Carrier®

30HK,HL040-060,
30HWA,B,C,S018-040,
30GTN015-025
Reciprocating Liquid Chillers
with *ComfortLink*™ Controls
50/60 Hz

Controls Start-Up, Operation, Service, and Troubleshooting

SAFETY CONSIDERATIONS

Installing, starting up, and servicing this equipment can be hazardous due to system pressures, electrical components, and equipment location (roof, elevated structures, mechanical rooms, 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

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.

⚠ WARNING

To prevent potential damage to heat exchanger tubes always run fluid through heat exchangers when adding or removing refrigerant charge. Use appropriate brine solutions in cooler and condenser fluid loops to prevent the freezing of heat exchangers when the equipment is exposed to temperatures below 32 F (0° C). Proof of flow switch is required to protect coolers from freezing.

DO NOT VENT refrigerant relief valves within a building. Outlet from relief valves must be vented outdoors 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.

CONTENTS

CONTENTS (cont)

GENERAL

This publication contains Start-Up, Service, Controls, Operation, and Troubleshooting information for the 30HK,HWB, and HWC,S water-cooled chillers and the 30HL,HWA and 30GTN air-cooled chillers. See Table 1. These liquid chillers are equipped with *ComfortLink* controls and conventional thermostatic expansion valves (TXVs). The 30GTN and 30HL are also equipped with liquid line solenoid valves (LLSVs).

⚠ WARNING

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

Table 1 — Unit Sizes (30G,H)

UNIT MODEL	NOMINAL TONS
30HK040	40
30HK050	50
30HK060	60
30HL050	50
30HL060	60
30HW018	15
30HW025	20
30HW028	25
30HW035	30
30HW040	35
30GTN015	15
30GTN020	20
30GTN025	25
30GTN030	30
30GTN035*	35

*60 Hz only.

MAJOR SYSTEM COMPONENTS

General — The 30HK,HL,HW, 30GTN air-cooled reciprocating chillers contain the *ComfortLink™* electronic control system that controls and monitors all operations of the chiller.

The control system is composed of several components as listed in the sections below. See Fig. 1 for typical control box drawing. See Fig. 2-4 for control schematics.

Main Base Board (MBB) — See Fig. 5. The MBB is the heart of the *ComfortLink* control system. It contains the major portion of operating software and controls the operation of the machine. The MBB continuously monitors input/output channel information received from its inputs and from all other modules. The MBB receives inputs from thermistors T1, T2, T9, and T10. The 30GTN models also include thermistor T3. See Table 2. The MBB also receives the feedback inputs from compressors A1 (all) and B1 (30HK,HL only) and other status switches. See Table 3. The MBB also controls several outputs. Relay outputs controlled by the MBB are shown in Table 4. 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. See Fig. 5.

QuickSet Set Point Adjustment — This standard device is used for setting the desired leaving fluid temperature set point. This device is the factory-installed standard.

Alarm/Alert Indicator Light — This light comes factory installed with the QuickSet Set Point Adjustment. It is illuminated when any alarm or alert conditions are present.

Scrolling Marquee Display — This optional device is the keypad interface used for accessing chiller information, reading sensor values, and testing the chiller. The marquee display is a 4-key, 4-character, 16-segment LED (light-emitting diode) display. Eleven mode LEDs are located on the display as well as an Alarm Status LED. See Marquee Display Usage section on page 15 for further details.

Energy Management Module (EMM) — The EMM module is available as a factory-installed option or as a field-installed accessory. The EMM module receives 4 to 20 mA inputs for the temperature reset, cooling set point reset and demand limit functions. The EMM module also receives the switch inputs for the field-installed 2-stage demand limit and ice done functions. The EMM module 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.

Enable/Off/Remote Contact Switch — The Enable/Off/Remote Contact switch 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 rated for dry circuit application capable of handling a 5-vdc, 1- to 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. See Fig. 6.

Emergency On/Off Switch — The Emergency On/Off switch should only be used when it is required to shut the chiller off immediately. Power to the MBB, EMM, and marquee display is interrupted when this switch is off and all outputs from these modules will be turned off.

Board Addresses — The Main Base Board (MBB) has a 3-position Instance jumper that must be set to '1.' All other boards have 4-position DIP switches. All switches are set to 'On' for all boards.

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 should be blinking in unison at a rate of once every 2 seconds. If the red LEDs are not blinking in unison, verify that correct power is being supplied to all modules. 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 board 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 — The MBB has one green LED. The Local Equipment Network (LEN) LED should always be blinking whenever power is on. All other boards have a LEN LED which should be blinking whenever power is on. Check LEN connections for potential communication errors at the board J3 and/or J4 connectors. Communication between modules is accomplished by a 3-wire sensor bus. These 3 wires run in parallel from module to module. The J4 connector on the MBB provides both power and communication directly to the marquee display only.

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 — The 30HK,HL,HW and 30GTN chiller units can be connected to the CCN if desired. The communication bus wiring is a shielded, 3-conductor cable with drain wire and is supplied and installed in the field. See Table 5. 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. This 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.

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. Wire manufactured by Alpha (2413 or 5463), American (A22503), Belden (8772), or Columbia (02525) meets the above mentioned requirements.

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, unplug the connector. 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.

