable concentration of antifreeze solution. When the Cooler Pumps Sequence is configured, the cooler pump output will be energized when the chiller enters an "ON" mode. 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 P.01 Water Exchanger Freeze Protection alarm is generated, which provides additional freeze protection if the system is not protected with a suitable antifreeze solution.

For all Cooler Pumps Sequence (***PUMP***) settings (including 0), closure of both the chilled water flow switch (CWFS) and the chilled water pump interlock contact (connected across TB-5 terminals 1 and 2) are required. In addition, for Cooler Pumps Sequence settings of ***PUMP* = 1, 2, 3, 4,** normally open auxiliary contacts for Pump 1 and Pump 2 (wired in parallel) must be connected to the violet and pink wires located in the harness from the MBB-J5C-CH18 connector. The wires in the harness are marked "PMP1-13" and "PMP1-14". See the field wiring diagram in the 30RB Installation Instructions.

Regardless of the cooler pump control option selected, if the chilled water flow switch/interlock does not close within the **MINUTES OFF TIME** (***Configuration→OPTN→DELY***) period after the unit is enabled and in an **ON** mode, alarm P.14 will be generated. Other conditions which will trigger this alarm include:

- Cooler pump interlock is open for at least 30 seconds during chiller operation.
- Lag chiller in Master/Slave Control pump interlock does not close after 1 minute of the pump start command.
- Cooler pump control is enabled and the chilled water flow switch/interlock is closed for more than 2 minutes following a command to shut down the pump.

The last alarm criterion can be disabled. If Flow Checked if Pmp Off (***Configuration→OPTN→P.LOC***) is set to **NO**, the control will ignore the pump interlock input if the cooler pump output is **OFF**.

Another feature available with the *Comfort*Link™ controls is the ability to periodically start the pumps to maintain the bearing lubrication and seal integrity. If Periodic Pump Start (***Configuration→OPTN→PM.PS***) 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, or6 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 ***PM.PS*=NO**.

Machine Control Methods — Three variables control how the machine operates. One variable controls the machine On-Off function. The second controls the set point operation. The third variable controls the Heat-Cool operation which is always set to cool. Table 23 illustrates how the control method and cooling set point select variables direct the operation of the chiller and the set point to which it controls. Table 23 also provides the On/Off state of the machine for the given combinations.

Table 23 — Control Methods and Cooling Set Points

PARAMETER							ACTIVE SET POINT
Control Method (*OPER*)	Heat Cool Select (*HC.SE*)	Setpoint Select (*SP.SE*)	Ice Mode Enable (*ICE.M*)	Ice Done (*ICE.D*)	Dual Setpoint Switch (*DUAL*)	Setpoint Occupied (*SP.OC*)	
0 (Switch Ctrl)	0 (Cool)	1 (Setpoint1)	—	—	—	—	***CSP.1***
			Enable	Open	Closed	—	***CSP.3***
		2 (Setpoint2)	—	—	—	—	***CSP.2***
			Enable	Open	Closed	—	***CSP.3***
		3 (4-20mA Setp)	—	—	—	—	4-20 mA
		—	Enable	Open	Open	—	***CSP.1***
					Closed	—	***CSP.3***
				Closed	Closed	—	***CSP.2***
		4 (Dual Setp Sw)	—	—	Open	—	***CSP.1***
					Closed	—	***CSP.2***
			Enabled	Open	Closed	—	***CSP.3***
				Closed	Closed	—	***CSP.2***
1 (Time Sched)	0 (Cool)	0 (Setpoint Occ)	—	—	—	Occupied	***CSP.1***
						Unoccupied	***CSP.2***
			Enable	Open	—	Unoccupied	***CSP.3***
				Closed	—		***CSP.2***
2 (CCN)	0 (Cool)	—	—	—	—	Occupied	***CSP.1***
					—	Unoccupied	***CSP.2***
			Enable	Open	—	Unoccupied	***CSP.3***

— = No Effect

Machine On/Off control is determined by the configuration of the Operating Type Control (***Operating Modes→SLCT →OPER***). Options to control the machine locally via a switch, on a local Time Schedule, or via a Carrier Comfort Network command are offered.

SWITCH CONTROL — In this Operating Type Control, the Enable/Off/Remote Contact switch controls the machine locally. All models are factory configured with ***OPER*=0** (Switch Control). With the ***OPER*** set to 0, simply switching the Enable/Off/Remote Contact switch to the Enable or Remote Contact position (external contacts closed) will put the chiller in an occupied state. The unit Occupied Status (***Run Status→VIEW→OCC***) will change from **NO** to **YES**. The Status Unit Control Type (***Run Status→VIEW→CTRL***) will change from **0** (Local Off) when the switch is Off to **1** (Local On) when in the Enable position or Remote Contact position with external contacts closed.

TIME SCHEDULE — In this Operating Type Control, the machine operates under a local schedule programmed by the user as long as the Enable/Off/Remote Contact switch is in the Enable or Remote Contact position (external contacts closed). To operate under this Operating Type Control, ***Operating Modes→SLCT*** must be set to ***OPER*=1**. Two Internal Time Schedules are available. Time Schedule 1 (***Time Clock→ SCH1***) is used for single set point On-Off control. Time Schedule 2 (***Time Clock→SCH2***) is used for dual set point On-Off and Occupied-Unoccupied set point control. The control will use the operating schedules as defined under the Time Clock mode in the Scrolling Marquee display.

CCN Global Time Schedule — A CCN Global Schedule can be utilized. The schedule number can be set anywhere from 65 to 99 for operation under a CCN global schedule. 30RB chillers can be configured to follow a CCN Global Time Schedule broadcast by another system element. 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 (OCC1P01E) to the Global Schedule Number. The Schedule Number can be set from 65 to 99 (OCC1P65E).

The Occupancy Supervisory Part table name (OCC1PO1S) number must be changed to configure the unit to broadcast a Global Time Schedule. The Schedule Number can be set from 65 to 99 (OCC1P65S). When OCC1PxxS is set to a value greater than 64, an occupancy flag is broadcast over the CCN every time it transitions from occupied to unoccupied or vice-versa. 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 Remote Contact position with the contacts closed for the unit to operate. The Status Unit Control Type (***Run Status→VIEW→STAT***) will be **0** (Local Off) when the switch is Off. The Status Unit Control Type will be **2** (CCN) when the Enable/Off/Remote Contact switch input is On.

CCN CONTROL — An external CCN device such as Chillervisor controls the On/Off state of the machine. This CCN device forces the variable CHIL_S_S between Start/Stop to control the chiller. The Status Unit Control Type (***Run Status→ VIEW→STAT***) will be **0** (Local Off) when the Enable/Off/Remote Contact switch is Off. The Status Unit Control Type will be **2** (CCN) when the Enable/Off/Remote Contact switch input is Closed and the CHIL_S_S variable is Stop or Start.

UNIT RUN STATUS (***Run Status→VIEW→STAT***) — As the unit transitions from off to on and back to off, the Unit Run Status will change based on the unit's operational status. The variables are: **0** (Off), **1** (Running), **2** (Stopping), and **3** (Delay).

- 0 indicates the unit is Off due to the Enable/Off/Remote Contact Switch, a time schedule or CCN command.
- 1 indicates the unit is operational.
- 2 indicates the unit is shutting down due to the command to shut down from the Enable/Off/Remote Contact Switch, a time schedule or CCN command.
- 3 indicates the unit has received a command to start from Enable/Off/Remote Contact Switch, a time schedule or CCN command, and is waiting for the start-up timer (***Configuration→OPTN→DELY***) to expire.

Cooling Set Point Selection (*Operating Modes →SLCT→SP.SE*) — Several options for controlling the Leaving Chilled Water Set Point are offered and are configured by the Cooling Set Point Select variables. In addition to the Cooling Set Point Select, Ice Mode Enable (***Configuration→OPTN→ICE.M***), and Heat Cool Select (***Operating Modes→ SLCT→HC.SL***) variables also have a role in determining the set point of the machine. All units are shipped from the factory with the Heat Cool Select variable set to ***HC.SL*=0** (Cooling). All set points are based on Leaving Water Control, (***Configuration→SERV→EWTO*=NO**).

In all cases, there are limits on what values are allowed for each set point. These values depend on the Cooler Fluid Type (***Configuration→SERV→FLUD***) and the Brine Freeze Set point (***Configuration→SERV→LOSP***). See Table 24.

Table 24 — Configuration Set Point Limits

SET POINT LIMIT	COOLER FLUID TYPE, FLUD	
	1 = Water	2 = Medium Brine
Minimum*	38 F (3.3 C)	14 F (–10.0 C)
Maximum	60 F (15.5 C)	

*The minimum set point for Medium Temperature Brine applications is related to the Brine Freeze Point. The set point is limited to be no less than the Brine Freeze Point +5° F (2.8° C). See Table 23.

SET POINT 1 (***Operating Modes→SLCT→SP.SE*=1**) — When Set Point Select is configured to 1, the unit's active set point is based on Cooling Set Point 1 (***Set Point→COOL→CSP.1***).

SET POINT 2 (***Operating Modes→SLCT→SP.SE*=2**) — When Set Point Select is configured to 2, the unit's active set point is based on Cooling Set Point 2 (***Set Point→COOL→CSP.2***).

4 TO 20 mA INPUT (***Operating Modes→SLCT →SP.SE*=3**) — When Set Point Select is configured to 3, the unit's active set point is based on an external 4 to 20 mA signal input to the Energy Management Module (EMM).

See Table 23 for Control Methods and Cooling Set Points. The following equation is used to control the set point. See Fig. 15.

Set Point = 10 + 70(mA – 4)/16 (deg F)
Set Point = -12.2 + 38.9(mA – 4)/16 (deg C)

DUAL SWITCH (***Operating Modes→SLCT→SP.SE*=4**) — When Set Point Select is configured to 4, the unit's active set point is based on Cooling Set Point 1 (***Set Point→COOL→ CSP.1***) when the Dual Set Point switch contacts are open and Cooling Set Point 2 (***Set Point→COOL→CSP.2***) when they are closed.

Ice Mode — Operation of the machine to make and store ice can be accomplished many ways. The Energy Management Module and an Ice Done Switch is required for operation in the Ice Mode. In this configuration, the machine can operate with up to three cooling set points: Cooling Set Point 1 (Occupied) (***Set Point→COOL→CSP.1***), Cooling Set Point 2 (Unoccupied) (***Set Point→COOL→CSP.2***), and Ice Set Point (***Set Point→COOL→CSP.3***).

SET POINT OCCUPANCY (***Operating Modes→ SLCT→SP.SE*=0**) — When Set point Select is configured to 0, the unit's active set point is based on Cooling Set Point 1 (***Set Point→COOL→CSP.1***) during the occupied period while operating under ***Time Clock→SCH1***. If the ***Time Clock →SCH2*** is in use, the unit's active set point is based on Cooling Set Point 1 (***Set Point→COOL→CSP.1***) during the occupied period and Cooling Set Point 2 (***Set Point →COOL→CSP.2***) during the unoccupied period.

4-20 mA Set Point Control

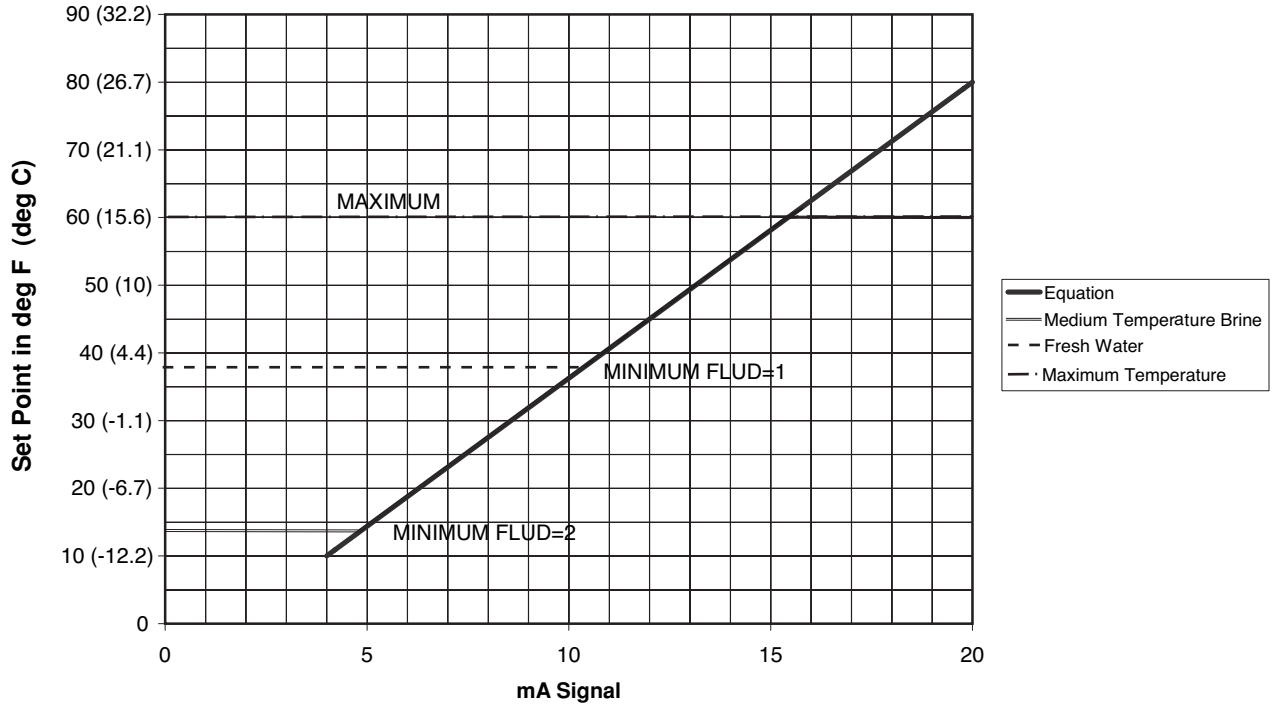


Fig. 15 — Set Point Control

Temperature Reset — Temperature reset is a value added to the basic leaving fluid temperature set point. The sum of these values is the control point. When a non-zero temperature reset is applied, the chiller controls to the control point, not the set point. The control system is capable of handling leaving-fluid temperature reset based on cooler fluid temperature difference. 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. The control system is also capable of temperature reset based on outdoor-air temperature (OAT), space temperature (SPT), or from an externally powered 4 to 20 mA signal. An accessory sensor must be used for SPT reset (33ZCT55SPT). The Energy Management Module (EMM) is required for temperature reset using space temperature or a 4 to 20 mA signal.

Under normal operation, the chiller will maintain a constant leaving fluid temperature 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 as shown in the Return Water Reset figure. Usually the chiller size and leaving-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. If the leaving fluid temperature were allowed to increase at part load, the efficiency of the machine would increase.

Temperature difference reset allows for the leaving temperature set point to be reset upward as a function of the fluid temperature difference or, in effect, the building load.

To use Water Temperature Difference Reset, four variables must be configured. They are: Cooling Reset Type (***Configuration→RSET→CRST***), Delta T No Reset Temp (***Setpoints→ COOL→CRT1***), Delta T Full Reset Temp (***Setpoints→ COOL→CRT2***) and Degrees Cool Reset (***Setpoints→COOL→DGRC***). In the following example using Water Temperature Difference Reset, the chilled water temperature will be reset by 5.0° F (2.8° C) when the ΔT is 2° F (1.1° C) and 0° F (0° C) reset when the ΔT is 10° F. The variable ***CRT1*** should be set to the cooler temperature difference (ΔT) where no chilled water temperature reset should occur. The variable ***CRT2*** should be set to the cooler temperature difference where the maximum chilled water temperature reset should occur. The variable ***DGRC*** should be set to the maximum amount of reset desired. To verify that reset is functioning correctly proceed to ***Run Status→VIEW***, and subtract the active set point (***SETP***) from the control point (***CTPT***) to determine the degrees reset. See Fig. 16 and Table 25.

Other, indirect means of estimating building load and controlling temperatures reset are also available and are discussed below. See Fig. 17.

To use Outdoor Air Temperature Reset, four variables must be configured. They are: Cooling Reset Type (***Configuration →RSET→CRST***), OAT No Reset Temp (***Setpoints→ COOL→CRO1***), OAT Full Reset Temp (***Setpoints→ COOL→CRO2***) and Degrees Cool Reset (***Setpoints→ COOL→DGRC***). In the following example, the outdoor air temperature reset example provides 0° F (0° C) chilled water set point reset at 85.0 F (29.4 C) outdoor-air temperature and 15.0° F (8.3° C) reset at 55.0 F (12.8 C) outdoor-air temperature. See Fig. 18 and Table 26.

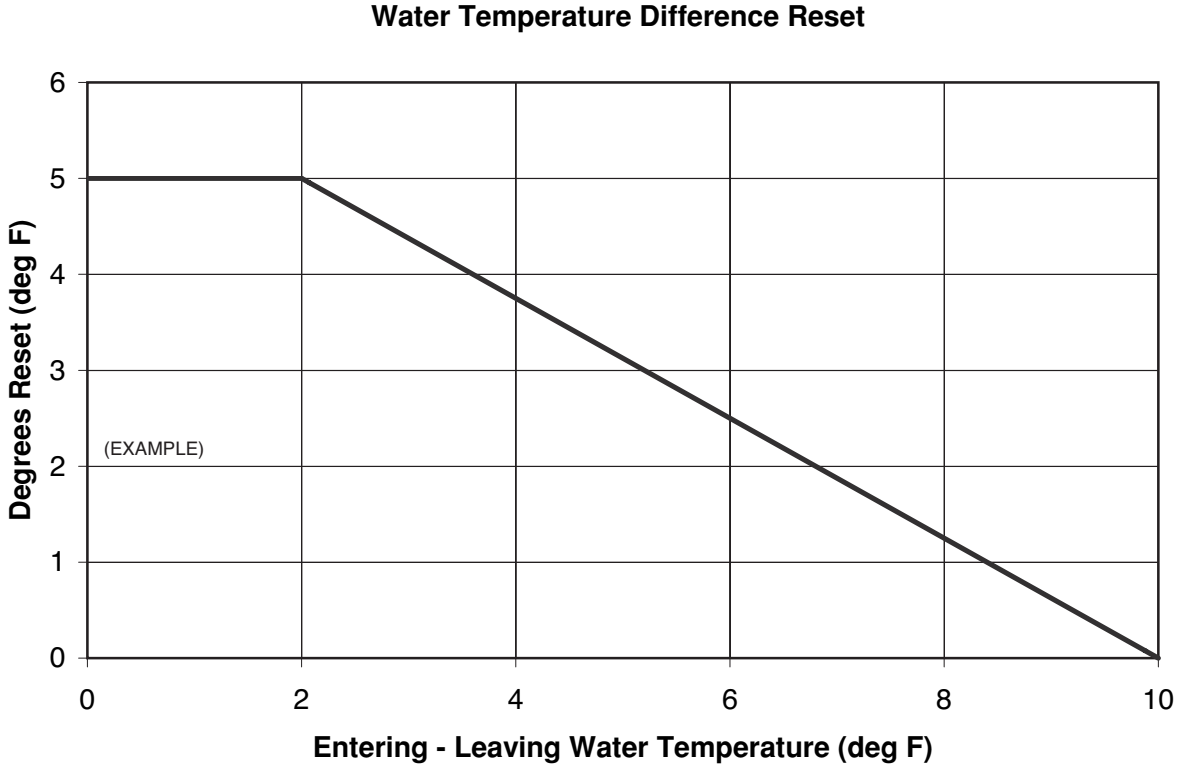


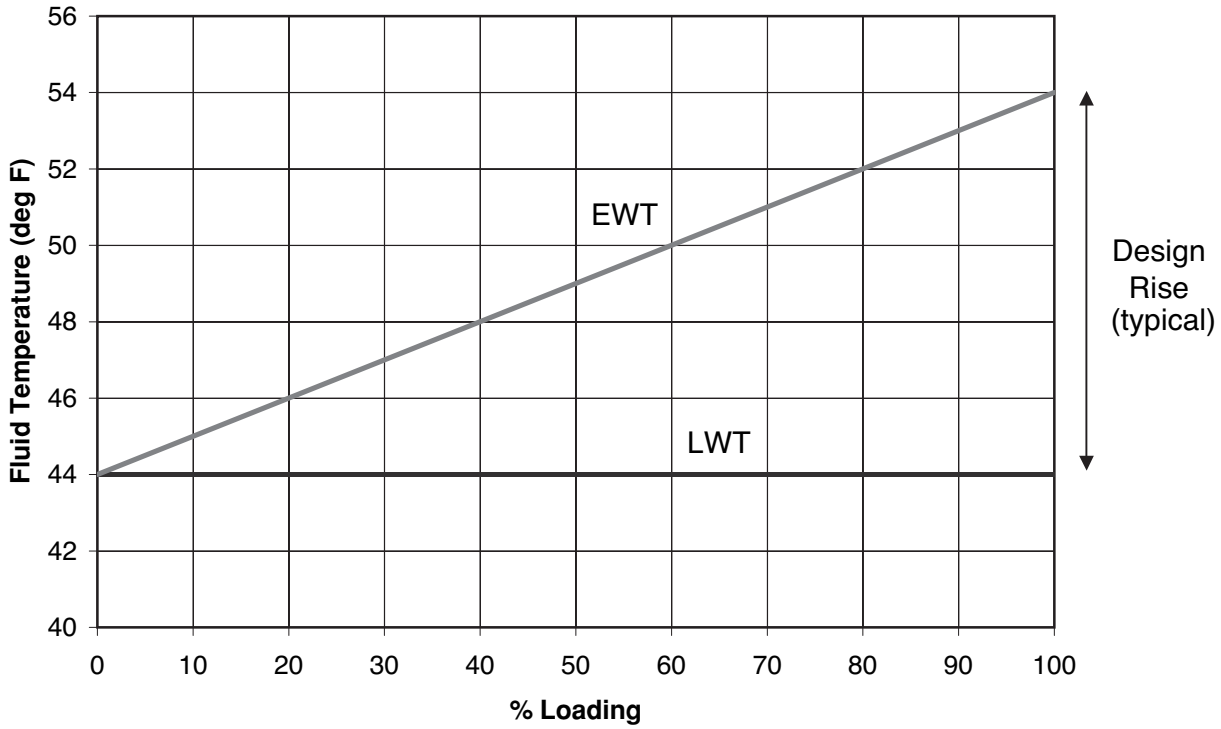
Fig. 16 — Water Temperature Difference Reset

Table 25 — Water Temperature Difference Reset Configuration

MODE	KEYPAD ENTRY	DISPLAY	ITEM EXPANSION	COMMENT
CONFIGURATION	ENTER	**DISP**		
	↓	**UNIT**		
	↓	**SERV**		
	↓	**OPTN**		
	↓	**RSET**	Reset Cool and Heat Tmp	
	ENTER	CRST	Cooling Reset Type	
	ENTER	0	No Reset	
	ENTER	0	No Reset	Flashing to indicate Edit mode. May require Password
	↓ / ↑	2	Delta T Temp	Use up or down arrows to change value to 2.
	ENTER	2		Accepts the change.
	ESCAPE	CRST		
	ESCAPE			At mode level
SETPOINTS	↓ / ↑			Change to Setpoints Mode
	ENTER	**COOL**	Cooling Setpoints	
	ENTER	CSP.1	Cooling Setpoint 1	
	↓ x 4	CRV.2		
	↓	CRT1	Delta T No Reset Temp	Cooler Temperature difference where no temperature reset is required.
	ENTER	0		Value of CRT1
	ENTER	0		Flashing to indicate Edit mode
	↑	10.0		Value of No Temperature Reset, 10 from the example.
	ENTER	10.0		Accepts the change.
	ESCAPE	CRT1		
	↓	CRT2	Delta T Full Reset Temp	Cooler Temperature difference where full temperature reset, DGRC is required.
	ENTER	0		Value of CRT2.
	ENTER	0		Flashing to indicate Edit mode
	↑	2.0		Value of full Temperature Reset, 2 from the example.
	ENTER	2.0		Accepts the change.
	ESCAPE	CRT2		
	↓ x 4	CRS2		
	↓	DGRC	Degrees Cool Reset	Amount of temperature reset required.
	ENTER	0		Value of DGRC
	ENTER	0		Flashing to indicate Edit mode
	↑	5.0		Amount of Temperature Reset required, 5 from the example.
	ENTER	5.0		Accepts the change.
	ESCAPE	DGRC		

NOTE: **Bold** values indicate sub-mode level.

Chilled Water Temperature Control



LEGEND

EWT — Entering Water Temperature
LWT — Leaving Water Temperature

Fig. 17 — Chilled Water Temperature Control

OAT Temperature Reset

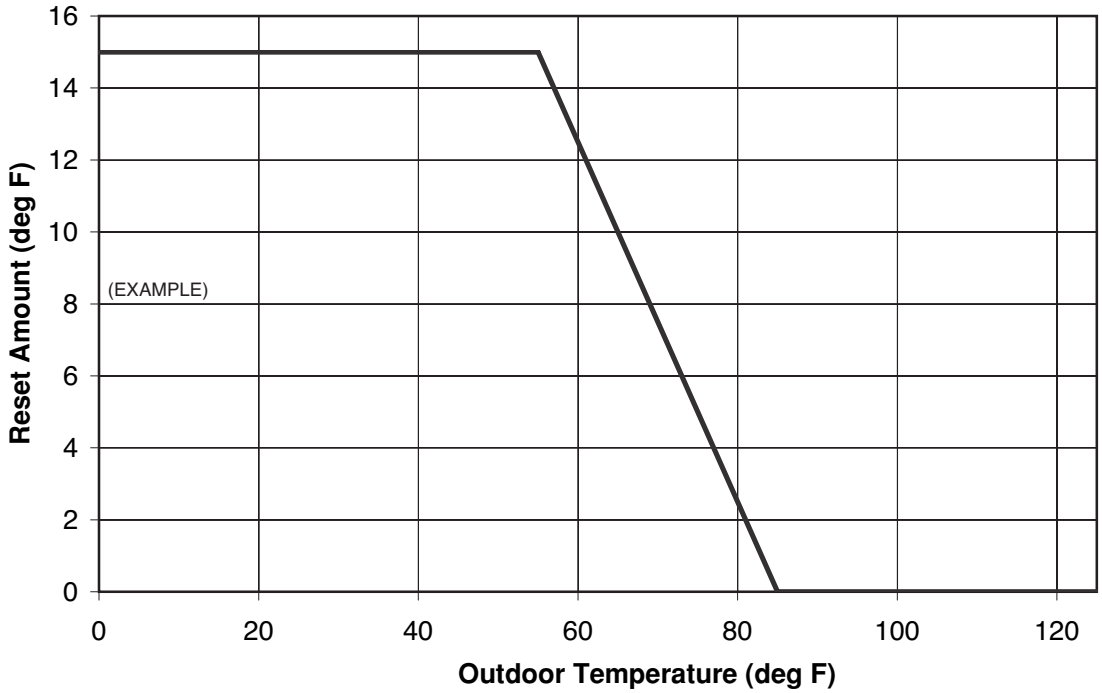


Fig. 18 — OAT Reset

Table 26 — OAT Reset Configuration

MODE	KEYPAD ENTRY	DISPLAY	ITEM EXPANSION	COMMENT
CONFIGURATION	ENTER	**DISP**		
	↓	**UNIT**		
	↓	**SERV**		
	↓	**OPTN**		
	↓	**RSET**	Reset Cool and Heat Tmp	
	ENTER	CRST	Cooling Reset Type	
	ENTER	0	No Reset	
	ENTER	0	No Reset	Flashing to indicate Edit mode. May require Password
	↓ / ↑	1	Out Air Temp	Use up or down arrows to change value to 1.
	ENTER	1		Accepts the change.
	ESCAPE	CRST		
	ESCAPE			At mode level
SETPOINTS	↓ / ↑			Change to Setpoints Mode
	ENTER	**COOL**	Cooling Setpoints	
	ENTER	CSP.1	Cooling Setpoint 1	
	↓ x 6	CRT.2		
	↓	CRO1	OAT No Reset Temp	Outdoor Temperature where no temperature reset is required.
	ENTER	0		Value of CRO1
	ENTER	0		Flashing to indicate Edit mode
	↑	85.0		Value of No Temperature Reset, 85 from the example.
	ENTER	85.0		Accepts the change.
	ESCAPE	CRO1		
	↓	CRO2	OAT Full Reset Temp	Outdoor Temperature where full temperature reset, DGRC is required.
	ENTER	0		Value of CRO2.
	ENTER	0		Flashing to indicate Edit mode
	↑	55.0		Value of full Temperature Reset, 55 from the example.
	ENTER	55.0		Accepts the change.
	ESCAPE	CRO2		
	↓	CRS1		
	↓	CRS2		
	↓	DGRC	Degrees Cool Reset	Amount of temperature reset required.
	ENTER	0		Value of DGRC
	ENTER	0		Flashing to indicate Edit mode
	↑	15.0		Amount of Temperature Reset required, 15 from the example.
	ENTER	15.0		Accepts the change.
	ESCAPE	DGRC		

NOTE: **Bold** values indicate sub-mode level.

To use Space Temperature Reset in addition to the Energy Management Module, four variables must be configured. They are: Cooling Reset Type (***Configuration→RSET→CRST***), Space T No Reset Temp (***Setpoints→COOL→CRS1***), Space T Full Reset Temp (***Setpoints→COOL→CRS2***) and Degrees Cool Reset (***Setpoints→COOL→DGRC***). In the following space temperature reset example, 0° F (0° C) chilled water set point reset at 72.0 F (22.2 C) space temperature and 6.0° F (3.3° C) reset at 68.0 F (20.0 C) space temperature. See Fig. 19 and Table 27.

To use 4-20 mA Temperature Reset in addition to the Energy Management Module, four variables must be configured. They are: Cooling Reset Type (***Configuration→RSET →CRST***), Current No Reset Val (***Setpoints→COOL→CRV1***), Current Full Reset Val (***Setpoints→COOL→CRV2***) and Degrees Cool Reset (***Setpoints→COOL→DGRC***). In the following example, at 4 mA no reset takes place. At 20 mA, 5° F (2.8° C) chilled water set point reset is required. See Fig. 20 and Table 28.

⚠ 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. *Comfort*Link™ 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.

Space Temperature Reset

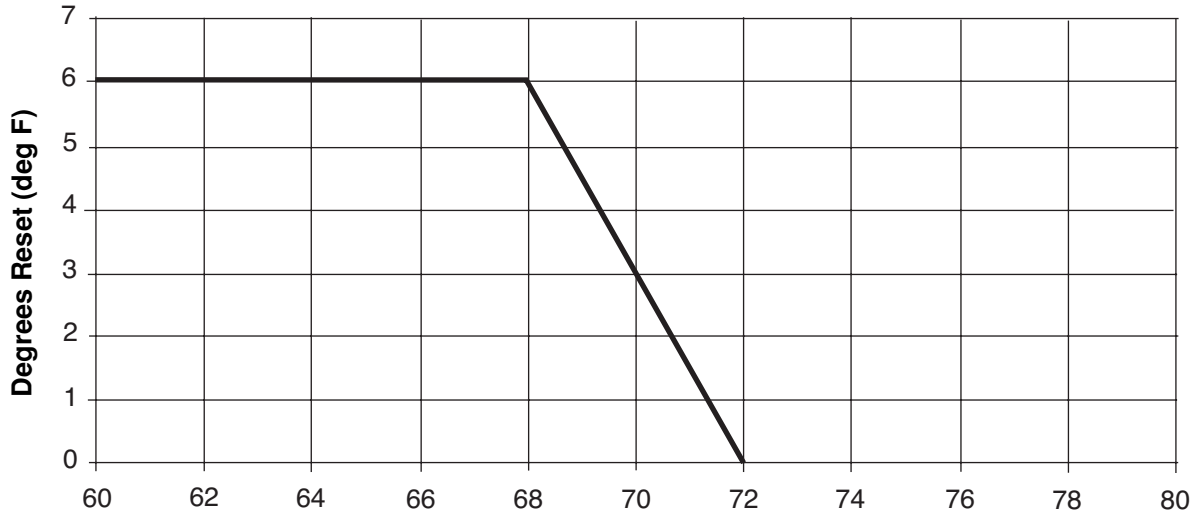


Fig. 19 — Space Temperature Reset

4-20 mA Temperature Reset

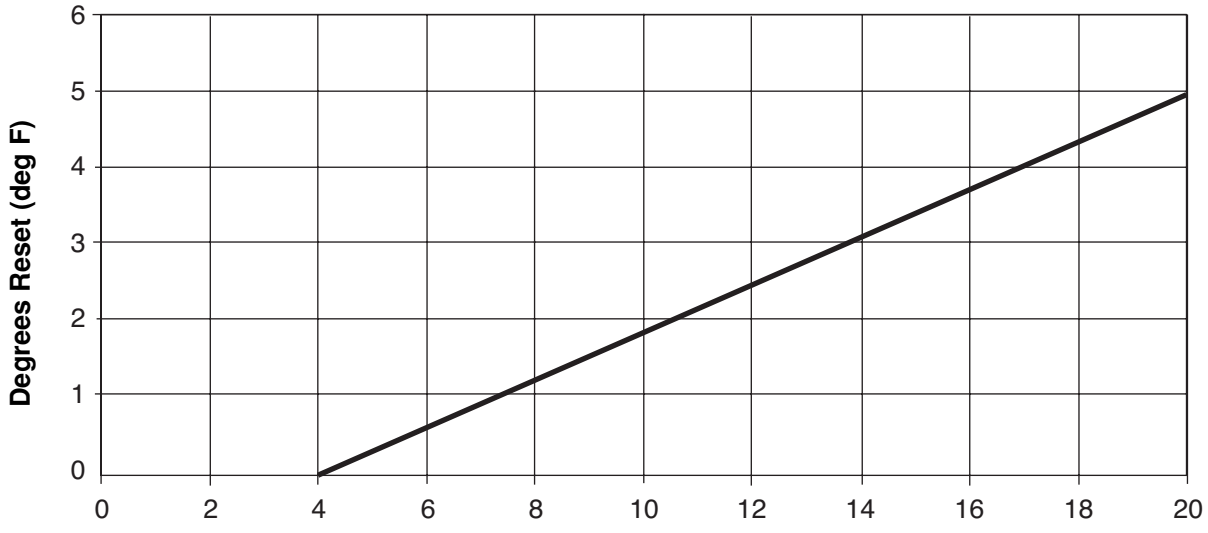


Fig. 20 — 4 to 20 mA Temperature Reset

Table 27 — Space Temperature Reset Configuration

MODE	KEYPAD ENTRY	DISPLAY	ITEM EXPANSION	COMMENT
CONFIGURATION	ENTER	**DISP**		
	↓	**UNIT**		
	↓	**SERV**		
	↓	**OPTN**		
	↓	**RSET**	Reset Cool and Heat Tmp	
	ENTER	CRST	Cooling Reset Type	
	ENTER	0	No Reset	
	ENTER	0	No Reset	Flashing to indicate Edit mode. May require Password
	↓ / ↑	4	Space Temp	Use up or down arrows to change value to 4.
	ENTER	4		Accepts the change.
	ESCAPE	CRST		
	ESCAPE			At mode level
SETPOINTS	↓ / ↑			Change to Setpoints Mode
	ENTER	**COOL**	Cooling Setpoints	
	ENTER	CSP.1	Cooling Setpoint 1	
	↓ x 8	CRO2		
	↓	CRS1	Space T No Reset Temp	Space Temperature where no temperature reset is required.
	ENTER	0		Value of CRS1
	ENTER	0		Flashing to indicate Edit mode
	↑	72.0		Value of No Temperature Reset, 72 from the example.
	ENTER	72.0		Accepts the change.
	ESCAPE	CRS1		
	↓	CRS2	Space T Full Reset Temp	Space Temperature where full temperature reset, DGRC is required.
	ENTER	0		Value of CRS2.
	ENTER	0		Flashing to indicate Edit mode
	↑	68.0		Value of full Temperature Reset, 68 from the example.
	ENTER	68.0		Accepts the change.
	ESCAPE	CRS2		
	↓	DGRC	Degrees Cool Reset	Amount of temperature reset required.
	ENTER	0		Value of DGRC
	ENTER	0		Flashing to indicate Edit mode
	↑	6.0		Amount of Temperature Reset required, 6 from the example.
	ENTER	6.0		Accepts the change.
	ESCAPE	DGRC		

NOTE: **Bold** values indicate sub-mode level.

Table 28 — 4 to 20 mA Temperature Reset Configuration

MODE	KEYPAD ENTRY	DISPLAY	ITEM EXPANSION	COMMENT
CONFIGURATION	ENTER	**DISP**		
	↓	**UNIT**		
	↓	**SERV**		
	↓	**OPTN**		
	↓	**RSET**	Reset Cool and Heat Tmp	
	ENTER	CRST	Cooling Reset Type	
	ENTER	0	No Reset	
	ENTER	0	No Reset	Flashing to indicate Edit mode. May require Password
	↓ / ↑	3	4-20 mA Input	Use up or down arrows to change value to 3.
	ENTER	3		Accepts the change.
	ESCAPE	CRST		
	ESCAPE			At mode level
SETPOINTS	↓ / ↑			Change to Setpoints Mode
	ENTER	**COOL**	Cooling Setpoints	
	ENTER	CSP.1	Cooling Setpoint 1	
	↓ x 2	CSP.3	Cooling Setpoint 3	
	↓	CRV1	Current No Reset Val	Outdoor Temperature where no temperature reset is required.
	ENTER	0		Value of CRV1
	ENTER	0		Flashing to indicate Edit mode
	↑	4.0		Value of No Temperature Reset, 4 from the example.
	ENTER	4.0		Accepts the change.
	ESCAPE	CRV1		
	↓	CRV2	Current Full Reset Val	Current value where full temperature reset, DGRC is required.
	ENTER	0		Value of CRV2.
	ENTER	0		Flashing to indicate Edit mode
	↑	20.0		Value of full Temperature Reset, 20 from the example.
	ENTER	20.0		Accepts the change.
	ESCAPE	CRV2		
	↓ x 6	CRS2		
	↓	DGRC	Degrees Cool Reset	Amount of temperature reset required.
	ENTER	0		Value of DGRC
	ENTER	0		Flashing to indicate Edit mode
	↑	5.0		Amount of Temperature Reset required, 5 from the example.
	ENTER	5.0		Accepts the change.
	ESCAPE	DGRC		

NOTE: **Bold** values indicate sub-mode level.

Demand Limit — Demand Limit is a feature that allows the unit capacity to be limited during periods of peak energy usage. There are three types of demand limiting that can be configured. The first type is through 2-step switch control, which will reduce the maximum capacity to 2 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.

NOTE: One-step Demand Limit is standard.

The 2-step switch control and 4 to 20-mA input signal types of demand limiting require the Energy Management Module (EMM).

To use Demand Limit, select the type of demand limiting to use. Then configure the Demand Limit set points based on the type selected.

2-STEP SWITCH CONTROLLED — If using 2-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 2-step switch control, three parameters must be configured: Demand Limit Select (***Configuration*→*RSET*→*DMDC***), Switch Limit Setpoint 1 (***Setpoints*→*MISC*→*DLS1***) and Switch Limit Setpoint 2 (***Setpoints*→*MISC*→*DLS2***). In the following example, Demand Limit Switch 1 is 60% and Demand Limit Switch 2 is 40%. Demand Limit steps are controlled by two relay switch inputs field wired to TB5 for Switch 1 and TB6 for Switch 2. See Table 29.

For Demand Limit by 2-stage switch control, closing the first stage demand limit contact will put the unit on the first demand limit level. The unit will not exceed the percentage of capacity entered as Demand Limit Switch 1 set point. Closing contacts on the second demand limit switch prevents the unit from exceeding the capacity entered as Demand Limit Switch 2 set point. The demand limit stage that is set to the lowest demand takes priority if both demand limit inputs are closed. If the demand limit percentage does not match unit staging, the unit will limit capacity to the closest capacity stage without exceeding the value. To disable demand limit configure ***DMDC*** to 0.

EXTERNALLY POWERED (4 to 20 mA Controlled) — The Energy Management Module is required for 4 to 20 mA demand limit control. To configure demand limit for 4 to 20 mA control three parameters must be configured. They are: Demand Limit Select (***Configuration*→*RSET*→*DMDC***), mA for 100% Demand Limit (***Configuration*→*RSET*→*DMMX***) and mA for 0% Demand Limit (***Configuration*→*RSET*→*DMZE***). In the following example, 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. See Table 30 and Fig. 21.

⚠ 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. *Comfort*Link™ 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.

In Fig. 21, if the machine receives a 12 mA signal, the machine controls will limit the capacity to 50%.

CCN LOADSHED CONTROLLED — To configure Demand Limit for CCN Loadshed control the unit Operating Type Control must be in CCN control, (***Operating Modes*→*SLCT*→*SP.SE*=2**) and 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.

Remote Alarm and Alert Relays — The 30RB chiller 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. For an alert relay, indicating that at least 1 circuit was off due to the alert, a field-supplied and installed relay must be connected between MBB-J3-CH25-3 and TB5-13.

Table 29 — 2-Step Demand Limit Configuration

MODE	KEYPAD ENTRY	DISPLAY	ITEM EXPANSION	COMMENT
CONFIGURATION	ENTER	**DISP**		
	↓	**UNIT**		
	↓	**SERV**		
	↓	**OPTN**		
	↓	**RSET**	Reset Cool and Heat Tmp	
	ENTER	CRST		
	↓	HRST		
	↓	DMDC	Demand Limit Select	
	ENTER	0	None	
	ENTER	0	None	Flashing to indicate Edit mode. May require Password
	↓ / ↑	1	Switch	Use up or down arrows to change value to 1.
	ENTER	1		Accepts the change.
	ESCAPE	DMDC		
	ESCAPE			At mode level
SETPOINTS	↓ / ↑			Change to Setpoints Mode
	ENTER	**COOL**	Cooling Setpoints	
	↓	HEAT		
	↓	MISC	Miscellaneous Setpoints	
	ENTER	DLS1	Switch Limit Setpoint 1	
	ENTER	0	None	Current value for DLS1.
	ENTER	0	None	Flashing to indicate Edit mode. May require Password
	↑	60	Switch	Use arrows to change value to 60 from the example.
	ENTER	60		Accepts the change.
	ESCAPE	DLS1		
	↓	DLS2	Switch Limit Setpoint 2	
	ENTER	0		Current value of DLS2
	ENTER	0		Flashing to indicate Edit mode
	↑	40		Use arrows to change the value for DLS2 to 40 from the example.
	ENTER	40		Accepts the change.
	ESCAPE	DLS2		
	ESCAPE x 2	DGRC	SETPOINTS	

NOTE: **Bold** values indicate sub-mode level.