Table 2 — Thermistor Designations

THERMISTOR NO.	PIN CONNECTION POINT	THERMISTOR INPUT
T1	J8-13,14 (MBB)	Cooler Leaving Fluid
T2	J8-11,12 (MBB)	Cooler Entering Fluid
T3	J8-21,22 (MBB)	Saturated Condensing Temperature, Circuit A (30GTN Only)
T9	J8-7,8 (MBB)	Outdoor-Air Temperature Sensor or Dual LWT Sensors (Accessory)
T10	J8-5,6 (MBB)	Remote Space Temperature Sensor (Accessory)

LEGEND

LWT — Leaving Water Temperature
MBB — Main Base Board

Table 3 — Status Switches

STATUS SWITCH	PIN CONNECTION POINT	30HK,HL 040-060	30HW 018-040	30GTN 015-035
Oil Pressure, Ckt B*	J7-1,2	OPSB	Not Used	Not Used
Oil Pressure, Ckt A*	J7-3,4	OPSA	OPSA	OPSA
Remote On/Off	TB5-9,10	Field-Installed Relay Closure		
Compressor Fault Signal, B1	J9-8,12	CR-B1	Not Used	Not Used
Compressor Fault Signal, A1	J9-11,12	CR-A1	CR-A1	CR-A1

*Standard on 30HL, 30HWA, and brine 30GTN units.

LEGEND FOR FIG. 2-4

ALM	— Alarm
C	— Compressor Contactor
CB	— Circuit Breaker
COTP	— Compressor Overtemperature Protection
CWFS	— Chilled Water Flow Switch
CWPI	— Chilled Water Pump Interlock
CR	— Control Relay
EMM	— Energy Management Module
FB	— Fuse Block
FIOP	— Factory-Installed Option Package
FM	— Fan Motor
GCS	— Ground Current Sensing
HGBP	— Hot Gas Bypass
HPS	— High-Pressure Switch
LPS	— Low-Pressure Switch
OAT	— Outdoor-Air Temperature
OPS	— Oil Pressure Switch
PL	— Plug
POT	— Potentiometer
R	— Relay
SPT	— Space Temperature
SW	— Switch
TB	— Terminal Block
TRAN	— Transformer
UL	— Unloader

Table 4 — Output Relays

RELAY NO.	DESCRIPTION
K1	Energize Compressor A1 (30HK,HL,HW) Energize Compressor A1 and Condenser Fan Motor OFM1 (30GTN)
K2	Energize Compressor B1 (30HK,HL)
K3	Energize Unloader A1
K4	Energize Unloader B1 (30HK,HL) Energize Unloader A2 (30HW, 30GTN)*
K5	Energize Liquid Line Solenoid Valve for Circuit A (30HL, 30GTN)
K6	Energize Liquid Line Solenoid Valve for Circuit B (30HL)
K7	Alarm
K8	Cooler Pump
K9	Energize Condenser Fan Relay for Circuit A (30HL, 30HWA) Energize Condenser Pump Relay (30HK, 30HWB,C,S) Energize Condenser Fan Motor OFM2 (30GTN015-035)
K10	Energize Condenser Fan Relay for Circuit B (30HL) Energize Condenser Fan Motor OFM3 (30GTN035)
K11	Hot Gas Bypass

*Hot Gas Bypass is energized for 30GTN models 015 (50 Hz), 020 (60 Hz) and 30HW025.

Table 5 — CCN Communication Bus Wiring

MANUFACTURER	PART NO.	
	Regular Wiring	Plenum Wiring
Alpha	1895	—
American	A21451	A48301
Belden	8205	884421
Columbia	D6451	—
Manhattan	M13402	M64430
Quabik	6130	—

OPERATING DATA

Sensors — The electronic control uses 2 to 6 thermistors to sense temperatures for controlling chiller operation. See Table 2. These sensors are outlined below. Thermistors T1, T2, T3, T9 and condenser entering and leaving thermistors (30HWB,C,S HL) are 5 kΩ at 77 F (25 C) and are identical in temperature versus resistance and voltage drop performance. Thermistor T10 is 10 kΩ at 77 F (25 C) and has a different temperature vs resistance and voltage drop performance. See Thermistors section on page 58 for temperature-resistance-voltage drop characteristics.

T1 — COOLER LEAVING FLUID SENSOR — This thermistor is located in the leaving-fluid nozzle for 30HK,HL and 30GTN models. The sensor is installed in a friction-fit well which is located directly in the fluid path. For 30HW models, the sensor itself is installed directly in the fluid path using a compression fitting. Pressure must be relieved from the cooler and fluid drained before the sensor is removed.

T2 — COOLER ENTERING FLUID SENSOR — This thermistor is located in the entering fluid nozzle. The thermistor probe is inserted into a friction-fit well. The sensor is located directly in the fluid path. This sensor is factory-supplied and field-installed on 30HW units only. Sensor and probe are secured to the back of the 30HW control box. Sensor is factory-installed for all other models.

T3 — SATURATED CONDENSING TEMPERATURE SENSOR — This thermistor is factory installed on 30GTN models only. The sensor is clamped to the outside of a return bend on the condenser coil. Sensor location is shown in Fig. 7.