Table 30 — Externally Powered Demand Limit Configuration

MODE	KEYPAD ENTRY	DISPLAY	ITEM EXPANSION	COMMENT
CONFIGURATION	ENTER	**DISP**		
	↓	**UNIT**		
	↓	**SERV**		
	↓	**OPTN**		
	↓	**RSET**	Reset Cool and Heat Tmp	
	ENTER	CRST		
	↓	HRST		
	↓	DMDC	Demand Limit Select	
	ENTER	0	None	
	ENTER	0	None	Flashing to indicate Edit mode. May require Password
	↑	2	4-20 mA Input	Use up arrows to change value to 2.
	ENTER	2		Accepts the change.
	ESCAPE	DMDC		
	↓	DMMX	mA for 100% Demand Limit	
	ENTER	0		
	ENTER	0		Flashing to indicate Edit mode
	↑	4.0		Use up arrows to change the value to 4.
	ESCAPE	DMMX		
	↓	DMZE	mA for 0% Demand Limit	
	ENTER	0		
	ENTER	0		Flashing to indicate Edit mode
	↑	20.0		Use up arrows to change value to 20.
	ESCAPE	DMZE		

NOTE: **Bold** values indicate sub-mode level.

4-20 mA Demand Limit

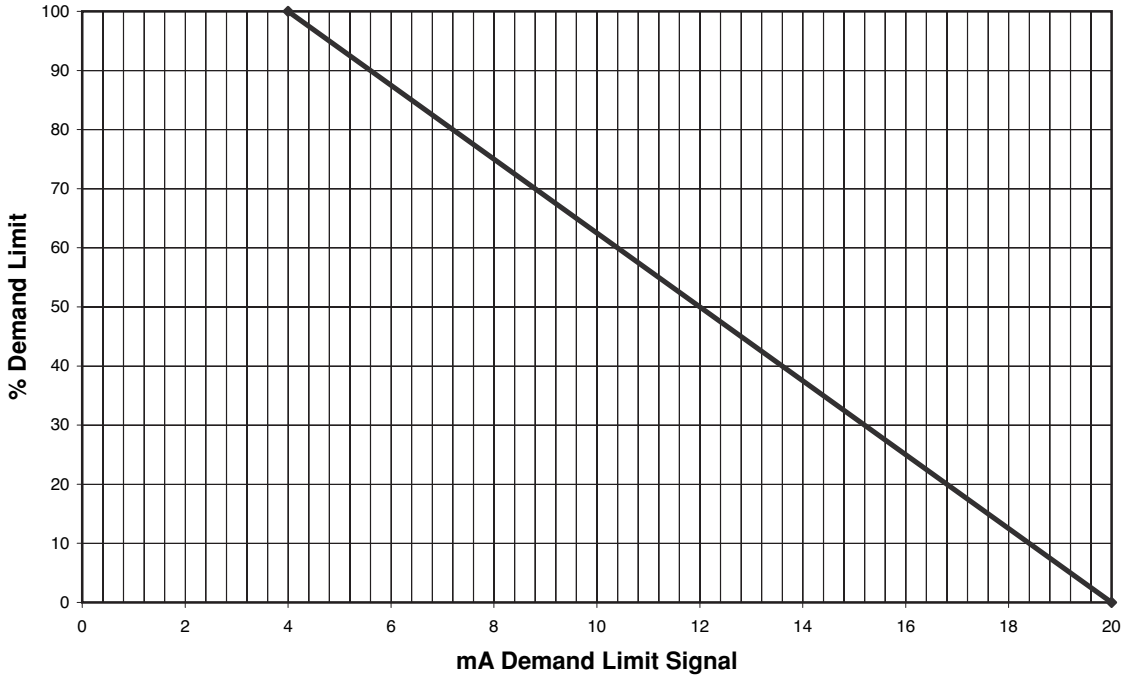


Fig. 21 — Demand Limit

PRE-START-UP

IMPORTANT: Complete the Start-Up Checklist for *Comfort*Link™ Chiller Systems 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 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 (if equipped) and discharge shutoff valves.
3. Open liquid line 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. An air vent is included with the cooler. 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. Units supplied with the accessory hydronic package include a run in screen. If the run-in screen is left in the Suction Guide/Strainer, it is recommended that the Service Maintenance be set to alert the operator within 24 hours of start-up to be sure that the run-in screen in the Suction Guide/Strainer is removed. To set the time for the parameter, go to ***Time Clock→MCFG→ W.FIL***. Values for this item are counted as days. Refer to the hydronic pump package literature if unit is equipped with the optional hydronic pump package.
5. Check tightness of all electrical connections.
6. Oil should be visible in the compressor sight glass. An acceptable oil level in the compressor is from $^{7}/_{8}$ to a full sight glass. Adjust the oil level as required. No oil should be removed unless the crankcase heater has been energized for at least 24 hours. See Oil Charge section for Carrier-approved oils.
7. Electrical power source must agree with unit nameplate.
8. Crankcase heaters must be firmly seated under compressor, and must be energized for 24 hours prior to start-up.
9. Verify power supply phase sequence. Fan motors are 3 phase. Check rotation of fans by using the quick test. Fan rotation is counterclockwise as viewed from top of unit. If fan is not turning counterclockwise, reverse 2 of the power wires at the main terminal block.
10. Check compressor suspension. Mounting rails must be floating freely.

START-UP

⚠ CAUTION

Do not manually operate contactors. Serious damage to the machine may result.

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

1. Be sure all service valves are open. Units are shipped from factory with suction valves (if equipped) open. Discharge and liquid line service valves are closed.
2. Using the Scrolling Marquee display, set leaving-fluid set point (***CSP.1*** is Set Point mode under sub-mode COOL). 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 chilled fluid pump, if unit is not configured for pump control, (***Configuration→OPTN→PUMP*= 0**).
5. Complete the Start-Up Checklist to verify all components are operating properly.
6. Turn ENABLE/OFF/REMOTE CONTACT switch to ENABLE position.
7. Allow unit to operate and confirm that everything is functioning properly. Check to see that leaving fluid temperature agrees with leaving set point Control Point (***Run Status→VIEW→CTPT***).

Operating Limitations

TEMPERATURES — Unit operating temperature limits are listed in Table 31.

Table 31 — Temperature Limits for Standard Units

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†	40	4.4

LEGEND

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

*For sustained operation, EWT should not exceed 85 F (29.4 C).
†Unit requires brine modification for operation below this temperature.

Low Ambient Operation — If unit operating temperatures below 32 F (0° C) are expected, refer to separate unit installation instructions for low ambient temperature operation using accessory low ambient temperature head pressure control, if not equipped. Contact a Carrier representative for details.

NOTE: Wind baffles and brackets must be field-fabricated and installed for all units using accessory low ambient head pressure control to ensure proper cooling cycle operation at low-ambient temperatures. See the 30RB Installation Instructions or the low ambient temperature head pressure control accessory installation instructions for more information.

⚠ CAUTION

Brine duty application (below 40 F [4.4 C] LCWT) for chiller normally requires factory modification. Contact a Carrier Representative for details regarding specific applications. Operation below 40 F (4.4 C) LCWT without modification can result in compressor failure.

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%.

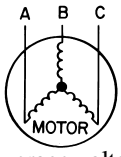
To determine percent voltage imbalance:

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

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 32.

Table 32 — Minimum and Maximum Cooler Flow Rates

SIZES 060-300

30RB SIZE	MINIMUM COOLER FLOW RATE (gpm)	MAXIMUM FLOW RATE (gpm)	MINIMUM LOOP VOLUME (gal.)	MINIMUM COOLER FLOW RATE (l/s)	MAXIMUM COOLER FLOW RATE (l/s)	MINIMUM LOOP VOLUME (liters)
060	72	288	180	5	18	681
070	84	336	210	5	21	795
080	96	384	240	6	24	908
090	108	432	270	7	27	1022
100	120	480	300	8	30	1136
110	132	528	330	8	33	1249
120	144	576	360	9	36	1363
130	156	624	390	10	39	1476
150	180	720	450	11	45	1703
160	192	768	480	12	48	1817
170	204	816	510	13	51	1931
190	228	912	570	14	58	2158
210	252	1008	630	16	64	2385
225	270	1080	675	17	68	2555
250	300	1200	750	19	76	2839
275	330	1320	825	21	83	3123
300	360	1440	900	23	91	3407

SIZES 315-390

30RB SIZE	MINIMUM COOLER FLOW RATE (gpm)		MAXIMUM COOLER FLOW RATE (gpm)		MIN LOOP VOLUME (gal.)	MINIMUM COOLER FLOW RATE (l/s)		MAXIMUM COOLER FLOW RATE (l/s)		MIN LOOP VOLUME (liters)
	Module A	Module B	Module A	Module B		Module A	Module B	Module A	Module B	
315	192	192	768	768	945	12	12	48	48	3577
330	192	204	768	816	990	12	13	48	51	3748
345	204	204	816	816	1035	13	13	51	51	3918
360	204	228	816	912	1080	13	14	51	58	4088
390	228	228	912	912	1170	14	14	58	58	4429

⚠ CAUTION

Operation below minimum flow rate could subject tubes to frost pinching in the tube sheet, resulting in failure of the cooler.

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

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. At any time that a compressor is not operating, its crankcase heater is active. If the need for mechanical cooling is determined, the control decides which circuit and compressor to start. The compressor will deenergize the crankcase heater as it starts. Compressors will be staged with minimum load control (if equipped and configured) to maintain LWT set point.

Shutdown of each circuit under normal conditions occurs in increments, starting with the minimum load control (if equipped) and finishing with the last running compressor. Once minimum load control is disabled, one compressor is shutdown. Eight seconds later the next compressor will shutdown. The process will continue until all of the compressors are shut down. The EXV will close completely, 1 minute after the last compressor has shut down. There are several abnormal conditions that, if detected, will shut down the circuit immediately. In this case, minimum load control and all compressors are turned off *without* an 8-second interval between them. The cooler pump will remain ON for 20 seconds after the last compressor has been turned OFF.

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 ***Configuration→RSET→LLBL*** and ***Configuration→RSET→LLBD***. 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%. The lead chiller's water pump will be started. The lag chiller's water pump shall be maintained off if ***Configuration→RSET→LAGP*=0**. The internal algorithm of lead chiller will control capacity of the lead chiller. If Lead Pulldown Time (***Configuration→RSET→LPUL***) has been configured, the lead chiller will continue to operate alone for that specified time. After the Lead Pulldown Time (***Configuration→RSET→LPUL***) 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 (***Configuration→RSET→LLDY***) is initiated. When the pulldown timer and lag start timer has 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.

To configure the two chillers for dual chiller operation, follow the example shown Dual Chiller Control section. Both chillers must have the Control Method variable (***Operating Modes→SLCT→CTRL***) set to **2** (CCN Control). In the example the master chiller will be configured with a CCN address of '1' and the slave chiller with a CCN address of '2' (***Configuration→OPTN→CCNA***). The master and slave chillers can be addressed from 1 to 239. Each device connected to the network must have its own unique address. Both chillers must have the same CCN Bus Number (***Configuration→OPTN→CCNB***). Lead/Lag Chiller Enable must be set for both chillers by configuring Master/Slave Select (***Configuration→RSET→MSSL***). The master chiller Master/Slave Select must be set to **1** (Master). The slave chiller Master/Slave Select must be set to **2** (Slave). Also in this example, the master chiller will be configured to use Lead/Lag Balance (***Configuration→RSET→LBL***) to rotate the lead chiller after 168 hours of operation. The Lag Start Delay (***Configuration→RSET→LLBD***) will be set for 10 minutes. This prevents the Lag chiller from starting until the lead chiller is fully loaded and the delay has elapsed.

Operating Modes

MODE 1 (MD01) — Startup Delay in Effect

Criteria for Mode — Tested when the unit is started. This mode is active when the Minutes Off Time (**Configuration→OPTN→DELY**) timer is active.

Action Taken — The unit will not start until the timer has expired.

Termination — The mode will terminate when the timer expires.

Possible Causes — This mode is in effect only due to the Minutes Off Time timer.

MODE 2 (MD02) — Second Setpoint in Use

Criteria for Mode — Tested when the unit is ON. This mode is active when Cooling Setpoint 2 (***Setpoints→COOL→CSP.2***) or Ice Setpoint (***Setpoints→COOL→CSP.3***) is in use. While in this mode, the Active Setpoint (***Run Status→VIEW→SETP***) will show the ***CSP.2*** or ***CSP.3*** value.

Action Taken — The unit will operate to the Cooling Setpoint 2 (***CSP.2***) or Ice Setpoint (***CSP.3***).

Termination — This mode will terminate when the Cooling Setpoint 2 (***CSP.2***) or Ice Setpoint (***CSP.3***) is no longer in use.

Possible Causes — This mode is in effect only due to programming options.

MODE 3 (MD03) — Reset in Effect

Criteria for Mode — Tested when the unit is ON. This mode is active when Temperature Reset (***Configuration→RSET→CRST***) is enabled either by ***CRST*=1** (Outside Air Temperature), ***CRST*=2** (Return Water), ***CRST*=3** (4-20 mA Input), or ***CRST*=4** (Space Temperature) and is active.

Action Taken — The Active Setpoint (***Run Status→VIEW→SETP***) will be modified according to the programmed information and will be displayed as the Control Point (***Run Status→VIEW→CTPT***).

Termination — This mode will terminate when the Temperature Reset is not modifying the active leaving water set point, so ***SETP*** is the same as ***CTPT***.

Possible Causes — This mode is in effect only due to programming options.

MODE 4 (MD04) — Demand Limit Active

Criteria for Mode — Tested when the unit is ON. This mode is active when Demand Limit (***Configuration→RSET→DMDC***) is enabled either by ***DMDC*=1** (Switch), ***DMDC*=2** (4-20 mA Input) or the Night Time Low Sound Capacity Limit (***Configuration→OPTN →LS.LT***).

Action Taken — The Active Demand Limit Value (***Run Status→VIEW→LIM***) 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.

Termination — This mode will terminate when the Demand Limit command has been removed.

Possible Causes — This mode is in effect when capacity is being limited by the demand limit function.

MODE 5 (MD05) — Ramp Loading Active

Criteria for Mode — Tested when the unit is ON. This mode is active when Ramp Loading (***Configuration→OPTN →RL.S***) is enabled and the following conditions are met:

1. The leaving water temperature is more than 4° F (2.2° C) from the Control Point (***Run Status→VIEW→CTPT***), and
2. The rate of change of the leaving water temperature is greater than the Cool Ramp Loading (***Set Points→ COOL→CRMP***).

Action Taken — The control will limit the capacity step increase until one of the two conditions in Mode 5 is no longer true.

Termination — This mode will terminate once both conditions in Mode 5 are no longer true.

Possible Causes — This mode is in effect only when capacity is being limited by the ramp loading function.

MODE 6 (MD06) — Cooler Heater Active

Criteria for Mode — Tested when unit is ON or OFF. This mode is active when the cooler heater is energized, if the Outdoor Air Temperature (***Temperature→UNIT→OAT***) is less than the calculated value, (Freeze Setpoint + Cooler Heater Delta T Setpoint [***Configuration→SERV→HTR***] default – 2° F [1.1° C]) and either the Leaving Water Temperature (***Temperature→UNIT→LWT***) or the Entering Water Temperature (***Temperature→UNIT→EWT***) are less than or equal to the Freeze Setpoint + Cooler Heater Delta T Setpoint (***HTR***).

The Freeze Setpoint is 34 F (1.1 C), for fresh water systems (***Configuration→SERV→FLUD*=1**). The Freeze Setpoint is Brine Freeze Setpoint (***Configuration→SERV→LOSP***), for Medium Temperature Brine systems, (***Configuration-→SERV→FLUD*=2**).

Action Taken — The cooler heater will be energized.

Termination — The cooler heater will be deenergized when both the Entering Water Temperature (***EWT***) and Leaving Water Temperature (***LWT***) are above the Freeze Setpoint + Cooler Heater Delta T Setpoint (***HTR***).

Possible Causes — This mode will be enabled for freeze protection. If the temperatures are not as described above, check the accuracy of the outside air, entering and leaving water thermistors.

MODE 7 (MD07) — Water Pump Rotation

Criteria for Mode — Tested when the unit is ON or OFF. This mode is active when the Cooler Pump Sequence (***Configuration→OPTN→ PUMP*=2**) (2 Pumps Automatic Changeover) and the Pump Rotation Delta Timer (***Configuration→OPTN →ROT.P***) has expired.

Action Taken — The control will switch the operation of the pumps. The lead pump will be operating normally. The lag pump will be started, becoming the lead, and then the original lead pump will be shut down.

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

Possible Causes — This mode is in effect only due to programming options.

MODE 8 (MD08) — Pump Periodic Start

Criteria for Mode — This mode is active when the cooler pump is started for the Periodic Pump Start configuration (***Configuration Mode→ OPTN→PM.PS*=YES**).

Action Taken — 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 equipped with dual pumps, Pump no. 1 will run on even days (such as day 2, 4, 6 of the month). Pump no. 2 will run on odd days (such as day 1, 3, 5 of the month).

Termination — This mode will terminate when the pump shuts down.

Possible Causes — This mode is in effect only due to programming options.

MODE 9 (MD09) — Night Low Noise Active

Criteria for Mode — This mode is active when the Night Time Low Noise Option has been configured and the time is within the configured time. Programming a Night Low Noise Start Time (***Configuration→OPTN→LS.ST***) and a Night Low Noise End Time (***Configuration Mode→OPTN →LS.ND***) configures the option.

Action Taken — The control will raise the head pressure set point to reduce the number of condenser fans on, thereby reducing the sound of the machine. Additionally, if the Night Time Low Sound Capacity Limit (***Configuration→OPTN →LS.LT***) has been configured, the units capacity will be limited to the programmed level.

Termination — This mode will terminate once the Night Low Noise End Time (***LS.ND***) has been reached.

Possible Causes — This mode is in effect only due to programming options.

MODE 10 (MD10) — System Manager Active

Criteria for Mode — Tested when the unit is ON or OFF. This mode is active if a System Manager such as Building Supervisor, Chillervisor System Manager, or another CCN device is controlling the machine.

Action Taken — The machine will respond to the specific command received from the System Manager.

Termination — The mode will be terminated if the System Manager control is released.

Possible Causes — This mode is in effect only due to programming options.

MODE 11 (MD11) — Mast Slave Ctrl Active

Criteria for Mode — Tested if the machine is ON. This mode is active if the Master Slave Control has been enabled. Having 2 machines programmed, one as the master (***Configuration →RSET→MSSL=1*** [Master]) and the other as a slave (***Configuration→RSET→MSSL=2*** [Slave]).

Action Taken — Both the master and slave machine will respond to the capacity control commands issued by the master controller. This may include control point changes and demand limit commands.

Termination — This mode will terminate when the Master Slave Control has been disabled.

Possible Causes — This mode is in effect only due to programming options.

MODE 12 (MD12) — Auto Changeover Active

Criteria for Mode — This mode is not supported for Cooling Only units.

Action Taken — None.

Termination — None.

Possible Causes — This mode is in effect only due to programming options.

MODE 13 (MD13) — Free Cooling Active

Criteria for Mode — This mode is not supported for Cooling Only units.

Action Taken — None.

Termination — None.

Possible Causes — This mode is in effect only due to programming options.

MODE 14 (MD14) — Reclaim Active

Criteria for Mode — This mode is not supported for Cooling Only units.

Action Taken — None.

Termination — None.

Possible Causes — This mode is in effect only due to programming options.

MODE 15 (MD15) — Electric Heat Active

Criteria for Mode — This mode is not supported for Cooling Only units.

Action Taken — None.

Termination — None.

Possible Causes — This mode is in effect only due to programming options.

MODE 16 (MD16) — Heating Low EWT Lockout

Criteria for Mode — This mode is not supported for Cooling Only units.

Action Taken — None.

Termination — None.

Possible Causes — This mode is in effect only due to programming options.

MODE 17 (MD17) — Boiler Active

Criteria for Mode — This mode is not supported for Cooling Only units.

Action Taken — None.

Termination — None.

Possible Causes — This mode is in effect only due to programming options.

MODE 18 (MD18) — Ice Mode in Effect

Criteria for Mode — Tested when the unit is ON. This mode is active when Ice Setpoint (***Setpoints→COOL→CSP.3***) is in use. While in this mode, the Active Setpoint (***Run Status →VIEW→SETP***) will show the ***CSP.3*** value.

Action Taken — The unit will operate to the Ice Setpoint (***CSP.3***).

Termination — This mode will terminate when the Ice Setpoint (***CSP.3***) is no longer in use.

Possible Causes — This mode is in effect only due to programming options.

MODE 19 (MD19) — Defrost Active on Cir A

MODE 20 (MD20) — Defrost Active on Cir B

Criteria for Mode — This mode is not supported for Cooling Only units.

Action Taken — None.

Termination — None.

Possible Causes — This mode is in effect only due to programming options.

MODE 21 (MD21) — Low Suction Circuit A

MODE 22 (MD22) — Low Suction Circuit B

MODE 23 (MD23) — Low Suction Circuit C

Criteria for Mode — The criteria are tested when the circuit is ON. The appropriate circuit mode will be active if one of the following conditions is true:

1. If the circuit's Saturated Suction Temperature (SST) is more than 6° F (3.3° C) less than the freeze point and both the cooler approach (Leaving Water Temperature-SST) and superheat (Return Gas Temperature – SST) are greater than 15° F (8.3° C).
2. If there is more than 1 compressor ON in the circuit and the circuit's SST is greater than 18° F (10.0° C) below the freeze point for more than 90 seconds.
3. If there is more than 1 compressor ON in the circuit and the circuit's SST is greater than –4° F (–20.0° C) and the SST 30 seconds ago was 18° F (10.0° C) below the freeze point.
4. If the circuit's saturated suction temperature is greater than 6° F (3.3° C) below the freeze point for more than 3 minutes.

For a fresh water system (***Configuration→SERV→FLUD*** **=1**), the freeze point is 34° F (1.1° C). For medium temperature brine systems, (***Configuration→SERV→FLUD*****=2**), the freeze point is Brine Freeze Set Point (***Configuration→SERV→ LOSP***).

Action Taken — For criterion 1, no additional stages will be added. For criteria 2, 3 and 4, 1 stage of capacity will be removed.

Termination — The mode will terminate when the circuit's Saturated Suction Temperature is greater than the freeze point minus 6° F (3.3° C) or the circuit has alarmed.

Possible Causes — If this condition is encountered, see Possible Causes for Alarms P.05, P.06, and P.07 on page 66.

MODE 24 (MD24) — High DGT Circuit A

MODE 25 (MD25) — High DGT Circuit B

MODE 26 (MD26) — High DGT Circuit C

Criteria for Mode — This mode is not supported for Cooling Only units.

Action Taken — None.

Termination — None.

Possible Causes — This mode is in effect only due to programming options.

MODE 27 (MD27) — High Pres Override Cir A

MODE 28 (MD28) — High Pres Override Cir B

MODE 29 (MD29) — High Pres Override Cir C

Criteria for Mode — Tested when the circuit is ON. The appropriate circuit mode will be active if the discharge pressure for the circuit, Discharge Pressure Circuit A (***Pressure →PRC.A→DP.A***), Discharge Pressure Circuit B (***Pressure→PRC.B→DP.B***), or Discharge Pressure Circuit C (***Pressure→PRC.A→DP.C***), is greater than the High Pressure Threshold (***Configuration→UNIT→HP.TH***).

Action Taken — The capacity of the affected circuit will be reduced. If the unit is equipped with Minimum Load Control and has been configured for High Ambient (***Configuration →UNIT→HGBP=3***), the minimum load control valve will be energized. Two minutes following the capacity reduction, the circuit's saturated condensing temperature (SCT) is calculated and stored. The affected circuit will not be allowed to add capacity for at least 5 minutes following the capacity reduction. If after 5 minutes, the circuit's saturated condensing temperature is less than SCT –3° F (1.7° C), and then if required, another stage of capacity will be added.

If additional steps of capacity are required, the control will look for other circuits to add capacity.

Termination — This mode will terminate once the circuit's saturated condensing temperature is less than SCT –3° F (1.7° C).

Possible Causes — If this condition is encountered, see Possible Causes for Alarm A1.03. on page 63.

MODE 30 (MD30) — Low Superheat Circuit A

MODE 31 (MD31) — Low Superheat Circuit B

MODE 32 (MD32) — Low Superheat Circuit C

Criteria for Mode — Tested when the circuit is ON with at least 1 compressor ON. The appropriate circuit mode will be active is the circuit's superheat is less than 5° F (2.8° C).

Action Taken — No additional stages of circuit capacity will be added until the circuit's superheat is greater than 5° F (2.8° C).

The control will look for other circuits to add capacity if additional steps of capacity are required.

Termination — This mode will terminate once the affected circuit's superheat is greater than 5° F (2.8° C).

Possible Causes — If this condition is encountered, see Possible Causes for Alarms P.11, P.12 and P.13 on page 66.

SERVICE

Electronic Expansion Valve (EXV) — See Fig. 22 for a cutaway view of the EXV. High-pressure liquid refrigerant enters 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.

There are two different EXVs. For circuits with 1 or 2 compressors, the total number of steps is 2785. For circuits with 3 or 4 compressors, the total number of steps is 3690. The EXV motor moves at 150/300 steps per second. Commanding the valve to either 0% or 100% will add extra 160 steps to the move, to ensure the value is open or closed completely.

The EXV board controls the valve. Each circuit has a thermistor located in a well in the suction manifold before the compressor. Suction pressure as measured by the suction pressure transducer is converted to a saturated suction temperature. The thermistor measures the temperature of the superheated gas entering the compressor and the pressure transducer determines the saturated temperature of suction gas. The difference between the temperature of the superheated gas and the saturated suction temperature is the superheat. The EXV board controls the position of the electronic expansion valve stepper motor to maintain superheat set point.

The MBB controls the superheat leaving cooler to approximately 7.2° F (4° C). Because EXV status is communicated to the main base board (MBB) and is controlled by the EXV boards, it is possible to track the valve position. The unit is then protected against loss of charge and a faulty valve. During initial start-up, the EXV is fully closed. After initialization period, valve position is tracked by the EXV board by constantly monitoring the amount of valve movement.

The EXV is also used to limit cooler saturated suction temperature to 50 F (10 C). This makes it possible for the chiller to start at higher cooler fluid temperatures without overloading the compressor. This is commonly referred to as MOP (maximum operating pressure).

If it appears that the EXV module is not properly controlling circuit operation to maintain correct superheat, there are a number of checks that can be made using test functions and initialization features built into the microprocessor control. See the EXV Troubleshooting Procedure section to test EXVs.

EXV TROUBLESHOOTING PROCEDURE — 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. Press ESCAPE on the Scrolling Marquee until the highest operating level is displayed. Use the arrow keys to select the Service Test mode and press ENTER . The display will be **TEST**. Use the arrow keys until display shows **QUIC**. Press ENTER (password entry may be required) and use ▲ or ▼ to change **OFF** to **ON**. The Quick Test sub-mode is now enabled. Move the arrow down to the appropriate circuit EXV, Circuit A EXV % Open (***Service Test Mode→QUIC→EXV.A***), Circuit B EXV % Open (***Service Test Mode→QUIC→EXV.B***), or Circuit C EXV % Open (***Service Test Mode→QUIC→ EXV.C***), and press ENTER. The current value of **0** will be displayed. Press ENTER and the value will be flashing. Using the ▲ increase the EXV position to select 100% valve position (hold ▲ for quick movement) and press ENTER. The actuator should be felt moving through the EXV. Press ENTER again twice if necessary to confirm this has occurred. This will attempt to force the EXV to 100% again. To close the valve, press ENTER, select 0% with ▼ and press ENTER. The actuator should knock when it reaches the bottom of its stroke. If it is believed that the valve is not working properly, continue with the following test procedure:

Check the 8-position DIP switch on the board for the proper address. Check the EXV output signals at appropriate terminals on the EXV module. Connect positive test lead to (EXV-J2A (060-190) /EXV1-J2A (210-300) terminal 5 for Circuit A, (EXV-J2B (060-190) /EXV1-J2B (210-300) terminal 5 for Circuit B or EXV2-J2A (210-300) terminal 5 for Circuit C). Set meter to approximately 20 vdc. Using the Service Test procedure above, move the valve output under test to 100%. DO NOT short meter leads together or pin 5 to any other pin, as board damage will occur. During the next several seconds, carefully connect the negative test lead to pins 1,2,3 and 4 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.

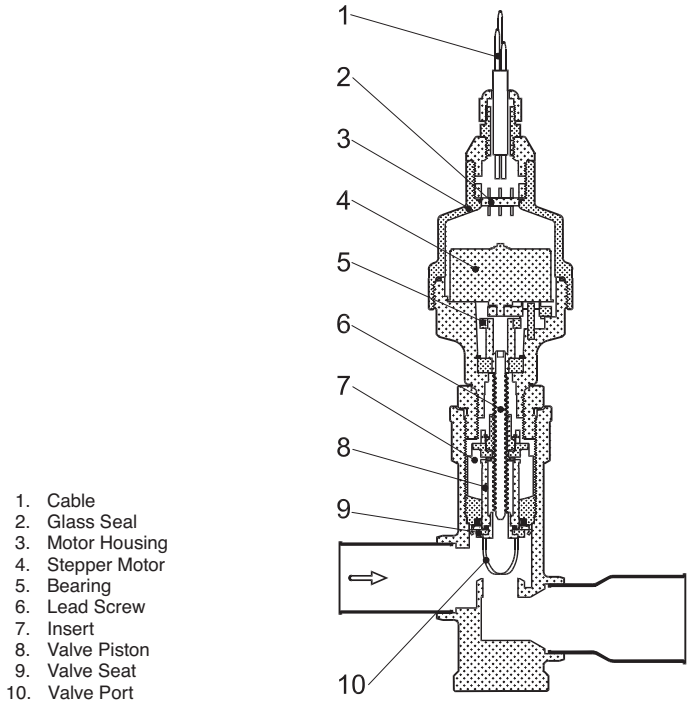


Fig. 22 — Cutaway View of the Electronic Expansion Valve

Press ENTER and select 0% to close the valve. If a problem still exists, replace the EXV 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 (EXV-J2A [060-190]/EXV1-J2A [210-300] for Circuit A, (EXV-J2B [060-190]/EXV1-J2B [210-300] for Circuit B or EXV2-J2A [210-300] for Circuit C) and check the resistance of the two windings between pins 1 and 3 for one winding and pins 2 and 4 for the other winding. The resistance should be 52 ohms (± 5.2 ohms).

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 must be performed.

1. Close the liquid line service valve of the circuit to be checked. Put the Enable/Off/Remote Contact switch in the Off position. Using the Scrolling Marquee, enter the Service Test mode and change ***Service Test→TEST →T.REQ*** from **OFF** to **ON**. A password may be required. Switch the EOR switch to the Enable position. Under the COMP sub-mode, enable the one of the compressors (***Service Test→TEST→CP.xn***) for the circuit. Let compressor run until gage on suction pressure port reads 10 psig. Press ENTER, ▼ and ENTER to turn the compressor off. The compressor will turn off. Immediately after the compressor shuts off, close the discharge valve.
2. Remove any remaining refrigerant from the system low side using proper reclaiming techniques. Turn off the line voltage power supply to the compressors.
3. The expansion valve motor is hermetically sealed inside the top portion of the valve. See Fig. 22. Carefully unscrew the $1^{1}/_{16}$ in. (27 mm) retaining nut securing the motor portion to the body of the valve making sure the EXV plug is still connected. The EXV operator will come out with the motor portion of the device.
4. Enter the appropriate EXV test step under the (***Service Test→QUIC***) sub-mode in the Service Test mode. Locate the desired item ***Service Test→QUIC→EXV.A***, ***Service Test→QUIC→EXV.B***, or ***Service Test→ QUIC→EXV.C***. Press ENTER twice to make the valve position of 0% flash. Press and hold ▲ until 100% is displayed and press ENTER. Observe the operation of the lead screw. See Fig. 22. 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. Press ENTER twice, use ▼ to select 0% and press ENTER again to 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. 23. It is easier to install the motor assembly with the lead screw in the fully closed position. Using the steps outlined above, move the EXV position to 0. 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 33. Change filter drier at first sign of moisture in system.

Table 33 — Color Indicators when Moisture is Present in Refrigerant

	R-410A, 75 F (24 C) (ppm)	R-410A, 125 F (52 C) (ppm)
Green — Dry	<20	<60
Yellow-green — Caution	20-165	60-500
Yellow — Wet	>165	>500

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 on each circuit. Refer to 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. Schrader connection for field charging. In combination with compressor discharge service valve, each circuit can be pumped down into the high side for servicing.

Cooler

FREEZE PROTECTION — Coolers can be ordered with heaters installed in the factory. If equipped, the Main Base Board based on the outdoor-air temperature and the entering and leaving water thermistors controls the cooler heaters. The Heater Set Point is the sum of the freeze point and Cooler Heater DT Setp (***Configuration→SERV→HTR***).

If the entering or leaving water temperature is less than the Heater Set Point and the outdoor air temperature is less than the Heater Set Point – 2° F (1.1° C), then the heater will be turned on.

If the Entering or Leaving Water Temperature is less than the Brine Freeze Setpoint (***Configuration→SERV→LOSP***) + 1.0° F (0.5° C), then the heater will be turned on along with the pump.

Entire cooler is covered with closed-cell insulation applied over the heater. Heater plus insulation protect cooler against low ambient temperature freeze-up to –20 F (–28 C).

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

LOW FLUID TEMPERATURE — Main Base Board is programmed to shut chiller down if leaving fluid temperature drops below 34 F (1.1 C) for water or below Brine Freeze Setpoint (***Configuration→SERV→LOSP***) for brine units. The unit will shut down without a pumpout. When fluid temperature rises to 6° F (3.3° C) above the leaving fluid set point, safety resets and chiller restarts. Reset is automatic as long as this is the first occurrence.

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

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. 24 shows an Elliott tube plug and a cross-sectional view of a plug in place. See Tables 34 and 35 for plug components.

⚠ CAUTION

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

Table 34 — Plug Components

COMPONENTS FOR PLUGGING	PART NUMBER
For Tubes	
Brass Pin	853103-312*
Brass Ring	853002-333*
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.

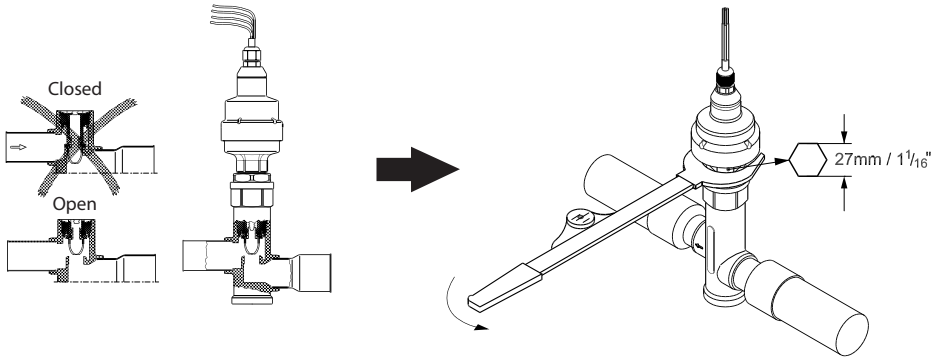
Table 35 — Plug Component

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.)	0.336	8.53

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

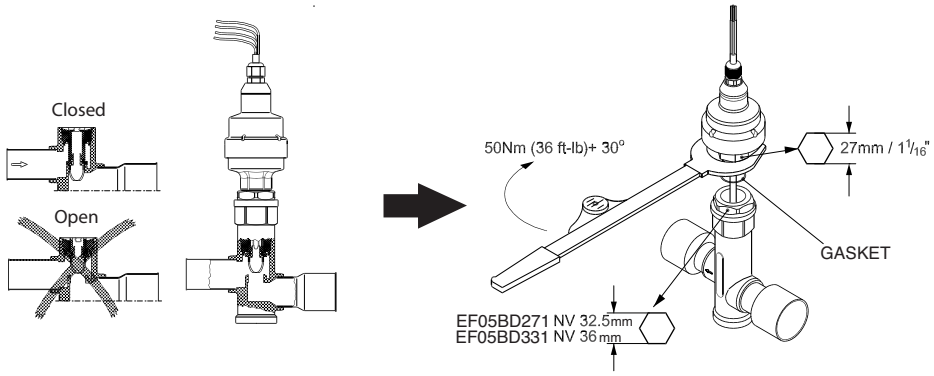
For the 30RB150-390 coolers, the pass partition has a perforated distribution plate in the inlet pass to more uniformly distribute the refrigerant as it enters the first pass tubes of the cooler. The perforated distribution plate is on the tubesheet side of the pass partition. A tube plug in a first pass tube 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.

DISASSEMBLY



NOTE: Open valve in Quick Test sub-mode before disassembling.

ASSEMBLY



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. 23 — Disassembly and Assembly of EXV Motor

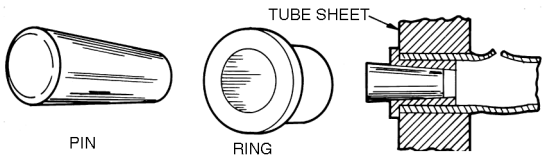


Fig. 24 — Elliott Tube Plug

RETUBING — When retubing is required, obtain 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 tubesheet.

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.

TIGHTENING COOLER HEAD BOLTS (Fig. 25-29)

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. 25-29. 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.

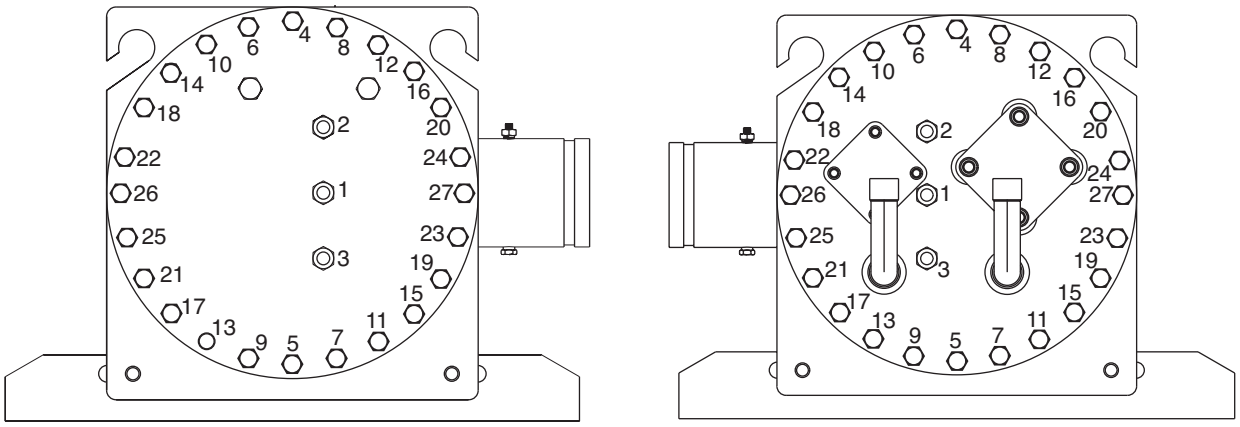


Fig. 25 — Bolt Tightening Sequence, 30RB060,070

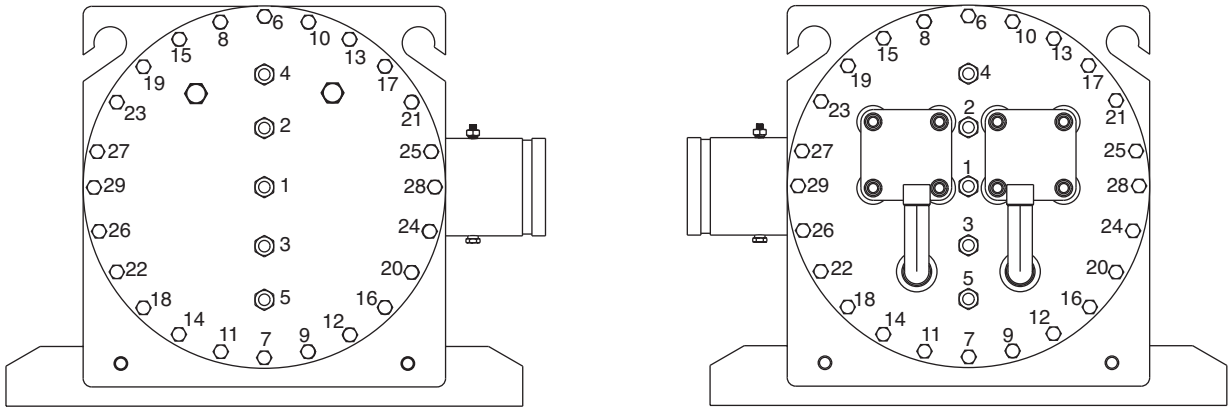


Fig. 26 — Bolt Tightening Sequence, 30RB080-100

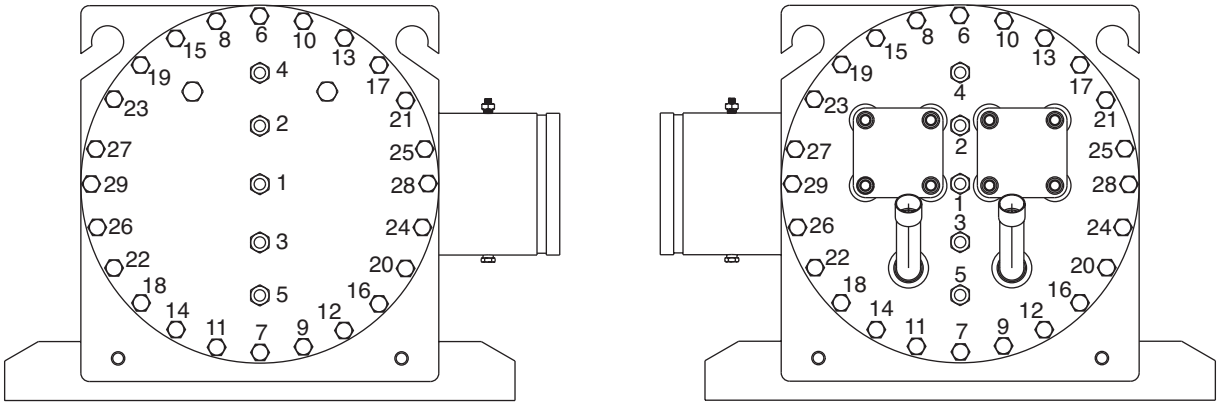


Fig. 27 — Bolt Tightening Sequence, 30RB110-130

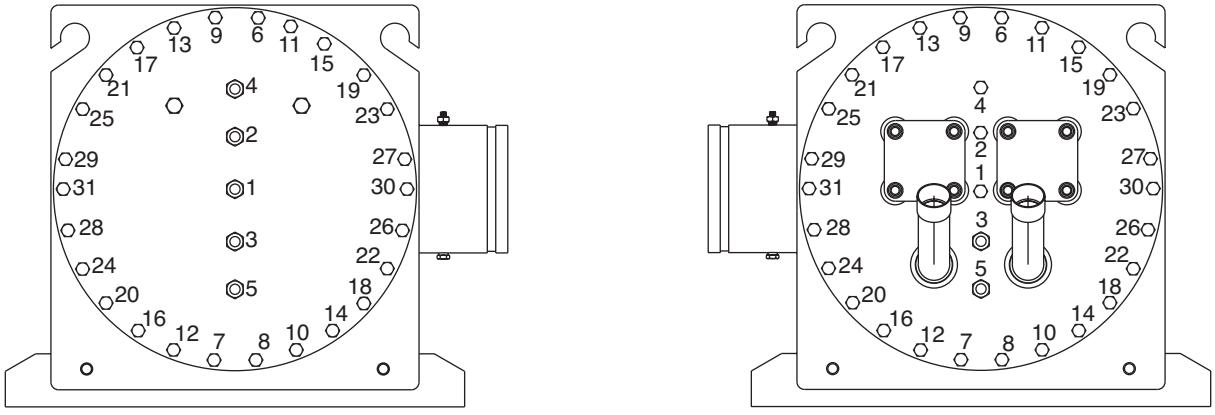


Fig. 28 — Bolt Tightening Sequence, 30RB150-190, 315A/B, 345A/B, 360A/B, 390A/B

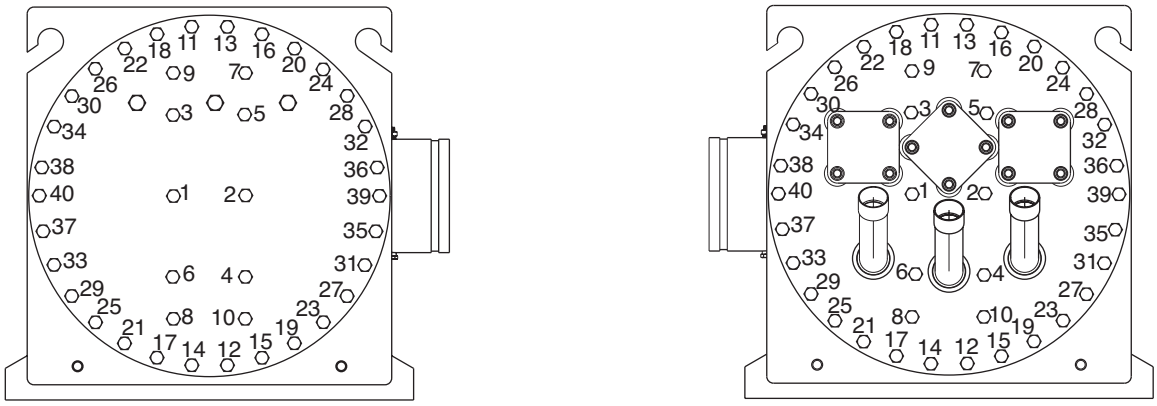


Fig. 29 — Bolt Tightening Sequence, 30RB210-300

CHILLED WATER FLOW SWITCH — A factory-installed flow switch is installed in the cooler nozzle for all machines. This is a thermal-dispersion flow switch with no field adjustments. The switch is set for approximately 0.5 ft/sec flow. This does not indicate minimum flow is satisfied. See Table 36 for approximate flow for various pipe sizes.