LEGEND

A	— Alarm
C	— Contactor, Compressor
CB	— Circuit Breaker
CH	— Crankcase Heater
CR	— Control Relay
CWFS	— Chilled Water Flow Switch
CWP	— Chilled Water Pump Interlock
DLS	— Demand Limit Switch
EMM	— Energy Management
FU	— Control Transformer Fuse
GCS	— Ground Current Sensing
GND	— Ground
HGS	— Hot Gas Solenoid
HPS	— High-Pressure Switch
LPS	— Low-Pressure Switch
MBB	— Main Base Board
OPS	— Oil Pressure Switch
PL	— Plug
POT	— Potentiometer
SW	— Switch
T	— Thermistor
TB	— Terminal Block
TRAN	— Transformer
UL	— Unloader
[x]	Terminal Block
———	Factory Wiring
▬ ▬ ▬	Field Wiring
– – – –	Accessory or Option Wiring

NOTES:
1. Factory wiring is in accordance with the National Electrical Codes. Any field modifications or additions must be in compliance with all applicable codes.
2. Use 75 C min wire for field power supply.
3. All circuit breakers 'Must Trip Amps' are equal to or less than 156% FLA (Full Load Amps).
4. Oil pressure safety switches are standard on 30HL units only.
5. All field interlock contacts must have a minimum rating of 2 amps at 24 vac sealed. See field interlock wiring.
6. Compressors thermally protected — three phase motors protected against primary single phase conditions.
7. Terminals 9 and 10 of TB5 are for field connection of remote On-Off. The contacts must be rated for dry circuit application capable of handling a 5 vdc 1 mA to 20 mA load.