Table 36 — Flow and Pipe Size

SIZE (in.)	O.D. (in.)	WALL THICKNESS (in.)	I.D. (in.)	AREA (ft^2)	GPM
4	4.500	0.237	4.026	0.09	20
6	6.625	0.280	6.065	0.20	44
8	8.625	0.322	7.981	0.35	77

Condenser Coil Maintenance and Cleaning Recommendation — 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 COIL SURFACES — Monthly cleaning with Totaline® environmentally sound 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 5 gallon container. It is recommended that all coils, including standard aluminum, pre-coated, copper/copper or E-coated coils be cleaned with the Totaline environmentally sound 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 sound 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 Sound 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 sound 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 Sound 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 sound 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, as the enzymatic activity will be destroyed.

5. Thoroughly apply Totaline environmentally sound 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. Reapplying 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 fan deck supports each fan and motor assembly. A shroud and a wire guard provide protection from the rotating fan. The exposed end of 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. Tighten the bolt.

IMPORTANT: Check for proper fan rotation (counterclockwise viewed from above). If necessary, switch any 2 power leads to reverse fan rotation.

Refrigerant Circuit

LEAK TESTING — Units are shipped with complete operating charge of refrigerant R-410a (see Physical Data tables supplied in the 30RB 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 30RB 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. Schrader 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 450 psig (3102 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).

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 — Chillers contain many safety devices and protection logic built into electronic control. Following is a brief summary of major safeties.

COMPRESSOR PROTECTION

Circuit Breaker — One manual-reset, calibrated-trip magnetic circuit breaker for each compressor protects against overcurrent. Do not bypass or increase size of a breaker to correct problems. Determine cause for trouble and correct before resetting breaker. Circuit breaker must-trip amps (MTA) are listed on individual circuit breakers.

A high-pressure switch with a trip pressure of 641 psig (4419 kPa) is mounted on the discharge line of each circuit. Switch is wired in series with the SPM modules of all compressors in the circuit. If switch opens, the SPM opens all compressor contactors in the circuit and all compressors are locked off. See the table below for high pressure switch protection.

DEVICE	CUTOUT	CUT-IN
High Pressure Switch	641 ± 10 psi (4420 ± 70 kPa)	493 ± 29 psi (3400 ± 200 kPa)

CRANKCASE HEATERS — Each compressor has a 56-w crankcase heater to prevent absorption of liquid refrigerant by oil in crankcase when compressor is not running. Heater power source is control power transformer.

IMPORTANT: Never open any switch or disconnect that deenergizes crankcase heaters unless unit is being serviced or is to be shut down for a prolonged period. After a prolonged shutdown or service, energize crankcase heaters for 24 hours before starting unit.

Relief Devices — Fusible plugs are located in each circuit to protect against damage from excessive pressures.

HIGH-SIDE PROTECTION — One device is located between condenser and filter drier; a second is on filter drier.

These are both designed to relieve pressure on a temperature rise to approximately 210 F (99 C).

LOW-SIDE PROTECTION — A device is located on suction line and is designed to relieve pressure on a temperature rise to approximately 170 F (77 C).

Some local building codes require that relieved gases be removed. This connection will allow conformance to this requirement.

Compressors

⚠ WARNING

Do not supply power to unit with compressor cover removed. Failure to follow this warning can cause a fire resulting in personal injury or death.

⚠ WARNING

Exercise extreme caution when reading compressor currents when high-voltage power is on. Correct any of the problems described below before installing and running a replacement compressor. Wear safety glasses and gloves when handling refrigerants. Failure to follow this warning can cause a fire, resulting personal injury or death.

⚠ CAUTION

Do not manually operate contactors. Serious damage to the machine may result.

COMPRESSOR CHANGEOUT SEQUENCE — Compressor service requires the following metric tool:

8 mm socket

Additional required material:

Oil catch pan

$1^{5}/_{8}$ in. coupling (suction line)

$1^{1}/_{8}$ in. coupling (discharge line)

Change the compressor according to the following procedure:

1. Close the liquid line of the affected circuit.
2. If the optional suction service valve is installed, close the suction and discharge service valves. Remove any remaining refrigerant from the compressor section using proper reclaiming techniques.

   If the optional suction service valve is not installed and no additional compressors are available, or the compressor failure is a burn-out, close the liquid and discharge valves. Remove the refrigerant from the low side using proper reclaiming techniques.

   If additional compressors are available, use the Service Test procedure to pumpdown the low side of the system. Put the Enable/Off/Remote Contact switch in the Off position. Using the Scrolling Marquee, enter the Service Test mode and change ***Service Test→TEST→T.REQ*** from **OFF** to **ON**. A password may be required. Switch the EOR switch to the Enable position. Under the COMP sub-mode, enable the one of the compressors (***Service Test→TEST→CP.xn***) for the circuit. Let compressor run until gage on suction pressure port reads 10 psig. Press ENTER, ▼ and ENTER to turn the compressor off. The compressor will turn off. Immediately after the compressor shuts off, close the discharge valve. Remove any remaining refrigerant from the system low side using proper reclaiming techniques.

IMPORTANT: Chilled water pumps must be energized when removing or adding refrigerant. Fluid must be flowing through the heat exchanger, or serious damage to the cooler may result.

3. Turn off the line voltage power supply to the unit. Lock and tag all disconnects.
4. Remove the compressor control box cover.
5. Be sure that the compressor power leads are marked. If not, mark with the appropriate terminal designation. Remove the power connection from the compressor. Save the hardware for installation later. The conduit connection does not need to be removed. Disconnect adjacent communication cable wiring. Disconnect the crankcase heater wiring from the scroll board.
6. Loosen the nuts that secure the bottom platform of the compressor control box from the shell of the compressor. Save the hardware, as it will be required for the installation of the new compressor.
7. Remove the oil from the compressor until the level is below the sight glass. An oil dip tube is provided in the compressor. Loosen the oil equalizer line connection. The equalizer line is used on multiple compressor circuits. Use the catch pan to collect any oil that may remain. Dispose of the oil properly. Do not reuse the oil. Seal the oil equalizer connection port.
8. Cut the suction line with a tubing cutter. Cut the line close to the manifold. Close to the compressor connection is an orifice in the piping that must be reused in the installation of the new compressor.
9. Cut the discharge line, downstream of the reverse flow check valve.
10. Loosen the 8 mm bolts that hold the compressor in place on the compressor skid assembly. Save the hardware, as it will be required for the installation of the new compressor.
11. Slide the compressors toward the side of the machine for removal.
12. Once the compressor has been removed, loosen the nuts and remove the compressor mounting spacers. Save the hardware, as it will be required for the installation of the new compressor. Wrap the reverse rotation check valve with a wet rag wrap or use a heat sink to prevent damage to the reverse flow check valve. Unsweat the suction and discharge lines from the failed compressor. Save the lines for installation later.
13. Add the couplings to the suction and discharge lines on the chiller.
14. On the new compressor install the compressor mounting spacers. Tighten the nut to 40 ft-lb (54.2 Nm).
15. Slide the new compressor onto the skid. Remove the oil equalizer cap installed on the new compressor by the factory. Move the compressor into place. Do not secure the compressor to the mounting skid.
16. Connect the oil equalizer to the compressor first. Tighten the Roto-lock fitting to 75 ft-lb (101.6 Nm).
17. Secure the compressor to the mounting skid with the 8 mm bolts. Tighten the bolts to 12 ft-lb (16.3 Nm).
18. Using the suction and discharge lines from the old compressor, braze the connections. Be sure to use a wet rag wrap or heat sink to prevent damage to the reverse flow check valve.
19. Leak check the assembly using standard refrigeration techniques.
20. Evacuate the compressor section (or compressor-cooler section) by attaching a vacuum pump ahead of the discharge service valve. Remove the suction and discharge pressure transducers and use those fittings.
21. Check the oil level in the compressor. Add oil if necessary.
22. Re-install the control box bottom platform. Tighten the nuts to 8 ft-lb (10.8 Nm). Reconnect the power to the compressor. Re-install the control box cover. Ensure both sides securely snap in to place.

Restore power to the unit and check the operation and refrigerant charge. Obtain an oil sample for quality evaluation.

⚠ CAUTION

Do not manually operate contactors. Serious damage to the machine may result.

⚠ CAUTION

The compressor in a Puron® system uses a polyol ester (POE) oil. This oil is extremely hygroscopic, meaning it absorbs water readily. POE oils can absorb 15 times as much water as other oils designed for HCFC and CFC refrigerants. Take all necessary precautions to avoid exposure of the oil to the atmosphere.

OIL CHARGE — All units are factory charged with polyolester (POE) oil to $^{7}/_{8}$ sight glass. Acceptable oil level for each compressor is $^{7}/_{8}$ to full sight glass.

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

- Manufacturer . . . . . ICI Emkarate RL 32H
- Oil Type . . . . . Inhibited polyolester-based synthetic compressor lubricant.
- ISO Viscosity Grade. 32

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

SYSTEM BURNOUT CLEANUP PROCEDURE — Some compressor electrical failures can cause the motor to burn. When this occurs, by-products such as sludge, carbon, and acids contaminate the system. There are 2 classifications of motor burnouts, mild and severe. Test the oil for acidity using a POE oil acid test kit to determine the severity of the burnout.

In a mild burnout, there is little or no detectable odor. Compressor oil is clear or slightly discolored. An acid test of the oil will be negative. This type of failure is treated the same as a mechanical failure. The liquid line filter drier or core should be replaced.

In a severe burnout, there is a strong, pungent, rotten egg odor. Compressor oil is very dark. Evidence of burning may be present in the tubing connected to the compressor. An acid test of the oil will be positive. The following steps should be taken before restarting any compressors in the circuit.

1. Isolate compressors and recover refrigerant from compressor section.
2. Remove oil from all compressors in the circuit. An oil drain plug is provided on each compressor. Pressurize the low side of the compressor circuit with Puron refrigerant or nitrogen. Less than 10 psig (68.9 kPa) should be adequate. This will help in the removal of the oil from the compressor sump. Dispose of contaminated oil as per local codes and regulations.
3. Replace failed compressor as outlined under compressor replacement procedure.
4. Recharge the circuit with fresh oil. The circuit oil charge information is supplied in the 30RB Installation Instructions. Oil level should be approximately $^{7}/_{8}$ sight glass.
5. Install activated carbon (burnout) filter drier/core.
6. Leak check, evacuate and recharge refrigerant circuit.
7. Operate compressors. Check filter drier pressure drop periodically. Replace cores if pressure drop exceeds 4 psig (27.6 kPa).

Perform additional acid test after 24 hours of operation. Change liquid line filter drier/core if necessary. Replace with standard filter drier/core once circuit is clean. Use the Carrier Standard Service Techniques Manual as a reference source.

MAINTENANCE

Recommended Maintenance Schedule — The following are only recommended guidelines. Jobsite conditions may dictate that maintenance schedule is 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:
- 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 condenser coils for debris, clean as necessary with Carrier approved coil cleaner.
- Check sight glass moisture indicator for moisture.
- Check all condenser fans for proper operation.
- Check compressor oil level.
- Check crankcase heater operation.
- Inspect pump seal, if equipped with a hydronic pump package.

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 psi (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, if equipped.
- 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.

TROUBLESHOOTING

See Table 37 for an abbreviated list of symptoms, possible causes and possible remedies.

Table 37 — 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.
	Wrong or incorrect unit configuration	Check unit configuration.
	Active alarm	Check Alarm status. See separate Alarm and follow troubleshooting instructions.
	Active operating mode	Check for Operating Modes. See Operating Modes and follow troubleshooting instructions
Unit Operates too Long or Continuously	Low refrigerant charge	Check for leak and add refrigerant.
	Compressor or control contacts welded	Replace contactor or relay.
	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.
Circuit Does Not Run	Active alarm	Check Alarm status. See separate Alarm and follow troubleshooting instructions.
	Active operating mode	Check for Operating Modes. See Operating Modes and follow troubleshooting instructions.
Circuit Does Not Load	Active alarm	Check Alarm status. See separate Alarm and follow troubleshooting instructions.
	Active operating mode	Check for Operating Modes. See Operating Modes and follow troubleshooting instructions.
	Low saturated suction temperature	See Operating Modes 21, 22 and 23.
	High circuit suction superheat	The circuit capacity is not allowed increase if circuit superheat is greater than 36 F (20 C). See Alarms P.08, P.09 and P.10 for potential causes.
	Low suction superheat	The circuit capacity is not allowed to increase if the circuit superheat is less than 5 F (2.8 C). See Alarms P.11, P.12 and P.13 for potential causes.
Compressor Does Not Run	Active alarm	Check Alarm status. See separate Alarm and follow troubleshooting instructions.
	Active operating mode	Check for Operating Modes. See Operating Modes and follow troubleshooting instructions.
	Inoperative compressor contactor	• Check control wiring. • Check scroll protection module. • Check contactor operation, 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.

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 shutdown. Alarms and Alerts are assigned codes as described in Fig. 30. The alarm/alert indicator LED on the Scrolling Marquee or Navigator™ module is illuminated when any alarm or alert condition is present. If an Alert is active, the Alarm Indicator LED will blink. If an Alarm is active, the Alarm Indicator LED will remain on. Currently active Alerts and Alarms can be found in ***Alarms→ALRM→ALM1*** to ***ALM5***.

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. The following method must be followed to reset manual alarms:

Before resetting any alarm, first determine the cause of the alarm and correct it. Enter the Alarms mode indicated by the LED on the side of the Scrolling Marquee display. Press ENTER and sub-mode ***Alarm→R.ALM*** (Reset All Current Alarms) is displayed. Press ENTER . The control will prompt the user for a password, by displaying PASS and WORD. Press ENTER to display 1111. Press ENTER for each character. The default password is 0111. Use the arrow keys to change each individual character. Use the up or down arrow keys to toggle the display to **YES** and press ENTER . The alarms will be reset. Indicator light will be turned off when switched correctly. Do not reset the chiller at random without first investigating and correcting the cause(s) of the failure.

Each alarm is described by a three or four-digit code. The first one or two digits indicate the alarm source and are listed below. The last two digits pinpoint the problem. See Table 38.

An alarm example is shown in Fig. 30.

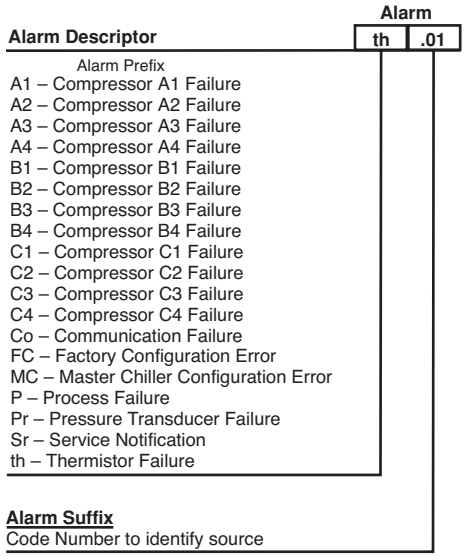


Fig. 30 — Alarm Description

Table 38 — Alarm Codes

PREFIX CODE	SUFFIX CODE	DESCRIPTION	REASON FOR ALARM	ACTION TAKEN BY CONTROL	RESET TYPE	PROBABLE CAUSE
A1 A2 A3 A4 B1 B2 B3 B4 C1 C2 C3 C4	.01	Compressor nn Motor Temperature Too High	Compressor Motor Sensor PTC resistance is greater than 4.5k Ω.	Circuit shut down or not allowed to start-up	Manual	Compressor failure, wiring error, operation outside of limits, improper refrigerant charge
	.02	Compressor nn Crankcase Heater Failure	Crankcase heater current not detected when required or detected when not required.	Circuit shut down or not allowed to start-up	Manual	Wiring error, failed Crankcase heater, failed SPM.
	.03	Compressor nn High Pressure Switch	High Pressure Switch open.	Circuit shut down or not allowed to start-up	Manual	Wiring error, closed/ restricted discharge valve, improper refrigerant charge, dirty condenser coils, failed outdoor fan motor, discharge pressure transducer inaccuracy
	.04	Compressor nn Motor Sensor PTC Out of Range	Compressor Motor Sensor PTC resistance is less than 50 Ω or greater than 17k Ω.	Circuit shut down or not allowed to start-up	Manual	Wiring error, operation outside of limits, compressor failure, improper refrigerant charge
Co	.A1	Loss of Communication with Compressor Board A1	No communication with SPM	Affected compressor is shut down	Automatic	Wrong SPM address, wrong unit configuration, wiring error, power loss to SPM.
	.A2	Loss of Communication with Compressor Board A2				
	.A3	Loss of Communication with Compressor Board A3				
	.A4	Loss of Communication with Compressor Board A4				
	.B1	Loss of Communication with Compressor Board B1				
	.B2	Loss of Communication with Compressor Board B2				
	.B3	Loss of Communication with Compressor Board B3				
	.B4	Loss of Communication with Compressor Board B4				
	.C1	Loss of Communication with Compressor Board C1				
	.C2	Loss of Communication with Compressor Board C2				
	.C3	Loss of Communication with Compressor Board C3				
	.C4	Loss of Communication with Compressor Board C4				
Co	.E1	Loss of Communication with EXV Board Number 1	No communication with EXV1	Circuit A & B shut down or not allowed to start	Automatic	Wrong module address, wrong unit configuration, wiring error, power loss to module
	.E2	Loss of Communication with EXV Board Number 2	No communication with EXV2	Circuit C shut down or not allowed to start		
Co	.F1	Loss of Communication with Fan Board Number 1	No communication with Fan Board 1	Circuit A & B shut down or not allowed to start (060-150, 210-250) Circuit A shut down or not allowed to start (160-190, 275-300)	Automatic	Wrong module address, wrong unit configuration, wiring error, power loss to module
	.F2	Loss of Communication with Fan Board Number 2	No communication with Fan Board 2	Circuit B shut down or not allowed to start (160-190, 275-300)		
	.F3	Loss of Communication with Fan Board Number 3	No communication with Fan Board 3	Circuit C shut down or not allowed to start (210-300)		

LEGEND

EXV — Electronic Expansion Valve
OAT — Outdoor Air Temperature
MOP — Maximum Operating Pressure
PTC — Positive Temperature Coefficient
SPM — Scroll Protection Module
SST — Saturated Suction Temperature

Table 38 — Alarm Codes (cont)

PREFIX CODE	SUFFIX CODE	DESCRIPTION	REASON FOR ALARM	ACTION TAKEN BY CONTROL	RESET TYPE	PROBABLE CAUSE
Co	**.O1**	Loss of Communication with Free Cooling Board	No communication with Free Cooling Board	None	Automatic	Configuration error.
Co	**.O2**	Loss of Communication with Electrical Heaters Board	No communication with Electrical Heaters Board			
Co	**.O3**	Loss of Communication with Energy Management Board	No communication with Energy Management Board	Disable or not allow EMM Functions (3-Step and 4-20 mA Demand Limit, 4-20 mA and Space Temperature Reset, Occupancy Override, and Ice Build)	Automatic	Wrong module address, wrong unit configuration, wiring error, power loss to module
Co	**.O4**	Loss of Communication with Heat Reclaim Board	No communication with Heat Reclaim Board	None	Automatic	Configuration error.
FC	**.n0**	Initial Factory Configuration Required	No configuration	Unit not allowed to start	Automatic	Configuration error.
	.nn	Illegal Configuration	Wrong or incompatible configuration data	Unit not allowed to start	Automatic	Configuration error.
MC	**.nn**	Master Chiller Configuration Error	Wrong or incompatible configuration data	Unit not allowed to start in Master-Slave Control	Automatic	Configuration error.
P	**.01**	Water Exchanger Freeze Protection	Entering or Leaving Thermistor sensed a temperature at or below freeze point.	Unit shut down or not allowed to start. Chilled Water Pump will be started	Automatic, first occurrence in 24 hours, Manual, if multiple alarms within 24 hours	Faulty thermistor, faulty wiring, low water flow rate, low loop volume, or freeze conditions.
P	**.05**	Circuit A Low Suction Temperature	Low Saturated Suction Temperatures sensed for a period of time.	Circuit shut down	Automatic, first occurrence in 24 hours, Manual, if multiple alarms within 24 hours	Faulty transducer, faulty wiring, low water flow rate, low loop volume, fouled cooler, or freeze conditions.
	.06	Circuit B Low Suction Temperature				
	.07	Circuit C Low Suction Temperature				
P	**.08**	Circuit A High Superheat	EXV>98%, Suction Superheat >54 F (30.0 C) and SST<MOP for more than 5 minutes	Circuit shut down	Manual	Faulty transducer, faulty thermistor, faulty wiring, faulty EXV, low refrigerant charge, plugged or restricted liquid line.
	.09	Circuit B High Superheat				
	.10	Circuit C High Superheat				
P	**.11**	Circuit A Low Superheat	EXV ≤5% and Suction Superheat is less than the superheat setting by at least 5 F (2.8 C) or SST>Maximum Operating Pressure for more than 5 minutes	Circuit shut down	Automatic, first occurrence in 24 hours, Manual, if multiple alarms within 24 hours	Faulty transducer, faulty thermistor, faulty wiring, faulty EXV, or incorrect configuration.
	.12	Circuit B Low Superheat				
	.13	Circuit C Low Superheat				
P	**.14**	Cooler Interlock Failure	Cooler Pump Interlock circuit opens	Unit shut down or not allowed to start	Automatic if stage=0, Manual if stage>0.	Low Water Flow, faulty wiring or contacts, faulty water flow switch, or chilled water pump problem.
P	**.15**	Condenser Flow Switch Failure	—	None	Manual	Configuration error.

LEGEND

EXV — Electronic Expansion Valve
OAT — Outdoor Air Temperature
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PTC — Positive Temperature Coefficient
SPM — Scroll Protection Module
SST — Saturated Suction Temperature

Table 38 — Alarm Codes (cont)

PREFIX CODE	SUFFIX CODE	DESCRIPTION	REASON FOR ALARM	ACTION TAKEN BY CONTROL	RESET TYPE	PROBABLE CAUSE
P	.16	Compressor A1 Not Started or Pressure not Established	Compressor differential (Discharge-Suction) did not increase by 10 psig (69 kPa) in 2 minutes	Circuit shut down	Manual	No power to the compressor, faulty compressor contactor, low control voltage, faulty discharge or suction pressure transducers, wiring error, improper electrical phasing.
	.17	Compressor A2 Not Started or Pressure not Established				
	.18	Compressor A3 Not Started or Pressure not Established				
	.19	Compressor A4 Not Started or Pressure not Established				
	.20	Compressor B1 Not Started or Pressure not Established				
	.21	Compressor B2 Not Started or Pressure not Established				
	.22	Compressor B3 Not Started or Pressure not Established				
	.23	Compressor B4 Not Started or Pressure not Established				
	.24	Compressor C1 Not Started or Pressure not Established				
	.25	Compressor C2 Not Started or Pressure not Established				
	.26	Compressor C3 Not Started or Pressure not Established				
	.27	Compressor C4 Not Started or Pressure not Established				
P	.28	Electrical Box Thermostat Failure	Improper phasing detected by the reverse rotation board	Unit not allowed to start	Automatic	Check power phasing, improper wiring, or faulty detection board.
P	.29	Loss of Communication with System Manager	Loss of communication with an external control device for more than 2 minutes	Unit changes to stand alone operation	Automatic	Faulty communication wiring, no power supply to the external controller.
P	.30	Master/Slave Communication Failure	Communication between the master and slave machines has been lost.	Units operate as stand alone machines	Automatic	Faulty communication wiring, no power or control power to the main base board to either module.
P	.31	Unit is in Emergency Stop	Emergency Stop command has been received.	Unit shuts down or not allowed to start.	Automatic	Carrier Comfort Network Emergency Stop Command received.
P	.32	Cooler Pump 1 Fault	Pump Interlock status does not match pump status.	Unit shuts down. If available, another pump will start.	Manual	Faulty contacts, wiring error, or low control voltage.
	.33	Cooler Pump 2 Fault				
P	.34	Circuit A Reclaim Operation Failure	—	None	Manual	Configuration error.
	.35	Circuit B Reclaim Operation Failure				
P	.37	Circuit A Repeated High Discharge Gas Overrides	Multiple capacity overrides due to high saturated discharge temperatures	Circuit shut down	Automatic	Condenser air recirculation, dirty or plugged condenser coils, inaccurate discharge transducer, faulty condenser fan,
	.38	Circuit B Repeated High Discharge Gas Overrides				
	.39	Circuit C Repeated High Discharge Gas Overrides				
P	.40	Circuit A Repeated Low Suction Temperature Override in Heating	Not supported	—	—	—
	.41	Circuit B Repeated Low Suction Temperature Override in Heating				
	.42	Circuit C Repeated Low Suction Temperature Override in Heating				

LEGEND

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Table 38 — Alarm Codes (cont)

PREFIX CODE	SUFFIX CODE	DESCRIPTION	REASON FOR ALARM	ACTION TAKEN BY CONTROL	RESET TYPE	PROBABLE CAUSE
Pr	.01	Circuit A Discharge Transducer	Measured voltage is 0 vdc	Circuit shut down or not allowed to start.	Automatic	Faulty transducer, wiring error, failed Main Base Board or Fan Board 3.
	.02	Circuit B Discharge Transducer				
	.03	Circuit C Discharge Transducer				
	.04	Circuit A Suction Transducer				
	.05	Circuit B Suction Transducer				
	.06	Circuit C Suction Transducer				
Pr	.07	Circuit A Reclaim Pumpdown Pressure Transducer		None		Configuration error.
	.08	Circuit B Reclaim Pumpdown Pressure Transducer				
Sr	nn	Service Maintenance Alert	Field programmed elapsed time has expired for maintenance item	None	Manual	Maintenance required (see Table 41).
th	.01	Water Exchanger Entering Fluid Thermistor Failure	Temperature measured by the controller is less than -40 F (-40 C) or greater than 240 F (115.6 C)	Unit will be shut down or not allowed to start.	Automatic	Faulty thermistor, wiring error, failed Main Base Board.
	.02	Water Exchanger Entering Fluid Thermistor Failure				
th	.03	Circuit A Defrost Thermistor Failure		None		Configuration error.
	.04	Circuit B Defrost Thermistor Failure				
	.08	Reclaim Condenser Entering Thermistor				
	.09	Reclaim Condenser Leaving Thermistor				
th	.10	OAT Thermistor Failure		Unit is shut down or not allowed to start. Cooler/ Pump heaters are energized		Faulty thermistor, wiring error, failed Main Base Board.
th	.11	Master/Slave Common Fluid Thermistor		Dual Chiller deactivated. Master and Slave machines operate in stand alone mode		
th	.12	Circuit A Suction Gas Thermistor	Temperature measured by the controller is less than -40 F (-40 C) or greater than 240 F (115.6 C)	Circuit shut down	Automatic	Faulty thermistor, wiring error, failed Main Base Board or EXV Board
	.13	Circuit B Suction Gas Thermistor		Circuit shut down		
	.14	Circuit C Suction Gas Thermistor		Circuit shut down		
th	.17	Circuit A Condenser Subcooling Liquid Thermistor		None		Configuration error.
	.18	Circuit B Condenser Subcooling Liquid Thermistor				
th	.21	Space Temperature Sensor Failure		Temperature Reset based on Space Temperature disabled		Faulty thermistor, wiring error, failed Main Base Board.

LEGEND

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OAT — Outdoor Air Temperature
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SPM — Scroll Protection Module
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DIAGNOSTIC ALARM CODES AND POSSIBLE CAUSES

Motor Temperature Too High

A1.01 — Compressor A1
A2.01 — Compressor A2
A3.01 — Compressor A3
A4.01 — Compressor A4
B1.01 — Compressor B1
B2.01 — Compressor B2
B3.01 — Compressor B3
B4.01 — Compressor B4
C1.01 — Compressor C1
C2.01 — Compressor C2
C3.01 — Compressor C3
C4.01 — Compressor C4

Criteria for Trip — The alarm criterion is checked whether the compressor is ON or OFF. This alarm will be generated if the Scroll Protection Module (SPM) detects a compressor motor PTC resistance greater than 4.5 kΩ, indicating that the motor temperature is too high.

Action to be Taken — The circuit shuts down immediately or is not allowed to start.

Reset Method — Manual

Possible Causes — If this condition is encountered, check the following items:
- Check for a PTC Thermistor Failure.
- Check for a compressor motor failure.
- Check for a wiring error.
- Check wiring terminations for corrosion.
- Check for operation outside of the limits.
- Check for condenser air recirculation.
- Check the circuit for proper charge.
- Check the EXV for proper operation.
- Check the EXV input devices, pressure transducer and temperature for accuracy.
- Check the liquid line filter drier for a restriction.

Crankcase Heater Failure

A1.02 — Compressor A1
A2.02 — Compressor A2
A3.02 — Compressor A3
A4.02 — Compressor A4
B1.02 — Compressor B1
B2.02 — Compressor B2
B3.02 — Compressor B3
B4.02 — Compressor B4
C1.02 — Compressor C1
C2.02 — Compressor C2
C3.02 — Compressor C3
C4.02 — Compressor C4

Criteria for Trip — The alarm criteria are checked whether the compressor is ON or OFF. The Scroll Protection Module (SPM) monitors crankcase heater current draw. This family of alarms is generated if one of the following criteria is detected:

1. The SPM fails to detect a crankcase current draw of at least 0.5 amps while the crankcase heater is ON.
2. The SPM detects a crankcase current draw of at least 0.5 amps while the crankcase heater is OFF. The current is sensed internally on the SPM.

Action to be Taken — If a fault is detected, the affected compressor will be shut down or not allowed to start.

Reset Method — Manual

Possible Causes — If this condition is encountered, check the following items:
- Check the wiring to the crankcase heater.
- Check the crankcase heater for operation.
- Check the SPM crankcase heater output operation.
- Confirm unit configuration.

High Pressure Switch

A1.03 — Compressor A1
A2.03 — Compressor A2
A3.03 — Compressor A3
A4.03 — Compressor A4
B1.03 — Compressor B1
B2.03 — Compressor B2
B3.03 — Compressor B3
B4.03 — Compressor B4
C1.03 — Compressor C1
C2.03 — Compressor C2
C3.03 — Compressor C3
C4.03 — Compressor C4

Criteria for Trip — The alarm criterion is checked whether the circuit is ON or OFF. This alarm will be generated if the circuit high pressure switch (HPS) opens. The Scroll Protection Module (SPM) monitors the HPS. The 30RB units employ one HPS for each circuit. The HPS signal is connected to all of the SPM modules of the circuit.

Action to be Taken — The circuit shuts down immediately or is not allowed to start.

Reset Method — Manual

Possible Causes — If this condition is encountered, check the following items:
- Check the wiring of the High Pressure switch circuit. Be sure the HPS is connected to all of the SPM boards in the circuit.
- Check the Maximum Condensing Temperature (MCT) for the proper setting.
- Check for noncondensables in the refrigerant circuit.
- Check for condenser air re-circulation.
- Check for the proper refrigerant charge (overcharged).
- Check for operation beyond the limit of the machine.
- Check the condenser coils for debris or restriction.
- Check the condenser fans and motors for proper rotation and operation.
- Check the discharge service valve to be sure that it is open. A closed or restricted valve is a potential high pressure trip.
- Check the discharge pressure transducer for accuracy.
- Confirm unit configuration.

Motor Sensor PTC Out of Range

A1.04 — Compressor A1
A2.04 — Compressor A2
A3.04 — Compressor A3
A4.04 — Compressor A4
B1.04 — Compressor B1
B2.04 — Compressor B2
B3.04 — Compressor B3
B4.04 — Compressor B4
C1.04 — Compressor C1
C2.04 — Compressor C2
C3.04 — Compressor C3
C4.04 — Compressor C4

Criteria for Trip — The alarm criterion is checked whether the circuit is ON or OFF. The Scroll Protection Module (SPM) monitors the compressor motor temperature. This alarm will be generated if the Motor Sensor PTC in the compressor resistance is less than 50Ω or greater than 17kΩ.

Action to be Taken — The circuit shuts down immediately or not allowed to start.

Reset Method — Manual

Possible Causes — If this condition is encountered, check the following items:
- Check the sensor wiring to the Scroll Compressor Protection Module (SPM).
- Check for a faulty SPM.
- Check for a compressor failure.
- Check for noncondensables in the refrigerant circuit.
- Check for condenser air re-circulation.

- Check for the proper refrigerant charge (overcharged).
- Check for operation beyond the limit of the machine.
- Check the condenser coils for debris or restriction.
- Check the condenser fans and motors for proper rotation and operation.
- Check the discharge service valve to be sure that it is open.
- Check the discharge pressure transducer for accuracy.
- Confirm unit configuration.

Loss of Communication with Compressor

Co.A1 — Board A1
Co.A2 — Board A2
Co.A3 — Board A3
Co.A4 — Board A4
Co.B1 — Board B1
Co.B2 — Board B2
Co.B3 — Board B3
Co.B4 — Board B4
Co.C1 — Board C1
Co.C2 — Board C2
Co.C3 — Board C3
Co.C4 — Board C4

Criteria for Trip — The alarm criterion is tested whether the unit is ON or OFF. If communication with the Scroll Protection Module (SPM) is lost for a period of 10 seconds, the alarm will be generated.

Action to be Taken — The affected compressor will be shut down.

Reset Method — Automatic, if communication is established, the compressor, if called for will start normally.

Possible Causes — If this condition is encountered, check the following items:
- Check the power supply to the affected SPM.
- Check the address of the SPM to be sure that it is correct.
- Check the Local Equipment Network (LEN) wiring to be sure that it is connected properly.
- Confirm unit configuration.

Co.E1— Loss of Communication with EXV Board Number 1

Criteria for Trip — The alarm criterion is tested whether the unit is ON or OFF. If communication with EXV1 is lost for a period of 10 seconds, the alarm will be triggered.

Action to be Taken — If running, Circuit A and B will shut down normally. If Circuit A or Circuit B is not operating, it will not be allowed to start.

Reset Method — Automatic, if communication is established, the unit will start normally.

Possible Causes — If this condition is encountered, check the following items:
- Check the power supply to EXV1.
- Check the address of the EXV1 to be sure that it is correct.
- Check the Local Equipment Network (LEN) wiring to be sure that it is connected properly.
- Confirm unit configuration.

Co.E2 — Loss of Communication with EXV Board Number 2

Criteria for Trip — The alarm criterion is tested whether the unit is ON or OFF, on 30RB210-300 units only.

Action to be Taken — If communication with EXV Board 2 is lost for a period of 10 seconds, the alarm will be triggered. If running, Circuit C will shut down normally. If Circuit C is not running, it will not be allowed to start.

Reset Method — Automatic, if communication is established, the unit will start normally.

Possible Causes — If this condition is encountered, check the following items:
- Check the power supply to EXV Board 2.
- Check the address of the EXV Board 2 to be sure that it is correct.
- Check the Local Equipment Network (LEN) wiring to be sure that it is connected properly.
- Confirm unit configuration.

Co.F1 — Loss of Communication with Fan Board Number 1

Criteria for Trip — The criterion is tested whether the unit is ON or OFF. If communication with Fan Board 1 is lost for a period of 10 seconds, the alarm will be triggered.

Action to be Taken — For 30RB060-150 and 30RB210-250, Circuit A and B will shut down normally if they are running. For 30RB160-190 and 30RB275-300, Circuit A will shut down normally if it is running. If the circuit or circuits controlled by the board are not running, then they will not be allowed to start.

Reset Method — Automatic, if communication is established, the unit will start normally.

Possible Causes — If this condition is encountered, check the following items:
- Check the power supply to Fan Board 1.
- Check the address of the Fan Board 1 to be sure that it is correct.
- Check the Local Equipment Network (LEN) wiring to be sure that it is connected properly.
- Confirm unit configuration.

Co.F2 — Loss of Communication with Fan Board Number 2

Criteria for Trip — The criterion is tested whether the unit is ON or OFF and on 30RB160-190, 275, and 300 only.

Action to be Taken — If communication with Fan Board 2 is lost for a period of 10 seconds, the alarm will be triggered. If running, Circuit B will shut down normally for 30RB160-190, 275 and 300. If Circuit B is not running for 30RB160-190, 275 and 300, then it will not be allowed to start.

Reset Method — Automatic, if communication is established, the unit will start normally.

Possible Causes — If this condition is encountered, check the following items:
- Check the power supply to Fan Board 2.
- Check the address of the Fan Board 2 to be sure that it is correct.
- Check the Local Equipment Network (LEN) wiring to be sure that it is connected properly.
- Confirm unit configuration.

Co.F3 — Loss of Communication with Fan Board Number 3

Criteria for Trip — The criterion is tested whether the unit is ON or OFF, and on 30RB210-300 machines only. If communication with Fan Board 3 is lost for a period of 10 seconds, the alarm will be triggered.

Action to be Taken — If running, Circuit C will shut down normally for 30RB210-300. If the circuit is not running for 30RB210-300, then it will not be allowed to start.

Reset Method — Automatic, if communication is established, the unit will start normally.

Possible Causes — If this condition is encountered, check the following items:
- Check the power supply to Fan Board 3.
- Check the address of the Fan Board 3 to be sure that it is correct.
- Check the Local Equipment Network (LEN) wiring to be sure that it is connected properly.
- Confirm unit configuration.

Co.O1 — Loss of Communication with Free Cooling Board

Criteria for Trip — This alarm is for a free cooling machine only. This feature is not supported for a cooling only machine.

Action to be Taken — None

Reset Method — Automatic

Possible Causes — If this condition is encountered, confirm unit configuration.

Co.O2 — Loss of Communication with Electrical Heaters Board

Criteria for Trip — This alarm is for a heat pump machines only. This feature is not supported for a cooling only machine.

Action to be Taken — None

Reset Method — Automatic

Possible Causes — If this condition is encountered, confirm unit configuration.

Co.O3 — Loss of Communication with Energy Management Board

Criteria for Trip — The criterion is tested whether the unit is ON or OFF and when a function that requires the Energy Management Module (EMM) is configured. If communication with the EMM is lost for a period of 10 seconds, the alarm will be triggered.

Action to be Taken — If any function controlled by the EMM (3-Step and 4-20 mA Demand Limit, 4-20 mA and Space Temperature Reset, Occupancy Override, and Ice Build) is active, that function will be terminated. If an EMM function is programmed, and communication is lost, the function will not be allowed to start.

Reset Method — Automatic, if communication is established, the functions will be enabled.

Possible Causes — If this condition is encountered, check the following items:

- Check configuration to see if the EMM is installed, (***Configuration→UNIT→EMM***). If (***EMM=YES***), check for a control option that requires the EMM that may be enabled. Correct configuration if not correct.
- Check the power supply to EMM.
- Check the address of the EMM to be sure that it is correct.
- Check the Local Equipment Network (LEN) wiring to be sure that it is connected properly.
- Check unit configuration to be sure that no options that require the EMM are enabled.

Co.O4 — Loss of Communication with Heat Reclaim Board

Criteria for Trip — This alarm is for a heat reclaim machine. This feature is not supported for a cooling only machine.

Action to be Taken — None

Reset Method — Automatic

Possible Causes — If this condition is encountered, confirm the unit configuration.

FC.n0 — Initial Factory Configuration Required

Criteria for Trip — The criterion is tested whether the unit is ON or OFF. The alarm will be generated if the ***Configuration →UNIT→TONS*=0**.

Action to be Taken — The unit is not allowed to start.

Reset Method — Automatic after factory configuration is complete. The configuration must be manually completed.

Possible Causes — If this condition is encountered, confirm the unit configuration.

FC.nn — Illegal Configuration

Criteria for Trip — The criterion is tested whether the unit is ON or OFF. The alarm will be generated if the one of the following configuration errors is detected by the control. The "nn" refers to the error code listed in Table 39.

Table 39 — Illegal Configuration Alarm Code

FC ERROR CODE	DESCRIPTION
01	Unit size is unknown.
02	Reclaim option selected for Heat Pump machine.
03	Hot Gas Bypass configured for a Heat Pump machine.
04	Number of Fans controlled by Motormaster is greater than expected.

Action to be Taken — The unit is not allowed to start.

Reset Method — Automatic after factory reconfiguration is completed.

Possible Causes — If this condition is encountered, confirm the unit configuration.

MC.nn — Master Chiller Configuration Error

Criteria for Trip — The criterion is tested whether the unit is ON or OFF. The units must be configured as a Master and Slave machine (***Configuration→RSET→MSSL*=1** and ***Configuration→RSET→MSSL*=2**), and one of the following configuration errors has been found. The "nn" refers to the error code listed in Table 40.

Table 40 — Master/Slave Alarm Code

MC ERROR CODE	MASTER	SLAVE	DESCRIPTION
01	X	X	The master or slave water pump is not configured while the control of the lag unit pump is required (***lag_pump = 1***)
02	X		Master and slave units have the same network address.
03	X		There is no slave configured at the slave address
04	X		Slave ***pump_seq*** incorrect configuration
05	X		There is a conflict between the master and the slave LWT option: the master is configured for EWT control while the slave is configured for LWT control.
06	X		There is a conflict between the master and the slave LWT option: the master is configured for LWT control while the slave is configured for EWT control.
07	X		There is a conflict between the master and the slave pump option: the master is configured for lag pump control while the slave is not configured for lag pump control.
08	X		There is a conflict between the master and the slave pump option: the master is not configured for lag pump control while the slave is configured for lag pump control.
09	X	X	The slave chiller is in local or remote control (***chilstat = 3***)
10	X	X	The slave chiller is down due to fault (***chilstat = 5***)
11	X		The master chiller operating type is not Master: ***master_oper_typ***
12	X	X	No communication with slave.
13	X		Master and slave heatcool status are not the same.

LEGEND

EWT — Entering Water Temperature
LWT — Leaving Water Temperature

Action to be Taken — Unit not allowed to start in Master Slave control.

Reset Method — Automatic

Possible Causes — If this condition is encountered, confirm proper configuration.

P.01 — Water Exchanger Freeze Protection

Criteria for Trip — The alarm criteria are checked whether the unit is ON or OFF. If the entering or leaving water thermistor senses a temperature at the freeze point or less, the alarm will be generated. For a fresh water system (***Configuration →SERV→FLUD*=1**), the freeze point is 34 F (1.1 C). For medium temperature brine systems (***Configuration →SERV→FLUD*=2**), the freeze point is Brine Freeze Set Point (***Configuration→SERV→LOSP***).

Action to be Taken — Unit shut down or not allowed to start. Chilled water pump will be started.

Reset Method — Automatic, first occurrence in 24 hours if LWT rises to 6° F (3° C) above set point. Manual, if more than one occurrence in 24 hours.

Possible Causes — If this condition is encountered, check the following items:

- Check the entering and leaving fluid thermistors for accuracy.
- Check the water flow rate.
- Check loop volume. Low loop volume at nominal flow rates can in extreme cases bypass cold water to the cooler.
- Check for freezing conditions.
- Check heater tape and other freeze protection items for proper operation.
- Check glycol concentration and adjust ***LOSP*** accordingly.
- 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 (***Configuration →SERV→FLUD*=2**) to utilize the brine freeze point instead of 34 F (1.1 C).

Low Suction Temperature

P.05 — Circuit A
P.06 — Circuit B
P.07 — Circuit C

Criteria for Trip — The criteria are tested whether the circuit is ON. This alarm is generated if one of the following criteria is met:

- If the circuit Saturated Suction Temperature is below –13 F (–25 C) for more than 30 seconds.
- If the circuit Saturated Suction Temperature is below –22 F (–30 C) for more than 8 seconds.
- If the circuit Saturated Suction Temperature is below –40 F (–40 C) for more than 3 seconds.

Action to be Taken — The circuit is shut down immediately.

Prior to the alarm trip, the control will take action to avoid the alarm. See Operating Modes 21, 22 and 23 on page 48.

Reset Method — Automatic, first occurrence in 24 hours. Manual, if more than one occurrence in 24 hours.

Possible Causes — If this condition is encountered, check the following items:

- Check the sensor wiring to Main Base Board (P.05 and P.06) or Fan Board 3 (P.07).
- Check the board for a faulty channel.
- Check for a faulty transducer.
- Check cooler water flow.
- Check loop volume.
- Check EXV operation.
- Check for a liquid line refrigerant restriction, filter drier, service valve, etc.
- Check the 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 (***Configuration→ SERV→FLUD=2***) to utilize the brine freeze point instead of 34 F (1.1 C).

High Superheat

P.08 — Circuit A
P.09 — Circuit B
P.10 — Circuit C

Criteria for Trip — The criteria are tested whether the circuit is ON. This alarm is generated if all of the following criteria are met:

1. The EXV position is equal to or greater than 98%.
2. The circuit's Suction Superheat (Suction Gas Temperature – Saturated Suction Temperature) is greater than 54 F (30.0 C).
3. The circuit's Saturated Suction Temperature is less than Maximum Operating Pressure (MOP) set point (***Configuration→SERV→MOP***) for more than 5 minutes.

Action to be Taken — The circuit is shut down normally.

Reset Method — Manual.

Possible Causes — If this condition is encountered, check the following items:

- Check the suction pressure transducer wiring to Main Base Board (P.08 and P.09) or Fan Board 3 (P.10).
- Check the board for a faulty channel.
- Check for a faulty transducer.
- Check the suction gas thermistor wiring to EXV Board 1 (P.08 and P.09) or to EXV Board 2 (P.10)
- Check the suction gas thermistor sensor for accuracy.
- Check for EXV Board 1 (P.08 and P.09) or EXV Board 2 (P.10) faulty channel.
- Check EXV operation.
- Check for a liquid line refrigerant restriction, filter drier, service valve, etc.
- Check the refrigerant charge.

Low Superheat

P.11 — Circuit A
P.12 — Circuit B
P.13 — Circuit C

Criteria for Trip — The criteria are tested whether the circuit is ON. This alarm is generated if the following criterion is met:

The EXV position is equal to or less than 5% and the circuit's Suction Superheat (Suction Gas Temperature – Saturated Suction Temperature) is less than the Suction Superheat Set Point (***Configuration→SERV/SHP.A***, ***Configuration→ SERV→SHP.B***, or ***Configuration →SERV→SHP.C***) by at least 5° F (2.8° C) or the circuit Saturated Suction Temperature is greater than Maximum Operating Pressure (MOP) set point (***Configuration→SERV→MOP***) for more than 5 minutes.

Action to be Taken — The circuit is shut down normally.

Reset Method — Automatic, first occurrence in 24 hours. Manual, if more than one occurrence in 24 hours.

Possible Causes — If this condition is encountered, check the following items:

- Check the suction pressure transducer wiring to Main Base Board (P.11 and P.12) or Fan Board 3 (P.13).
- Check the board for a faulty channel.
- Check for a faulty transducer.
- Check the suction gas thermistor wiring to EXV Board 1 (P.08 and P.09) or to EXV Board 2 (P.10)
- Check the suction gas thermistor sensor for accuracy.
- Check for EXV Board 1 (P.11 and P.12) or EXV Board 2 (P.13) faulty channel.
- Check EXV operation.
- Confirm Maximum Operating Pressure Set Point.
- Check the refrigerant charge.

P.14 — Cooler Interlock Failure

Criteria for Trip — The criteria are tested whether the unit is ON or OFF. This algorithm monitors the cooler flow switch circuit, which may include field-installed cooler pump interlock contacts. This alarm is generated if one of the following criteria is met:

1. The interlock circuit fails to close within the OFF to ON delay (***Configuration→OPTN→DELAY***).
2. If the unit is the lag chiller under Master/Slave Control and the cooler interlock circuit fails to close within 1 minute after its pump is commanded ON.
3. The cooler interlock circuit opens while the machine is ON.
4. If the Remote Interlock Switch is CLOSED while the machine is ON.
5. The remote customer interlock is CLOSED during normal operation.
6. If the machine is configured for Cooler Pump Control and the cooler interlock circuit does not open within 2 minutes.
7. The interlock circuit fails to close within the OFF to ON delay when the cooler pump has been commanded ON for freeze protection.

Action to be Taken — The unit is shut down immediately, or not allowed to start.

Reset Method — Automatic, if the alarm occurs while the machine is at Stage 0 (no compressors ON). Manual reset if machine was at Stage 1 or greater.

Possible Causes — If this condition is encountered, check the following items:

- Check the chilled water flow switch operation.
- Check for water flow. Be sure all water isolation valves are open. Check the water strainer for a restriction.
- Check the interlock wiring circuit.
- Check for a power supply to the pump.
- Check for a control signal to the pump controller.
- Check the chilled water pump operation.
- Check the cooler pump contactor for proper operation.

P.15 — Condenser Flow Switch Failure

Criteria for Trip — This alarm is for a heat reclaim machine only. This feature is not supported for a cooling only machine.

Action to be Taken — None.

Reset Method — Manual.

Possible Causes — If this condition is encountered, check unit configuration.

Compressor Not Started or Pressure not Established

P.16 — A1
P.17 — A2
P.18 — A3
P.19 — A4
P.20 — B1
P.21 — B2
P.22 — B3
P.23 — B4
P.24 — C1
P.25 — C2
P.26 — C3
P.27 — C4

Criteria for Trip — The criteria are tested whether the unit is ON or in Service Test. This algorithm monitors the pressure differential across the compressor to prove proper rotation of the compressor.

During normal operation with the start of a compressor, the discharge pressure for the circuit or the compressor differential (Discharge Pressure – Suction Pressure) must increase 10 psig (69 kPa) after 2 minutes. If this criterion is not met, the alarm is generated.

Action to be Taken — The circuit is shut down immediately.

Reset Method — Manual

Possible Causes — If this condition is encountered, check the following items:

- Check for power to the compressor.
- Check control voltage to the compressor contactor. On 208-volt systems, be sure the proper tap on TRAN1 is utilized.
- Check for proper electrical phasing of the unit power supply.
- Check the compressor contactor operation.
- Check the discharge and suction pressure transducers for accuracy.
- Check the wiring and location of the discharge and suction pressure transducers.

P.28 — Electrical Box Thermostat Failure/Reverse Rotation

Criteria for Trip — The criterion is tested whether the unit is ON. This alarm is generated if the signal is open.

Action to be Taken — The unit is not allowed to start.

Reset Method — Automatic, once the phasing is corrected.

Possible Causes — If this condition is encountered, check the following items:

- Check the power wiring for proper phasing.
- Check the sensor wiring to Reverse Rotation Protection Board.

P.29 — Loss of Communication with System Manager

Criteria for Trip — The criterion is tested whether the unit is ON or OFF. This alarm is generated if the System Manager had established communications with the machine and is lost for more than 2 minutes.

Action to be Taken — The action to be taken by the control depends on the configuration. If Auto Start when SM lost is enabled, (***Configuration→SERV→AU.SM*=YES**), then the unit will force the CCN Chiller Start Stop (***Run Status →VIEW→CH.S.S***) to **ENBL** and clear all forced points from the System Manager. The unit will revert to stand-alone operation.

Reset Method — Automatic, once communication is re-established.

Possible Causes — If this condition is encountered, check the following items:

- Check communication wiring.
- Check the power supply to the System Manager and unit controls.

P.30 — Master/Slave Communication Failure

Criteria for Trip — The criterion is tested whether the units are ON or OFF and a Master and Slave machine has been configured, (***Configuration→RSET→MSSL*=1** and ***Configuration →RSET→MSSL*=2**). If communication is lost for more than 3 minutes, this alarm is generated.

Action to be Taken — Dual chiller control will be disabled and each unit will operate in Stand-Alone mode.

Reset Method — Automatic, once communication is re-established.

Possible Causes — If this condition is encountered, check the following items:

- Check the CCN wiring.
- Check for control power to each Main Base Board, Master and Slave.
- Confirm correct configuration.

P.31 — Unit is in Emergency Stop

Criteria for Trip — The criterion is tested whether the units are ON or OFF and the machine receives a Carrier Comfort Network (CCN) command for an Emergency Stop.

Action to be Taken — Unit will stop, or not allowed to start.

Reset Method — Automatic, once a return to normal command is received.

Possible Causes — If this condition is encountered, check for CCN Emergency Stop command.

Cooler Pump Fault

P.32 — Pump 1 Fault
P.33 — Pump 2 Fault

Criteria for Trip — The criterion is tested whether the units are ON or OFF. This alarm will be generated if the cooler pump interlock opens. When starting the pump, the control must read an open circuit for 3 consecutive reads. If the pump is operating and the circuit opens, the alarm will be generated immediately.

Action to be Taken — The pump and machine will be shut down. If there is another pump available, the control will start that pump, restart the machine and clear the alarm. If no other pump is available, the unit will remain OFF.

Reset Method — Manual.

Possible Causes — If this condition is encountered, check the following items:

- Check the interlock wiring circuit.
- Check for a control signal to the pump controller.
- Check the cooler pump contactor for proper operation.
- Check control voltage for proper voltage. On 208-volt systems, be sure the proper tap on TRAN1 is utilized.

Reclaim Operation Failure

P.34 — Circuit A
P.35 — Circuit B

Criteria for Trip — This alarm is for a heat reclaim machine only. This feature is not supported for a cooling only machine.

Action to be Taken — None.

Reset Method — Manual.

Possible Causes — If this condition is encountered, check unit configuration.

Repeated High Discharge Gas Overrides

P.37 — Circuit A
P.38 — Circuit B
P.39 — Circuit C

Criteria for Trip — The criterion is tested whether the circuit is ON. This alarm will be tripped if the circuit capacity is reduced more than 8 times in 30 minutes due to high discharge gas temperatures. If no override occurs in a 30-minute period, the counter is reset.

Action to be Taken — The affected circuit will be shut down.

Reset Method — Automatic, after 30 minutes. If the alarm is cleared via the Manual method, the counter will be reset to zero.

Possible Causes — If this condition is encountered, check the following items:

- Check the Maximum Condensing Temperature (MCT) for the proper setting.
- Check for noncondensables in the refrigerant circuit.
- Check for condenser air re-circulation.
- Check for the proper refrigerant charge (overcharged).
- Check for operation beyond the limit of the machine.
- Check the condenser coils for debris or restriction.
- Check the condenser fans and motors for proper rotation and operation.
- Check the discharge service valve to be sure that it is open. check the discharge pressure transducer for accuracy.
- Confirm unit configuration.

Discharge Transducer

Pr.01 — Circuit A
Pr.02 — Circuit B
Pr.03 — Circuit C

Criteria for Trip — The criterion is tested whether the circuit is ON or OFF. This alarm is generated if the voltage as sensed by the MBB or FB3 is 0 vdc.

Action to be Taken — The circuit is shut down normally, or not allowed to start.

Reset Method — Automatic, once the transducer voltage is greater than 0 vdc.

Possible Causes — If this condition is encountered, check the following items:

- Check the sensor wiring to Main Base Board (Pr.01 and Pr.02).
- Check the sensor wiring to Fan Board 3 (Pr.03).
- Check the board for a faulty channel.
- Check for a faulty transducer.
- Confirm unit configuration.

Suction Transducer

Pr.04 — Circuit A
Pr.05 — Circuit B
Pr.06 — Circuit C

Criteria for Trip — The criteria are tested whether the circuit is ON or OFF. The alarm is generated if one of the following criteria is met:

1. This alarm is generated if the voltage as sensed by the MBB or FB3 is 0 vdc.
2. The circuit is ON in cooling mode and the Saturated Suction Temperature for the circuit is greater than the Leaving Water Temperature for more than 30 seconds.

Action to be Taken — The circuit is shut down immediately, or not allowed to start.

Reset Method

1. Automatic, once the transducer voltage is greater than 0 vdc.
2. Automatic once the circuit's saturated suction temperature is lower than the Leaving Water Temperature by 3° F (1.6° C). If this criterion trips the alarm 3 times within a 24-hour period, the alarm changes to a manual reset.

Possible Causes — If this condition is encountered, check the following items:

- Check the sensor wiring to Main Base Board (Pr.04 and Pr.05).
- Check the sensor wiring to Fan Board 3 (Pr.06).
- Check the board for a faulty channel.
- Check for a faulty transducer.
- Check for a faulty leaving water temperature sensor.
- Confirm unit configuration.

Reclaim Pumpdown Pressure Transducer

Pr.07 — Circuit A
Pr.08 — Circuit B

Criteria for Trip — This alarm is for a heat reclaim machine only. This feature is not supported for a cooling only machine.

Action to be Taken — None.

Reset Method — Automatic

Possible Causes — If this condition is encountered, confirm the machine's configuration.

Sr.nn — Service Maintenance Alert

Criteria for Trip — This alert is tested whether the unit is ON or OFF and the Servicing Alert decisions listed under ***Time Clock→MCFG*** have been enabled. The alarm will be generated if the one of the following configuration errors is detected by the control. The "nn" refers to the error code listed in Table 41.

Table 41 — Service Maintenance Alert Codes

CODE	DESCRIPTION
01	Circuit A Loss of Refrigerant Charge
02	Circuit B Loss of Refrigerant Charge
03	Circuit C Loss of Refrigerant Charge
04	Water Loop Size Warning
05	Air Exchanger Cleanliness Warning
06	Pump 1 Servicing Required
07	Pump 2 Servicing Required
08	Reclaim Pump Servicing Required
09	Water Filter Servicing Required

Action to be Taken — None.

Reset Method — Manual, after the service has been completed and ***Time Clock→MCFG→RS.SV*** is reset for the alert.

Possible Causes — If this condition is encountered, confirm the machine's configuration.

Water Exchanger Fluid Thermistor Failure

th.01 — Entering
th.02 — Leaving

Criteria for Trip — If the temperature as measured by the thermistor is outside of the range –40 F (–40 C) to 240 F (115.6 C).

Action to be Taken — The unit shuts down normally, or is not allowed to start.

Reset Method — Automatic, the alarm will reset once the thermistor reading is within the expected range.

Possible Causes — If this condition is encountered, check the following items:
- Check the sensor wiring to the Main Base Board.
- Check the sensor for accuracy.

For thermistor descriptions, identifiers and connections, see Thermistors on page 70.

Defrost Thermistor Failure

th.03 — Circuit A
th.04 — Circuit B

Criteria for Trip — This alarm is for a heat pump machine only. This feature is not supported for a cooling only machine.

Action to be Taken — None

Reset Method — Automatic

Possible Causes — If this condition is encountered, confirm the machine's configuration.

Condenser Reclaim Thermistor

th.08 — Entering
th.09 — Leaving

Criteria for Trip — This alarm is for a heat reclaim machine only. This feature is not supported for a cooling only machine.

Action to be Taken — None

Reset Method — Automatic

Possible Causes — If this condition is encountered, confirm the machine's configuration.

th.10 — OAT Thermistor Failure

Criteria for Trip — If the outdoor air temperature as measured by the thermistor is outside of the range –40 F (–40 C) to 240 F (115.6 C).

Action to be Taken — Unit shuts down under normal conditions or is not allowed to start. Temperature Reset based on outdoor air temperature will be disabled.

The OAT sensor controls the cooler heaters. If this sensor fails, the cooler heaters will be energized when the machine stages to 0.

Reset Method — Automatic, the alarm will reset once the thermistor reading is within the expected range and Temperature Reset based on outdoor-air temperature will be enabled.

Possible Causes — If this condition is encountered, check the following items:
- Check the sensor wiring to the Main Base Board.
- Check for a faulty thermistor.

For thermistor descriptions, identifiers and connections, see Thermistors on page 70.

th.11 — Master/Slave Common Fluid Thermistor

Criteria for Trip — This alarm criterion is checked whether the unit is ON or OFF and has been configured for Dual Chiller Control. The alarm will be triggered if the Dual Chiller Common Fluid temperature as measured by the thermistor is outside of the range –40 F (–40 C) to 240 F (115.6 C).

Action to be Taken — Dual Chiller Control disabled. Units operate as a Stand-Alone machine.

Reset Method — Automatic, once the thermistor reading is within the expected range. The Dual Chiller algorithm will resume once the alarm is cleared.

Possible Causes — If this condition is encountered, check the following items:
- Check the sensor wiring to the Main Base Board.
- Check for a faulty thermistor.

For thermistor descriptions, identifiers and connections, see Thermistors on page 70.

Suction Gas Thermistor

th.12 — Circuit A
th.13 — Circuit B
th.14 — Circuit C

Criteria for Trip — This alarm criterion is checked whether the unit is ON or OFF. If the suction gas temperature as measured by the thermistor is outside of the range –40 F (–40 C) to 240 F (115.6 C), the alarm will be triggered.

Action to be Taken — The affected circuit shuts down normally.

Reset Method — Automatic, once the thermistor reading is within the expected range. The affected circuit will restart once the alarm has cleared.

Possible Causes — If this condition is encountered, check the following items:
- Check the sensor wiring to the EXV Board.
- Check the board for a faulty channel.
- Check for a faulty thermistor.

For thermistor descriptions, identifiers and connections, see Thermistors on page 70.

Condenser Subcooling Liquid Thermistor

th.17 — Circuit A
th.18 — Circuit B

Criteria for Trip — This alarm is for a heat reclaim machine only. This feature is not supported for a cooling only machine.

Action to be Taken — None

Reset Method — Automatic

Possible Causes — If this condition is encountered, confirm the machine's configuration.

th.21 — Space Temperature Sensor Failure

Criteria for Trip — This alarm criterion is checked whether the unit is ON or OFF and if Space Temperature Reset has been enabled. If the outdoor air temperature as measured by the thermistor is outside of the range –40 F (–40 C) to 240 F (115.6 C)

Action to be Taken — Unit operates under normal control. Temperature Reset based on Space Temperature is disabled.

Reset Method — Automatic, once the thermistor reading is within the expected range. The Space Temperature Reset will resume once the alarm has cleared.

Possible Causes — If this condition is encountered, check the following items:

- Check the sensor wiring to the Energy Management Module.
- Check the board for a faulty channel.
- Check for a faulty thermistor.

For thermistor descriptions, identifiers and connections, see Thermistors below.

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

Thermistors (Tables 42-43B) — Thermistors that are monitoring the chiller's operation include: Cooler Entering Water, Cooler Leaving Water, Dual Chiller Leaving Water, Compressor Suction Gas Temperature, and Outside Air Thermistors. These thermistors are 5 kΩ at 77 F (25 C) and are identical in temperature versus resistance. The Space Temperature Thermistor is 10 kΩ at 77 F (25 C) and has a different temperature vs. resistance.

COOLER LEAVING FLUID SENSOR — On all sizes, this thermistor is installed in a friction fit well in the leaving water nozzle of the cooler. See Fig. 31 and 32.

COOLER ENTERING FLUID SENSOR — On all sizes, this thermistor is factory-installed in a friction fit well in the entering water nozzle of the cooler.

DUAL CHILLER LWT — On duplex chillers, 30RB315-390, a factory-supplied, field-installed friction fit well and thermistor are installed in the common supply water header of the two modules.

COMPRESSOR RETURN GAS TEMPERATURE — This thermistor is factory-installed in a friction fit well located in the common suction line for the circuit. There is one thermistor for each circuit.

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. 33. The space temperature sensor includes a terminal block (SEN) and a RJ11 female connector. The RJ11 connector is used access into the Carrier Comfort Network (CCN) at the sensor. See Fig. 31 and 32.

To connect the space temperature sensor (see Fig. 33):

1. Using a 20 AWG 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.

IMPORTANT: The cable selected for the RJ11 connector wiring MUST be identical to the CCN communication bus wire used for the entire network. Refer to Table 11 for acceptable wiring.

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.

Table 42 — Thermistor Identification

THERMISTOR ID	DESCRIPTION	RESISTANCE AT 77 F (25 C)	CONNECTION POINT
EWT	Entering Water Thermistor	5k Ω	MBB-J6-CH2
LWT	Leaving Water Thermistor	5k Ω	MBB-J6-CH1
OAT	Outdoor Air Thermistor	5k Ω	MBB-J6-CH4
SGTA	Circuit A Suction Gas Thermistor	5k Ω	EXV1-J3-A, THA
SGTB	Circuit B Suction Gas Thermistor	5k Ω	EXV1-J3-B, THB
SGTC	Circuit C Suction Gas Thermistor	5k Ω	EXV2-J3-A, THA
DUAL	Dual Chiller LWT Thermistor	5k Ω	MBB-J6-CH3
SPT	Space Temperature Thermistor	10k Ω	EMM-J6-CH2

Table 43A — 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 43B — 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

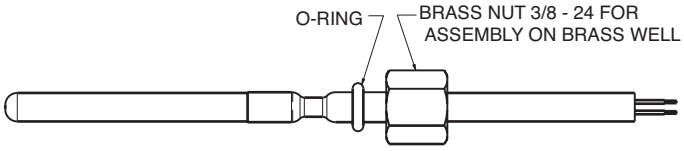

Fig. 31 — 5K Thermistor

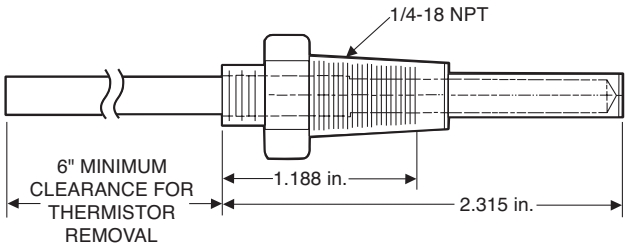

Fig. 32 — Dual Leaving Water Thermistor Well

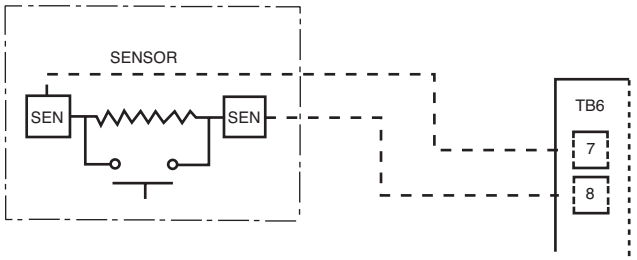

Fig. 33 — Typical Remote Space Temperature Sensor Wiring

Service Test — Main power and control circuit power must be on for Service Test.

The Service Test function is used to verify proper operation of various devices within the chiller, such as condenser fan(s), compressors, minimum load valve solenoid (if installed), cooler pump(s) and remote alarm relay. This is helpful during the start-up procedure to determine if devices are installed correctly. See Fig. 34-37 for 30RB wiring diagrams.

To use the Service Test mode, the Enable/Off/Remote Contact switch must be in the OFF position. Use the display keys to move to the Service Test mode. The items are described in the Service Test table. There are two sub-modes available. ***Service Test→T.REQ*** allows for manual control of the compressors and minimum load control. In this mode the compressors will operate only on command. The capacity control and head pressure control algorithms will be active. The condenser fans will operate along with the EXVs. There must be a load on the chiller of operate for an extended period of time. All circuit safeties will be honored during the test. ***Service Test→QUIC*** allows for test of EXVs, condenser fans, pumps, low ambient head pressure control speed control, crankcase and cooler heaters, and status points (alarm relays, running status and chiller capacity). This mode allows for the testing of non-refrigeration items. If there are no keys pressed for 5 minutes, the active test mode will be disabled.

To enter the Manual Control mode, the Enable/Off/Remote Contact switch must be in the OFF position. Move the LED to the Service Test mode. Press ENTER to access ***TEST***. Press ENTER to access ***T.REQ.*** Press ENTER and the display will show **OFF**. Press ENTER and **OFF** will flash. Enter the password if required. Use either arrow key to change the ***T.REQ*** value to **ON** and press ENTER. Manual Control mode is now active. Press the arrow keys to move to the appropriate item. To activate an item locate the item, press ENTER and the display will show **OFF**. Press ENTER and **OFF** will flash. Use either arrow key to change the value to **ON** and press ENTER. The item should be active. To turn the item off, locate the item, press ENTER and the display will show **ON**. The chiller must be enabled by turning the Enable/Off/Remote Contact switch to Enable. Press ENTER and **ON** will flash. Use either arrow key to change the value to **OFF** and press ENTER. The item should be inactive.

To enter the Quick Test mode, the Enable/Off/Remote Contact switch must be in the OFF position. Move the LED to the Service Test mode. Press ENTER to access ***TEST***. Use the ▼ key until the display reads **QUIC**. Press ENTER to access ***Q.REQ***. Press ENTER and the display will show **OFF**. Press ENTER and **OFF** will flash. Enter the password if required. Use either arrow key to change the ***QUIC*** value to **ON** and press ENTER. Quick Test mode is now active. Follow the same instructions for the Manual Control mode to activate a component.

Example — Test the chilled water pump (see Table 44).

Power must be applied to the unit. Enable/Off/Remote Contact switch must be in the OFF position.

Test the condenser fans, cooler pump(s) and alarm relay by changing the item values from OFF to ON. These discrete outputs are then turned off if there is no keypad activity for 10 minutes. Test the compressor and minimum load valve solenoid (if installed) outputs in a similar manner. The minimum load valve solenoids will be turned off if there is no keypad activity for 10 minutes. Compressors will stay on until the operator turns them off. The Service Test mode will remain enabled for as long as there is one or more compressors running. All safeties are monitored during this test and will turn a compressor, circuit or the machine off if required. Any other mode or sub-mode can be accessed, viewed, or changed during the Manual Control mode only. The ***STAT*** item (***Run Status→VIEW***) will display "0" as long as the Service mode is enabled. The ***TEST*** sub-mode value must be changed back to OFF before the chiller can be switched to Enable or Remote contact for normal operation.

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

Table 44 — Testing the Chilled Water Pump

MODE (Red LED)	SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY EXPANSION	VALUE DESCRIPTION (Units)	COMMENT
SERVICE TEST		ENTER		Service Test Mode		
	TEST	↓		Manual Sequence		
	QUIC	ENTER	Q.REQ			
			PASS WORD			Password may be required
		ENTER			0111	
		ENTER ENTER ENTER ENTER				Each ENTER will lock in the next digit. If 0111 is not the password, use the arrow keys to change the password digit and press ENTER when correct.
		ENTER	Q.REQ			Returns to the original field
		ENTER			OFF	
		ENTER			OFF	OFF will flash
		↓			ON	The Enable/Off/Remote Contact switch must be in the OFF position.
		ESCAPE	Q.REQ			
		↓	EXV.A			
		↓	EXV.B			
		↓	PMP.1	Water Exchanger Pump 1		
		ENTER			OFF	
		ENTER			OFF	OFF will flash
		↓			ON	
		ENTER			ON	Pump 1 will turn on.
		ENTER			ON	ON will flash
		↓			OFF	
		ENTER			OFF	Pump 1 will turn off.