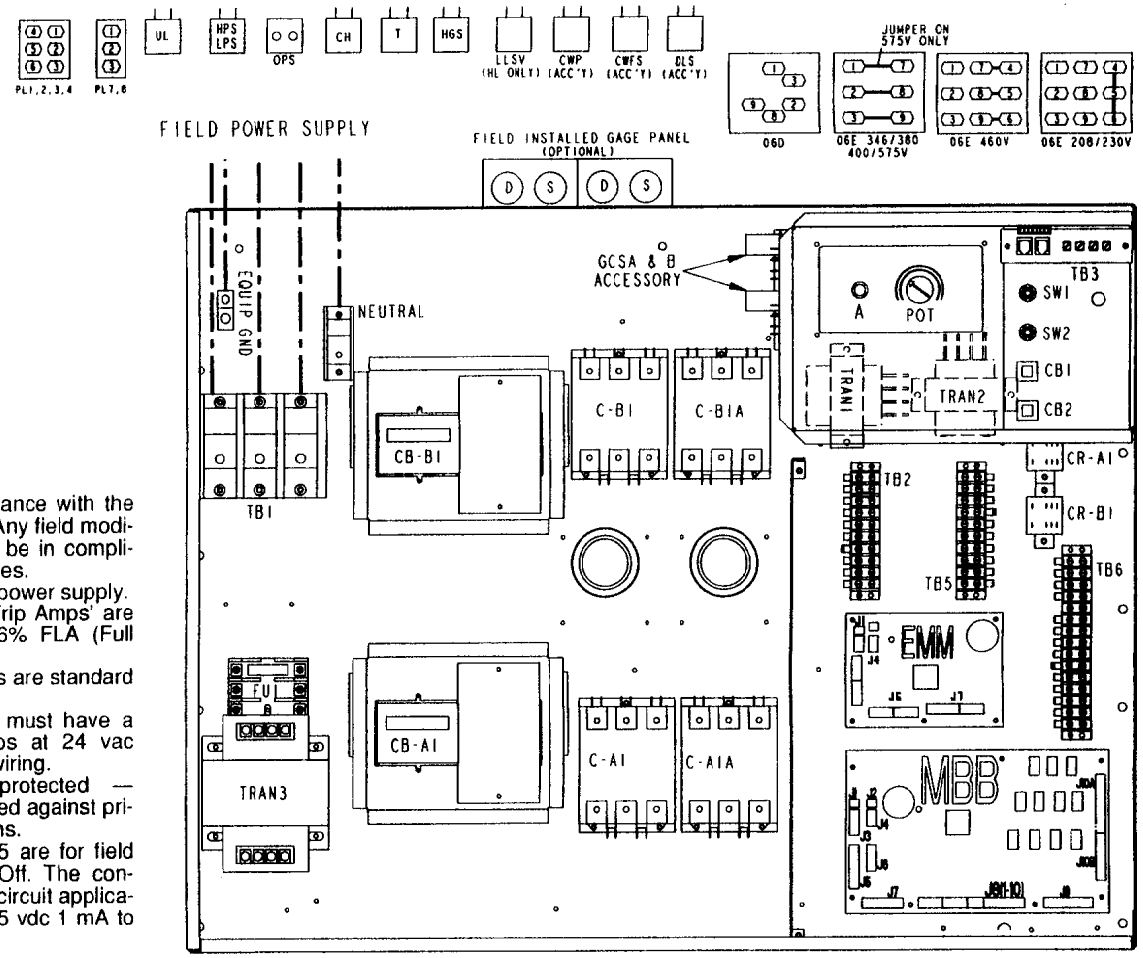


Fig. 1 — Typical Control Box — 30HK,HL Units Shown

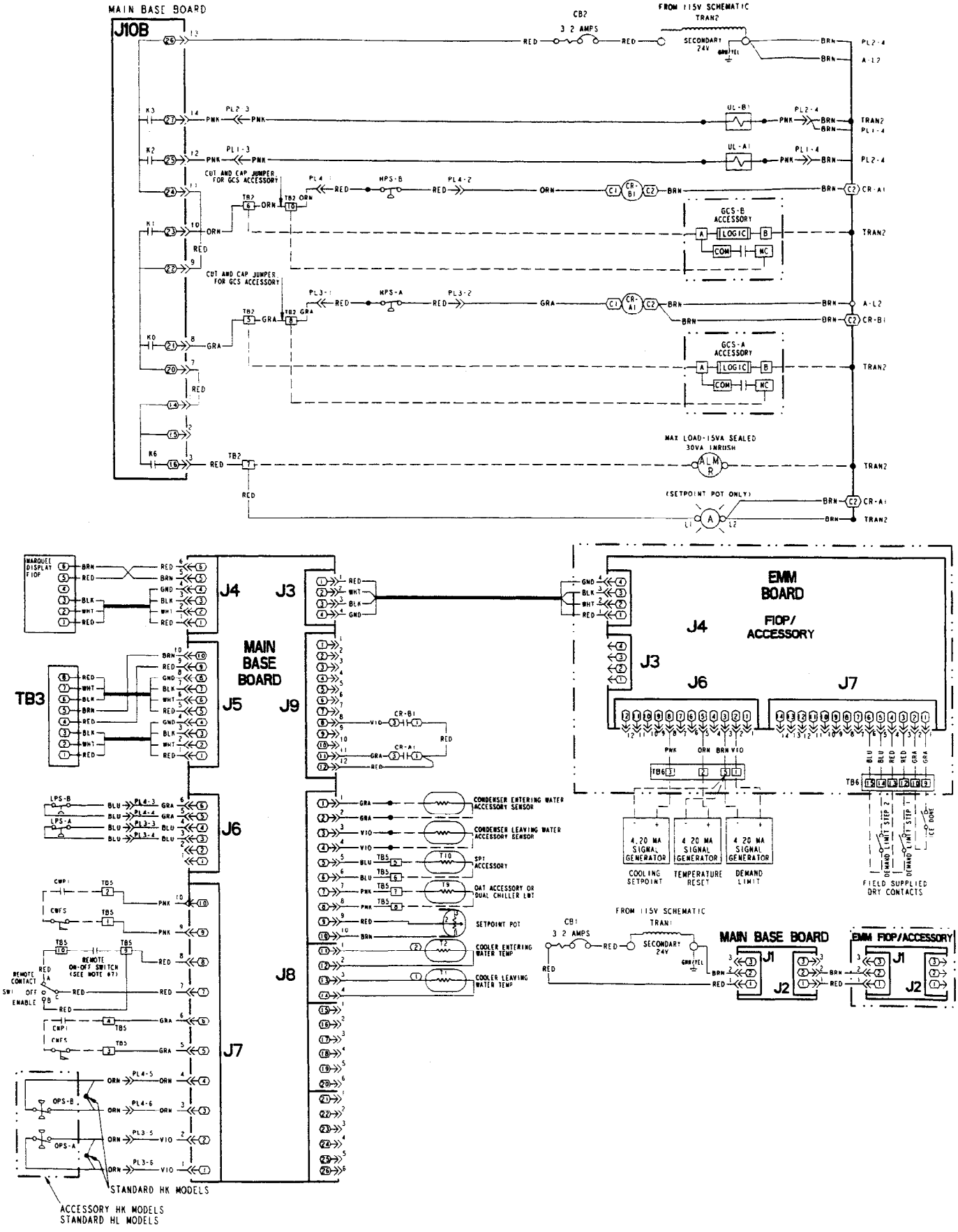


Fig. 2 — Low-Voltage (24-V) Control Schematic; 30HK,HL Units

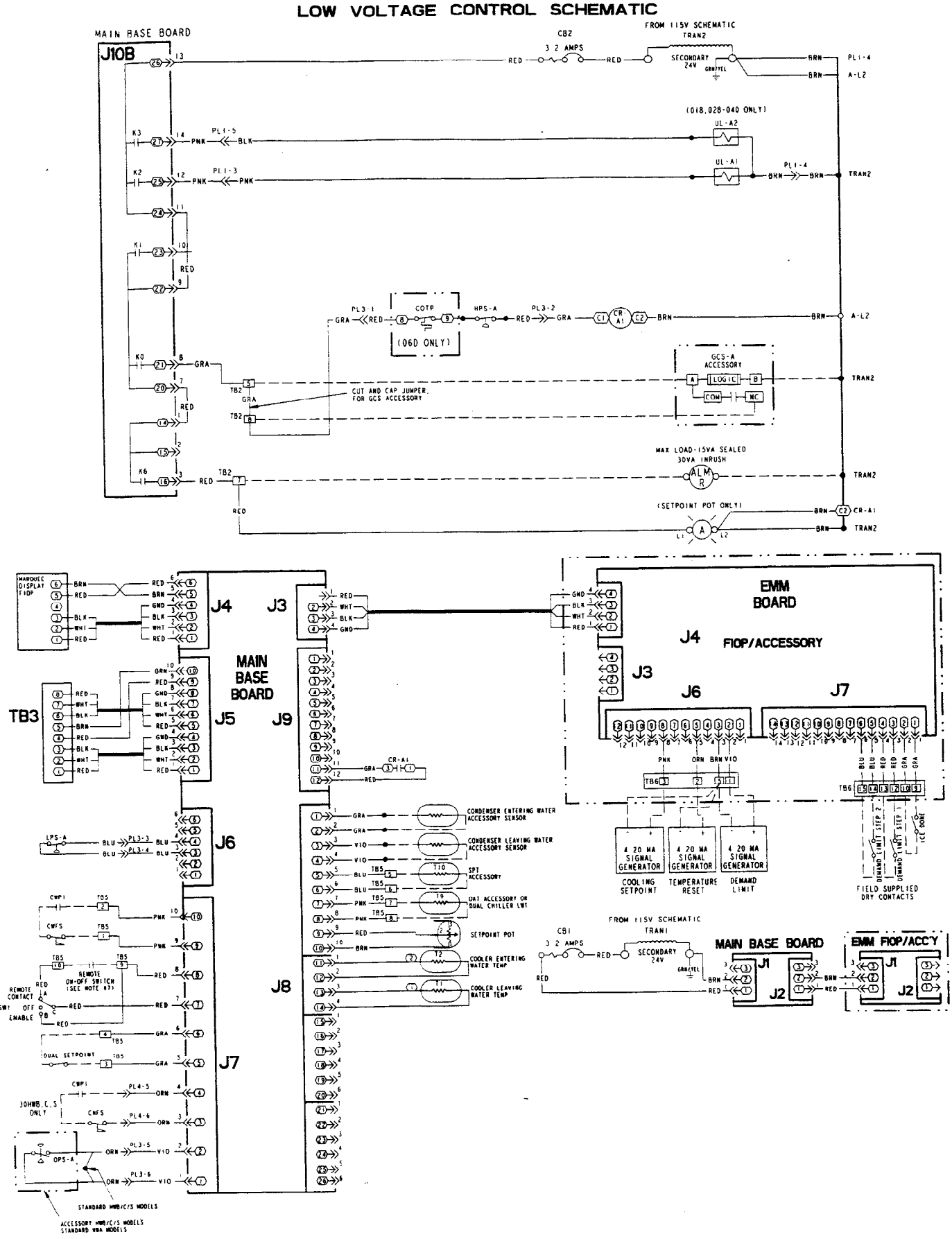


Fig. 3 — Low-Voltage (24-V) Control Schematic; 30HW Units

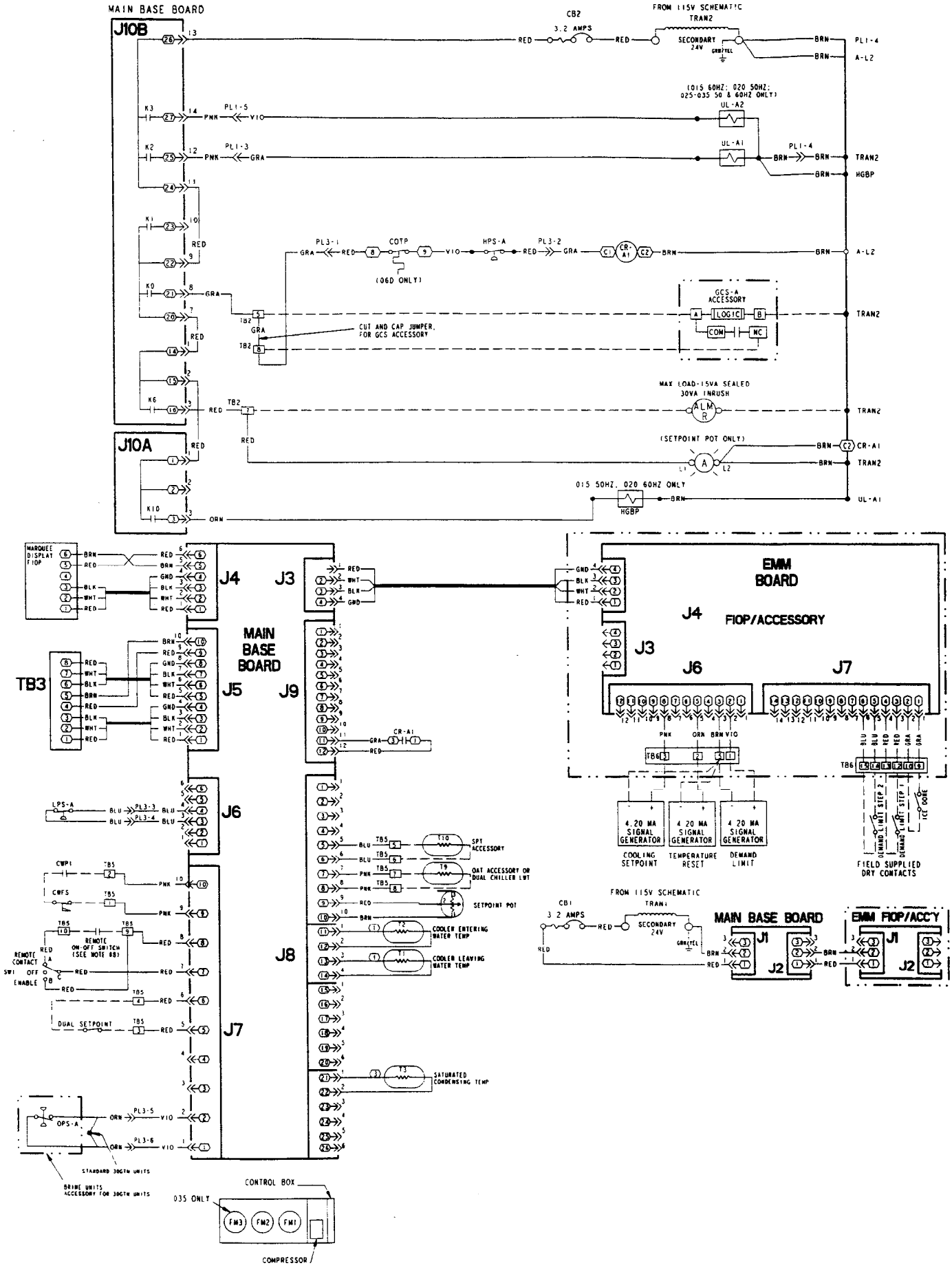