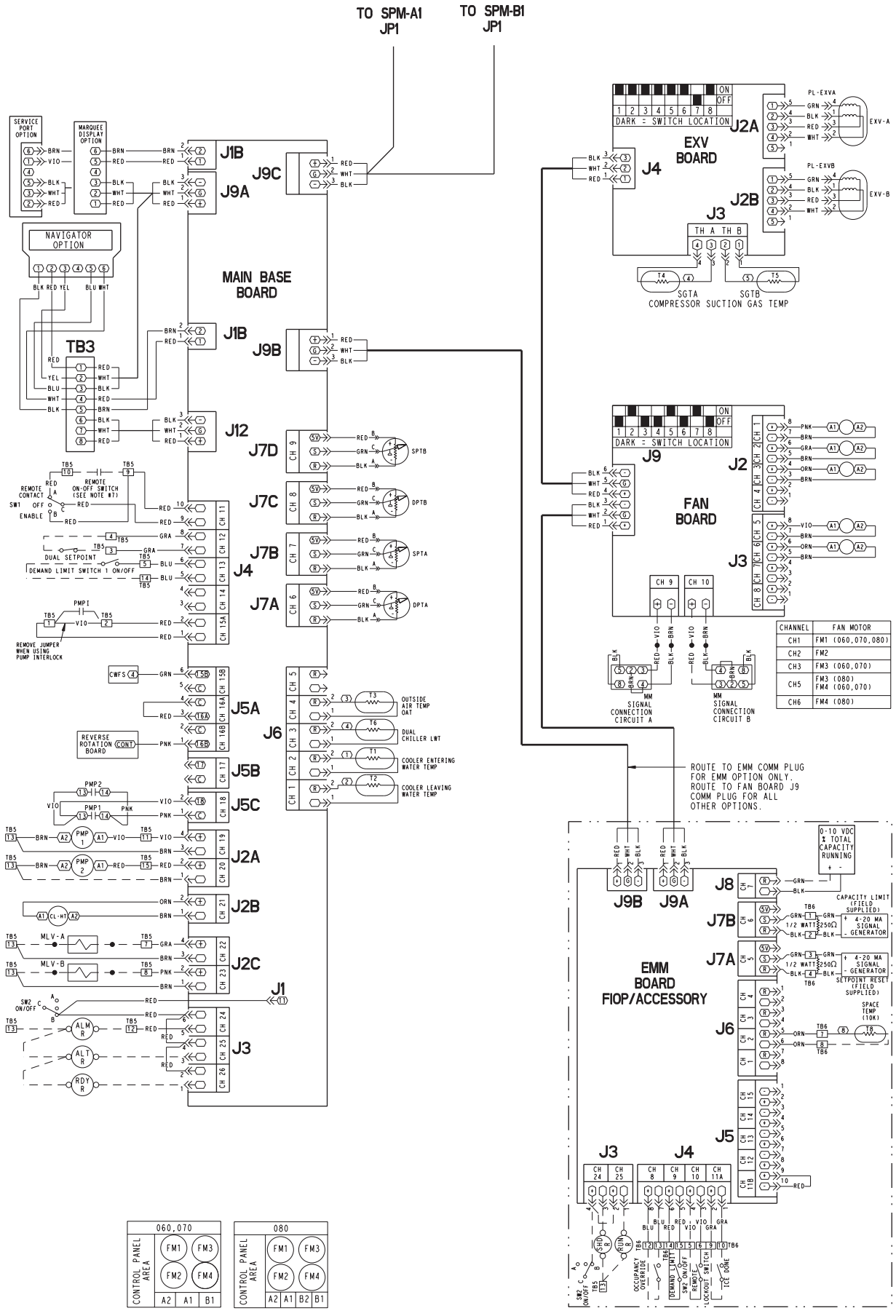

Fig. 34 — Control Schematic, 30RB060-080

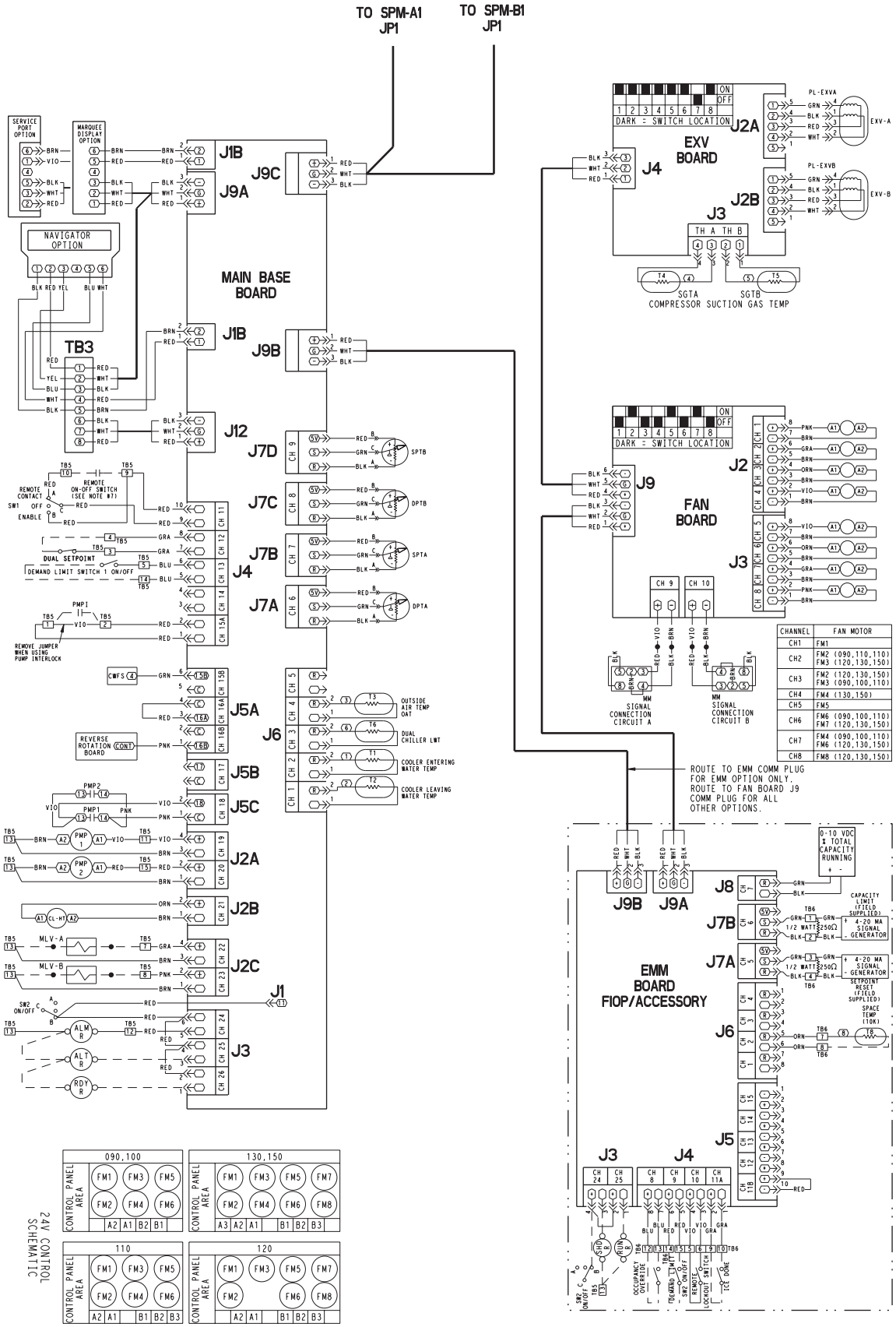

Fig. 35 — Control Schematic, 30RB090-150

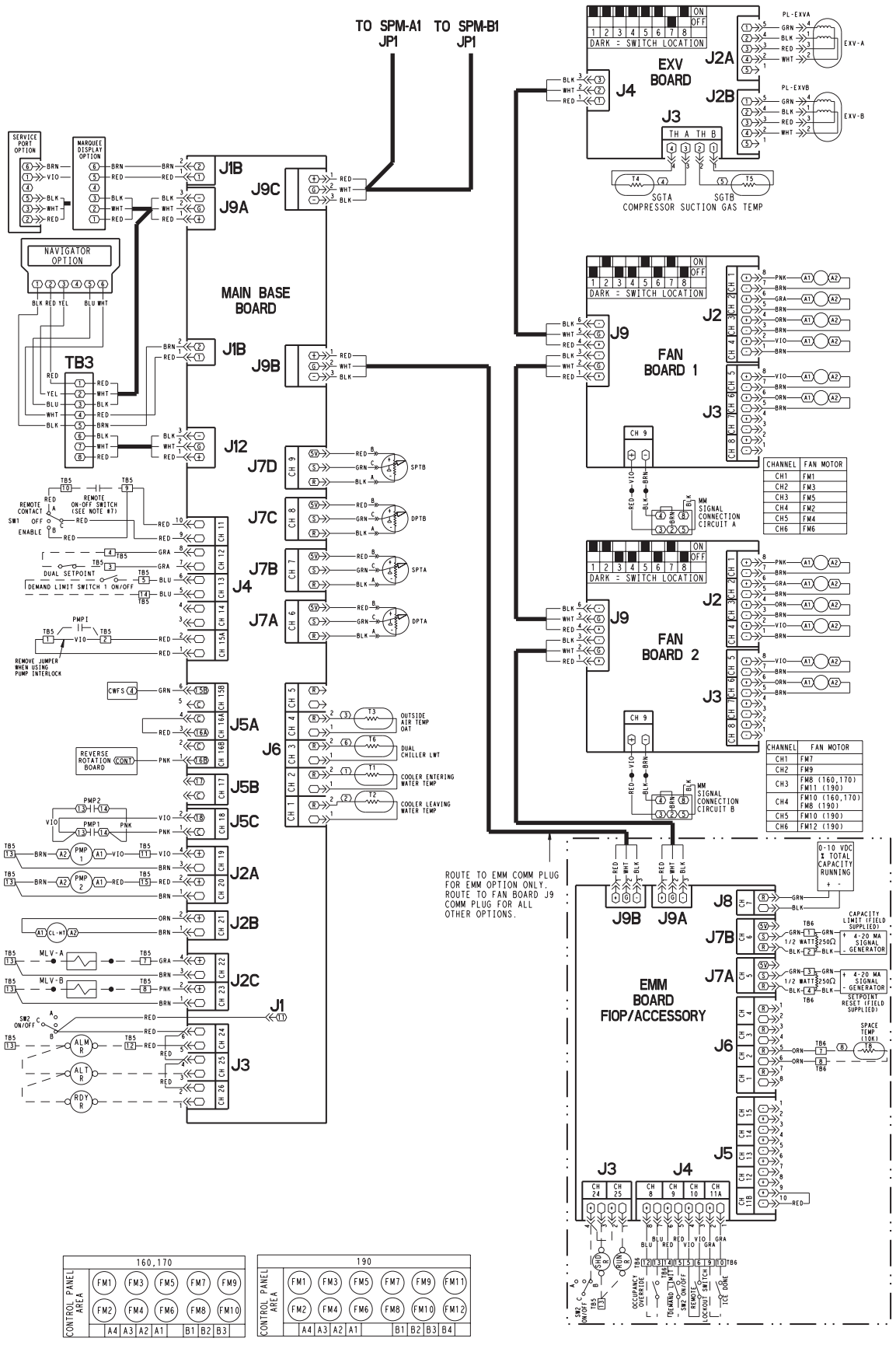

Fig. 36 — Control Schematic, 30RB160-190

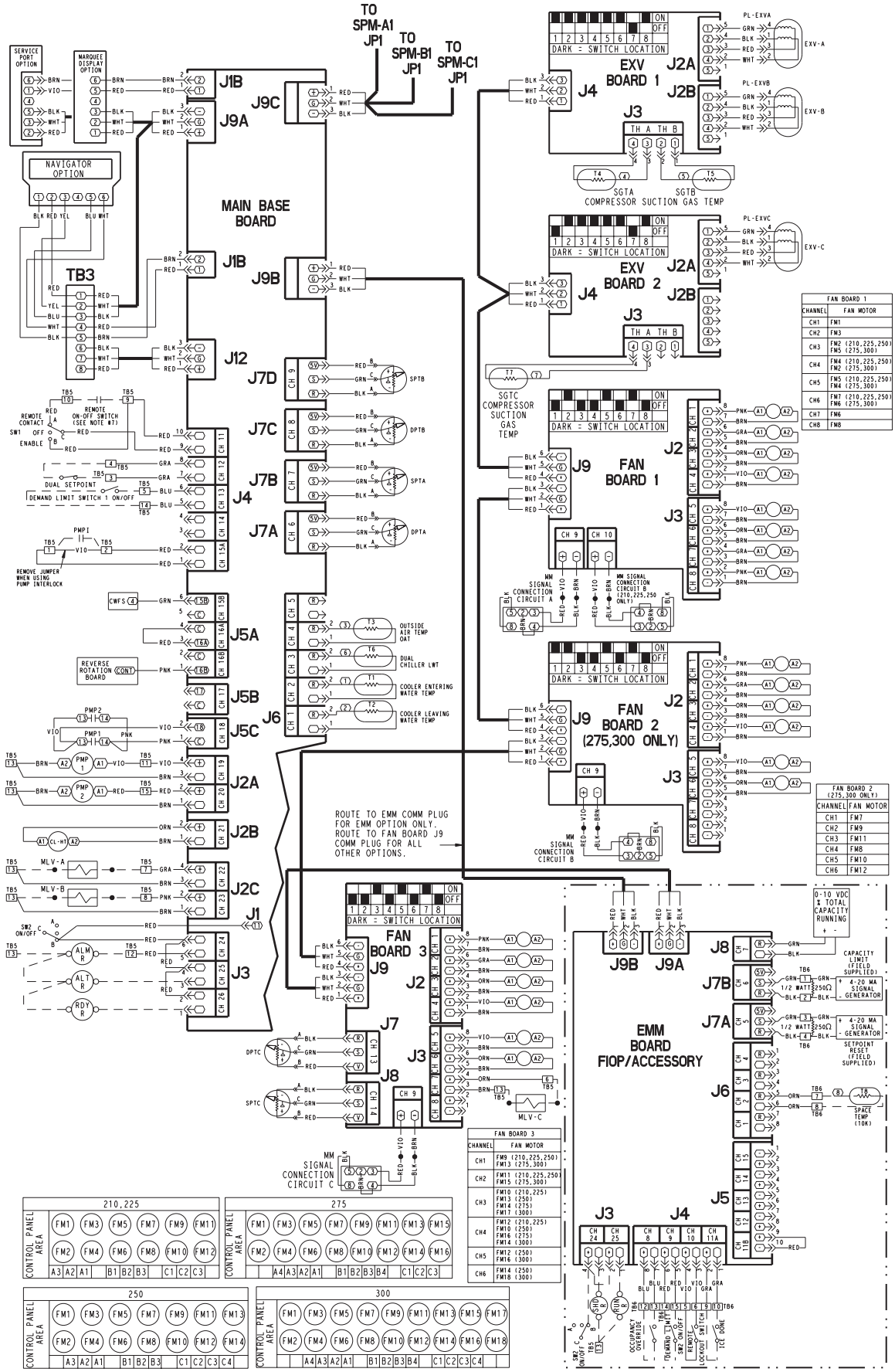

Fig. 37 — Control Schematic, 30RB210-300

APPENDIX A — LOCAL DISPLAY TABLES

MODE — RUN STATUS

ITEM	EXPANSION	UNITS	RANGE	COMMENT	WRITE STATUS	CCN TABLE	CCN POINT	PAGE NO.
VIEW	AUTO DISPLAY							
→***EWT***	Entering Fluid Temp	XXXX.X (deg F/deg C)	0-100			STATEGEN	EWT	23
→***LWT***	Leaving Fluid Temp	XXX.X (deg F/deg C)	0-100			STATEGEN	LWT	23
→***SETP***	Active Setpoint	XXX.X (deg F/deg C)	0-100			GENUNIT	SP	46
→***CTPT***	Control Point	XXX.X (deg F/deg C)	0-100			GENUNIT	CTRL_PNT	23, 47
→***STAT***	Unit Run Status		0=Off 1=Running 2=Stopping 3=Delay			GENUNIT	STATUS	32
→***OCC***	Occupied		NO/YES			GENUNIT	CHIL_OCC	32
→***CTRL***	Status Unit Control Type		0=Local Off 1=Local On 2=CCN 3=Remote			GENUNIT	ctr_type	32
→***CAP***	Percent Total Capacity	XXX (%)	0-100			GENUNIT	CAP_T	
→***LIM***	Active Demand Limit Val	XXX (%)	0-100			GENUNIT	DEM-LIM	47
→***STGE***	Current Stage	XX					cur_stag	
→***ALRM***	Alarm State		0=Normal 1=Partial 2=Shutdown			GENUNIT	ALM	
→***HC.ST***	Heat Cool Status		0=Cooling 1=Heating 2=Standby	Heating and Standby not supported.		GENUNIT	HEATCOOL	23
→***RC.ST***	Reclaim Select Status		NO/YES	Not supported.		GENUNIT	reclaim_sel	
→***TIME***	Time of Day	XX.XX	00.00-23.59			N/A	TIME	
→***MNTH***	Month of Year		1=January 2=February 3=March 4-April 6=May 6=June 7=July 8=August 9=September 10=October 11=November 12=December			N/A	moy	
→***DATE***	Day of Month	XX	1-31			N/A	dom	
→***YEAR***	Year of Century	XX	00-99			N/A	yoc	
R.CCN	REMOTE USER INTERFACE							
→***CH.SS***	CCN Chiller Start Stop		ENBL/DSBL		forcible	GENUNIT	CHIL_S_S	
→***HC.SL***	Heat Cool Select		0=Cool 1=Heat 2=Auto	Heat and Auto not supported.	forcible	GENUNIT	HC_SEL	33
→***C.OCC***	Chiller Occupied		NO/YES		forcible	GENUNIT	CHIL_OCC	34
→***RECL***	Reclaim Select		NO/YES		forcible	GENUNIT	RECL_SEL	48
→***SP.OC***	Setpoint Occupied		NO/YES		forcible	GENUNIT	SP_OCC	
→***D.LIM***	Active Demand Limit Val	XXX (%)	0-100		forcible	GENUNIT	DEM_LIM	
→***CTRL***	Control Point	XXX.X (deg F/deg C)	0-100		forcible	GENUNIT	CTRL_PNT	
→***EMGY***	Emergency Stop		ENBL/DSBL		forcible	GENUNIT	EMSTOP	
RUN	MACHINE STARTS/HOURS							17
→***HRS.U***	Machine Operating Hours	XXXX (hours)	0-999000*		forcible		hr_mach	
→***STR.U***	Machine Starts	XXXX	0-9999		forcible	STRTHOUR	st_mach	
→***HR.P1***	Water Pump #1 Run Hours	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_cpum1	
→***HR.P2***	Water Pump #2 Run Hours	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_cpum2	
→***HR.CD***	Heat Reclaim Pump Hours	XXXX (hours)		Not supported.	forcible	FANHOURS	hr_hpump	
HOUR	COMPRESSOR RUN HOURS							17
→***HR.A1***	Compressor A1 Run Hours	XXXX (hours)	0-999000*		forcible	STRTHOUR	hr_cp_a1	
→***HR.A2***	Compressor A2 Run Hours	XXXX (hours)	0-999000*		forcible	STRTHOUR	hr_cp_a2	
→***HR.A3***	Compressor A3 Run Hours	XXXX (hours)	0-999000*		forcible	STRTHOUR	hr_cp_a3	
→***HR.A4***	Compressor A4 Run Hours	XXXX (hours)	0-999000*		forcible	STRTHOUR	hr_cp_a4	
→***HR.B1***	Compressor B1 Run Hours	XXXX (hours)	0-999000*		forcible	STRTHOUR	hr_cp_b1	
→***HR.B2***	Compressor B2 Run Hours	XXXX (hours)	0-999000*		forcible	STRTHOUR	hr_cp_b2	
→***HR.B3***	Compressor B3 Run Hours	XXXX (hours)	0-999000*		forcible	STRTHOUR	hr_cp_b3	
→***HR.B4***	Compressor B4 Run Hours	XXXX (hours)	0-999000*		forcible	STRTHOUR	hr_cp_b4	
→***HR.C1***	Compressor C1 Run Hours	XXXX (hours)	0-999000*		forcible	STRTHOUR	hr_cp_c1	
→***HR.C2***	Compressor C2 Run Hours	XXXX (hours)	0-999000*		forcible	STRTHOUR	hr_cp_c2	
→***HR.C3***	Compressor C3 Run Hours	XXXX (hours)	0-999000*		forcible	STRTHOUR	hr_cp_c3	
→***HR.C4***	Compressor C4 Run Hours	XXXX (hours)	0-999000*		forcible	STRTHOUR	hr_cp_c4	
STRT	COMPRESSOR STARTS							17, 21
→***ST.A1***	Compressor A1 Starts	XXXX	0-999000*		forcible	STRTHOUR	st_cp_a1	
→***ST.A2***	Compressor A2 Starts	XXXX	0-999000*		forcible	STRTHOUR	st_cp_a2	
→***ST.A3***	Compressor A3 Starts	XXXX	0-999000*		forcible	STRTHOUR	st_cp_a3	
→***ST.A4***	Compressor A4 Starts	XXXX	0-999000*		forcible	STRTHOUR	st_cp_a4	
→***ST.B1***	Compressor B1 Starts	XXXX	0-999000*		forcible	STRTHOUR	st_cp_b1	
→***ST.B2***	Compressor B2 Starts	XXXX	0-999000*		forcible	STRTHOUR	st_cp_b2	
→***ST.B3***	Compressor B3 Starts	XXXX	0-999000*		forcible	STRTHOUR	st_cp_b3	
→***ST.B4***	Compressor B4 Starts	XXXX	0-999000*		forcible	STRTHOUR	st_cp_b4	
→***ST.C1***	Compressor C1 Starts	XXXX	0-999000*		forcible	STRTHOUR	st_cp_c1	
→***ST.C2***	Compressor C2 Starts	XXXX	0-999000*		forcible	STRTHOUR	st_cp_c2	
→***ST.C3***	Compressor C3 Starts	XXXX	0-999000*		forcible	STRTHOUR	st_cp_c3	
→***ST.C4***	Compressor C4 Starts	XXXX	0-999000*		forcible	STRTHOUR	st_cp_c4	

APPENDIX A — LOCAL DISPLAY TABLES (cont)

MODE — RUN STATUS (cont)

ITEM	EXPANSION	UNITS	RANGE	COMMENT	WRITE STATUS	CCN TABLE	CCN POINT	PAGE NO.
FAN	FAN RUN HOURS							
→***FR.A1***	Fan 1 Run Hours Cir A	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fana1	
→***FR.A2***	Fan 2 Run Hours Cir A	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fana2	
→***FR.A3***	Fan 3 Run Hours Cir A	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fana3	
→***FR.A4***	Fan 4 Run Hours Cir A	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fana4	
→***FR.A5***	Fan 5 Run Hours Cir A	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fana5	
→***FR.A6***	Fan 6 Run Hours Cir A	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fana6	
→***FR.B1***	Fan 1 Run Hours Cir B	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fanb1	
→***FR.B2***	Fan 2 Run Hours Cir B	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fanb2	
→***FR.B3***	Fan 3 Run Hours Cir B	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fanb3	
→***FR.B4***	Fan 4 Run Hours Cir B	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fanb4	
→***FR.B5***	Fan 5 Run Hours Cir B	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fanb5	
→***FR.B6***	Fan 6 Run Hours Cir B	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fanb6	
→***FR.C1***	Fan 1 Run Hours Cir C	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fanc1	
→***FR.C2***	Fan 2 Run Hours Cir C	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fanc2	
→***FR.C3***	Fan 3 Run Hours Cir C	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fanc3	
→***FR.C4***	Fan 4 Run Hours Cir C	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fanc4	
→***FR.C5***	Fan 5 Run Hours Cir C	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fanc5	
→***FR.C6***	Fan 6 Run Hours Cir C	XXXX (hours)	0-999000*		forcible	FANHOURS	hr_fanc6	
CP.UN	COMPRESSOR DISABLE							17
→***A1.UN***	Compressor A1 Disable		NO/YES		forcible	CP_UNABL	un_cp_a1	
→***A2.UN***	Compressor A2 Disable		NO/YES		forcible	CP_UNABL	un_cp_a2	
→***A3.UN***	Compressor A3 Disable		NO/YES		forcible	CP_UNABL	un_cp_a3	
→***A4.UN***	Compressor A4 Disable		NO/YES		forcible	CP_UNABL	un_cp_a4	
→***B1.UN***	Compressor B1 Disable		NO/YES		forcible	CP_UNABL	un_cp_b1	
→***B2.UN***	Compressor B2 Disable		NO/YES		forcible	CP_UNABL	un_cp_b2	
→***B3.UN***	Compressor B3 Disable		NO/YES		forcible	CP_UNABL	un_cp_b3	
→***B4.UN***	Compressor B4 Disable		NO/YES		forcible	CP_UNABL	un_cp_b4	
→***C1.UN***	Compressor C1 Disable		NO/YES		forcible	CP_UNABL	un_cp_c1	
→***C2.UN***	Compressor C2 Disable		NO/YES		forcible	CP_UNABL	un_cp_c2	
→***C3.UN***	Compressor C3 Disable		NO/YES		forcible	CP_UNABL	un_cp_c3	
→***C4.UN***	Compressor C4 Disable		NO/YES		forcible	CP_UNABL	un_cp_c4	
MAIN	PREDICTIVE MAINTENANCE							17
→***CHRG***	Refrigerant Charge		NO/YES			SERMAINT	charge_m	
→***WATE***	Water Loop Size		NO/YES			SERMAINT	wloop_m	
→***PMP.1***	Pump 1	(days)				SERMAINT	cpump1_m	
→***PMP.2***	Pump 2	(days)				SERMAINT	cpump2_m	
→***PMP.C***	Cond Pump	(days)		Not supported.		SERMAINT	hpump_m	
→***W.FIL***	Water Filter	(days)				SERMAINT	wfilte_m	
VERS	SOFTWARE VERSIONS			Press ENTER and ESCAPE simultaneously to read version information				17
→***APPL***	CSA-XX-XXXXXXXXX						PD5_APPL	
→***MARQ***	XXXXXX-XX-XX						STDU	
→***NAVI***	XXXXXX-XX-XX						Navigator	
→***EXV1***	XXXXXX-XX-XX						EXV_BRD1	
→***EXV2***	XXXXXX-XX-XX						EXV_BRD2	
→***AUX1***	XXXXXX-XX-XX						AUX_BRD1	
→***AUX2***	XXXXXX-XX-XX						AUX_BRD2	
→***AUX3***	XXXXXX-XX-XX						AUX_BRD3	
→***AUX4***	XXXXXX-XX-XX						AUX_BRD4	
→***AUX5***	XXXXXX-XX-XX						AUX_BRD5	
→***CPA1***	XXXXXX-XX-XX						SPM_CPA1	
→***CPA2***	XXXXXX-XX-XX						SPM_CPA2	
→***CPA3***	XXXXXX-XX-XX						SPM_CPA3	
→***CPA4***	XXXXXX-XX-XX						SPM_CPA4	
→***CPB1***	XXXXXX-XX-XX						SPM_CPB1	
→***CPB2***	XXXXXX-XX-XX						SPM_CPB2	
→***CPB3***	XXXXXX-XX-XX						SPM_CPB3	
→***CPB4***	XXXXXX-XX-XX						SPM_CPB4	
→***CPC1***	XXXXXX-XX-XX						SPM_CPC1	
→***CPC2***	XXXXXX-XX-XX						SPM_CPC2	
→***CPC3***	XXXXXX-XX-XX						SPM_CPC3	
→***CPC4***	XXXXXX-XX-XX						SPM_CPC4	
→***EMM***	XXXXXX-XX-XX						EMM_NRCP	

*As data in all of these categories can exceed 9999 the following display strategy is used:
From 0-9999 display as 4 digits.
From 9999-99900 display xx.xK
From 99900-999000 display as xxxK.

APPENDIX A — LOCAL DISPLAY TABLES (cont)

MODE — SERVICE TEST

ITEM	EXPANSION	UNITS	RANGE	COMMENT	WRITE STATUS	CCN TABLE	CCN POINT	PAGE NO.
TEST	MANUAL TEST MODE			Remote-Off-		N/A		17
→***T.REQ***	Manual Sequence		OFF/ON	Enable Switch	forcible	N/A	service_test	
→***CP.A1***	Compressor A1 Output		OFF/ON	must be set to	forcible	N/A	comp_serv_a_1	
→***CP.A2***	Compressor A2 Output		OFF/ON	Enable Position	forcible	N/A	comp_serv_a_2	
→***CP.A3***	Compressor A3 Output		OFF/ON		forcible	N/A	comp_serv_a_3	
→***CP.A4***	Compressor A4 Output		OFF/ON		forcible	N/A	comp_serv_a_4	
→***HGB.A***	Hot Gas Bypass A Output		OFF/ON		forcible	N/A	hgbp_serv_a	
→***CP.B1***	Compressor B1 Output		OFF/ON		forcible	N/A	comp_serv_b_1	
→***CP.B2***	Compressor B2 Output		OFF/ON		forcible	N/A	comp_serv_b_2	
→***CP.B3***	Compressor B3 Output		OFF/ON		forcible	N/A	comp_serv_b_3	
→***CP.B4***	Compressor B4 Output		OFF/ON		forcible	N/A	comp_serv_b_4	
→***HGB.B***	Hot Gas Bypass B Output		OFF/ON		forcible	N/A	hgbp_serv_b	
→***CP.C1***	Compressor C1 Output		OFF/ON		forcible	N/A	comp_serv_c_1	
→***CP.C2***	Compressor C2 Output		OFF/ON		forcible	N/A	comp_serv_c_2	
→***CP.C3***	Compressor C3 Output		OFF/ON		forcible	N/A	comp_serv_c_3	
→***CP.C4***	Compressor C4 Output		OFF/ON		forcible	N/A	comp_serv_c_4	
→***HGB.C***	Hot Gas Bypass C Output		OFF/ON		forcible	N/A	hgbp_serv_c	
QUIC	QUICK TEST MODE			Remote-Off-		N/A		
→***Q.REQ***			OFF/ON	Enable Switch	forcible	N/A	test_request	
→***EXV.A***	Circuit A EXV % Open	XXX (%)	0-100	must be set to	forcible	N/A	exv_qck_a	
→***EXV.B***	Circuit B EXV % Open	XXX (%)	0-100	Off Position	forcible	N/A	exv_qck_b	
→***EXV.C***	Circuit C EXV % Open	XXX (%)	0-100		forcible	N/A	exv_qck_c	
→***FAN.A***	Circuit A Fan Stages	X	0-6		forcible	N/A	fan_qck_a	
→***FAN.B***	Circuit B Fan Stages	X	0-6		forcible	N/A	fan_qck_b	
→***FAN.C***	Circuit C Fan Stages	X	0-6		forcible	N/A	fan_qck_c	
→***SPD.A***	Cir A Varifan position	XXX (%)	0-100		forcible	N/A	hd_qck_a	
→***SPD.B***	Cir B Varifan position	XXX (%)	0-100		forcible	N/A	hd_qck_b	
→***SPD.C***	Cir C Varifan position	XXX (%)	0-100		forcible	N/A	hd_qck_c	
→***FRV.A***	Free Cooling Heater A		OPEN/CLSE	Not supported.	forcible	N/A	fr_qck_1a	
→***FRP.A***	Refrigerant Pump A		OFF/ON	Not supported.	forcible	N/A	fr_qck_2a	
→***FRV.B***	Free Cooling Heater B		OPEN/CLSE	Not supported.	forcible	N/A	fr_qck_1b	
→***FRP.B***	Refrigerant Pump B		OFF/ON	Not supported.	forcible	N/A	fr_qck_2b	
→***FRV.C***	Free Cooling Heater C		OPEN/CLSE	Not supported.	forcible	N/A	fr_qck_1c	
→***FRP.C***	Refrigerant Pump C		OFF/ON	Not supported.	forcible	N/A	fr_qck_2c	
→***RV.A***	4 Way Valve Circuit A		OPEN/CLSE	Not supported.	forcible	N/A	rv_qck_a	
→***RV.B***	4 Way Valve Circuit B		OPEN/CLSE	Not supported.	forcible	N/A	rv_qck_b	
→***BOIL***	Boiler Command		OFF/ON	Not supported.	forcible	N/A	boiler_qck	
→***HR1.A***	Air Cond Enter Valve A		OPEN/CLSE	Not supported.	forcible	N/A	hr_ea_qck_a	
→***HR2.A***	Air Cond Leaving Valv A		OPEN/CLSE	Not supported.	forcible	N/A	hr_la_qck_a	
→***HR3.A***	Water Cond Enter Valv A		OPEN/CLSE	Not supported.	forcible	N/A	hr_ew_qck_a	
→***HR4.A***	Water Cond Leav Valve A		OPEN/CLSE	Not supported.	forcible	N/A	hr_lw_qck_a	
→***HR1.B***	Air Cond Enter Valve B		OPEN/CLSE	Not supported.	forcible	N/A	hr_ea_qck_b	
→***HR2.B***	Air Cond Leaving Valv B		OPEN/CLSE	Not supported.	forcible	N/A	hr_la_qck_b	
→***HR3.B***	Water Cond Enter Valv B		OPEN/CLSE	Not supported.	forcible	N/A	hr_ew_qck_b	
→***HR4.B***	Water Cond Leav Valve B		OPEN/CLSE	Not supported.	forcible	N/A	hr_lw_qck_b	
→***PMP.1***	Water Exchanger Pump 1		OFF/ON		forcible	N/A	cpump_qck1	
→***PMP.2***	Water Exchanger Pump 2		OFF/ON		forcible	N/A	cpump_qck2	
→***CND.P***	Reclaim Condenser Pump		OFF/ON	Not supported.	forcible	N/A	cond_pump_qck	
→***CL.HT***	Cooler Heater Output		OFF/ON		forcible	N/A	coo_heat_qck	
→***CP.HT***	Condenser Heater Output		OFF/ON	Not supported.	forcible	N/A	cond_htr_qck	
→***CH.A1***	Compressor A1 Heater		OFF/ON		forcible	N/A	cp_ht_qck_a1	
→***CH.A2***	Compressor A2 Heater		OFF/ON		forcible	N/A	cp_ht_qck_a2	
→***CH.A3***	Compressor A3 Heater		OFF/ON		forcible	N/A	cp_ht_qck_a3	
→***CH.A4***	Compressor A4 Heater		OFF/ON		forcible	N/A	cp_ht_qck_a4	
→***CH.B1***	Compressor B1 Heater		OFF/ON		forcible	N/A	cp_ht_qck_b1	
→***CH.B2***	Compressor B2 Heater		OFF/ON		forcible	N/A	cp_ht_qck_b2	
→***CH.B3***	Compressor B3 Heater		OFF/ON		forcible	N/A	cp_ht_qck_b3	
→***CH.B4***	Compressor B4 Heater		OFF/ON		forcible	N/A	cp_ht_qck_b4	
→***CH.C1***	Compressor C1 Heater		OFF/ON		forcible	N/A	cp_ht_qck_c1	
→***CH.C2***	Compressor C2 Heater		OFF/ON		forcible	N/A	cp_ht_qck_c2	
→***CH.C3***	Compressor C3 Heater		OFF/ON		forcible	N/A	cp_ht_qck_c3	
→***CH.C4***	Compressor C4 Heater		OFF/ON		forcible	N/A	cp_ht_qck_c4	
→***HGB.A***	Hot Gas Bypass A Output					N/A		
→***HGB.B***	Hot Gas Bypass B Output					N/A		
→***HGB.C***	Hot Gas Bypass C Output					N/A		
→***Q.RDY***	Chiller Ready Status		OFF/ON		forcible	N/A	ready_qck	
→***Q.RUN***	Chiller Running Status		OFF/ON		forcible	N/A	running_qck	
→***SHUT***	Customer Shutdown Stat		OFF/ON		forcible	N/A	shutdown_qck	
→***CATO***	Chiller Capacity in 0-10v	XX.X (vdc)			forcible	N/A	CAPT_010_qcK	
→***ALRM***	Alarm Relay		OFF/ON		forcible	N/A	alarm_qck	
→***ALRT***	Alert Relay		OFF/ON		forcible	N/A	alert_qck	

APPENDIX A — LOCAL DISPLAY TABLES (cont)

MODE — TEMPERATURE

ITEM	EXPANSION	UNITS	RANGE	COMMENT	WRITE STATUS	CCN TABLE	CCN POINT	PAGE NO.
UNIT	UNIT TEMPERATURES							
→***EWT***	Water Exchanger Enter	XXX.X (deg F/deg C)	–45-245 F (–43-118 C)			STATEGEN	EWT	4, 47
→***LWT***	Water Exchanger Leaving	XXX.X (deg F/deg C)	–45-245 F (–43-118 C)			STATEGEN	LWT	4, 47
→***OAT***	Outside Air Temperature	XXX.X (deg F/deg C)	–45-245 F (–43-118 C)			GENUNIT	OAT	4, 47
→***CHWS***	Lead/Lag Leaving Fluid	XXX.X (deg F/deg C)	–45-245 F (–43-118 C)			STATEGEN	CHWS TEMP	4
→***HEWT***	Heat Reclaim Entering	XXX.X (deg F/deg C)		Not supported.		RECLAIM	HR_EWT	
→***HLWT***	Heat Reclaim Leaving	XXX.X (deg F/deg C)		Not supported.		RECLAIM	HR_LWT	
→***SPT***	Optional Space Temp	XXX.X (deg F/deg C)	–45-245 F (–43-118 C)			STATEGEN	SPACETMP	14
CIR.A	CIRCUIT A TEMPERATURES							
→***SCT.A***	Sat Cond Temp Circ A	XXX.X (deg F/deg C)	–45-245 F (–43-118 C)			CIRCA_AN	SCT_A	
→***SST.A***	Sat Suction Temp Circ A	XXX.X (deg F/deg C)	–45-245 F (–43-118 C)			CIRCA_AN	SST_A	
→***SGT.A***	Suction Gas Temp Circ A	XXX.X (deg F/deg C)	–45-245 F (–43-118 C)			CIRCA_AN	SUCT_T_A	8
→***SUP.A***	Superheat Temp Circ A	XXX.X (ΔF/ΔC)				CIRCA_AN	SH_A	
→***DEF.A***	Defrost Temp Circ A	XXX.X (deg F/deg C)	–45-245 F (–43-118 C)	Not supported.		N/A	DEFRT_A	
CIR.B	CIRCUIT B TEMPERATURES							
→***SCT.B***	Sat Cond Temp Circ B	XXX.X (deg F/deg C)	–45-245 F (–43-118 C)			CIRCB_AN	SCT_B	
→***SST.B***	Sat Suction Temp Circ B	XXX.X (deg F/deg C)	–45-245 F (–43-118 C)			CIRCB_AN	SST_B	
→***SGT.B***	Suction Gas Temp Circ B	XXX.X (deg F/deg C)	–45-245 F (–43-118 C)			CIRCB_AN	SUCT_T_B	8
→***SUP.B***	Superheat Temp Circ B	XXX.X (ΔF/ΔC)				CIRCB_AN	SH_B	
→***DEF.B***	Defrost Temp Circ B	XXX.X (deg F/deg C)	–45-245 F (–43-118 C)			N/A	DEFRT_B	
CIR.C	CIRCUIT C TEMPERATURES					CIRCC_AN		
→***SCT.C***	Sat Cond Temp Circ C	XXX.X (deg F/deg C)	–45-245 F (–43-118 C)			CIRCC_AN	SCT_C	
→***SST.C***	Sat Suction Temp Circ C	XXX.X (deg F/deg C)	–45-245 F (–43-118 C)			CIRCC_AN	SST_C	
→***SGT.C***	Suction Gas Temp Circ C	XXX.X (deg F/deg C)	–45-245 F (–43-118 C)			CIRCC_AN	SUCT_T_C	8
→***SUP.C***	Superheat Temp Circ C	XXX.X (ΔF/ΔC)				CIRCC_AN	SH_C	

MODE — PRESSURE

ITEM	EXPANSION	UNITS	RANGE	COMMENT	WRITE STATUS	CCN TABLE	CCN POINT	PAGE NO.
PRC.A	CIRCUIT A PRESSURES							
→***DP.A***	Discharge Pressure Cir A	XXX.X (psig/kPa)				CIRCA_AN	DP_A	48
→***SP.A***	Suction Pressure Circ A	XXX.X (psig/kPa)				CIRCA_AN	SP_A	4
PRC.B	CIRCUIT B PRESSURES							
→***DP.B***	Discharge Pressure Cir B	XXX.X (psig/kPa)				CIRCB_AN	DP_B	48
→***SP.B***	Suction Pressure Circ B	XXX.X (psig/kPa)				CIRCB_AN	SP_B	4
PRC.C	CIRCUIT A PRESSURES							
→***DP.C***	Discharge Pressure Cir C	XXX.X (psig/kPa)				CIRCC_AN	DP_C	12
→***SP.C***	Suction Pressure Circ C	XXX.X (psig/kPa)				CIRCC_AN	SP_C	12

APPENDIX A — LOCAL DISPLAY TABLES (cont)

MODE — SET POINTS

ITEM	EXPANSION	UNITS	RANGE	COMMENT	WRITE STATUS	CCN TABLE	CCN POINT	PAGE NO.
COOL	COOLING SETPOINTS							
→***CSP.1***	Cooling Setpoint 1	XXXX.X (deg F/deg C)	–20-70 F (–29-21 C), Default = 44.0		forcible	SETPOINT	csp1	33
→***CSP.2***	Cooing Setpoint 2	XXXX.X (deg F/deg C)	–20-70 F (–29-21 C), Default = 44.0		forcible	SETPOINT	csp2	33
→***CSP.3***	Ice Setpoint	XXXX.X (deg F/deg C)	–20-70 F (–29-21 C), Default = 44.0		forcible	SETPOINT	ice_sp	33
→***CRV1***	Current No Reset Val	XX.X (mA)	0-20, Default = 0		forcible	SETPOINT	v_cr_no	38
→***CRV2***	Current Full Reset Val	XX.X (mA)	0-20, Default = 0		forcible	SETPOINT	v_cr_fu	38
→***CRT1***	Delta T No Reset Temp	XXX.X (ΔF/ΔC)	0-125 F (0-69.4 C), Default = 0		forcible	SETPOINT	dt_cr_no	34
→***CRT2***	Delta T Full Reset Temp	XXX.X (ΔF/ΔC)	0-125 F (0-69.4 C), Default = 0		forcible	SETPOINT	dt_cr_fu	34
→***CRO1***	OAT No Reset Temp	XXX.X (deg F/deg C)	0-125 F (–18-52 C), Default = 14.0		forcible	SETPOINT	oatcr_no	34
→***CRO2***	OAT Full Reset Temp	XXX.X (deg F/deg C)	0-25 F (–18-52 C), Default = 14.0		forcible	SETPOINT	oatcr_fu	34
→***CRS1***	Space T No Reset Temp	XXX.X (deg F/deg C)	0-125 F (–18-52 C), Default = 14.0		forcible	SETPOINT	spacr_no	37
→***CRS2***	Space T Full Reset Temp	XXX.X (deg F/deg C)	0-125 F (–18-52 C), Default = 14.0		forcible	SETPOINT	spacr_fu	37
→***DGRC***	Degrees Cool Reset	XX.X (ΔF/ΔC)	–30-30 F (–16.7-16.7 C), Default = 0		forcible	SETPOINT	cr_deg	37
→***CAUT***	Cool Changeover Setpt	XX.X (deg F/deg C)	Default = 75.0	Not supported.	forcible	SETPOINT	cauto_sp	
→***CRMP***	Cool Ramp Loading	X.X	0.2-2.0 F (0.1-1.1 C), Default = 1.0		forcible		cramp_sp	17
HEAT	HEATING SETPOINTS							
→***HSP.1***	Heating Setpoint 1	XXX.X (deg F/deg C)	Default = 100	Not supported.	forcible	SETPOINT	HSP.1	
→***HSP.2***	Heating Setpoint 2	XXX.X (deg F/deg C)	Default = 100	Not supported.	forcible	SETPOINT	HSP.2	
→***HRV1***	Current to Reset Val	XX.X (mA)	Default = 0	Not supported.	forcible	SETPOINT	v_hr_no	
→***HRV2***	Current Full Reset Val	XX.X (mA)	Default = 0	Not supported.	forcible	SETPOINT	v_hr_fu	
→***HRT1***	Delta T No Reset Temp	XXX.X (ΔF/ΔC)	Default = 0	Not supported.	forcible	SETPOINT	dt_hr_no	
→***HRT2***	Delta T Full Reset Temp	XXX.X (ΔF/ΔC)	Default = 0	Not supported.	forcible	SETPOINT	dt_hr_fu	
→***HRO1***	OAT No Reset Temp	XXX.X (deg F/deg C)	Default = 14.0	Not supported.	forcible	SETPOINT	oathr_no	
→***HRO2***	OAT Full Reset Temp	XXX.X (deg F/deg C)	Default = 14.0	Not supported.	forcible	SETPOINT	oathr_fu	
→***DGRH***	Degrees Heat Reset	XX.X (ΔF/ΔC)	Default = 0	Not supported.	forcible	SETPOINT	DGRH	
→***HAUT***	Heat Changeover Setpt	XX.X (deg F/deg C)	Default = 64	Not supported.	forcible	SETPOINT	hauto_sp	
→***HRMP***	Heat Ramp Loading	X.X	Default = 1.0	Not supported.	forcible	SETPOINT	hramp_sp	
MISC	MISC SETPOINTS							
→***DLS1***	Switch Limit Setpoint 1	XXX (%)	0-100, Default = 100		forcible	SETPOINT	lim_sp1	41
→***DLS2***	Switch Limit Setpoint 2	XXX (%)	0-100, Default = 100		forcible	SETPOINT	lim_sp2	41
→***DLS3***	Switch Limit Setpoint 3	XXX (%)	0-100, Default = 100		forcible	SETPOINT	lim_sp3	
→***RSP***	Heat Reclaim Setpoint	XXX.X (deg F/deg C)	Default = 122	Not supported.	forcible	SETPOINT	rsp	
→***RDB***	Reclaim Deadband	XX.X (ΔF/ΔC)	Default = 9.0	Not supported.	forcible	SETPOINT	hr_deadb	

MODE — INPUTS

ITEM	EXPANSION	UNITS	RANGE	COMMENT	WRITE STATUS	CCN TABLE	CCN POINT	PAGE NO.
GEN.I	GENERAL INPUTS							
→***ONOF***	On Off Switch		OPEN/CLSE			STATEGEN	ONOF	4
→***LOCK***	Cooler Interlock		OPEN/CLSE			STATEGEN	LOCK_1	23
→***DLS1***	Demand Limit Switch 1		OPEN/CLSE			STATEGEN	LIM_SW1	
→***DLS2***	Demand Limit Switch 2		OPEN/CLSE			STATEGEN	LIM_SW2	
→***ICE.D***	Ice Done		OFF/ON			STATEGEN	ICE_SW	14
→***DUAL***	Dual Setpoint Switch		OFF/ON			STATEGEN	SETP_SW	34
→***ELEC***	Electrical Box Safety		OPEN/CLSE			STATEGEN	ELEC_BOX	4
→***PUMP***	Pump Run Feedback		OFF/ON			STATEGEN	PUMP_DEF	4
→***OCCS***	Occupancy Override Swit		OFF/ON			STATEGEN	OCC_OVSW	14
→***RECL***	Heat Reclaim Switch		OFF/ON	Not supported.		STATEGEN	RECL_SW	
→***HC.SW***	Heat Cool Switch Status		OFF/ON	Not supported.		STATEGEN	HC_SW	
→***RLOC***	Remote Interlock Switch		OPEN/CLSE			STATEGEN	REM-LOCK	14
→***DMND***	4-20 mA Demand Signal	XXX.X (mA)	4 to 20			STATEGEN	LIM_ANAL	14
→***RSET***	4-20 mA Reset/Setpoint	XXX.X (mA)	4 to 20			STATEGEN	SP_RESET	14
→***C.FLOW***	Reclaim Cond Flow		OPEN/CLSE	Not supported.		STATEGEN	CONDFLOW	

APPENDIX A — LOCAL DISPLAY TABLES (cont)

MODE — OUTPUTS

ITEM	EXPANSION	UNITS	RANGE	COMMENT	WRITE STATUS	CCN TABLE	CCN POINT	PAGE NO.
CIR.A	CIRCUIT A OUTPUTS							
→***CP.A1***	Compressor A1 Relay	OFF/ON				CIRCA_D	CP_A1	
→***CP.A2***	Compressor A2 Relay	OFF/ON				CIRCA_D	CP_A2	
→***CP.A3***	Compressor A3 Relay	OFF/ON				CIRCA_D	CP_A3	
→***CP.A4***	Compressor A4 Relay	OFF/ON				CIRCA_D	CP_A4	
→***HGB.A***	Hot Gas Bypass Circ A	OFF/ON				CIRCA_D	HGBP_A	4
→***HT.A1***	Comp A1 Heater Relay	OFF/ON				CIRCA_D	cp_a1_ht	
→***HT.A2***	Comp A2 Heater Relay	OFF/ON				CIRCA_D	cp_a2_ht	
→***HT.A3***	Comp A3 Heater Relay	OFF/ON				CIRCA_D	cp_a3_ht	
→***HT.A4***	Comp A4 Heater Relay	OFF/ON				CIRCA_D	cp_a4_ht	
→***FAN.A***	Circuit A Fan Stages	X	0-6			CIRCA_D	FAN_ST_A	
→***SPD.A***	Circ A Varifan Position	XXX (%)	0-100			CIRCA_AN	hd_pos_a	
→***EXV.A***	Circuit A EXV % Open	XXX (%)	0-100			CIRCA_AN	EXV_A	8
→***FRP.A***	Refrigerant Pump Out A	OFF/ON		Not supported.		CIRCA_D	FR_PMP_A	
→***FRHA***	Free Cooling Heater A	OFF/ON		Not supported.		CIRCA_D	FR_HEATA	
→***HR1.A***	Air Cond Enter Valve A	OPEN/CLSE		Not supported.		RECLAIM	hr_ca_a	
→***HR2.A***	Air Cond Leaving Valv A	OPEN/CLSE		Not supported.		RECLAIM	hr_la_a	
→***HR3.A***	Water Cond Enter Valv A	OPEN/CLSE		Not supported.		RECLAIM	hr_en_a	
→***HR4.A***	Water Cond Leav Valve A	OPEN/CLSE		Not supported.		RECLAIM	hr_lw_a	
→***RV.A***	4 Way Valve Circuit A	OPEN/CLSE		Not supported.		CIRCA_D	RV_A	
CIR.B	CIRCUIT B OUTPUTS							
→***CP.B1***	Compressor B1 Relay	OFF/ON				CIRCB_D	CP_B1	
→***CP.B2***	Compressor B2 Relay	OFF/ON				CIRCB_D	CP_B2	
→***CP.B3***	Compressor B3 Relay	OFF/ON				CIRCB_D	CP_B3	
→***CP.B4***	Compressor B4 Relay	OFF/ON				CIRCB_D	CP_B4	
→***HGB.B***	Hot Gas Bypass Circ B	OFF/ON				CIRCB_D	HGBP_B	4
→***HT.B1***	Comp B1 Heater Relay	OFF/ON				CIRCB_D	CP_HT_B1	
→***HT.B2***	Comp B2 Heater Relay	OFF/ON				CIRCB_D	CP_HT_B2	
→***HT.B3***	Comp B3 Heater Relay	OFF/ON				CIRCB_D	CP_HT_B3	
→***HT.B4***	Comp B4 Heater Relay	OFF/ON				CIRCB_D	CP_HT_B4	
→***FAN.B***	Circuit B Fan Stages	X	0-6			CIRCB_D	FAN_ST_B	
→***SPD.B***	Circ B Varifan Position	XXX (%)	0-100			CIRCB_AN	hd_pos_b	
→***EXV.B***	Circuit B EXV % Open	XXX (%)	0-100			CIRCB_AN	EXV_B	8
→***FRP.B***	Refrigerant Pump Out B	OFF-ON		Not supported.		CIRCB_D	FR_PMP_B	
→***FRHB***	Free Cooling Heater B	OFF-ON		Not supported.		CIRCA_D	FR_HEATB	
→***HR1.B***	Air Cond Enter Valve B	OPEN/CLSE		Not supported.		RECLAIM	hr_ca_b	
→***HR2.B***	Air Cond Leaving Valv B	OPEN/CLSE		Not supported.		RECLAIM	hr_la_b	
→***HR3.B***	Water Cond Enter Valv B	OPEN/CLSE		Not supported.		RECLAIM	hr_en_b	
→***HR4.B***	Water Cond Leav Valve B	OPEN/CLSE		Not supported.		RECLAIM	hr_lw_b	
→***RV.B***	4 Way Valve Circuit B	OPEN/CLSE		Not supported.		CIRCB_D	RV_B	
CIR.C	CIRCUIT C OUTPUTS							
→***CP.C1***	Compressor C1 Relay	OFF/ON				CIRCC_D	CP_C1	
→***CP.C2***	Compressor C2 Relay	OFF/ON				CIRCC_D	CP_C2	
→***CP.C3***	Compressor C3 Relay	OFF/ON				CIRCC_D	CP_C3	
→***CP.C4***	Compressor C4 Relay	OFF/ON				CIRCC_D	CP_C4	
→***HGB.C***	Hot Gas Bypass Circ C	OFF/ON				CIRCC_D	HGBP_C	
→***HT.C1***	Comp C1 Heater Relay	OFF/ON				CIRCC_D	cp_c1_ht	
→***HT.C2***	Comp C2 Heater Relay	OFF/ON				CIRCC_D	cp_c2_ht	
→***HT.C3***	Comp C3 Heater Relay	OFF/ON				CIRCC_D	cp_c3_ht	
→***HT.C4***	Comp C4 Heater Relay	OFF/ON				CIRCC_D	cp_c4_ht	
→***FAN.C***	Circuit C Fan Stages	X	0-6			CIRCC_D	FAN_ST_C	
→***SPD.C***	Circ C Varifan Position	XXX (%)	0-100			CIRCC_AN	hd_pos_c	
→***EXV.C***	Circuit C EXV % Open	XXX (%)	0-100			CIRCC_AN	EXV_C	8
→***FRP.C***	Refrigerant Pump Out C	OFF/ON		Not supported.		CIRCC_D	FR_PMP_C	
→***FRHC***	Free Cooling Heater C	OFF/ON		Not supported.		CIRCC_D	FR_HEATC	
GEN.O	GENERAL OUTPUTS							
→***PMP.1***	Water Exchanger Pump 1	OFF/ON				STATEGEN	CPUMP_1	
→***PMP.2***	Water Exchanger Pump 2	OFF/ON				STATEGEN	CPUMP_2	
→***CND.P***	Reclaim Condenser Pump	OFF/ON		Not supported.		STATEGEN	COND_PUMP	
→***CO.HT***	Cooler Heater Output	OFF/ON				STATEGEN	COOLHEAT	
→***CN.HT***	Condenser Heat Output	OFF/ON		Not supported.		RECLAIM	cond_htr	
→***REDY***	Chiller Ready Status	OFF/ON			forcible	RECLAIM	READY	
→***RUN***	Chiller Running Status	OFF/ON			forcible	STATEGEN	RUNNING	14
→***SHUT***	Customer Shutdown Stat	OFF/ON			forcible	STATEGEN	SHUTDOWN	14
→***CATO***	Chiller Capacity 0-10 v	XX.X			forcible	STATEGEN	CAPT_010	14
→***ALRM***	Alarm Relay	OFF/ON				STATEGEN	ALARM	4
→***ALRT***	Alert Relay	OFF/ON				STATEGEN	ALERT	4
→***BOIL***	Boiler Command	OFF/ON				STATEGEN	BOILER	

APPENDIX A — LOCAL DISPLAY TABLES (cont)

MODE — CONFIGURATION

ITEM	EXPANSION	UNITS	RANGE	COMMENT	WRITE STATUS	DEFAULT	CCN TABLE	CCN POINT	PAGE NO.
DISP	DISPLAY CONFIGURATION								
→***TEST***	Test Display LEDs		OFF/ON			OFF	N/A	display_test	
→***METR***	Metric Display		US/METR			US	DISPCONF	DISPUNIT	
→***LANG***	Language Selection		0=English 1=Espanol 2=Francais 3=Portugues 4=Translated			0	DISPCONF	LANGUAGE	14
UNIT	UNIT CONFIGURATION								
→***TYPE***	Unit Type		1=Air Cooled 2=Heat Pump	Heat pump not supported		1	FACTORY	unit_typ	
→***TONS***	Unit Size	XXX (tons)	56 to 300 (nominal size — refer to Table 1 for unit modular combinations)				FACTORY	unitsize	
→***VAR.A***	Nb Fan on Varifan Cir A	X	0-6			0: No low ambient temperature head pressure control 1:low ambient temperature head pressure control	FACTORY	varfan_a	
→***VAR.B***	Nb Fan on Varifan Cir B	X	0-6			0: No low ambient temperature head pressure control 1: low ambient temperature head pressure control	FACTORY	varfan_b	
→***VAR.C***	Nb Fan on Varifan Cir C	X	0-6			0: No low ambient temperature head pressure control 1: low ambient temperature head pressure control	FACTORY	varfan_c	
→***HGBP***	Hot Gas Bypass Control		0=Unused 1=Startup Only 2=Close Ctrl 3=High Ambient			0	FACTORY	hgbp_sel	20, 21
→***60HZ***	60 Hz Frequency		NO/YES			YES	FACTORY	freq_60H	
→***RECL***	Heat Reclaim Select		NO/YES	Not supported.		NO	FACTORY	recl_opt	
→***EHS***	Electrical Heater Stage		0-4	Not supported		0	FACTORY	ehs_sel	
→***EMM***	EMM Module Installed		NO/YES			NO	FACTORY	emm_nrcp	
→***PAS.E***	Password Enable		NO/YES				FACTORY	pass_enb	
→***PASS***	Factory Password	XXX	1 to 0150			0111	FACTORY	fac_pass	
→***FREE***	Free Cooling Select		NO/YES	Not supported.		NO	FACTORY	freecool	
→***PD4.D***	Pro_Dialog User Display		NO/YES			NO	FACTORY	pd4_disp	
→***BOIL***	Boiler Control Select		OFF/ON	Not supported.		OFF	FACTORY	boil_sel	
SERV	SERVICE CONFIGURATIONS								
→***FLUD***	Cooler Fluid Type		1=Water 2=Brine 3=Low Brine	Low Brine is not supported.		1	SERVICE1	flui_typ	33
→***MOP***	EXV MOP Setpoint	XX.X (deg F/deg C)	40-60 F (4.4-15.6 C)			50	SERVICE1	mop_sp	
→***HP.TH***	High Pressure Threshold	XXX.X (psi/kPa)	500-640 psi (3447 to 4412 kPa)			609	SERVICE1	hp_th	23
→***SHP.A***	Cir A Superheat Setp	XX.X (ΔF/ΔC)	3-14 F (1.7-7.8 C)			7.2	SERVICE1	sh_sp_a	
→***SHP.B***	Cir B Superheat Setp	XX.X (ΔF/ΔC)	3-14 F (1.7-7.8 C)			7.2	SERVICE1	sh_sp_b	
→***SHP.C***	Cir C Superheat Setp	XX.X (ΔF/ΔC)	3-14 F (1.7-7.8 C)			7.2	SERVICE1	sh_sp_c	
→***HTR***	Cooler Heater DT Setp	XX.X (ΔF/ΔC)	0.5-9 F (0.3-5.0 C)			2.0 (Number of degrees added to brine freeze set point to enable cooler heater.)	SERVICE1	heatersp	47
→***EWTO***	Entering Water Control		NO/YES			NO	SERVICE1	ewt_opt	33
→***AU.SM***	Auto Start When SM Lost		NO/YES			NO	SERVICE1	auto_sm	
→***BOTH***	HSM Both Command Select		NO/YES			NO	USER	both_sel	
→***LOSP***	Brine Freeze Setpoint	XX.X (deg F/deg C)	–4-50 F (–20-10 C)			14	SERVICE1	lowestsp	33
→***HD.PG***	Varifan Proportion Gain	XX.X	–10-10			2.0	SERVICE1	hd_pg	
→***HD.DG***	Varifan Derivative Gain	XX.X	–10-10			0.4	SERVICE1	hd_dg	
→***HD.IG***	Varifan Integral Gain	XX.X	–10-10			0.4	SERVICE1	hd_ig	
→***HR.MI***	Reclaim Water Valve Min	XXX.X (%)		Not supported.		20	SERVICE1	min_3w	
→***HR.MA***	Reclaim Water Valve Max	XXX.X (%)		Not supported.		100	SERVICE1	max_3w	

APPENDIX A — LOCAL DISPLAY TABLES (cont)

MODE — CONFIGURATION (cont)

ITEM	EXPANSION	UNITS	RANGE	COMMENT	DEFAULT	CCN TABLE	CCN POINT	PAGE NO.
OPTN	OPTIONS CONFIGURATION							
→CCNA	CCN Address	XXX	1-239		1	N/A	CCNA	46
→CCNB	CCN Bus Number	XXX	0-239		0	N/A	CCNB	46
→BAUD	CCN Baud Rate		1=2400 2=4800 3=9600 4=19200 5=38400		3	N/A	BAUD	
→LOAD	Loading Sequence Select		0=Equal 1=Staged		0	USER	lead_cir	20
→LLCS	Lead/Lag Circuit Select		0=Automatic 1=Cir A Leads 2=Cir B Leads 3=Cir C Leads		0	USER	seq_typ	20
→RL.S	Ramp Load Select		ENBL/DSBL		DSBL	USER	ramp_sel	23
→DELY	Minutes Off Time	XX (Minutes)	1 to 15		1	USER	off_on_d	32
→ICE.M	Ice Mode Enable		ENBL/DSBL		DSBL	USER	ice_cnfg	33
→PUMP	Cooler Pumps Sequence		0=No Pump 1=1 Pump Only 2=2 Pumps Auto 3=PMP 1 Manual 4=PMP 2 Manual		0	USER	pump_seq	44
→ROT.P	Pump Rotation Delay	XXXX (hours)	24 to 3000		48	USER	pump_del	47
→PM.PS	Periodic Pump Start		NO-YES		NO	USER	pump_per	47
→P.SBY	Stop Pump In Standby		NO-YES		NO	USER	pump_sby	
→P.LOC	Flow Checked if Pmp Off		NO-YES		NO	USER	pump_loc	31
→LS.ST	Night Low Noise Start	XX.XX	00.00-23.59		00.00	USER	nh_start	47
→LS.ND	Night Low Noise End	XX.XX	00-00-23.59		00.00	USER	nh_end	
→LS.LT	Low Noise Capacity Lim	XXX (%)	0-100		100	USER	nh_limit	47
→OA.TH	Heat Mode OAT Threshold	XX.X (deg F/deg C)		Not supported.	5 F	USER	heat_th	
→FREE	Free Cooling OAT Limit	XX.X (deg F/deg C)		Not supported.	32.0	USER	free_oat	
→BO.TH	Boiler OAT Threshold	XX.X (deg F/deg C)	5-32 F (–15-0 C)		14	USER	boil_th	
→EHST	Elec Stag OAT Threshold	XX.XX (deg F/deg C)	23 -70 F (–5-21 C)		41	USER	ehs_th	
→EHSB	Last Heat Elec Backup		NO-YES		NO	USER	ehs_back	
→E.DEF	Quick EHS in Defrost		NO-YES		NO	USER	ehs_defr	
→EHSP	Elec Heating Pulldown	XX (min)		Not supported.	0	USER	ehs_pull	
→AUTO	Auto Changeover Select		NO-YES	Not supported.	NO	USER	auto_sel	
RSET	RESET, DEMAND LIMIT, MASTER/SLAVE							
→CRST	Cooling Reset Type		0=No Reset 1=Out Air Temp 2=Delta T Temp 3=4-20 mA Input 4=Space Temp		0	USER	cr_sel	46
→HRST	Heating Reset Type		0=No Reset 1=Out Air Temp 2=Delta T Temp 3=4-20 mA Input	Not supported.	0	USER	hr_sel	
→DMDC	Demand Limit Select		0=None 1=Switch 2=4-20 mA Input		0	USER	lim_sel	41
→DMMX	mA for 100% Demand Limit	XX.X (mA)			0.0	USER	lim_mx	41
→DMZE	mA for 0% Demand Limit	XX.X (mA)			0.0	USER	lim_ze	41
→MSSL	Master/Slave Select		0=Disable 1=Master 2=Slave		0	MST_SLV	ms_sel	46
→SLVA	Slave Address	XXX	1-236		2	MST_SLV	slv_addr	
→LLBL	Lead/Lag Balance Select		ENBL/DSBL		DSBL	MST_SLV	ll_bal	46
→LLBD	Lead/Lag Balance Delta	XXX (hours)	40-400		168	MST_SLV	ll_bal_d	46
→LLDY	Lead/Lag Delay	XX (minutes)	2-30		10	MST_SLV	lsrt_tim	46
→LAGP	Lag Unit Pump Select		0=Off if Unit stopped 1=On if Unit stopped		0	MST_SLV	lag_pump	17, 46
→LPUL	Lead Pulldown Time	XX (minutes)	0-60		0	MST_SLV	lead_pul	17, 46

APPENDIX A — LOCAL DISPLAY TABLES (cont)

MODE — TIMECLOCK

ITEM	EXPANSION	UNITS	RANGE	COMMENT	WRITE STATUS	CCN TABLE	CCN POINT	PAGE NO.
TIME	TIME OF DAY							
→HH.MM	Hour and Minute	XX.XX	00.00-23.59		forcible*	N/A	HH.MM	
DATE	DAY, DATE							
→MNTH	Month		1=January 2=February 3=March 4=April 5=May 6=June 7=July 8=August 9=September 10=October 11=November 12=December		forcible*	N/A	MNTH	
→DOM	Day of Month	XX	1-31		forcible*	N/A	DOM	
→DAY	Day of Week		1=Monday 2=Tuesday 3=Wednesday 4=Thursday 5=Friday 6=Saturday 7=Sunday		forcible*	N/A	DAY	
→YEAR	Year of Century	XX	00-99		forcible*	N/A	YEAR	
SCH1	SCHEDULE 1							32
→PER.1	Period 1 Occ/Unocc Sel							
→PER.1→OCC.1	Occupied Time	XX.XX	00.00-23.59		forcible	OCC1P01S	OCCTOD1	
→PER.1→UNO.1	Unoccupied Time	XX.XX	00.00-23.59		forcible	OCC1P01S	UNOCTOD1	
→PER.1→MON.1	Monday Select		NO/YES		forcible	OCC1P01S	DOW1	
→PER.1→TUE.1	Tuesday Select		NO/YES		forcible	OCC1P01S	DOW1	
→PER.1→WED.1	Wednesday Select		NO/YES		forcible	OCC1P01S	DOW1	
→PER.1→THU.1	Thursday Select		NO/YES		forcible	OCC1P01S	DOW1	
→PER.1→FRI.1	Friday Select		NO/YES		forcible	OCC1P01S	DOW1	
→PER.1→SAT.1	Saturday Select		NO/YES		forcible	OCC1P01S	DOW1	
→PER.1→SUN.1	Sunday Select		NO/YES		forcible	OCC1P01S	DOW1	
→PER.1→HOL.1	Holiday Select		NO/YES		forcible	OCC1P01S	DOW1	
→PER.2	Period 2 Occ/Unocc Sel					OCC1P01S		
→PER.2→OCC.2	Occupied Time	XX.XX	00.00-23.59		forcible	OCC1P01S	OCCTOD2	
→PER.2→UNO.2	Unoccupied Time	XX.XX	00.00-23.59		forcible	OCC1P01S	UNOCTOD2	
→PER.2→MON.2	Monday Select		NO/YES		forcible	OCC1P01S	DOW2	
→PER.2→TUE.2	Tuesday Select		NO/YES		forcible	OCC1P01S	DOW2	
→PER.2→WED.2	Wednesday Select		NO/YES		forcible	OCC1P01S	DOW2	
→PER.2→THU.2	Thursday Select		NO/YES		forcible	OCC1P01S	DOW2	
→PER.2→FRI.2	Friday Select		NO/YES		forcible	OCC1P01S	DOW2	
→PER.2→SAT.2	Saturday Select		NO/YES		forcible	OCC1P01S	DOW2	
→PER.2→SUN.2	Sunday Select		NO/YES		forcible	OCC1P01S	DOW2	
→PER.2→HOL.2	Holiday Select		NO/YES		forcible	OCC1P01S	DOW2	
→PER.3	Period 3 Occ/Unocc Sel					OCC1P01S		
→PER.3→OCC.3	Occupied Time	XX.XX	00.00-23.59		forcible	OCC1P01S	OCCTOD3	
→PER.3→UNO.3	Unoccupied Time	XX.XX	00.00-23.59		forcible	OCC1P01S	UNOCTOD3	
→PER.3→MON.3	Monday Select		NO/YES		forcible	OCC1P01S	DOW3	
→PER.3→TUE.3	Tuesday Select		NO/YES		forcible	OCC1P01S	DOW3	
→PER.3→WED.3	Wednesday Select		NO/YES		forcible	OCC1P01S	DOW3	
→PER.3→THU.3	Thursday Select		NO/YES		forcible	OCC1P01S	DOW3	
→PER.3→FRI.3	Friday Select		NO/YES		forcible	OCC1P01S	DOW3	
→PER.3→SAT.3	Saturday Select		NO/YES		forcible	OCC1P01S	DOW3	
→PER.3→SUN.3	Sunday Select		NO/YES		forcible	OCC1P01S	DOW3	
→PER.3→HOL.3	Holiday Select		NO/YES		forcible	OCC1P01S	DOW3	
→PER.4	Period 4 Occ/Unocc Sel							
→PER.4→OCC.4	Occupied Time	XX.XX	00.00-23.59		forcible	OCC1P01S	OCCTOD4	
→PER.4→UNO.4	Unoccupied Time	XX.XX	00.00-23.59		forcible	OCC1P01S	UNOCTOD4	
→PER.4→MON.4	Monday Select		NO/YES		forcible	OCC1P01S	DOW4	
→PER.4→TUE.4	Tuesday Select		NO/YES		forcible	OCC1P01S	DOW4	
→PER.4→WED.4	Wednesday Select		NO/YES		forcible	OCC1P01S	DOW4	
→PER.4→THU.4	Thursday Select		NO/YES		forcible	OCC1P01S	DOW4	
→PER.4→FRI.4	Friday Select		NO/YES		forcible	OCC1P01S	DOW4	
→PER.4→SAT.4	Saturday Select		NO/YES		forcible	OCC1P01S	DOW4	
→PER.4→SUN.4	Sunday Select		NO/YES		forcible	OCC1P01S	DOW4	
→PER.4→HOL.4	Holiday Select		NO/YES		forcible	OCC1P01S	DOW4	
→PER.5	Period 5 Occ/Unocc Sel							
→PER.5→OCC.5	Occupied Time	XX.XX	00.00-23.59		forcible	OCC1P01S	OCCTOD5	
→PER.5→UNO.5	Unoccupied Time	XX.XX	00.00-23.59		forcible	OCC1P01S	UNOCTOD5	
→PER.5→MON.5	Monday Select		NO/YES		forcible	OCC1P01S	DOW5	
→PER.5→TUE.5	Tuesday Select		NO/YES		forcible	OCC1P01S	DOW5	
→PER.5→WED.5	Wednesday Select		NO/YES		forcible	OCC1P01S	DOW5	
→PER.5→THU.5	Thursday Select		NO/YES		forcible	OCC1P01S	DOW5	
→PER.5→FRI.5	Friday Select		NO/YES		forcible	OCC1P01S	DOW5	
→PER.5→SAT.5	Saturday Select		NO/YES		forcible	OCC1P01S	DOW5	
→PER.5→SUN.5	Sunday Select		NO/YES		forcible	OCC1P01S	DOW5	
→PER.5→HOL.5	Holiday Select		NO/YES		forcible	OCC1P01S	DOW5	
→PER.6	Period 6 Occ/Unocc Sel							
→PER.6→OCC.6	Occupied Time	XX.XX	00.00-23.59		forcible	OCC1P01S	OCCTOD6	
→PER.6→UNO.6	Unoccupied Time	XX.XX	00.00-23.59		forcible	OCC1P01S	UNOCTOD6	
→PER.6→MON.6	Monday Select		NO/YES		forcible	OCC1P01S	DOW6	
→PER.6→TUE.6	Tuesday Select		NO/YES		forcible	OCC1P01S	DOW6	
→PER.6→WED.6	Wednesday Select		NO/YES		forcible	OCC1P01S	DOW6	
→PER.6→THU.6	Thursday Select		NO/YES		forcible	OCC1P01S	DOW6	
→PER.6→FRI.6	Friday Select		NO/YES		forcible	OCC1P01S	DOW6	
→PER.6→SAT.6	Saturday Select		NO/YES		forcible	OCC1P01S	DOW6	
→PER.6→SUN.6	Sunday Select		NO/YES		forcible	OCC1P01S	DOW6	
→PER.6→HOL.6	Holiday Select		NO/YES		forcible	OCC1P01S	DOW6	

*Password protected.

APPENDIX A — LOCAL DISPLAY TABLES (cont)

MODE — TIMECLOCK (cont)

ITEM	EXPANSION	UNITS	RANGE	COMMENT	WRITE STATUS	CCN TABLE	CCN POINT	PAGE NO.
SCH1	SCHEDULE 1							
→PER.7	Period 7 Occ/Unocc Sel							
→PER.7→OCC.7	Occupied Time	XX.XX	00.00-23.59		forcible	OCCP01S	OCCTOD7	
→PER.7→UNO.7	Unoccupied Time	XX.XX	00.00-23.59		forcible	OCCP01S	UNOCTOD7	
→PER.7→MON.7	Monday Select		NO/YES		forcible	OCCP01S	DOW7	
→PER.7→TUE.7	Tuesday Select		NO/YES		forcible	OCCP01S	DOW7	
→PER.7→WED.7	Wednesday Select		NO/YES		forcible	OCCP01S	DOW7	
→PER.7→THU.7	Thursday Select		NO/YES		forcible	OCCP01S	DOW7	
→PER.7→FRI.7	Friday Select		NO/YES		forcible	OCCP01S	DOW7	
→PER.7→SAT.7	Saturday Select		NO/YES		forcible	OCCP01S	DOW7	
→PER.7→SUN.7	Sunday Select		NO/YES		forcible	OCCP01S	DOW7	
→PER.7→HOL.7	Holiday Select		NO/YES		forcible	OCCP01S	DOW7	
→PER.8	Period 8 Occ/Unocc Sel					OCCP01S		
→PER.8→OCC.8	Occupied Time	XX.XX	00.00-23.59		forcible	OCCP01S	OCCTOD8	
→PER.8→UNO.8	Unoccupied Time	XX.XX	00.00-23.59		forcible	OCCP01S	UNOCTOD8	
→PER.8→MON.8	Monday Select		NO/YES		forcible	OCCP01S	DOW8	
→PER.8→TUE.8	Tuesday Select		NO/YES		forcible	OCCP01S	DOW8	
→PER.8→WED.8	Wednesday Select		NO/YES		forcible	OCCP01S	DOW8	
→PER.8→THU.8	Thursday Select		NO/YES		forcible	OCCP01S	DOW8	
→PER.8→FRI.8	Friday Select		NO/YES		forcible	OCCP01S	DOW8	
→PER.8→SAT.8	Saturday Select		NO/YES		forcible	OCCP01S	DOW8	
→PER.8→SUN.8	Sunday Select		NO/YES		forcible	OCCP01S	DOW8	
→PER.8→HOL.8	Holiday Select		NO/YES		forcible	OCCP01S	DOW8	
SCH2	SCHEDULE 2							32
→PER.1	Period 1 Occ/Unocc Sel							
→PER.1→OCC.1	Occupied Time	XX.XX	00.00-23.59		forcible	OCC2P02S	OCCTOD1	
→PER.1→UNO.1	Unoccupied Time	XX.XX	00.00-23.59		forcible	OCC2P02S	UNOCTOD1	
→PER.1→MON.1	Monday Select		NO/YES		forcible	OCC2P02S	DOW1	
→PER.1→TUE.1	Tuesday Select		NO/YES		forcible	OCC2P02S	DOW1	
→PER.1→WED.1	Wednesday Select		NO/YES		forcible	OCC2P02S	DOW1	
→PER.1→THU.1	Thursday Select		NO/YES		forcible	OCC2P02S	DOW1	
→PER.1→FRI.1	Friday Select		NO/YES		forcible	OCC2P02S	DOW1	
→PER.1→SAT.1	Saturday Select		NO/YES		forcible	OCC2P02S	DOW1	
→PER.1→SUN.1	Sunday Select		NO/YES		forcible	OCC2P02S	DOW1	
→PER.1→HOL.1	Holiday Select		NO/YES		forcible	OCC2P02S	DOW1	
→PER.2	Period 2 Occ/Unocc Sel							
→PER.2→OCC.2	Occupied Time	XX.XX	00.00-23.59		forcible	OCC2P02S	OCCTOD	
→PER.2→UNO.2	Unoccupied Time	XX.XX	00.00-23.59		forcible	OCC2P02S	UNOCTOD2	
→PER.2→MON.2	Monday Select		NO/YES		forcible	OCC2P02S	DOW2	
→PER.2→TUE.2	Tuesday Select		NO/YES		forcible	OCC2P02S	DOW2	
→PER.2→WED.2	Wednesday Select		NO/YES		forcible	OCC2P02S	DOW2	
→PER.2→THU.2	Thursday Select		NO/YES		forcible	OCC2P02S	DOW2	
→PER.2→FRI.2	Friday Select		NO/YES		forcible	OCC2P02S	DOW2	
→PER.2→SAT.2	Saturday Select		NO/YES		forcible	OCC2P02S	DOW2	
→PER.2→SUN.2	Sunday Select		NO/YES		forcible	OCC2P02S	DOW2	
→PER.2→HOL.2	Holiday Select		NO/YES		forcible	OCC2P02S	DOW2	
→PER.3	Period 3 Occ/Unocc Sel							
→PER.3→OCC.3	Occupied Time	XX.XX	00.00-23.59		forcible	OCC2P02S	OCCTOD	
→PER.3→UNO.3	Unoccupied Time	XX.XX	00.00-23.59		forcible	OCC2P02S	UNOCTOD3	
→PER.3→MON.3	Monday Select		NO/YES		forcible	OCC2P02S	DOW3	
→PER.3→TUE.3	Tuesday Select		NO/YES		forcible	OCC2P02S	DOW3	
→PER.3→WED.3	Wednesday Select		NO/YES		forcible	OCC2P02S	DOW3	
→PER.3→THU.3	Thursday Select		NO/YES		forcible	OCC2P02S	DOW3	
→PER.3→FRI.3	Friday Select		NO/YES		forcible	OCC2P02S	DOW3	
→PER.3→SAT.3	Saturday Select		NO/YES		forcible	OCC2P02S	DOW3	
→PER.3→SUN.3	Sunday Select		NO/YES		forcible	OCC2P02S	DOW3	
→PER.3→HOL.3	Holiday Select		NO/YES		forcible	OCC2P02S	DOW3	
→PER.4	Period 4 Occ/Unocc Sel							
→PER.4→OCC.4	Occupied Time	XX.XX	00.00-23.59		forcible	OCC2P02S	OCCTOD4	
→PER.4→UNO.4	Unoccupied Time	XX.XX	00.00-23.59		forcible	OCC2P02S	UNOCTOD4	
→PER.4→MON.4	Monday Select		NO/YES		forcible	OCC2P02S	DOW4	
→PER.4→TUE.4	Tuesday Select		NO/YES		forcible	OCC2P02S	DOW4	
→PER.4→WED.4	Wednesday Select		NO/YES		forcible	OCC2P02S	DOW4	
→PER.4→THU.4	Thursday Select		NO/YES		forcible	OCC2P02S	DOW4	
→PER.4→FRI.4	Friday Select		NO/YES		forcible	OCC2P02S	DOW4	
→PER.4→SAT.4	Saturday Select		NO/YES		forcible	OCC2P02S	DOW4	
→PER.4→SUN.4	Sunday Select		NO/YES		forcible	OCC2P02S	DOW4	
→PER.4→HOL.4	Holiday Select		NO/YES		forcible	OCC2P02S	DOW4	
→PER.5	Period 5 Occ/Unocc Sel							
→PER.5→OCC.5	Occupied Time	XX.XX	00.00-23.59		forcible	OCC2P02S	OCCTOD5	
→PER.5→UNO.5	Unoccupied Time	XX.XX	00.00-23.59		forcible	OCC2P02S	UNOCTOD5	
→PER.5→MON.5	Monday Select		NO/YES		forcible	OCC2P02S	DOW5	
→PER.5→TUE.5	Tuesday Select		NO/YES		forcible	OCC2P02S	DOW5	
→PER.5→WED.5	Wednesday Select		NO/YES		forcible	OCC2P02S	DOW5	
→PER.5→THU.5	Thursday Select		NO/YES		forcible	OCC2P02S	DOW5	
→PER.5→FRI.5	Friday Select		NO/YES		forcible	OCC2P02S	DOW5	
→PER.5→SAT.5	Saturday Select		NO/YES		forcible	OCC2P02S	DOW5	
→PER.5→SUN.5	Sunday Select		NO/YES		forcible	OCC2P02S	DOW5	
→PER.5→HOL.5	Holiday Select		NO/YES		forcible	OCC2P02S	DOW5	
→PER.6	Period 6 Occ/Unocc Sel							
→PER.6→OCC.6	Occupied Time	XX.XX	00.00-23.59		forcible	OCC2P02S	OCCTOD6	
→PER.6→UNO.6	Unoccupied Time	XX.XX	00.00-23.59		forcible	OCC2P02S	UNOCTOD6	
→PER.6→MON.6	Monday Select		NO/YES		forcible	OCC2P02S	DOW6	
→PER.6→TUE.6	Tuesday Select		NO/YES		forcible	OCC2P02S	DOW6	
→PER.6→WED.6	Wednesday Select		NO/YES		forcible	OCC2P02S	DOW6	
→PER.6→THU.6	Thursday Select		NO/YES		forcible	OCC2P02S	DOW6	
→PER.6→FRI.6	Friday Select		NO/YES		forcible	OCC2P02S	DOW6	
→PER.6→SAT.6	Saturday Select		NO/YES		forcible	OCC2P02S	DOW6	
→PER.6→SUN.6	Sunday Select		NO/YES		forcible	OCC2P02S	DOW6	
→PER.6→HOL.6	Holiday Select		NO/YES		forcible	OCC2P02S	DOW6	

APPENDIX A — LOCAL DISPLAY TABLES (cont)

MODE — TIMECLOCK (cont)

ITEM	EXPANSION	UNITS	RANGE	COMMENT	WRITE STATUS	CCN TABLE	CCN POINT	PAGE NO.
→***PER.7***	Period 7 Occ/Unocc Sel							
→***PER.7***→***OCC.7***	Occupied Time	XX.XX	00.00-23.59		forcible	OCC2P02S	OCCTOD7	
→***PER.7***→***UNO.7***	Unoccupied Time	XX.XX	00.00-23.59		forcible		UNOCTOD7	
→***PER.7***→***MON.7***	Monday Select		NO/YES		forcible		DOW7	
→***PER.7***→***TUE.7***	Tuesday Select		NO/YES		forcible		DOW7	
→***PER.7***→***WED.7***	Wednesday Select		NO/YES		forcible		DOW7	
→***PER.7***→***THU.7***	Thursday Select		NO/YES		forcible		DOW7	
→***PER.7***→***FRI.7***	Friday Select		NO/YES		forcible		DOW7	
→***PER.7***→***SAT.7***	Saturday Select		NO/YES		forcible		DOW7	
→***PER.7***→***SUN.7***	Sunday Select		NO/YES		forcible		DOW7	
→***PER.7***→***HOL.7***	Holiday Select		NO/YES		forcible		DOW7	
→***PER.8***	Period 8 Occ/Unocc Sel							
→***PER.8***→***OCC.8***	Occupied Time	XX.XX	00.00-23.59		forcible		OCCTOD8	
→***PER.8***→***UNO.8***	Unoccupied Time	XX.XX	00.00-23.59		forcible		UNOCTOD8	
→***PER.8***→***MON.8***	Monday Select		NO/YES		forcible		DOW8	
→***PER.8***→***TUE.8***	Tuesday Select		NO/YES		forcible		DOW8	
→***PER.8***→***WED.8***	Wednesday Select		NO/YES		forcible		DOW8	
→***PER.8***→***THU.8***	Thursday Select		NO/YES		forcible		DOW8	
→***PER.8***→***FRI.8***	Friday Select		NO/YES		forcible		DOW8	
→***PER.8***→***SAT.8***	Saturday Select		NO/YES		forcible		DOW8	
→***PER.8***→***SUN.8***	Sunday Select		NO/YES		forcible		DOW8	
→***PER.8***→***HOL.8***	Holiday Select		NO/YES		forcible		DOW8	
HOLI	HOLIDAYS							
→***HOL.1***	Holiday 1 Configuration							
→***HOL.1***→***MON.1***	Holiday Start Month		1=January 2=February 3=March 4=April 5=May 6=June 7=July 8=August 9=September 10=October 11=November 12=December		forcible	HOLDY_01	HOL_MON	
→***HOL.1***→***DAY.1***	Holiday Start Day	XX	1 to 31		forcible	HOLDY_01	HOL_DAY	
→***HOL.1***→***DUR.1***	Holiday Duration in Days	XX	1 to 99		forcible	HOLDY_01	HOL_LEN	
→***HOL.1***→***HOL.2***	Holiday 2 Configuration							
→***HOL.1***→***MON.2***	Holiday Start Month		See HOL.1→MON.1		forcible	HOLDY_02	HOL_MON	
→***HOL.2***→***DAY.2***	Holiday Start Day		See HOL.1→DAY.1		forcible	HOLDY_02	HOL_DAY	
→***HOL.2***→***DUR.2***	Holiday Duration in Days		See HOL.1→DUR.1		forcible	HOLDY_02	HOL_LEN	
→***HOL.9***	Holiday 9 Configuration							
→***HOL.9***→***MON.9***	Holiday Start Month		See HOL.1→MON.1		forcible	HOLDY_09	HOL_MON	
→***HOL.9***→***DAY.9***	Holiday Start Day		See HOL.1→DAY.1		forcible	HOLDY_09	HOL_DAY	
→***HOL.9***→***DUR.9***	Holiday Duration in Days		See HOL.1→DUR.1		forcible	HOLDY_09	HOL_LEN	
→***HOL.10***→***HO.10***	Holiday 10 Configuration							
→***HOL.10***→***MO.10***	Holiday Start Month		See HOL.1→MON.1		forcible	HOLDY_09		
→***HOL.10***→***DA.10***	Holiday Start Day		See HOL.1→DAY.1		forcible	HOLDY_09		
→***HOL.10***→***DU.10***	Holiday Duration in Days		See HOL.1→DUR.1		forcible	HOLDY_09		
→***HOL.16***→***HO.16***	Holiday 16 Configuration							
→***HOL.16***→***MO.16***	Holiday Start Month		See HOL.1→MON.1		forcible	HOLDY_16		
→***HOL.16***→***DA.16***	Holiday Start Day		See HOL.1→DAY.1		forcible			
→***HOL.16***→***DU.16***	Holiday Duration in Days		See HOL.1→DUR.1		forcible			
MCFG	SERVICE MAINTENANCE CONFIGURATION							44
→***AL.SV***	Service Warning Select		NO/YES		forcible*	MAINTCFG	s_alert	
→***CHRG***	Refrigerant Charge		NO/YES		forcible*	MAINTCFG	charge_a	
→***WATE***	Water Loop Size		NO/YES		forcible*	MAINTCFG	wloop_c	
→***PMP.1***	Pump 1	XXXX (days)	0-65,500		forcible†	MAINTCFG	pump1_c	
→***PMP.2***	Pump 2	XXXX (days)	0-65,500		forcible†	MAINTCFG	pump2_c	
→***PMP.C***	Cond Pump	XXXX (days)	0-65,500	Not supported.	forcible†	MAINTCFG	hpump_c	
→***W.FIL***	Water Filter	XXXX (days)			forcible†	MAINTCFG	wfilte_c	
→***RS.SV***	Servicing Alert Reset		0=Default 1=Refrigerant Charge 2=Water loop size 3=Not used 4=Pump 1 5=Pump 2 6=Reclaim Pump (not used) 7=Water filter 8=Reset all		forcible†	SERMAINT	s_reset	

*Default=NO.
†Default=0.

APPENDIX A — LOCAL DISPLAY TABLES (cont)

MODE — OPERATING MODE

ITEM	EXPANSION	UNITS	RANGE	COMMENT	WRITE STATUS	CCN TABLE	CCN POINT	PAGE NO.
SLCT	OPERATING CONTROL TYPE							
→***OPER***	Operating Control Type		0=Switch Ctrl 1=Time Sched 2=CCN Control	Default = 0	forcible	N/A	N/A	32
→***SP.SE***	Setpoint Select		0=Setpoint Occ 1=Setpoint1 2=Setpoint2 3=4-20mA Setp 4=Dual Setp Sw	Default = 0	forcible	N/A	N/A	33
→***HC.SE***	Heat Cool Select		0=Cooling 1=Heating 2=Auto Chgover 3=Heat Cool Sw	Default = 0 1-3 not supported.	forcible	GENUNIT	HC_SEL	
→***RL.SE***	Reclaim Select		0=No 1=Yes 2=Switch Ctrl	Default = 0 1 and 2 not supported.	forcible	GENUNIT	RECL_SET	
MODE	OPERATING MODES							
→***MD01***	Startup Delay in Effect		OFF/ON			MODES	MODE_01	33, 46
→***MD02***	Second Setpoint in Use		OFF/ON			MODES	MODE_02	46
→***MD03***	Reset in Effect		OFF/ON			MODES	MODE_03	46
→***MD04***	Demand Limit Active		OFF/ON			MODES	MODE_04	46
→***MD05***	Ramp Loading Active		OFF/ON			MODES	MODE_05	46
→***MD06***	Cooler Heater Active		OFF/ON			MODES	MODE_06	47
→***MD07***	Water Pump Rotation		OFF/ON			MODES	MODE_07	47
→***MD08***	Pump Periodic Start		OFF/ON			MODES	MODE_08	47
→***MD09***	Night Low Noise Active		OFF/ON			MODES	MODE_09	47
→***MD10***	System Manager Active		OFF/ON			MODES	MODE_10	47
→***MD11***	Mast Slave Ctrl Active		OFF/ON			MODES	MODE_11	47
→***MD12***	Auto Changeover Active		OFF/ON	Not supported.		MODES	MODE_12	48
→***MD13***	Free Cooling Active		OFF/ON	Not supported.		MODES	MODE_13	48
→***MD14***	Reclaim Active		OFF/ON	Not supported.		MODES	MODE_14	48
→***MD15***	Electric Heat Active		OFF/ON	Not supported.		MODES	MODE_15	48
→***MD16***	Heating Low EWT Lockout		OFF/ON	Not supported.		MODES	MODE_16	48
→***MD17***	Boiler Active		OFF/ON	Not supported.		MODES	MODE_17	48
→***MD18***	Ice Mode in Effect		OFF/ON			MODES	MODE_18	48
→***MD19***	Defrost Active on Cir A		OFF/ON	Not supported.		MODES	MODE_19	48
→***MD20***	Defrost Active on Cir B		OFF/ON	Not supported.		MODES	MODE_20	48
→***MD21***	Low Suction Circuit A		OFF/ON			MODES	MODE_21	48
→***MD22***	Low Suction Circuit B		OFF/ON			MODES	MODE_22	48
→***MD23***	Low Suction Circuit C		OFF/ON			MODES	MODE_23	48
→***MD24***	High DGT Circuit A		OFF/ON			MODES	MODE_24	48
→***MD25***	High DGT Circuit B		OFF/ON			MODES	MODE_25	48
→***MD26***	High DGT Circuit C		OFF/ON			MODES	MODE_26	48
→***MD27***	High Pres Override Cir A		OFF/ON			MODES	MODE_27	48
→***MD28***	High Pres Override Cir B		OFF/ON			MODES	MODE_28	48
→***MD29***	High Pres OVerride Cir C		OFF/ON			MODES	MODE_29	48
→***MD30***	Low Superheat Circuit A		OFF/ON			MODES	MODE_30	49
→***MD31***	Low Superheat Circuit B		OFF/ON			MODES	MODE_31	49
→***MD32***	Low Superheat Circuit C		OFF/ON			MODES	MODE_32	49

NOTE: See operating modes starting on page 46.

MODE — ALARMS

ITEM	EXPANSION*	UNITS	RANGE	COMMENT	WRITE STATUS	CCN TABLE	CCN POINT	PAGE NO.
R.ALM	RESET CURRENT ALARMS				forcible	N/A	N/A	
ALRM†	CURRENT ALARMS							
	Current Alarm 1					GENUNIT	alarm_1	
	Current Alarm 2					GENUNIT	alarm_2	
	Current Alarm 3					GENUNIT	alarm_3	
	Current Alarm 4					GENUNIT	alarm_4	
	Current Alarm 5					GENUNIT	alarm_5	
H.ALM*	ALARM HISTORY							
	Alarm History #1					ALRMHIST	alm_history_01	
	Alarm History #2					ALRMHIST	alm_history_02	
						ALRMHIST		
	Alarm History #29					ALRMHIST	alm_history_29	
	Alarm History #30					ALRMHIST	alm_history_30	

*Expanded display will be actual alarm expansion.
†History of up to five past alarms will be displayed.
**History of thirty past alarms will be displayed.