Fig. 4 — Low-Voltage (24-V) Control Schematic; 30GTN Units

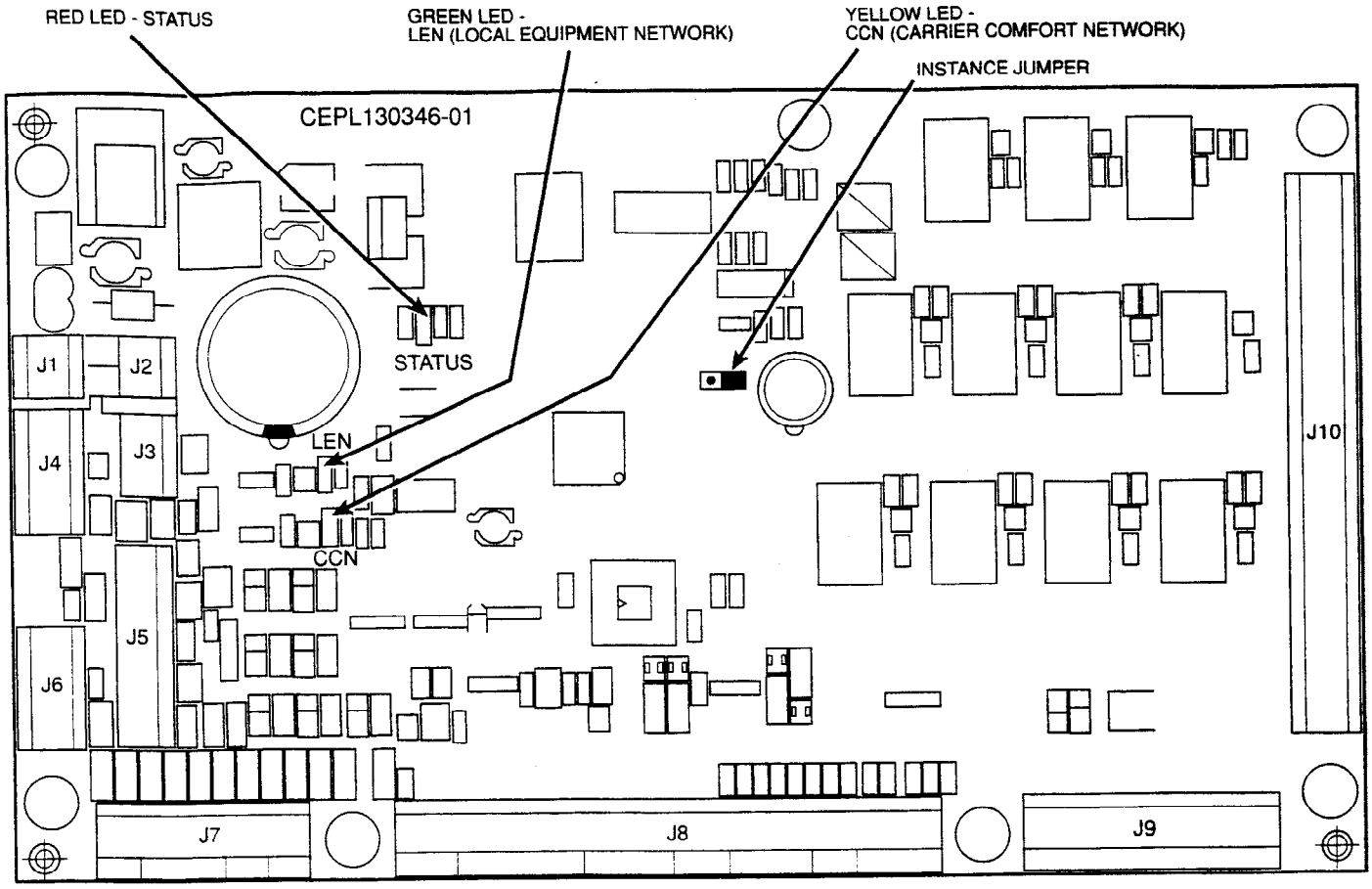
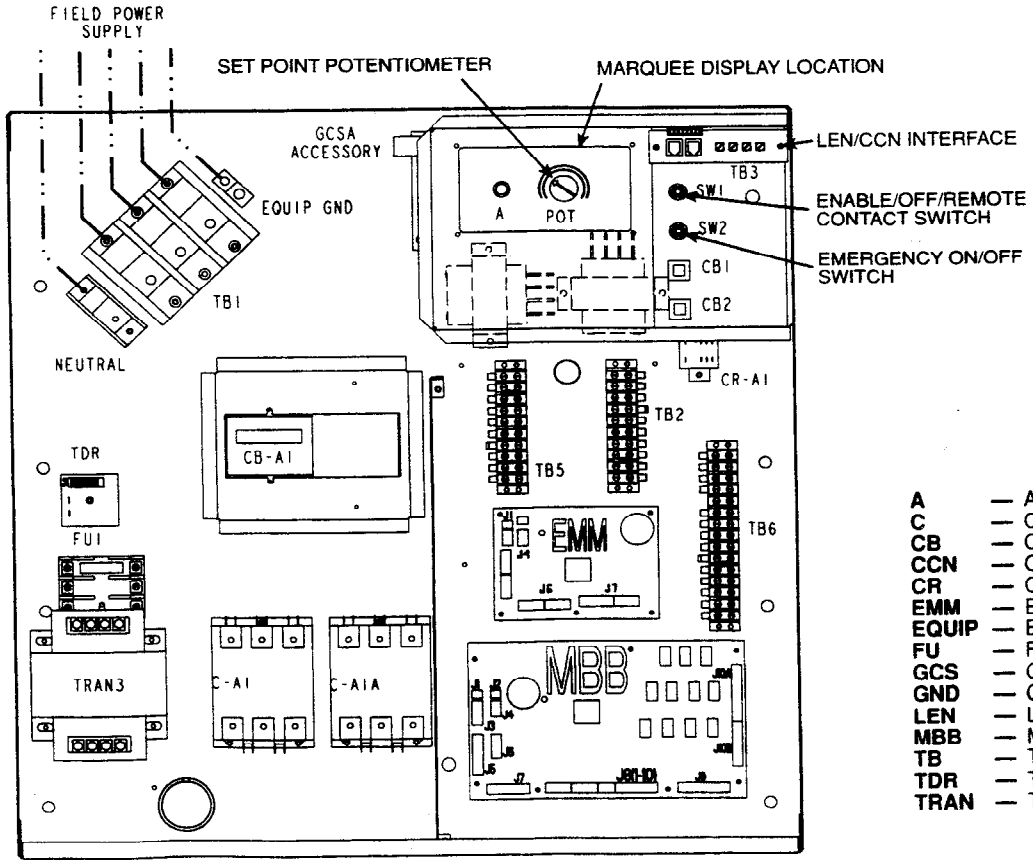