APPENDIX B — CCN TABLES

STATUS DISPLAY TABLES

TABLE	DISPLAY NAME	RANGE	UNITS	POINT NAME	WRITE STATUS
CIRCA_AN	CIRCUIT A ANALOG VALUES				
	Percent Total Capacity	0 - 100	%	CAPA_T	
	Discharge Pressure	nnn.n	psi	DP_A	
	Suction Pressure	nnn.n	psi	SP_A	
	Crank Heater Current Cp1	nnn.n	AMPS	cpa1_cur	
	Crank Heater Current Cp2	nnn.n	AMPS	cpa2_cur	
	Crank Heater Current Cp3	nnn.n	AMPS	cpa3_cur	
	Crank Heater Current Cp4	nnn.n	AMPS	cpa4_cur	
	Motor Thermistor Comp 1	nnnn		cpa1_tmp	
	Motor Thermistor Comp 2	nnnn		cpa2_tmp	
	Motor Thermistor Comp 3	nnnn		cpa3_tmp	
	Motor Thermistor Comp 4	nnnn		cpa4_tmp	
	Saturated Condensing Tmp	±nnn.n	°F	SCT_A	
	Saturated Suction Temp	±nnn.n	°F	SST_A	
	Suction Gas Temp	±nnn.n	°F	SUCT_T_A	
	Suction Superheat Temp	±nnn.n	^F	SH_A	
	EXV Position	0 - 100	%	EXV_A	
	Head Press Actuator Pos	0 - 100	%	hd_pos_a	
CIRCA_D	CIRCUIT A DISCRETE				
	Compressor 1 Output	On/Off		CP_A1	
	Compressor 2 Output	On/Off		CP_A2	
	Compressor 3 Output	On/Off		CP_A3	
	Compressor 4 Output	On/Off		CP_A4	
	Compressor 1 Heater Out	On/Off		cp_a1_ht	
	Compressor 2 Heater Out	On/Off		cp_a2_ht	
	Compressor 3 Heater Out	On/Off		cp_a3_ht	
	Compressor 4 Heater Out	On/Off		cp_a4_ht	
	Hot Gas Bypass Output	On/Off		HGBP_V_A	
	FANS OUTPUT				
	Fan Output DO # 1	On/Off		fan_a1	
	Fan Output DO # 2	On/Off		fan_a2	
	Fan Output DO # 3	On/Off		fan_a3	
	Fan Output DO # 4	On/Off		fan_a4	
	Fan Output DO # 5	On/Off		fan_a5	
	Fan Output DO # 6	On/Off		fan_a6	
	Fan Staging Number	0-6		FAN_ST_A	
	FREE COOLING OUTPUT				
	Refrigerant Pump Out	On/Off		FR_PMP_A	
	Circuit Heater Output	On/Off		FR_HEATA	
	4 Way Refrigerant Valve	On/Off		RV_A	
CIRCB_AN	CIRCUIT B ANALOG VALUES				
	Percent Total Capacity	0 - 100	%	CAPB_T	
	Discharge Pressure	nnn.n	psi	DP_B	
	Suction Pressure	nnn.n	psi	SP_B	
	Crank Heater Current Cp1	nnn.n	AMPS	cpb1_cur	
	Crank Heater Current Cp2	nnn.n	AMPS	cpb2_cur	
	Crank Heater Current Cp3	nnn.n	AMPS	cpb3_cur	
	Crank Heater Current Cp4	nnn.n	AMPS	cpb4_cur	
	Motor Thermistor Comp 1	nnnn		cpb1_tmp	
	Motor Thermistor Comp 2	nnnn		cpb2_tmp	
	Motor Thermistor Comp 3	nnnn		cpb3_tmp	
	Motor Thermistor Comp 4	nnnn		cpb4_tmp	
	Saturated Condensing Tmp	±nnn.n	°F	SCT_B	
	Saturated Suction Temp	±nnn.n	°F	SST_B	
	Suction Gas Temp	±nnn.n	°F	SUCT_T_B	
	Suction Superheat Temp	±nnn.n	^F	SH_B	
	EXV Position	0-100	%	EXV_B	
	Head Press Actuator Pos	0-100	%	hd_pos_b	
CIRCB_D	CIRCUIT B DISCRETE				
	Compressor 1 Output	On/Off		CP_B1	
	Compressor 2 Output	On/Off		CP_B2	
	Compressor 3 Output	On/Off		CP_B3	
	Compressor 4 Output	On/Off		CP_B4	
	Compressor 1 Heater Out	On/Off		cp_b1_ht	
	Compressor 2 Heater Out	On/Off		cp_b2_ht	
	Compressor 3 Heater Out	On/Off		cp_b3_ht	
	Compressor 4 Heater Out	On/Off		cp_b4_ht	
	Hot Gas Bypass Output	On/Off		HGBP_V_B	
	FANS OUTPUT				
	Fan Output DO # 1	On/Off		fan_b1	
	Fan Output DO # 2	On/Off		fan_b2	
	Fan Output DO # 3	On/Off		fan_b3	
	Fan Output DO # 4	On/Off		fan_b4	
	Fan Output DO # 5	On/Off		fan_b5	
	Fan Output DO # 6	On/Off		fan_b6	
	Fan Staging Number	0-6		FAN_ST_B	
	FREE COOLING OUTPUT				
	Refrigerant Pump Out	On/Off		FR_PMP_B	
	Circuit Heater Output	On/Off		FR_HEATB	
	4 Way Refrigerant Valve	On/Off		RV_B	

APPENDIX B — CCN TABLES (cont)

STATUS DISPLAY TABLES (cont)

TABLE	DISPLAY NAME	RANGE	UNITS	POINT NAME	WRITE STATUS
CIRCC_AN	CIRCUIT C ANALOG VALUES				
	Percent Total Capacity	0-100	%	CAPC_T	
	Discharge Pressure	nnn.n	psi	DP_C	
	Suction Pressure	nnn.n	psi	SP_C	
	Crank Heater Current Cp1	nnn.n	AMPS	cpc1_cur	
	Crank Heater Current Cp2	nnn.n	AMPS	cpc2_cur	
	Crank Heater Current Cp3	nnn.n	AMPS	cpc3_cur	
	Crank Heater Current Cp4	nnn.n	AMPS	cpc4_cur	
	Motor Thermistor Comp 1	nnnn		cpc1_tmp	
	Motor Thermistor Comp 2	nnnn		cpc2_tmp	
	Motor Thermistor Comp 3	nnnn		cpc3_tmp	
	Motor Thermistor Comp 4	nnnn		cpc4_tmp	
	Saturated Condensing Tmp	±nnn.n	°F	SCT_C	
	Saturated Suction Temp	±nnn.n	°F	SST_C	
	Suction Gas Temp	±nnn.n	°F	SUCT_T_C	
	Suction Superheat Temp	±nnn.n	^F	SH_C	
	EXV Position	0-100	%	EXV_C	
	Head Press Actuator Pos	0-100	%	hd_pos_c	
CIRCC_D	CIRCUIT C DISCRETE				
	Compressor 1 Output	On/Off		CP_C1	
	Compressor 2 Output	On/Off		CP_C2	
	Compressor 3 Output	On/Off		CP_C3	
	Compressor 4 Output	On/Off		CP_C4	
	Compressor 1 Heater Out	On/Off		cp_c1_ht	
	Compressor 2 Heater Out	On/Off		cp_c2_ht	
	Compressor 3 Heater Out	On/Off		cp_c3_ht	
	Compressor 4 Heater Out	On/Off		cp_c4_ht	
	Hot Gas Bypass Output	On/Off		HGBP_V_C	
	FANS OUTPUT				
	Fan Output DO # 1	On/Off		fan_c1	
	Fan Output DO # 2	On/Off		fan_c2	
	Fan Output DO # 3	On/Off		fan_c3	
	Fan Output DO # 4	On/Off		fan_c4	
	Fan Output DO # 5	On/Off		fan_c5	
	Fan Output DO # 6	On/Off		fan_c6	
	Fan Staging Number	0-6		FAN_ST_C	
	FREE COOLING OUT				
	Refrigerant Pump Out	On/Off		FR_PMP_C	
	Circuit Heater Output	On/Off		FR_HEATC	
FANHOURS	FAN OPERATING HOURS				
	Circuit A Fan #1 Hours	nnnnn	hours	hr_fana1	
	Circuit A Fan #2 Hours	nnnnn	hours	hr_fana2	
	Circuit A Fan #3 Hours	nnnnn	hours	hr_fana3	
	Circuit A Fan #4 Hours	nnnnn	hours	hr_fana4	
	Circuit A Fan #5 Hours	nnnnn	hours	hr_fana5	
	Circuit A Fan #6 Hours	nnnnn	hours	hr_fana6	
	Circuit B Fan #1 Hours	nnnnn	hours	hr_fanb1	
	Circuit B Fan #2 Hours	nnnnn	hours	hr_fanb2	
	Circuit B Fan #3 Hours	nnnnn	hours	hr_fanb3	
	Circuit B Fan #4 Hours	nnnnn	hours	hr_fanb4	
	Circuit B Fan #5 Hours	nnnnn	hours	hr_fanb5	
	Circuit B Fan #6 Hours	nnnnn	hours	hr_fanb6	
	Circuit C Fan #1 Hours	nnnnn	hours	hr_fanc1	
	Circuit C Fan #2 Hours	nnnnn	hours	hr_fanc2	
	Circuit C Fan #3 Hours	nnnnn	hours	hr_fanc3	
	Circuit C Fan #4 Hours	nnnnn	hours	hr_fanc4	
	Circuit C Fan #5 Hours	nnnnn	hours	hr_fanc5	
	Circuit C Fan #6 Hours	nnnnn	hours	hr_fanc6	
	WATER PUMPS				
	Water Pump #1 Hours	nnnnn	hours	hr_cpum1	
	Water Pump #2 Hours	nnnnn	hours	hr_cpum2	
	Heat Reclaim Pump Hours	nnnnn	hours	hr_hpump	

APPENDIX B — CCN TABLES (cont)

STATUS DISPLAY TABLES (cont)

TABLE	DISPLAY NAME	RANGE	UNITS	POINT NAME	WRITE STATUS
GENUNIT	Control Type	Local CCN Remote		ctr_type	
	Run Status	0 = Off 1 = Running 2 = Stopping 3 = Delay 4 = Tripout 5 = Ready 6 = Override 7 = Defrost 8 = Run Test 9 = Test		STATUS	
	CCN Chiller Start/Stop	Enable/Disable		CHIL_S_S	forcible
	Chiller Occupied?	Yes/No		CHIL_OCC	forcible
	Minutes Left for Start	0-15	min	min_left	
	Heat/Cool Status	0 = Cool 1 = Heat 2 = Stand-by 3 = Both		HEATCOOL	
	Heat/Cool Select	0 = Cool 1 = Heat 2 = Auto		HC_SEL	forcible
	Heat Reclaim Select	Yes/No		RECL_SEL	forcible
	Alarm State	0 Normal 1 Partial 2 Shutdown		ALM	
	Current Alarm 1	nnnnn		alarm_1	
	Current Alarm 2	nnnnn		alarm_2	
	Current Alarm 3	nnnnn		alarm_3	
	Current Alarm 4	nnnnn		alarm_4	
	Current Alarm 5	nnnnn		alarm_5	
	Percent Total Capacity	nnn	%	CAP_T	
	Active Demand Limit Val	nnn	%	DEM_LIM	forcible
	Lag Capacity Limit Value	nnn	%	LAG_LIM	
	Current Setpoint	±nnn.n	°F	SP	
	Setpoint Occupied	Yes/No		SP_OCC	forcible
	Setpoint Control	Setpt 1 Setpt 2 Ice_sp 4-20mA Auto		sp_ctrl	
	Control Point	±nnn.n	°F	CTRL_PNT	forcible
	Controlled Water Temp	±nnn.n	°F	CTRL_WT	
	External Temperature	±nnn.n	°F	OAT	
	Emergency Stop	Enable/Emstop		EMSTOP	forcible
MODES	Startup Delay in Effect	Yes/No	—	Mode_01	
	Second Setpoint in Use	Yes/No	—	Mode_02	
	Reset in Effect	Yes/No	—	Mode_03	
	Demand Limit Active	Yes/No	—	Mode_04	
	Ramp Loading Active	Yes/No	—	Mode_05	
	Cooler Heater Active	Yes/No	—	Mode_06	
	Cooler Pumps Rotation	Yes/No	—	Mode_07	
	Pump Periodic Start	Yes/No	—	Mode_08	
	Night Low Noise Active	Yes/No	—	Mode_09	
	System Manager Active	Yes/No	—	Mode_10	
	Master Slave Active	Yes/No	—	Mode_11	
	Auto Changeover Active	Yes/No	—	Mode_12	
	Free Cooling Active	Yes/No	—	Mode_13	
	Reclaim Active	Yes/No	—	Mode_14	
	Electric Heat Active	Yes/No	—	Mode_15	
	Heating Low EWT Lockout	Yes/No	—	Mode_16	
	Boiler Active	Yes/No	—	Mode_17	
	Ice Mode in Effect	Yes/No	—	Mode_18	
	Defrost Active On Cir A	Yes/No	—	Mode_19	
	Defrost Active On Cir B	Yes/No	—	Mode_20	
	Low Suction Circuit A	Yes/No	—	Mode_21	
	Low Suction Circuit B	Yes/No	—	Mode_22	
	Low Suction Circuit C	Yes/No	—	Mode_23	
	High DGT Circuit A	Yes/No	—	Mode_24	
	High DGT Circuit B	Yes/No	—	Mode_25	
	High DGT Circuit C	Yes/No	—	Mode_26	
	High Pres Override Cir A	Yes/No	—	Mode_27	
	High Pres Override Cir B	Yes/No	—	Mode_28	
	High Pres Override Cir C	Yes/No	—	Mode_29	
	Low Superheat Circuit A	Yes/No	—	Mode_30	
	Low Superheat Circuit B	Yes/No	—	Mode_31	
	Low Superheat Circuit C	Yes/No	—	Mode_32	

APPENDIX B — CCN TABLES (cont)

STATUS DISPLAY TABLES (cont)

TABLE	DISPLAY NAME	RANGE	UNITS	POINT NAME	WRITE STATUS
RECLAIM	Heat Reclaim Select	Yes/no		RECL_SEL	
	Reclaim Condenser Pump	On/Off		CONDPUMP	
	Reclaim Condenser Flow	On/Off		CONDFLOW	
	Reclaim Condenser Heater	On/Off		cond_htr	
	Reclaim Entering Fluid	±nnn.n	°F	HR_EWT	
	Reclaim Leaving Fluid	±nnn.n	°F	HR_LWT	
	Reclaim Fluid Setpoint	±nnn.n	°F	RSP	forcible
	Reclaim Valve Position	±nnn.n	%	hr_v_pos	
	Reclaim Status Circuit A	n		hrstat_a	
	Pumpdown Pressure Cir A	±nnn.n	psi	PD_P_A	
	Sub Condenser Temp Cir A	±nnn.n	°F	hr_subta	
	Pumdown Saturated Tmp A	±nnn.n	°F	hr_sat_a	
	Subcooling Temperature A	±nnn.n	^F	hr_subca	
	Air Cond Entering Valv A	On/Off		hr_ea_a	
	Water Cond Enter Valve A	On/Off		hr_ew_a	
	Air Cond Leaving Valve A	On/Off		hr_la_a	
	Water Cond Leaving Val A	On/Off		hr_lw_a	
	Heat Reclaim Circuit B				
	Reclaim Status Circuit B	n		hrstat_b	
	Pumpdown Pressure Cir B	±nnn.n	psi	PD_P_B	
	Sub Condenser Temp Cir B	±nnn.n	°F	hr_subtb	
	Pumdown Saturated Tmp B	±nnn.n	°F	hr_sat_b	
	Subcooling Temperature B	±nnn.n	^F	hr_subcb	
	Air Cond Entering Valv B	On/Off		hr_ea_b	
	Water Cond Enter Valve B	On/Off		hr_ew_b	
	Air Cond Leaving Valve B	On/Off		hr_la_b	
	Water Cond Leaving Val B	On/Off		hr_lw_b	
STATEGEN	UNIT DISCRETE IN				
	On/Off – Remote Switch	Open/Close		ONOFF_SW	
	Remote Heat/Cool Switch	Open/Close		HC_SW	
	Current Control	Off, On Cool, On Heat, On Auto		on_ctrl	
	Remote Reclaim Switch	Open/Close		RECL_SW	
	Remote Setpoint Switch	Open/Close		SETP_SW	
	Limit Switch 1 Status	Open/Close		LIM_SW1	
	Limit Switch 2 Status	Open/Close		LIM_SW2	
	Occupied Override Switch	Open/Close		OCC_OVSW	
	Ice Done Storage Switch	Open/Close		ICE_SW	
	Interlock Status	Open/Close		LOCK_1	
	Pump Run Status	Open/Close		PUMP_DEF	
	Remote Interlock Status	Open/Close		REM_LOCK	
	Electrical Box Safety	Open/Close		ELEC_BOX	
	UNIT DISCRETE OUT				
	Electrical Heat Stage	0-4/Off		EHS_STEP	
	Boiler Command	On/Off		BOILER	
	Water Pump #1 Command	On/Off		CPUMP_1	forcible
	Water Pump #2 Command	On/Off		CPUMP_2	forcible
	Rotate Pumps Now	Yes/No		ROT_PUMP	forcible
	Reclaim Condenser Pump	On/Off		COND_PMP	forcible
	Cooler Heater Command	On/Off		COOLHEAT	
	Shutdown Indicator State	On/Off		SHUTDOWN	
	Alarm Relay Status	On/Off		ALARMOUT	
	Alert Relay Status	On/Off		ALERT	
	Ready or Running Status	On/Off		READY	
	Running Status	On/Off		RUNNING	
	UNIT ANALOG				
	Water Exchanger Entering	±nnn.n	°F	EWT	
	Water Exchanger Leaving	±nnn.n	°F	LWT	
	Optional Space Temp	±nnn.n	°F	SPACETMP	
	CHWS Temperature	±nnn.n	°F	CHWSTEMP	
	Reset /Setpoint 4-20mA In	±nn.n	ma	SP_RESET	
	Limit 4-20mA Signal	±nn.n	ma	LIM_ANAL	
	Chiller Capacity Signal	±nn.n	volts	CAPT_010	

APPENDIX B — CCN TABLES (cont)

STATUS DISPLAY TABLES (cont)

TABLE	DISPLAY NAME	RANGE	UNITS	POINT NAME	WRITE STATUS
STRTHOUR	Machine Operating Hours	nnnnn	hours	HR_MACH	
	Machine Starts Number	nnnnn		st_mach	
	Compressor A1 Hours	nnnnn	hours	HR_CP_A1	
	Compressor A2 Hours	nnnnn	hours	HR_CP_A2	
	Compressor A3 Hours	nnnnn	hours	HR_CP_A3	
	Compressor A4 Hours	nnnnn	hours	HR_CP_A4	
	Compressor A1 Starts	nnnnn		st_cp_a1	
	Compressor A2 Starts	nnnnn		st_cp_a2	
	Compressor A3 Starts	nnnnn		st_cp_a3	
	Compressor A4 Starts	nnnnn		st_cp_a4	
	Compressor B1 Hours	nnnnn	hours	HR_CP_B1	
	Compressor B2 Hours	nnnnn	hours	HR_CP_B2	
	Compressor B3 Hours	nnnnn	hours	HR_CP_B3	
	Compressor B4 Hours	nnnnn	hours	HR_CP_B4	
	Compressor B1 Starts	nnnnn		st_cp_b1	
	Compressor B2 Starts	nnnnn		st_cp_b2	
	Compressor B3 Starts	nnnnn		st_cp_b3	
	Compressor B4 Starts	nnnnn		st_cp_b4	
	Compressor C1 Hours	nnnnn	hours	HR_CP_C1	
	Compressor C2 Hours	nnnnn	hours	HR_CP_C2	
	Compressor C3 Hours	nnnnn	hours	HR_CP_C3	
	Compressor C4 Hours	nnnnn	hours	HR_CP_C4	
	Compressor C1 Starts	nnnnn		st_cp_c1	
	Compressor C2 Starts	nnnnn		st_cp_c2	
	Compressor C4 Starts	nnnnn		st_cp_c3	
	Compressor C4 Starts	nnnnn		st_cp_c4	
	CYCLES				
	Starts Max During 1 Hour	nn		st_cp_mx	
	Starts/hr From Last 24 h	nn		st_cp_av	
	Circuit A Defrost Numer	nnnnn		nb_def_a	
	Circuit B Defrost Number	nnnnn		nb_def_b	

CONFIGURATION DISPLAY TABLES

TABLE	DISPLAY NAME	RANGE	DEFAULT	UNITS	POINT NAME
ALARMDEF	Alarm Routing Control	0-11111111	00000000		ALRM_CNT
	Alarm Equipment Priority	0-7	4		EQP_TYP
	Comm Failure Retry Time	1-240	10	min	RETRY_TM
	Realarm Time	1-255	30	min	RE_ALARM
	Alarm System Name	8 chars	PRO_RBRQ		ALRM_NAM
BRODEFS	Activate	0=Unused 1=Broadcast time, date, holiday flag and OAT (as like existing pro_dialog control). 2=For Standalone chiller. Daylight savings time & holiday determination will be done without broadcasting through the bus.	2	—	Ccnbroad
	OAT Broadcast				
		Bus # 0 to 239	0		Oatbusnm
		Element #0 to 239	0		Oatlocad
	DAYLIGHT SAVING SELECT	Disable/Enable	Disable		dayl_sel
	ENTERING				
	Month	1 to 12	3		Startmon
	Day of week* (1=Monday)	1 to 7	7		Startdow
	Week Number of Month†	1 to 5	5		Startwom
	LEAVING				
	Month	1 to 12	10		Stopmon
	Day of week* (1=Monday)	1 to 7	7		Stoptdow
	Week Number of Month†	1 to 5	5		stopwom

*Day of week where daylight savings time will occur in the morning (at 2:00 am). Daylight savings time occurs on Sunday (7) morning, 1 hour shall be added when entering and 1 hour subtracted when leaving.

†Date once selected (from 1) shall occur in the week number entered. 1: If day of week selected is 7 (Sunday) time change will occur the first Sunday (week number 1) in the month. 5: If day of week selected is 7 (Sunday) time change will occur the last Sunday of the month (week number 4 or 5).

APPENDIX B — CCN TABLES (cont)

CONFIGURATION DISPLAY TABLES (cont)

TABLE	DISPLAY NAME	RANGE	DEFAULT	UNITS	POINT NAME
Ctrl_ID	Device Name	8 chars	PD5_RBRQ		
	Description	24 chars	PRO-DIALOG 5 30RB&30HP		
	Location	24 chars			
	Software Part Number	16 chars	CSA-SR-20C4600NN		
	Model Number	20 chars			
	Serial Number	12 chars			
	Reference Number	24 chars			

NOTE: NN is software version.

TABLE	DISPLAY NAME	RANGE	DEFAULT	UNITS	POINT NAME
DISPCONF	Metric Display on STDU	Yes/No	No		DISPUNIT
	Language Selection	0=English 1=Espanol 2=Francais 3=Portugues 4=English2	0		LANGUAGE
FACTORY1	Unit Type	1 (Cooling Only), 2 (Heat Pump)	1		unit_typ
	Unit Capacity Model	56 to 300	192	tons	unitsize
	NB Fans on Varifan Cir A	0 to 6	0		varfan_a
	NB Fans on Varifan Cir B	0 to 6	0		varfan_b
	NB Fans on Varifan Cir C	0 to 6	0		varfan_c
	Air Cooled Reclaim Sel	Yes/No	No		recl_opt
	Free Cooling Select	Yes/No	No		freecool
	Electrical Heat Stages	0 to 4	0		ehs_sel
	Boiler Command Select	Yes/No	No		boil_sel
	Power Frequence 60HZ Sel	Yes/No	No		freq_60H
	Energy Management Module	Yes/No	No		emm_nrcp
	Hot Gas Bypass Select	0-Hot gas bypass valve (not used) 1=Used for Startup only 2=Close Control 3=High Ambient (if High pressure mode is active, close control shall be active)	0		hgbp_sel
	Pro_dialog Display Selec	No=Use *Comfort*Link™ display as user interface (factory installed) Yes=Use Pro_dialog synopsis as user interface (factory installed)	Yes		pd4_disp
	Factory Password	0 to 150	0111		fac_pass

NOTES:
1. Enter unit size. This item allows the controls to determine capacity of each compressor and the total number of fans on each circuit based on a compressor arrangement array (can be viewed in table FACTORY2). It is not necessary to enter compressor capacity and number of fans on each circuit. See the Unit Compressor Configuration table below as a reference.
2. Number of fans controlled directly by a variable speed fan actuator using 0 to 10 vdc signal. This will enable the controls to determine the remaining discrete fan staging outputs from the total fans on each circuit.
3. Used for compressor capacity and fans automatic determination (refer to the Unit Compressor Configuration table below).
4. Used for extra functions with the purpose of energy management such as occupancy override switch, ice storage, setpoint reset, and demand limit.

UNIT COMPRESSOR CONFIGURATION

30RB UNIT SIZE	cap_a1	cap_a2	cap_a3	cap_a4	cap_b1	cap_b2	cap_b3	cap_b4	cap_c1	cap_c2	cap_c3	cap_c4
060	20	20	0	0	20	0	0	0	0	0	0	0
070	25	25	0	0	20	0	0	0	0	0	0	0
080	20	20	0	0	20	20	0	0	0	0	0	0
090	25	25	0	0	20	20	0	0	0	0	0	0
100	25	25	0	0	25	25	0	0	0	0	0	0
110	25	25	0	0	20	20	20	0	0	0	0	0
120	25	25	0	0	25	25	25	0	0	0	0	0
130	25	25	25	0	20	20	20	0	0	0	0	0
150	25	25	25	0	25	25	25	0	0	0	0	0
160	25	25	25	25	20	20	20	0	0	0	0	0
170	25	25	25	25	25	25	25	0	0	0	0	0
190	25	25	25	25	25	25	25	25	0	0	0	0
210	25	25	25	0	20	20	20	0	25	25	25	0
225	25	25	25	0	25	25	25	0	25	25	25	0
250	25	25	25	0	25	25	25	0	25	25	25	25
275	25	25	25	25	25	25	25	25	25	25	25	0
300	25	25	25	25	25	25	25	25	25	25	25	25

APPENDIX B — CCN TABLES (cont)

CONFIGURATION DISPLAY TABLES (cont)

TABLE	DISPLAY NAME	RANGE	DEFAULT	UNITS	POINT NAME
FACTORY2	Compressor A1 Capacity	0 to 99	0		cap_a1
	Compressor A2 Capacity	0 to 99	0		cap_a2
	Compressor A3 Capacity	0 to 99	0		cap_a3
	Compressor A4 Capacity	0 to 99	0		cap_a4
	Compressor B1 Capacity	0 to 99	0		cap_b1
	Compressor B2 Capacity	0 to 99	0		cap_b2
	Compressor B3 Capacity	0 to 99	0		cap_b3
	Compressor B4 Capacity	0 to 99	0		cap_b4
	Compressor C1 Capacity	0 to 99	0		cap_c1
	Compressor C2 Capacity	0 to 99	0		cap_c2
	Compressor C3 Capacity	0 to 99	0		cap_c3
	Compressor C4 Capacity	0 to 99	0		cap_c4
	Circuit A Total Fans NB	2 to 6	0		nb_fan_a
	Circuit B Total Fans NB	2 to 6	0		nb_fan_b
	Circuit C Total Fans NB	0 to 6	0		nb_fan_c
	EXV A Maximum Steps Numb	0/15000	0=EXV not used		exva_max
	EXV B Maximum Steps Numb	0/15000	0		exvb_max
	EXV C Maximum Steps Numb	0/15000	0		exvc_max

NOTES:
1. Compressor capacity will be automatically be determined if unit size entered in FACTORY1 table matches the values in the unit compressor configuration table.
2. Total number of fans includes fans controlled by a variable speed fan. This value will be automatically populated if unit size entered in FACTORY1 table matches the values in the unit compressor configuration table.

TABLE	DISPLAY NAME	RANGE	DEFAULT	UNITS	POINT NAME
HOLIDAY/ HOLDY01S to HOLDY16S	Holiday Start Month	0-12	0		HOL_MON
	Start Day	0-31	0		HOL_DAY
	Duration (days)	0-99	0		HOL_LEN
MST_SLV	Master Slave Control				
	Master/Slave Select	0=Disable 1=Master 2=Slave	0		ms_sel
	Master Control Type	1=Local Control 2=Remote Control 3=CCN Control	1		ms_ctrl
	Slave Address	1 to 236	2		slv_addr
	Lag Start Timer	2 to 30	10	min	lstr_tim
	Lead/Lag Balance	Yes/No	No		ll_bal
	Lead/Lag Balance Delta	40 to 400	168	hours	ll_bal_d
	Lag Unit Pump Control	0=Stop if Unit Stops 1=Run if Unit Stops	0		lag_pump
	Lead Pulldown Time	0 to 60	0	minutes	lead_pul
OCCDEFCS/ OCCPC01S and OCCPC02S	Timed Override Hours	0-4	0		OVR_EXT
	Period 1 DOW (MTWTFSSH)	0/1	11111111		DOW1
	Occupied From	00:00-24:00	00:00		OCCTOD1
	Occupied To	00:00-24:00	24:00		UNOCTOD1
	Period 2 DOW (MTWTFSSH)	0/1	11111111		DOW1
	Occupied From	00:00-24:00	00:00		OCCTOD1
	Occupied To	00:00-24:00	00:00		UNOCTOD2
	Period 3 DOW (MTWTFSSH)	0/1	00000000		DOW3
	Occupied From	00:00-24:00	00:00		OCCTOD3
	Occupied To	00:00-24:00	00:00		UNOCTOD3
	Period 4 DOW (MTWTFSSH)	0/1	00000000		DOW4
	Occupied From	00:00-24:00	00:00		OCCTOD4
	Occupied To	00:00-24:00	00:00		UNOCTOD4
	Period 5 DOW (MTWTFSSH)	0/1	00000000		DOW5
	Occupied From	00:00-24:00	00:00		OCCTOD5
	Occupied To	00:00-24:00	00:00		UNOCTOD5
	Period 6 DOW (MTWTFSSH)	0/1	00000000		DOW6
	Occupied From	00:00-24:00	00:00		OCCTOD6
	Occupied To	00:00-24:00	00:00		UNOCTOD6
	Period 7 DOW (MTWTFSSH)	0/1	00000000		DOW7
	Occupied From	00:00-24:00	00:00		OCCTOD7
	Occupied To	00:00-24:00	00:00		UNOCTOD7
	Period 8 DOW (MTWTFSSH)	0/1	00000000		DOW8
	Occupied From	00:00-24:00	00:00		OCCTOD8
	Occupied To	00:00-24:00	00:00		UNOCTOD8

APPENDIX B — CCN TABLES (cont)

CONFIGURATION DISPLAY TABLES (cont)

TABLE	DISPLAY NAME	RANGE	DEFAULT	UNITS	POINT NAME
USER	Circuit Loading Sequence	0-3 0=Auto, 1=A Lead 2=B Lead, 3 =C Lead	0		lead_cir
	Staged Loading Sequence	No/Yes	No		seq_typ
	Ramp Loading Select	No/Yes	No		ramp_sel
	Unit Off to On Delay	1-15	1	Min	off_on_d
	Cooler Pumps Sequence	0-4 0=No Pump 1=One Pump Only 2=Two Pumps Auto 3=Pump#1 Manual 4=Pump#2 Manual	0		pump_seq
	Pump Auto Rotation Delay	24-3000	48	hours	pump_del
	Pump Sticking Protection	No/Yes	No		pump_per
	Stop Pump During Standby	No/Yes	No		pump_sby
	Flow Checked if Pump Off	No/Yes	Yes		pump_loc
	Auto Changeover Select	No/Yes	No		auto_sel
	Cooling Reset Select	0-4	0		cr_sel
	Heating Reset Select	0-4 1 =OAT, 0=None 2=Delta T, 3=4-20mA Control 4=Space Temp	0		hr_sel
	Demand Limit Type Select	0-2 0=None 1=Switch Control 2=4-20mA Control	0		lim_sel
	mA For 100% Demand Limit	0-20	0	ma	lim_mx
	mA For 0% Demand Limit	0-20	0	ma	lim_ze
	Heating OAT Threshold	-4-32	5	°F	heat_th
	Boiler OAT Threshold	5-59	14	°F	boil_th
	Free Cooling OAT Limit	-4-37.4	32	°F	free_oat
	HSM Both Commande Select	No/Yes	No		both_sel
	Elec Stage OAT Threshold	23-70	41	°F	ehs_th
	1 Elec Stage for backup	No/Yes	No		ehs_back
	Electrical Pulldown Time	0-60	0	minutes	ehs_pull
	Quick EHS for Defrost	No/Yes	No		ehs_defr
	NIGHT CONTROL				
	Start Hour	00:00-24:00	00:00		nh_start
	End Hour	00:00-24:00	00:00		nh_end
	Capacity Limit	0-100	100	%	nh_cnfg
	Ice Mode Enable	No/Yes	No		ice_cnfg
	Menu Description Select	No/Yes	Yes		menu_des
	Pass For All User Config	No/Yes	No		all_pass

NOTES:
1. Flow checked if pump off needed when a command is sent to the primary pump to prevent cooler from freezing in winter conditions. Command will set the cooler flow switch to closed while the controls stop the cooler pump. The controls may then generate an alarm. If this decision is active, the cooler flow switch is not checked when the cooler pump is stopped.
2. If cooling reset select set point has been selected the set point based on 4-20mA input signal through *Comfort*Link™ control, then a 4-20 mA reset function shall be ignored. Configuration 3 (4-20mA Control) and 4 (Space Temperature) shall require an Energy Management Module.
3. Configuration 2 (4-20mA Control) shall require an Energy Management Module. Configuration 1 Switch Demand limit provides 3 step demand limit if an Energy Management Module is present. Otherwise, only one step is allowed.

APPENDIX B — CCN TABLES (cont)

SETPOINT DISPLAY TABLES

TABLE	DISPLAY NAME	RANGE	DEFAULT	UNITS	POINT NAME
SETPOINT	COOLING				
	Cooling Setpoint 1	–20-70	44.0	°F	csp1
	Cooling Setpoint 2	–20-70	44.0	°F	csp2
	Cooling Ice Setpoinp	–20-70	44.0	°F	ice_sp
	OAT No Reset Value	14-125	14.0	°F	oatcr_no
	OAT Full Reset Value	14-125	14.0	°F	oatcr_fu
	Delta T No Reset Value	0-25	0.0	^F	dt_cr_no
	Delta T Full Reset Value	0-25	0.0	^F	dt_cr_fu
	Current No Reset Value	0-20	0.0	ma	v_cr_no
	Current Full Reset Value	0-20	0.0	ma	v_cr_fu
	Space T No Reset Value	14-125	14.0	°F	spacr_no
	SpaceT Full Reset Value	14-125	14.0	°F	spacr_fu
	Cooling Reset Deg. Value	–30-30	0.0	^F	cr_deg
	Cooling Ramp Loading	0.2-2.0	1.0	^F	cramp_sp
	HEATING				
	Heating Setpoint 1	80-140	100.0	°F	hsp1
	Heating Setpoint 2	80-140	100.0	°F	hsp2
	OAT No Reset Value	14-125	14.0	°F	oathr_no
	OAT Full Reset Value	14-125	14.0	°F	oathr_fu
	Delta T No Reset Value	0-25	0.0	^F	dt_hr_no
	Delta T Full Reset Value	0- 25	0.0	^F	dt_hr_fu
	Current No Reset Value	0-20	0.0	ma	v_hr_no
	Current Full Reset Value	0-20	0.0	ma	v_hr_fu
	Heating Reset Deg. Value	–30-30	0.0	^F	hr_deg
	Heating Ramp Loading	0.2-2.0	1.0	^F	hramp_sp
	AUTO CHANGEOVER				
	Cool Changeover Setpt	39-122	75.0	°F	cauto_sp
	Heat Changeover Setpt	32-115	64.0	°F	hauto_sp
	MISCELLANEOUS				
	Switch Limit Setpoint 1	0-100	100	%	lim_sp1
	Switch Limit Setpoint 2	0-100	100	%	lim_sp2
	Switch Limit Setpoint 3	0-100	100	%	lim_sp3
	Reclaim Setpoint	95-140	122.0	°F	rsp
	Reclaim Deadband	5-27	9.0	°F	hr_deadb

MAINTENANCE DISPLAY TABLES

TABLE	DISPLAY NAME	RANGE	UNITS	POINT NAME	WRITE STATUS
DEFROSTM	CIR A DEFROST CONTROL				
	Exchanger Frost Factor	0-100	%	frost_a	
	Next Sequence Allowed in	nnn	minutes	def_se_a	
	Defrost Active?	True/False		mode[19]	
	Defrost Temperature	±nnn.n	°F	DEFRT_A	
	Defrost Duration	nnn	minutes	defr_dua	
	Fan Sequence Started	n		def_fa_a	
	Override State	nn		over_d_a	
	Mean SST Calculation	±nnn.n	°F	sst_dm_a	
	Delta: OAT - Mean SST	±nnn.n	^F	delt_a	
	Reference Delta	±nnn.n	^F	delt_r_a	
	Delta - Reference Delta	±nnn.n	°F	del_v_a	
	Frost Integrator Gain	n.n		fr_int_a	
	Defrost Fan Start Cal A	0.00	psi	def_ca_a	
	Defrost Fan Offset Cal A	0.00	psi	def_of_a	
	CIR B DEFROST CONTROL				
	Exchanger Frost Factor	0-100	%	frost_b	
	Next Sequence Allowed in	nnn	minutes	def_se_b	
	Defrost Active?	True/False		mode[20]	
	Defrost Temperature	±nnn.n	°F	DEFRT_B	
	Defrost Duration	nnn	minutes	defr_dub	
	Fan Sequence Started?	n		def_fa_b	
	Override State	nn		over_d_b	
	Mean SST calculation	±nnn.n	°F	sst_dm_b	
	Delta: OAT - Mean SST	±nnn.n	^F	delt_b	
	Reference Delta	±nnn.n	^F	delt_r_b	
	Delta - Reference Delta	±nnn.n	^F	del_v_b	
	Frost Integrator Gain	n.n		fr_int_b	
	Defrost Fan Start Cal B	0.00	psi	def_ca_b	
	Defrost Fan Offset Cal B	0.00	psi	def_of_b	

NOTES: Tables for display only. Forcing shall not be supported on this maintenance screen.

APPENDIX B — CCN TABLES (cont)
MAINTENANCE DISPLAY TABLES (cont)

TABLE	DISPLAY NAME	RANGE	UNITS	POINT NAME	WRITE STATUS
FANCTRL	Cir B SCT Control Point		°F	sct_sp_b	
	Cir B SCT Candidate		°F	sct_fu_b	
	Cir B Fan Cycle Counter			fancyc_b	
	Cir B Optimal Fan Count			fancop_b	
	Cir C SCT Control Point		°F	sct_sp_c	
	Cir C SCT Candidate		°F	sct_fu_c	
	Cir C Fan Cycle Counter			fancyc_c	
	Cir C Optimal Fan Count			fancop_c	
	Cir A SCT Before Unload		°F	sct_un_a	
	Cir A Unloading Counter			sct_cn_a	
	Cir B SCT Before Unload		°F	sct_un_b	
	Cir B Unloading Counter			sct_cn_b	
	Cir C SCT Before Unload		°F	sct_un_c	
	Cir C Unloading Counter			sct_cn_c	
LAST_POR	Power On 1: day-mon-year	nnnnnn	ddmmyy	date_on1	
	Power On 1: hour-minute	nnnn	hhmm	time_on1	
	PowerDown 1:day-mon-year	nnnnnn	ddmmyy	date_of1	
	PowerDown 1:hour-minute	nnnn	hhmm	time_of1	
	Power On 2: day-mon-year	nnnnnn	ddmmyy	date_on2	
	Power On 2: hour-minute	nnnn	hhmm	time_on2	
	PowerDown 2:day-mon-year	nnnnnn	ddmmyy	date_of2	
	PowerDown 2:hour-minute	nnnn	hhmm	time_of2	
	Power On 3: day-mon-year	nnnnnn	ddmmyy	date_on3	
	Power On 3: hour-minute	nnnn	hhmm	time_on3	
	PowerDown 3:day-mon-year	nnnnnn	ddmmyy	date_of3	
	PowerDown 3:hour-minute	nnnn	hhmm	time_of3	
	Power On 4: day-mon-year	nnnnnn	ddmmyy	date_on4	
	Power On 4: hour-minute	nnnn	hhmm	time_on4	
	PowerDown 4:day-mon-year	nnnnnn	ddmmyy	date_of4	
	PowerDown 4:hour-minute	nnnn	hhmm	time_of4	
	Power On 5: day-mon-year	nnnnnn	ddmmyy	date_on5	
	Power On 5: hour-minute	nnnn	hhmm	time_on5	
	PowerDown 5:day-mon-year	nnnnnn	ddmmyy	date_of5	
	PowerDown 5:hour-minute	nnnn	hhmm	time_of5	
LOADFACT	CAPACITY CONTROL				
	Average Ctrl Water Temp	±nnn.n	°F	ctrl_avg	
	Differential Water Temp	±nnn.n	°F	diff_wt	
	Water Delta T	±nnn.n	^F	delta_t	
	Control Point	±nnn.n	°F	CTRL_PNT	
	Reset Amount	±nnn.n	^F	reset	
	Controlled Temp Error	±nnn.n	^F	tp_error	
	Actual Capacity	nnn	%	cap_t	
	Actual Capacity Limit	nnn	%	cap_lim	
	Current Z Multiplier Val	±n.n		zm	
	Load/Unload Factor	±nnn.n	0/0	smz	
	Active Stage Number	nn		cur_stag	
	Active Capacity Override	nn		over_cap	
	EXV CONTROL				
	EXV Position Circuit A	nnn.n	%	EXV_A	
	EXV Position Limit Cir A	nnn.n	%	exvlim_a	
	Superheat Circuit A	nn.n	^F	SH_A	
	SH Setpoint Circuit A	nn.n	^F	sh_sp_a	
	Cooler Exchange DT Cir A	nn.n	^F	pinch_a	
	Cooler Pinch Ctl Point A	nn.n	^F	pinch_spa	
	EXV Override Circuit A	nn		ov_exv_a	
	EXV Position Circuit B	nnn.n	%	EXV_B	
	EXV Position Limit Cir B	nnn.n	%	exvlim_b	
	Superheat Circuit B	nn.n	^F	SH_B	
	SH Setpoint Circuit B	nn.n	^F	sh_sp_b	
	Cooler Exchange DT Cir B	nn.n	^F	pinch_b	
	Cooler Pinch Ctl Point B	nn.n	^F	pinch_spb	
	EXV Override Circuit B	nn		ov_exv_b	
	EXV Position Circuit C	nnn.n	%	EXV_C	
	EXV Position Limit Cir C	nnn.n	%	exvlim_c	
	Superheat Circuit C	nn.n	^F	SH_C	
	SH Setpoint Circuit C	nn.n	^F	sh_sp_c	
	Cooler Exchange DT Cir C	nn.n	^F	pinch_c	
	Cooler Pinch Ctl Point C	nn.n	^F	pinch_spc	
	EXV Override Circuit C	nn		ov_exv_c	
	EHS CAPACITY CONTROL				
	EHS Ctrl Override	nn		over_ehs	
	Requested Electric Stage	nn		eh_stage	
	Electrical Pulldown	True/False		Ehspulld	

APPENDIX B — CCN TABLES (cont)

MAINTENANCE DISPLAY TABLES (cont)

TABLE	DISPLAY NAME	RANGE	UNITS	POINT NAME	WRITE STATUS
MSTSLAVE	Unit is Master or Slave	Disable/Master/Slave		mstslv	
	Master Control Type*	Local/Remote/CCN		ms_ctrl	
	Master/Slave Ctrl Active	True/False		ms_activ	
	Lead Unit is the	Master/Slave		lead_sel	
	Slave Chiller State†	0/1/2/3/4/5		slv_stat	
	Slave Chiller Total Cap	0-100	%	slv_capt	
	Lag Start Delay**	1-30	minutes	l_strt_d	
	Lead/Lag Hours Delta*	±nnnnn	hours	ll_hr_d	
	Lead/Lag Changeover?**	Yes/No		ll_chang	
	Lead Pulldown?	Yes/No		ll_pull	
	Master/Slave Error	nn		ms_error	
	Max Available Capacity?††	True/False		cap_max	

*Always CCN for the slave chiller.
†Slave chiller chillstat value
**This decision is consistent for Master chiller only. It shall be set by default to 0 for the slave chiller.
††This item is true when chiller has loaded its total available capacity tonnage.

TABLE	DISPLAY NAME	RANGE	UNITS	POINT NAME	WRITE STATUS
OCCMAINT	Current Mode (1=occup.)	0/1		MODE	
	Current Occp Period #	1 to 8		PER_NO	
	Timed-Override in Effect	Yes/No		OVERLAST	
	Timed-Override Duration	0-4	hours	OVR_HRS	
	Current Occupied Time	00:00-23:59		STRTTIME	
	Current Unoccupied Time	00:00-23:59		ENDTIME	
	Next Occupied Day	Mon-Sun		NXTOCDAY	
	Next Occupied Time	00:00-23:59		NXTOCTIM	
	Next Unoccupied Day	Mon-Sun		NXTUNDAY	
	Next Unoccupied Time	00:00-23:59		NXTUNTIM	
	Prev Unoccupied Day	Mon-Sun		PRVUNDAY	
	Prev Unoccupied Time	00:00-23:59		PRVUNTIM	

TABLE	DISPLAY NAME	RANGE	UNITS	POINT NAME	WRITE STATUS
PR_LIMIT	Discharge A Temp Average	±nnn.n	°F	sdt_m_a	
	Discharge A Temp Rate	±nnn.n	^F	sdt_mr_a	
	Discharge A Gas Limit	±nnn.n	°F	sdtlim_a	
	Suction A Temp Average	±nnn.n	°F	sst_m_a	
	Discharge B Temp Average	±nnn.n	°F	sdt_m_b	
	Discharge B Temp Rate	±nnn.n	^F	sdt_mr_b	
	Discharge B Gas Limit	±nnn.n	°F	sdtlim_b	
	Suction B Temp Average	±nnn.n	°F	sst_m_b	
	Discharge C Temp Average	±nnn.n	°F	sdt_m_c	
	Discharge C Temp Rate	±nnn.n	^F	sdt_mr_c	
	Discharge C Gas Limit	±nnn.n	°F	sdtlim_c	
	Suction C Temp Average	±nnn.n	°F	sst_m_c	

NOTE: Table for display only. Used for Cooling and Heat Pump Compressor Envelope.

TABLE	DISPLAY NAME	RANGE	UNITS	POINT NAME	WRITE STATUS
SERMAINT	Reset Maintenance Alert 1 to 6: reset individually 7: reset all	nn		S_RESET	forcible
	OPERATION WARNINGS				
	1 — Refrigerant Charge	Normal/Low/Disable		charge_m	
	2 — Water Loop Size	Normal/Low/Disable		wloop_m	
	GENERAL SERVICING DELAYS				
	4 — Pump 1 (days)	0-1000/Alert/Disable		cpump1_m	
	5 — Pump 2 (days)	0-1000/Alert/Disable		cpump2_m	
	6 — Reclaim Pump (days)	0-1000/Alert/Disable		hpump_m	
	7 — Water Filter (days)	0-1000/Alert/Disable		wfilte_m	

APPENDIX B — CCN TABLES (cont)

SERVICE DISPLAY TABLES

TABLE	DISPLAY NAME	RANGE	DEFAULT	UNITS	POINT NAME	WRITE STATUS
TABLE USED FOR DISABLE COMPRESSORS						
CP_UNABL	Compressor A1 Disable	No/Yes	No		un_cp_a1	
	Compressor A2 Disable	No/Yes	No		un_cp_a2	
	Compressor A3 Disable	No/Yes	No		un_cp_a3	
	Compressor A4 Disable	No/Yes	No		un_cp_a4	
	Compressor B1 Disable	No/Yes	No		un_cp_b1	
	Compressor B2 Disable	No/Yes	No		un_cp_b2	
	Compressor B3 Disable	No/Yes	No		un_cp_b3	
	Compressor B4 Disable	No/Yes	No		un_cp_b4	
	Compressor C1 Disable	No/Yes	No		un_cp_c1	
	Compressor C2 Disable	No/Yes	No		un_cp_c2	
	Compressor C3 Disable	No/Yes	No		un_cp_c3	
	Compressor C4 Disable	No/Yes	No		un_cp_c4	

NOTES:
1. Table used to disable compressors for maintenance purposes. The capacity control will consider that these compressors (once set to YES) are failed manually (no alarm will appear).
2. All data will be re-initialized to “NO” at Power on reset on units using pro_dialog display. For *Comfort*Link™ display, data shall be saved.