Fig. 5 — Main Base Board



LEGEND

A	— Alarm
C	— Contactor
CB	— Circuit Breaker
CCN	— Carrier Comfort Network
CR	— Control Relay
EMM	— Energy Management Module
EQUIP	— Equipment
FU	— Fuse
GCS	— Ground Current Sensing
GND	— Ground
LEN	— Local Equipment Network
MBB	— Main Base Board
TB	— Terminal Board
TDR	— Time-Delay Relay
TRAN	— Transformer

Fig. 6 — LEN/CCN Interface, Enable/Off/Remote Contact Switch, and Emergency On/Off Switch Locations

T9 — OUTDOOR-AIR TEMPERATURE SENSOR — Sensor T9 is an accessory sensor that is remotely mounted and used for outdoor-air temperature reset.

T10 — REMOTE SPACE TEMPERATURE SENSOR — Sensor T10 (part no. HH51BX006) is an accessory sensor that is remotely mounted in the controlled space and used for space 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). The push button override button is not supported by the *ComfortLink*™ Controls.

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

To connect the space temperature sensor (Fig. 8):

1. Using a 20 AWG twisted pair conductor cable rated for the application, connect 1 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 5 and 6 on TB5 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 (Fig. 9):

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 5 for acceptable wiring.

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

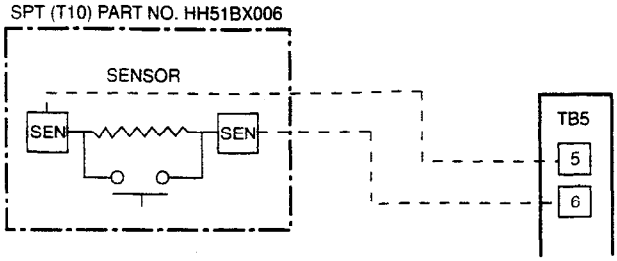


Fig. 8 — Typical Space Temperature Sensor Wiring

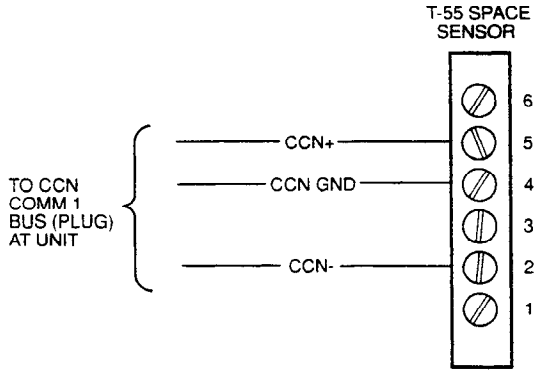
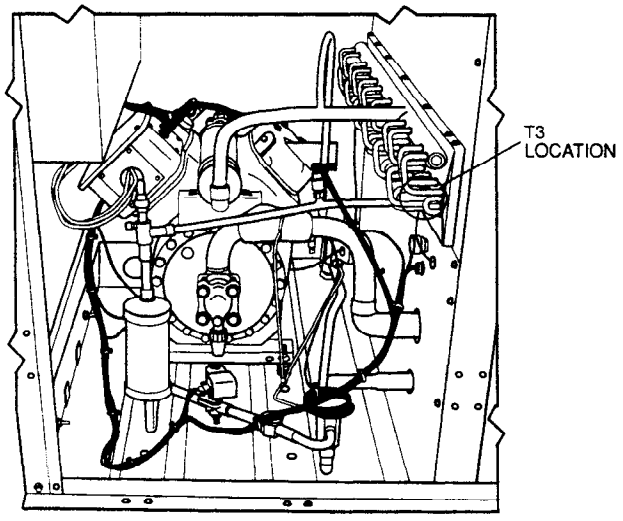


Fig. 9 — CCN Communications Bus Wiring to Optional Space Sensor RJ11 Connector



COMPRESSOR END, LEFT FRONT ACCESS DOOR (WHEN FACING COOLER)