TABLE	DISPLAY NAME	RANGE	DEFAULT	UNITS	POINT NAME	WRITE STATUS
MAINTCFG	Servicing Alert Maintenance Config	Enable/Disable	Disable		s_alert	
	Refrigerant Charge Ctrl	Enable/Disable	Disable		charge_c	
	Water Loop Control	Enable/Disable	Disable		wloop_c	
	CPump 1 Ctl Delay (days)	0-1000	0		cpump1_c	
	CPump 2 Ctl Delay (days)	0-1000	0		cpump2_c	
	HPump Ctrl Delay (days)	0-1000	0		hpump_c	
	Water Filter Ctrl (days)	0-1000	0		wfilte_c	

TABLE	DISPLAY NAME	RANGE	DEFAULT	UNITS	POINT NAME	WRITE STATUS
SERVICE1	Cooler Fluid Type	1-3	1		flui_typ	
	Entering Fluid Control	Yes/No	No		ewt_opt	
	Prop PID Gain Varifan	–20.0-20.0	2.0		hd_pg	
	Int PID Gain Varifan	–5.0-5.0	0.2		hd_ig	
	Deri PID Gain Varifan	–20.0-20.0	0.4		hd_dg	
	EXV A Superheat Setpoint	5-15	7.2	^F	sh_sp_a	
	EXV B Superheat Setpoint	5-15	7.2	^F	sh_sp_b	
	EXV C Superheat Setpoint	5-15	7.2	^F	sh_sp_c	
	EXV MOP Setpoint	40-55	55	°F	mop_sp	
	High Pressure Threshold	500-640	609	psi	hp_th	
	Cooler Heater Delta Spt	1-6	2	^F	heatersp	
	Brine Freeze Setpoint	–20-34	14	°F	lowestsp	
	Auto Start When SM Lost	Enable/Disable	Disable		auto_sm	
	Auto Z Multiplier Setpt	4-8	6		zm_spt	
	Maximum Z Multiplier	1.0-6.0	6.0		hc_zm	
	Recl Valve Min Position	0-50	20	%	min_3w	
	Recl Valve Max Position	20-100	100	%	max_3w	
	User Password	0-150	11		use_pass	
	Service Password	0-150	88		ser_pass	

NOTE: This table shall be downloadable at any time. However, modified value shall not be used by tasks until the unit is in OFF state. This shall not apply to the Varifan gains that shall be modified at any time and used immediately by the head pressure control tasks even if the unit is in operation.

APPENDIX B — CCN TABLES (cont)

SERVICE DISPLAY TABLES (cont)

TABLE	DISPLAY NAME	RANGE	UNITS	POINT NAME	WRITE STATUS
TABLE TO BE USED FOR RUN TIMES UPDATE IN CASE OF CONTROL RETROFIT					
UPDHRFAN	FAN Operating Hours				
	Circuit A Fan #1 Hours	nnnnn	hours	hr_fana1	
	Circuit A Fan #2 Hours	nnnnn	hours	hr_fana2	
	Circuit A Fan #3 Hours	nnnnn	hours	hr_fana3	
	Circuit A Fan #4 Hours	nnnnn	hours	hr_fana4	
	Circuit A Fan #5 Hours	nnnnn	hours	hr_fana5	
	Circuit A Fan #6 Hours	nnnnn	hours	hr_fana6	
	Circuit B Fan #1 Hours	nnnnn	hours	hr_fanb1	
	Circuit B Fan #2 Hours	nnnnn	hours	hr_fanb2	
	Circuit B Fan #3 Hours	nnnnn	hours	hr_fanb3	
	Circuit B Fan #4 Hours	nnnnn	hours	hr_fanb4	
	Circuit B Fan #5 Hours	nnnnn	hours	hr_fanb5	
	Circuit B Fan #6 Hours	nnnnn	hours	hr_fanb6	
	Circuit C Fan #1 Hours	nnnnn	hours	hr_fanc1	
	Circuit C Fan #2 Hours	nnnnn	hours	hr_fanc2	
	Circuit C Fan #3 Hours	nnnnn	hours	hr_fanc3	
	Circuit C Fan #4 Hours	nnnnn	hours	hr_fanc4	
	Circuit C Fan #5 Hours	nnnnn	hours	hr_fanc5	
	Circuit C Fan #6 Hours	nnnnn	hours	hr_fanc6	
	WATER PUMP #1 Hours	nnnnn	hours	hr_cpum1	
	WATER PUMP #2 Hours	nnnnn	hours	hr_cpum2	
	Heat Reclaim Pump Hours	nnnnn	hours	hr_hpump	

NOTE: This table shall be used for purposes of transplanting the devices on time in the event of a module hardware failure or software upgrade via downloading. It shall be usable only if all items are still null. Afterwards, its access shall be denied.

TABLE	DISPLAY NAME	RANGE	UNITS	POINT NAME	WRITE STATUS
TABLE TO BE USED FOR RUN TIMES UPDATE IN CASE OF CONTROL RETROFIT					
UPDTHOUR	Machine Operating Hours	nnnnn	hours	hr_mach	
	Machine Starts	nnnnn		st_mach	
	Compressor A1 Hours	nnnnn	hours	hr_cp_a1	
	Compressor A2 Hours	nnnnn	hours	hr_cp_a2	
	Compressor A3 Hours	nnnnn	hours	hr_cp_a3	
	Compressor A4 Hours	nnnnn	hours	hr_cp_a4	
	Compressor A1 Starts	nnnnn		st_cp_a1	
	Compressor A2 Starts	nnnnn		st_cp_a2	
	Compressor A3 Starts	nnnnn		st_cp_a3	
	Compressor A4 Starts	nnnnn		st_cp_a4	
	Compressor B1 Hours	nnnnn	hours	hr_cp_b1	
	Compressor B2 Hours	nnnnn	hours	hr_cp_b2	
	Compressor B3 Hours	nnnnn	hours	hr_cp_b3	
	Compressor B4 Hours	nnnnn	hours	hr_cp_b4	
	Compressor B1 Starts	nnnnn		st_cp_b1	
	Compressor B2 Starts	nnnnn		st_cp_b2	
	Compressor B3 Starts	nnnnn		st_cp_b3	
	Compressor B4 Starts	nnnnn		st_cp_b4	
	Compressor C1 Hours	nnnnn	hours	hr_cp_c1	
	Compressor C2 Hours	nnnnn	hours	hr_cp_c2	
	Compressor C3 Hours	nnnnn	hours	hr_cp_c3	
	Compressor C4 Hours	nnnnn	hours	hr_cp_c4	
	Compressor C1 Starts	nnnnn		st_cp_c1	
	Compressor C2 Starts	nnnnn		st_cp_c2	
	Compressor C3 Starts	nnnnn		st_cp_c3	
	Compressor C4 Starts	nnnnn		st_cp_c4	
	Circuit A Defrost Number	nnnnn		nb_def_a	
	Circuit B Defrost Number	nnnnn		nb_def_b	

NOTE: This table shall be used for purposes of transplanting the devices on time in the event of a module hardware failure or software upgrade via downloading. It shall be usable only if all items are still null. Afterwards, its access shall be denied.

APPENDIX C — CCN ALARM DESCRIPTION

ALARM CODE	ALARM TEXT DESCRIPTION AND CCN MESSAGE
	Thermistor Failure
th-01	Water exchanger Entering Fluid Thermistor
th-02	Water exchanger Leaving Fluid Thermistor
th-03	Circuit A Defrost Thermistor
th-04	Circuit B Defrost Thermistor
th-08	Reclaim Condenser Entering Thermistor
th-09	Reclaim Condenser Leaving Thermistor
th-10	OAT Thermistor
th-11	MASTER/Slave Common Fluid Thermistor
th-12	Circuit A Suction Gas Thermistor
th-13	Circuit B Suction Gas Thermistor
th-14	Circuit C Suction Gas Thermistor
th-18	Circuit A Condenser Subcooling Liquid Thermistor
th-19	Circuit B Condenser Subcooling Liquid Thermistor
th-21	Space Temperature Thermistor
	Pressure Transducer Failure
Pr-01	Circuit A Discharge Transducer
Pr-02	Circuit B Discharge Transducer
Pr-03	Circuit C Discharge Transducer
Pr-04	Circuit A Suction Transducer
Pr-05	Circuit B Suction Transducer
Pr-06	Circuit C Suction Transducer
Pr-07	Circuit A Reclaim Pumpdown Pressure Transducer
Pr-08	Circuit B Reclaim Pumpdown Pressure Transducer
	Communication with Slave Board Failure
Co-A1	Loss of communication with Compressor Board A1
Co-A2	Loss of communication with Compressor Board A2
Co-A3	Loss of communication with Compressor Board A3
Co-A4	Loss of communication with Compressor Board A4
Co-B1	Loss of communication with Compressor Board B1
Co-B2	Loss of communication with Compressor Board B2
Co-B3	Loss of communication with Compressor Board B3
Co-B4	Loss of communication with Compressor Board B4
Co-C1	Loss of communication with Compressor Board C1
Co-C2	Loss of communication with Compressor Board C2
Co-C3	Loss of communication with Compressor Board C3
Co-C4	Loss of communication with Compressor Board C4
Co-E1	Loss of communication with EXV Board Number 1
Co-E2	Loss of communication with EXV Board Number 2
Co-F1	Loss of communication with Fan Board Number 1
Co-F2	Loss of communication with Fan Board Number 2
Co-F3	Loss of communication with Fan Board Number 3
Co-O1	Loss of communication with Free Cooling Board
Co-O2	Loss of communication with Electrical Heaters Board
Co-O3	Loss of communication with Energy Management NRCP2 Board
Co-O4	Loss of communication with Heat Reclaim Board

APPENDIX C — CCN ALARM DESCRIPTION (cont)

ALARM CODE	ALARM TEXT DESCRIPTION AND CCN MESSAGE
	Process Failure
P-01	Water Exchanger Freeze Protection
P-05	Circuit A Low Suction Temperature
P-06	Circuit B Low Suction Temperature
P-07	Circuit C Low Suction Temperature
P-08	Circuit A High Superheat
P-09	Circuit B High Superheat
P-10	Circuit C High Superheat
P-11	Circuit A Low Superheat
P-12	Circuit B Low Superheat
P-13	Circuit C Low Superheat
P-14	Cooler Interlock Failure
P-16	Compressor A1 Not Started or Pressure Increase not established
P-17	Compressor A2 Not Started or Pressure Increase not established
P-18	Compressor A3 Not Started or Pressure Increase not established
P-19	Compressor A4 Not Started or Pressure Increase not established
P-20	Compressor B1 Not Started or Pressure Increase not established
P-21	Compressor B2 Not Started or Pressure Increase not established
P-22	Compressor B3 Not Started or Pressure Increase not established
P-23	Compressor B4 Not Started or Pressure Increase not established
P-24	Compressor C1 Not Started or Pressure Increase not established
P-25	Compressor C2 Not Started or Pressure Increase not established
P-26	Compressor C3 Not Started or Pressure Increase not established
P-27	Compressor C4 Not Started or Pressure Increase not established
P-28	Electrical Box Thermostat or Power Reverse Phase Detection
P-29	Loss of communication with System Manager
P-30	Master/Slave communication Failure
MC-nn	Master chiller configuration error Number #1 to nn
FC-n0	No factory configuration
FC-01	Illegal factory configuration Number #1 to nn
P-31	Unit is in CCN emergency stop
P-32	Water pump #1 default
P-33	Water pump #2 default
P-15	Condenser Flow Switch Failure
P-34	Circuit A Reclaim Operation Failure
P-35	Circuit A Reclaim Operation Failure
P-37	Circuit A — Repeated high discharge gas overrides
P-38	Circuit B — Repeated high discharge gas overrides
P-39	Circuit C — Repeated high discharge gas overrides
P-40	Circuit A — Repeated low suction temp overrides
P-41	Circuit B — Repeated low suction temp overrides
P-42	Circuit C — Repeated low suction temp overrides
P-43	Low entering water temperature in heating

APPENDIX C — CCN ALARM DESCRIPTION (cont)

ALARM CODE	ALARM TEXT DESCRIPTION AND CCN MESSAGE
	Service Failure
Sr-nn	Service maintenance alert Number # nn (see Table 41)
	Compressor Failure
A1-01	Compressor A1 Motor Temperature Too High
A1-02	Compressor A1 Crankcase Heater Failure
A1-03	Compressor A1 High Pressure Switch
A1-04	Compressor A1 Motor Temperature Sensor PTC Out Of Range
A2-01	Compressor A2 Motor Temperature Too High
A2-02	Compressor A2 Crankcase Heater Failure
A2-03	Compressor A2 High Pressure Switch
A2-04	Compressor A2 Motor Temperature Sensor PTC Out Of Range
A3-01	Compressor A3 Motor Temperature Too High
A3-02	Compressor A3 Crankcase Heater Failure
A3-03	Compressor A3 High Pressure Switch
A3-04	Compressor A3 Motor Temperature Sensor PTC Out Of Range
A4-01	Compressor A4 Motor Temperature Too High
A4-02	Compressor A4 Crankcase Heater Failure
A4-03	Compressor A4 High Pressure Switch
A4-04	Compressor A4 Motor Temperature Sensor PTC Out Of Range
B1-01	Compressor B1 Motor Temperature Too High
B1-02	Compressor B1 Crankcase Heater Failure
B1-03	Compressor B1 High Pressure Switch
B1-04	Compressor B1 Motor Temperature Sensor PTC Out Of Range
B2-01	Compressor B2 Motor Temperature Too High
B2-02	Compressor B2 Crankcase Heater Failure
B2-03	Compressor B2 High Pressure Switch
B2-04	Compressor B2 Motor Temperature Sensor PTC Out Of Range
B3-01	Compressor B3 Motor Temperature Too High
B3-02	Compressor B3 Crankcase Heater Failure
B3-03	Compressor B3 High Pressure Switch
B3-04	Compressor B3 Motor Temperature Sensor PTC Out Of Range
B4-01	Compressor B4 Motor Temperature Too High
B4-02	Compressor B4 Crankcase Heater Failure
B4-03	Compressor B4 High Pressure Switch
B4-04	Compressor B4 Motor Temperature Sensor PTC Out Of Range
C1-01	Compressor C1 Motor Temperature Too High
C1-02	Compressor C1 Crankcase Heater Failure
C1-03	Compressor C1 High Pressure Switch
C1-04	Compressor C1 Motor Temperature Sensor PTC Out Of Range
C2-01	Compressor C2 Motor Temperature Too High
C2-02	Compressor C2 Crankcase Heater Failure
C2-03	Compressor C2 High Pressure Switch
C2-04	Compressor C2 Motor Temperature Sensor PTC Out Of Range
C3-01	Compressor C3 Motor Temperature Too High
C3-02	Compressor C3 Crankcase Heater Failure
C3-03	Compressor C3 High Pressure Switch
C3-04	Compressor C3 Motor Temperature Sensor PTC Out Of Range
C4-01	Compressor C4 Motor Temperature Too High
C4-02	Compressor C4 Crankcase Heater Failure
C4-03	Compressor C4 High Pressure Switch
C4-04	Compressor C4 Motor Temperature Sensor PTC Out Of Range

APPENDIX D — R-410A PRESSURE VS TEMPERATURE CHART

PSIG	°F	°C	PSIG	°F	°C	PSIG	°F	°C	PSIG	°F	°C	PSIG	°F	°C	PSIG	°F	°C
12	–37.7	–38.7	**114**	37.8	3.2	**216**	74.3	23.5	**318**	100.2	37.9	**420**	120.7	49.3	**522**	137.6	58.7
14	–34.7	–37.1	**116**	38.7	3.7	**218**	74.9	23.8	**320**	100.7	38.2	**422**	121.0	49.4	**524**	137.9	58.8
16	–32.0	–35.6	**118**	39.5	4.2	**220**	75.5	24.2	**322**	101.1	38.4	**424**	121.4	49.7	**526**	138.3	59.1
18	–29.4	–34.1	**120**	40.5	4.7	**222**	76.1	24.5	**324**	101.6	38.7	**426**	121.7	49.8	**528**	138.6	59.2
20	–26.9	–32.7	**122**	41.3	5.2	**224**	76.7	24.8	**326**	102.0	38.9	**428**	122.1	50.1	**530**	138.9	59.4
22	–24.5	–31.4	**124**	42.2	5.7	**226**	77.2	25.1	**328**	102.4	39.1	**430**	122.5	50.3	**532**	139.2	59.6
24	–22.2	–30.1	**126**	43.0	6.1	**228**	77.8	25.4	**330**	102.9	39.4	**432**	122.8	50.4	**534**	139.5	59.7
26	–20.0	–28.9	**128**	43.8	6.6	**230**	78.4	25.8	**332**	103.3	39.6	**434**	123.2	50.7	**536**	139.8	59.9
28	–17.9	–27.7	**130**	44.7	7.1	**232**	78.9	26.1	**334**	103.7	39.8	**436**	123.5	50.8	**538**	140.1	60.1
30	–15.8	–26.6	**132**	45.5	7.5	**234**	79.5	26.4	**336**	104.2	40.1	**438**	123.9	51.1	**540**	140.4	60.2
32	–13.8	–25.4	**134**	46.3	7.9	**236**	80.0	26.7	**338**	104.6	40.3	**440**	124.2	51.2	**544**	141.0	60.6
34	–11.9	–24.4	**136**	47.1	8.4	**238**	80.6	27.0	**340**	105.1	40.6	**442**	124.6	51.4	**548**	141.6	60.9
36	–10.1	–23.4	**138**	47.9	8.8	**240**	81.1	27.3	**342**	105.4	40.8	**444**	124.9	51.6	**552**	142.1	61.2
38	–8.3	–22.4	**140**	48.7	9.3	**242**	81.6	27.6	**344**	105.8	41.0	**446**	125.3	51.8	**556**	142.7	61.5
40	–6.5	–21.4	**142**	49.5	9.7	**244**	82.2	27.9	**346**	106.3	41.3	**448**	125.6	52.0	**560**	143.3	61.8
42	–4.5	–20.3	**144**	50.3	10.2	**246**	82.7	28.2	**348**	106.6	41.4	**450**	126.0	52.2	**564**	143.9	62.2
44	–3.2	–19.6	**146**	51.1	10.6	**248**	83.3	28.5	**350**	107.1	41.7	**452**	126.3	52.4	**568**	144.5	62.5
46	–1.6	–18.7	**148**	51.8	11.0	**250**	83.8	28.8	**352**	107.5	41.9	**454**	126.6	52.6	**572**	145.0	62.8
48	0.0	–17.8	**150**	52.5	11.4	**252**	84.3	29.1	**354**	107.9	42.2	**456**	127.0	52.8	**576**	145.6	63.1
50	1.5	–16.9	**152**	53.3	11.8	**254**	84.8	29.3	**356**	108.3	42.4	**458**	127.3	52.9	**580**	146.2	63.4
52	3.0	–16.1	**154**	54.0	12.2	**256**	85.4	29.7	**358**	108.8	42.7	**460**	127.7	53.2	**584**	146.7	63.7
54	4.5	–15.3	**156**	54.8	12.7	**258**	85.9	29.9	**360**	109.2	42.9	**462**	128.0	53.3	**588**	147.3	64.1
56	5.9	–14.5	**158**	55.5	13.1	**260**	86.4	30.2	**362**	109.6	43.1	**464**	128.3	53.5	**592**	147.9	64.4
58	7.3	–13.7	**160**	56.2	13.4	**262**	86.9	30.5	**364**	110.0	43.3	**466**	128.7	53.7	**596**	148.4	64.7
60	8.6	–13.0	**162**	57.0	13.9	**264**	87.4	30.8	**366**	110.4	43.6	**468**	129.0	53.9	**600**	149.0	65.0
62	10.0	–12.2	**164**	57.7	14.3	**266**	87.9	31.1	**368**	110.8	43.8	**470**	129.3	54.1	**604**	149.5	65.3
64	11.3	–11.5	**166**	58.4	14.7	**268**	88.4	31.3	**370**	111.2	44.0	**472**	129.7	54.3	**608**	150.1	65.6
66	12.6	–10.8	**168**	59.0	15.0	**270**	88.9	31.6	**372**	111.6	44.2	**474**	130.0	54.4	**612**	150.6	65.9
68	13.8	–10.1	**170**	59.8	15.4	**272**	89.4	31.9	**374**	112.0	44.4	**476**	130.3	54.6	**616**	151.2	66.2
70	15.1	–9.4	**172**	60.5	15.8	**274**	89.9	32.2	**376**	112.4	44.7	**478**	130.7	54.8	**620**	151.7	66.5
72	16.3	–8.7	**174**	61.1	16.2	**276**	90.4	32.4	**378**	112.6	44.8	**480**	131.0	55.0	**624**	152.3	66.8
74	17.5	–8.1	**176**	61.8	16.6	**278**	90.9	32.7	**380**	113.1	45.1	**482**	131.3	55.2	**628**	152.8	67.1
76	18.7	–7.4	**178**	62.5	16.9	**280**	91.4	33.0	**382**	113.5	45.3	**484**	131.6	55.3	**632**	153.4	67.4
78	19.8	–6.8	**180**	63.1	17.3	**282**	91.9	33.3	**384**	113.9	45.5	**486**	132.0	55.6	**636**	153.9	67.7
80	21.0	–6.1	**182**	63.8	17.7	**284**	92.4	33.6	**386**	114.3	45.7	**488**	132.3	55.7	**640**	154.5	68.1
82	22.1	–5.5	**184**	64.5	18.1	**286**	92.8	33.8	**388**	114.7	45.9	**490**	132.6	55.9	**644**	155.0	68.3
84	23.2	–4.9	**186**	65.1	18.4	**288**	93.3	34.1	**390**	115.0	46.1	**492**	132.9	56.1	**648**	155.5	68.6
86	24.3	–4.3	**188**	65.8	18.8	**290**	93.8	34.3	**392**	115.5	46.4	**494**	133.3	56.3	**652**	156.1	68.9
88	25.4	–3.7	**190**	66.4	19.1	**292**	94.3	34.6	**394**	115.8	46.6	**496**	133.6	56.4	**656**	156.6	69.2
90	26.4	–3.1	**192**	67.0	19.4	**294**	94.8	34.9	**396**	116.2	46.8	**498**	133.9	56.6	**660**	157.1	69.5
92	27.4	–2.6	**194**	67.7	19.8	**296**	95.2	35.1	**398**	116.6	47.0	**500**	134.0	56.7	**664**	157.7	69.8
94	28.5	–1.9	**196**	68.3	20.2	**298**	95.7	35.4	**400**	117.0	47.2	**502**	134.5	56.9	**668**	158.2	70.1
96	29.5	–1.4	**198**	68.9	20.5	**300**	96.2	35.7	**402**	117.3	47.4	**504**	134.8	57.1	**672**	158.7	70.4
98	30.5	–0.8	**200**	69.5	20.8	**302**	96.6	35.9	**404**	117.7	47.6	**506**	135.2	57.3	**676**	159.2	70.7
100	31.2	–0.4	**202**	70.1	21.2	**304**	97.1	36.2	**406**	118.1	47.8	**508**	135.5	57.5	**680**	159.8	71.0
102	32.2	0.1	**204**	70.7	21.5	**306**	97.5	36.4	**408**	118.5	48.1	**510**	135.8	57.7	**684**	160.3	71.3
104	33.2	0.7	**206**	71.4	21.9	**308**	98.0	36.7	**410**	118.8	48.2	**512**	136.1	57.8	**688**	160.8	71.6
106	34.1	1.2	**208**	72.0	22.2	**310**	98.4	36.9	**412**	119.2	48.4	**514**	136.4	58.0	**692**	161.3	71.8
108	35.1	1.7	**210**	72.6	22.6	**312**	98.9	37.2	**414**	119.6	48.7	**516**	136.7	58.2	**696**	161.8	72.1
110	35.5	1.9	**212**	73.2	22.9	**314**	99.3	37.4	**416**	119.9	48.8	**518**	137.0	58.3			
112	36.9	2.7	**214**	73.8	23.2	**316**	99.7	37.6	**418**	120.3	49.1	**520**	137.3	58.5			

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START-UP CHECKLIST FOR 30RB LIQUID CHILLER

A. PROJECT INFORMATION

Job Name _____
Address _____
City _____ State _____ Zip _____

Installing Contractor _____
Sales Office _____
Start-up Performed By _____

Design Information

	CAPACITY	EWT	LWT	FLUID TYPE	FLOW RATE	P.D.	AMBIENT
Cooler							

Unit

Model _____
Serial _____

Cooler

Model _____
Serial _____

Compressors

A1)
Model _____
Serial _____

A2)
Model _____
Serial _____

A3)
Model _____
Serial _____

A4)
Model _____
Serial _____

B1)
Model _____
Serial _____

B2)
Model _____
Serial _____

B3)
Model _____
Serial _____

B4)
Model _____
Serial _____

C1)
Model _____
Serial _____

C2)
Model _____
Serial _____

C3)
Model _____
Serial _____

C4)
Model _____
Serial _____

Hydronic Package

P1)
Model _____
Serial _____

P2)
Model _____
Serial _____

B. PRELIMINARY EQUIPMENT CHECK (This section to be completed by installing contractor)

1. Is there any physical damage? ☐ Yes ☐ No
   a. 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. Check transformer primary on 208/230 v. ☐ 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. Crankcase heaters energized for 24 hours before start-up. ☐ 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 interlocked with chiller. ☐ Yes ☐ No
6. Chilled water flow switch operational. ☐ Yes ☐ No
7. Inlet piping to cooler includes a 20 mesh strainer. ☐ Yes ☐ No
8. Water loop volume greater than 3 gal/ton for air conditioning or 6 gal/ton for process cooling and low ambient operation. ☐ Yes ☐ No
9. Proper loop freeze protection provided to ____ °F (°C). ☐ Yes ☐ No

   Antifreeze type_____ Concentration _____%.

   (If antifreeze solution is not utilized on 30RB 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. 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. All discharge service valves are open. ☐ Yes ☐ No
3. All suction service valves are open. ☐ Yes ☐ No
4. All compressor rack holddown bolts removed. ☐ Yes ☐ No
5. Leak check unit. Locate, repair and report any refrigerant leaks. ☐ Yes ☐ No
6. Voltage at terminal block is within unit nameplate range. ☐ Yes ☐ No
7. 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 ☐ Yes ☐ No

   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 = _____ m of water

   Cooler flow rate _____ gpm (l/s) (See Cooler Pressure Drop Curve provided in the 30RB Installation Instructions.)

Start and operate machine. Complete the following:

1. Complete component test.
2. Check refrigerant and oil charge. Record charge information.
3. Record compressor and condenser fan motor current.
4. Record operating data.
5. Provide operating instructions to owner's personnel. Instruction time _____ hours

	Circuit A	Circuit B	Circuit C
Refrigerant Charge	_____	_____	_____
Additional charge required	_____	_____	_____

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Oil Charge

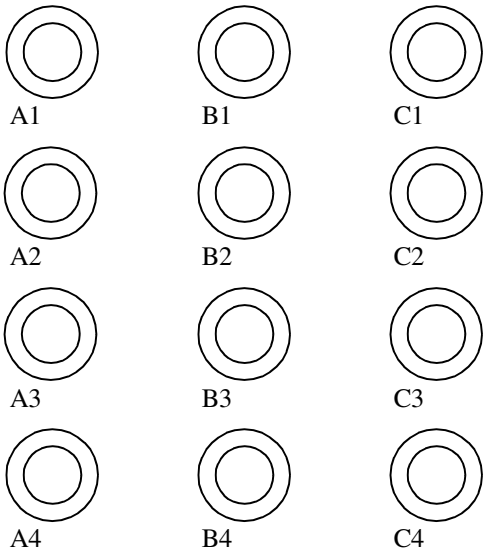
Indicate level in sight glass of compressors A1, B1 and C1.

Additional oil charge required.

Circuit A _____

Circuit B _____

Circuit C _____



Record Software Versions

MODE — RUN STATUS

SUB-MODE	ITEM	DISPLAY	ITEM EXPANSION
VERS	APPL		CSA-SR- __ __ __ __ __ __

(Press ENTER & ESCAPE simultaneously to obtain software versions)

Record Configuration Information

MODE — CONFIGURATION

SUB-MODE	ITEM	DISPLAY	ITEM EXPANSION	ENTRY
DISP	TEST	ON/OFF	Test Display LED's	
	METR	US-METR	Metric Display	
	LANG	x	Language	
UNIT	TYPE	x	Unit Type	
	TONS	xxx	Unit Size	
	VAR.A	x	NB Fan on Varifan CIR A	
	VAR.B	x	NB Fan on Varifan CIR B	
	VAR.C	x	NB Fan on Varifan CIR C	
	HGBP	x	Hot Gas Bypass Control	
	60HZ	NO/YES	60 Hz Frequency	
	RECL	NO/YES	Heat Reclaim Select	
	EHS	x	Electric Heater Stage	
	EMM	NO/YES	EXV Super Offset	
	PAS.E	NO/YES	Password Enable	
	FREE	NO/YES	Free Cooling Select	
	PD4D	NO/YES	Pro_Dialog Users Display	
	BOIL	NO/YES	Boiler Control Select	
SERV	FLUD	x	Cooler Fluid Type	
	MOP	xx.x	EXV MOP Setpoint	
	HP.TH	xxx.x	High Pressure Threshold	
	SHP.A	xx.x	Circuit A Superheat Setp	
	SHP.B	xx.x	Circuit B Superheat Setp	
	SHP.C	xx.x	Circuit C Superheat Setp	
	HTR	xx.x	Cooler Heater DT Setp	
	EWTO	NO/YES	Entering Water Control	
	AU.SM	NO/YES	Auto Start When SM Lost	
	BOTH	NO/YES	HSM Both Command Select	
	LOSP	xx.x	Brine Freeze Setpoint	
	HD.PG	xx.x	Varifan Proportion Gain	
	HD.DG	xx.x	Varifan Derivative Gain	
	HD.IG	xx.x	Varifan Integral Gain	
	HR.MI	xxx.x	Reclaim Water Valve Min	
	HR.MA	xxx.x	Reclaim Water Valve Max	

MODE — CONFIGURATION (cont)

SUB-MODE	ITEM	DISPLAY	ITEM EXPANSION	ENTRY
OPTN	CCNA	xxx	CCN Address	
	CCNB	xxx	CCN Bus Number	
	BAUD	x	CCN Baud Rate	
	LOAD	x	Loading Sequence Select	
	LLCS	x	Lead/Lag Sequence Select	
	RL.S	ENBL/DSBL	Ramp Load Select	
	DELY	xx	Minutes Time Off	
	ICE.M	ENBL/DSBL	Ice Mode Enable	
	PUMP	x	Cooler Pumps Sequence	
	ROT.P	xxxx	Pump Rotation Delay	
	PM.PS	NO/YES	Periodic Pump Start	
	PSBY	NO/YES	Stop Pump in Standby	
	P.LOC	NO/YES	Flow Checked if Pump Off	
	LS.ST	xx.xx	Night Low Noise Start	
	LS.ND	xx.xx	Night Low Noise End	
	LS.LT	xxx	Low Noise Capacity Limit	
	OATH	xx.x	Heat Mode OAT Threshold	
	FREE	xx.x	Free Cooling OAT Limit	
	BO.TH	xx.x	Boiler OAT Threshold	
	EHST	xx.xx	Elec Stag OAT	
	EHSB	NO/YES	Last Heat Elec Backup	
	E.DEF	NO/YES	Quick EHS in Defrost	
	EHSP	xx	Elec Heat Pulldown	
	AUTO	NO/YES	Auto Changeover Select	
RSET	CRST	x	Cooling Reset Type	
	HRST	x	Heating Reset Type	
	DMDC	xxx.x	Demand Limit Select	
	DMMX	xx.x	mA for 100% Demand Limit	
	DMZE	xx.x	mA for 100% Demand Limit	
	MSSL	x	Master/Slave Select	
	SLVA	xxx	Slave Address	
	LLBL	ENBL/DSBL	Lead/Lag Balance Select	
	LLBD	xxx	Lead/Lag Balance Delta	
	LLDY	xx	Lead/Lag Delay	
	LAGP	x	Lag Unit Pump Select	
	LPUL	xx	Lead Pulldown Time	

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MODE — SETPOINT

SUB-MODE	ITEM	DISPLAY	ITEM EXPANSION	ENTRY
COOL	CSP.1	xxx.x	Cooling Setpoint 1	
	CSP.2	xxx.x	Cooling Setpoint 2	
	CSP.3	xxx.x	Ice Setpoint	
	CRV1	xx.x	Current No Reset Value	
	CRV2	xx.x	Current Full Reset Value	
	CRT1	xxx.x	Delta T No Reset Temp	
	CRT2	xxx.x	Delta T Full Reset Value	
	CRO1	xxx.x	OAT No Reset Temp	
	CRO2	xxx.x	OAT Full Reset Temp	
	CRS1	xxx.x	SpaceT No Reset Temp	
	CRS2	xxx.x	Space T No Reset Temp	
	DGRC	xx.x	Degrees Cool Reset	
	CAUT	xx.x	Cool Changeover Setpt	N/A
	CRMP	x.x	Cool Ramp Loading	
HEAT	HSP.1	xxx.x	Heating Setpoint 1	N/A
	HSP.2	xxx.x	Heating Setpoint 2	N/A
	HRV1	xx.x	Current No Reset Value	N/A
	HRV2	xx.x	Current Full Reset Value	N/A
	HRT1	xxx.x	Delta T No Reset Temp	N/A
	HRT2	xxx.x	Delta T Full Reset Temp	N/A
	HRO1	xxx.x	OAT No Reset Temp	N/A
	HRO2	xxx.x	OAT Full Reset Temp	N/A
	DGRH	xx.x	Degrees Heat Reset	N/A
	HAUT	xx.x	Heat Changeover Setpt	N/A
	HRMP	x.x	Heat Ramp Loading	N/A
MISC	DLS1	xxx	Switch Limit Setpoint 1	
	DLS2	xxx	Switch Limit Setpoint 2	
	DLS3	xxx	Switch Limit Setpoint 3	
	RSP	xxx.x	Heat Reclaim Setpoint	N/A
	RDB	xx.x	Reclaim Deadband	N/A

MODE — OPERATING MODE

SUB-MODE	ITEM	DISPLAY	ITEM EXPANSION	ENTRY
SLCT	OPER	x	Operating Control Type	
	SP.SE	x	Setpoint Select	
	HC.SE	x	Heat Cool Select	
	RL.SE	x	Reclaim Select	

Component Test — Complete the following tests to make sure all peripheral components are operational before the compressors are started.

MODE — SERVICE TEST

To Enable Service Test Mode, move Enable/Off/Remote Contact Switch to OFF. Configure TEST to ON. Move Switch to ENABLE.

SUB-MODE	ITEM	DISPLAY	ITEM EXPANSION	ENTRY
TEST*	T.REQ	OFF/ON	Manual Sequence	COMPLETE
	CP.A1	OFF/ON	Compressor A1 Output	
	CP.A2	OFF/ON	Compressor A2 Output	
	CP.A3	OFF/ON	Compressor A3 Output	
	CP.A4	OFF/ON	Compressor A4 Output	
	HGB.A	OFF/ON	Hot Gas Bypass A Output	
	CP.B1	OFF/ON	Compressor B1 Output	
	CP.B2	OFF/ON	Compressor B2 Output	
	CP.B3	OFF/ON	Compressor B3 Output	
	CP.B4	OFF/ON	Compressor B4 Output	
	HGB.B	OFF/ON	Hot Gas Bypass B Output	
	CP.C1	OFF/ON	Compressor C1 Output	
	CP.C2	OFF/ON	Compressor C2 Output	
	CP.C3	OFF/ON	Compressor C3 Output	
	CP.C4	OFF/ON	Compressor C4 Output	
	HGB.C	OFF/ON	Hot Gas Bypass C Output	
QUIC†	Q.REQ	OFF/ON	Quick Test Mode	
	EXV.A	xxx%	Circuit A EXV % Open	
	EXV.B	xxx%	Circuit B EXV % Open	
	EXV.C	xxx%	Circuit C EXV % Open	
	FAN.A	X	Circuit A Fan Stages	
	FAN.B	X	Circuit B Fan Stages	
	FAN.C	X	Circuit C Fan Stages	
	SPD.A	xxx%	Cir A Varifan Position	
	SPD.B	xxx%	Cir B Varifan Position	
	SPD.C	xxx%	Cir C Varifan Position	
	FRV.A	OPEN/CLSE	Free Cooling Heater A	
	FRP.A	OFF/ON	Refrigerant Pump A	
	FRV.B	OPEN/CLSE	Free Cooling Heater B	
	FRP.B	OFF/ON	Refrigerant Pump B	
	FRV.C	OPEN/CLSE	Free Cooling Heater C	
	FRP.C	OFF/ON	Refrigerant Pump C	
	RV.A	OPEN/CLSE	4 Way Valve Circuit A	
	RV.B	OPEN/CLSE	4 Way Valve Circuit B	
	BOIL	OFF/ON	Boiler Command	
	HR1.A	OPEN/CLSE	Air Cond Enter Valve A	
	HR2.A	OPEN/CLSE	Air Cond Leaving Valve A	
	HR3.A	OPEN/CLSE	Water Cond Enter Valve A	
	HR4.A	OPEN/CLSE	Water Cond Leaving Valve A	
	HR1.B	OPEN/CLSE	Air Cond Enter Valve B	
	HR2.B	OPEN/CLSE	Air Cond Leaving Valve B	
	HR3.B	OPEN/CLSE	Water Cond Enter Valve B	
	HR4.B	OPEN/CLSE	Water Cond Leaving Valve B	
	PMP.1	OFF/ON	Water Exchanger Pump 1	
	PMP.2	OFF/ON	Water Exchanger Pump 2	
	CND.P	OFF/ON	Reclaim Condenser Pump	
	CL.HT	OFF/ON	Cooler Heater Output	
	CP.HT	OFF/ON	Condenser Heater Output	

*Place the Enable/Off/Remote Contact switch to the Off position prior to configuring ***T.REQ*** to ON. Configure the desired item to ON, then place the Enable/Off/Remote Contact switch to the Enable position.

†Place the Enable/Off/Remote Contact switch to the Off position prior to configuring ***Q.REQ*** to ON. The switch should be in the Off position to perform Quick Test.

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MODE — SERVICE TEST (cont)

To Enable Service Test Mode, move Enable/Off/Remote Contact Switch to OFF. Configure TEST to ON. Move Switch to ENABLE. (cont)

SUB-MODE	ITEM	DISPLAY	ITEM EXPANSION	ENTRY
QUIC†(cont)	CH.A1	OFF/ON	Compressor A1 Heater	
	CH.A2	OFF/ON	Compressor A2 Heater	
	CH.A3	OFF/ON	Compressor A3 Heater	
	CH.A4	OFF/ON	Compressor A4 Heater	
	CH.B1	OFF/ON	Compressor B1 Heater	
	CH.B2	OFF/ON	Compressor B2 Heater	
	CH.B3	OFF/ON	Compressor B3 Heater	
	CH.B4	OFF/ON	Compressor B4 Heater	
	CH.C1	OFF/ON	Compressor C1 Heater	
	CH.C2	OFF/ON	Compressor C2 Heater	
	CH.C3	OFF/ON	Compressor C3 Heater	
	CH.C4	OFF/ON	Compressor C4 Heater	
	Q.RDY	OFF/ON	Chiller Ready Status	
	Q.RUN	OFF/ON	Chiller Running Status	
	SHUT	OFF/ON	Customer Shut Down Stat	
	CATO	xx.x	Chiller Capacity in 0-10v	
	ALRM	OFF/ON	Alarm Relay	
	ALRT	OFF/ON	Alert Relay	

*Place the Enable/Off/Remote Contact switch to the Off position prior to configuring ***T.REQ*** to ON. Configure the desired item to ON, then place the Enable/Off/Remote Contact switch to the Enable position.
†Place the Enable/Off/Remote Contact switch to the Off position prior to configuring ***Q.REQ*** to ON. The switch should be in the Off position to perform Quick Test.

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	EWT _____	
COOLER LEAVING FLUID	LWT _____	
CONTROL POINT	CTPT _____	
CAPACITY	CAP _____	
OUTSIDE AIR TEMPERATURE	OAT _____	
LEAD/LAG LEAVING FLUID	CHWS_____	(Dual Chiller Control Only)

CIRCUIT A	CIRCUIT B	CIRCUIT C
SCT.A _____	SCT.B _____	SCT.C_____
SST.A _____	SST.B _____	SST.C _____
SGT.A _____	SGT.B _____	SGT.C _____
SUP.A _____	SUP.B _____	SUP.C _____
EXV.A_____	EXV.B _____	EXV.C _____

NOTE: EXV A,B,C positions are found in the output mode.

COMPRESSOR MOTOR CURRENT

	L1	L2	L3
COMPRESSOR A1	_____	_____	_____
COMPRESSOR A2	_____	_____	_____
COMPRESSOR A3	_____	_____	_____
COMPRESSOR A4	_____	_____	_____
COMPRESSOR B1	_____	_____	_____
COMPRESSOR B2	_____	_____	_____
COMPRESSOR B3	_____	_____	_____
COMPRESSOR B4	_____	_____	_____
COMPRESSOR C1	_____	_____	_____
COMPRESSOR C2	_____	_____	_____
COMPRESSOR C3	_____	_____	_____
COMPRESSOR C4	_____	_____	_____

CONDENSER FAN MOTOR CURRENT

	L1	L2	L3
FAN MOTOR 1	_____	_____	_____
FAN MOTOR 2	_____	_____	_____
FAN MOTOR 3	_____	_____	_____
FAN MOTOR 4	_____	_____	_____
FAN MOTOR 5	_____	_____	_____
FAN MOTOR 6	_____	_____	_____
FAN MOTOR 7	_____	_____	_____
FAN MOTOR 8	_____	_____	_____
FAN MOTOR 9	_____	_____	_____
FAN MOTOR 10	_____	_____	_____
FAN MOTOR 11	_____	_____	_____
FAN MOTOR 12	_____	_____	_____
FAN MOTOR 13	_____	_____	_____
FAN MOTOR 14	_____	_____	_____
FAN MOTOR 15	_____	_____	_____
FAN MOTOR 16	_____	_____	_____
FAN MOTOR 17	_____	_____	_____
FAN MOTOR 18	_____	_____	_____

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COMMENTS:

SIGNATURES:

Start-up Technician _____ Date _____

Customer Representative _____ Date _____

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