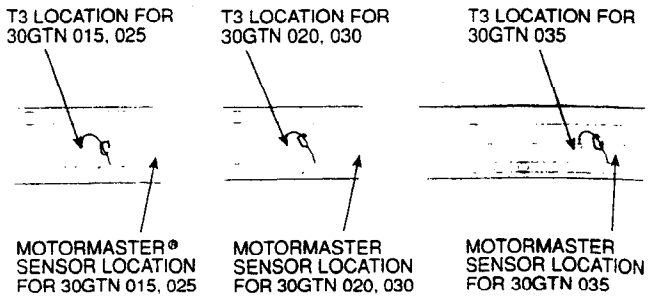


Fig. 7 — Thermistor T3 Location, 30GTN Units

Energy Management Module (Fig. 10) — This factory-installed option or field-installed accessory is used for the following types of temperature reset, demand limit, and/or ice features:

- 4 to 20 mA leaving fluid temperature reset (requires field-supplied 4 to 20 mA generator)
- 4 to 20 mA cooling set point reset (requires field-supplied 4 to 20 mA generator)
- Discrete inputs for 2-step demand limit (requires field-supplied dry contacts capable of handling a 5 vdc, 1 to 20 mA load)
- 4 to 20 mA demand limit (requires field-supplied 4 to 20 mA generator)
- Discrete input for Ice Done switch (requires field-supplied dry contacts capable of handling a 5 vdc, 1 to 20 mA load)

See Demand Limit and Temperature Reset sections on pages 39 and 37 for further details.

Loss-of-Cooler Flow Protection — A proof-of-cooler flow device (accessory flow switch) MUST be used with all chillers. The device should be set to shut the unit off if cooler gpm drops below the minimum flow rate for the machine. Refer to Pre-Start-Up, System Check section on page 63. The flow switch contacts are connected to TB5-1,2.

Compressor Ground Fault Sensor — The ground fault sensor accessory (Part Number 30HW900004) monitors all phases of the 3-phase power supply to the compressor. If a short to ground is sensed by the sensor, the compressor automatically shuts down. This action prevents contamination of the refrigeration system from acid formation. The compressor shuts down when a 2.5 ± 2 amp ground current is sensed by a toroid installed around the compressor power leads. The MBB will lock the compressor off until the compressor failure alert is reset. For installation details, see the instructions included with the accessory package.

NOTE: Two accessory packages are required for 30HK,HL units.

Thermostatic Expansion Valves (TXV) — All units are equipped from the factory with conventional TXVs. The 30HL and 30GTN models also have factory-installed liquid line solenoids. The liquid line solenoid valves are not intended to be a mechanical shut-off. When service is required, use the liquid line service valve to pump down the system.

The TXV is set at the factory to maintain approximately 8 to 12° F (4.4 to 6.7° C) suction superheat leaving the cooler by monitoring the proper amount of refrigerant into the cooler. All TXVs are adjustable, *but should not be adjusted unless absolutely necessary.*

The TXV is designed to limit the cooler saturated suction temperature to 55 F (12.8 C). This makes it possible for unit to start at high cooler fluid temperatures without overloading the compressor.

Compressor Control Relay (CR) — Each compressor has its own control relay. The CR is used to control and protect the compressors and crankcase heaters. The CR provides the following functions:

- compressor contactor and crankcase heater control
- status communication to the processor board

A high-pressure switch is wired in series between the MBB and CR. If the high-pressure switch opens during operation of a compressor, the compressor will be stopped, the failure will be detected through the signal contacts and the compressor will be locked off.

Capacity Control — The control system cycles compressors, unloaders, and hot gas bypass solenoids 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. The chilled fluid temperature set point can be automatically reset by the return temperature reset space, or outdoor-air temperature reset features. It can also be reset from an external 4- to 20-mA signal (requires Energy Management Module FIOP or accessory).

With the automatic lead-lag feature in the unit, the control determines by compressor wear factor (combination of starts and run hours) which circuit will start first (30HK,HL only). At the first call for cooling, the compressor crankcase heater will be deenergized, a condenser fan (30GTN) or condenser fan relay (30HL, 30HWA) will start and the compressor will start unloaded.

If the circuit has been off for 15 minutes, the liquid line solenoid (if installed) will remain closed for 10 seconds while the cooler and suction lines are purged of any liquid refrigerant.

After the purge period, the liquid line solenoid (if installed) will open allowing the TXV to meter the refrigerant to the cooler. If the off-time is less than 15 minutes, the liquid line solenoid will be opened as soon as the compressor starts.

The TXVs will open gradually to provide a controlled start-up. During start-up, the low pressure and oil pressure (if installed) switches will be bypassed for 2 minutes to allow for the transient changes during start-up. As additional stages of compression are required, the processor control will add them. See Table 5.

If a circuit is to be stopped, the following occurs:

For 30HK, 30HW units, the compressor will be shut off.

For 30HL, 30GTN units, the control will first close the liquid line solenoid valve. The compressor will operate until the low pressure switch opens and will then be shut off. If the low pressure switch does not open within 3 minutes, the alarm/alert indictor light will be illuminated and alert 135 (Circuit A) or 136 (Circuit B, 30HL only) will be generated (with Scrolling Marquee option only).

During shutdown all diagnostic conditions will be honored. If a safety trips or alarm condition is detected before pumpout is complete, the circuit will be shut down.

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 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 an unloader, the control deenergizes (energizes) an unloader when the ratio reaches +60% (−60%). Unloaders are allowed to cycle faster than compressors, to minimize the number of starts and stops on each compressor. A delay of 90 seconds occurs after each capacity step change. Refer to Table 6.

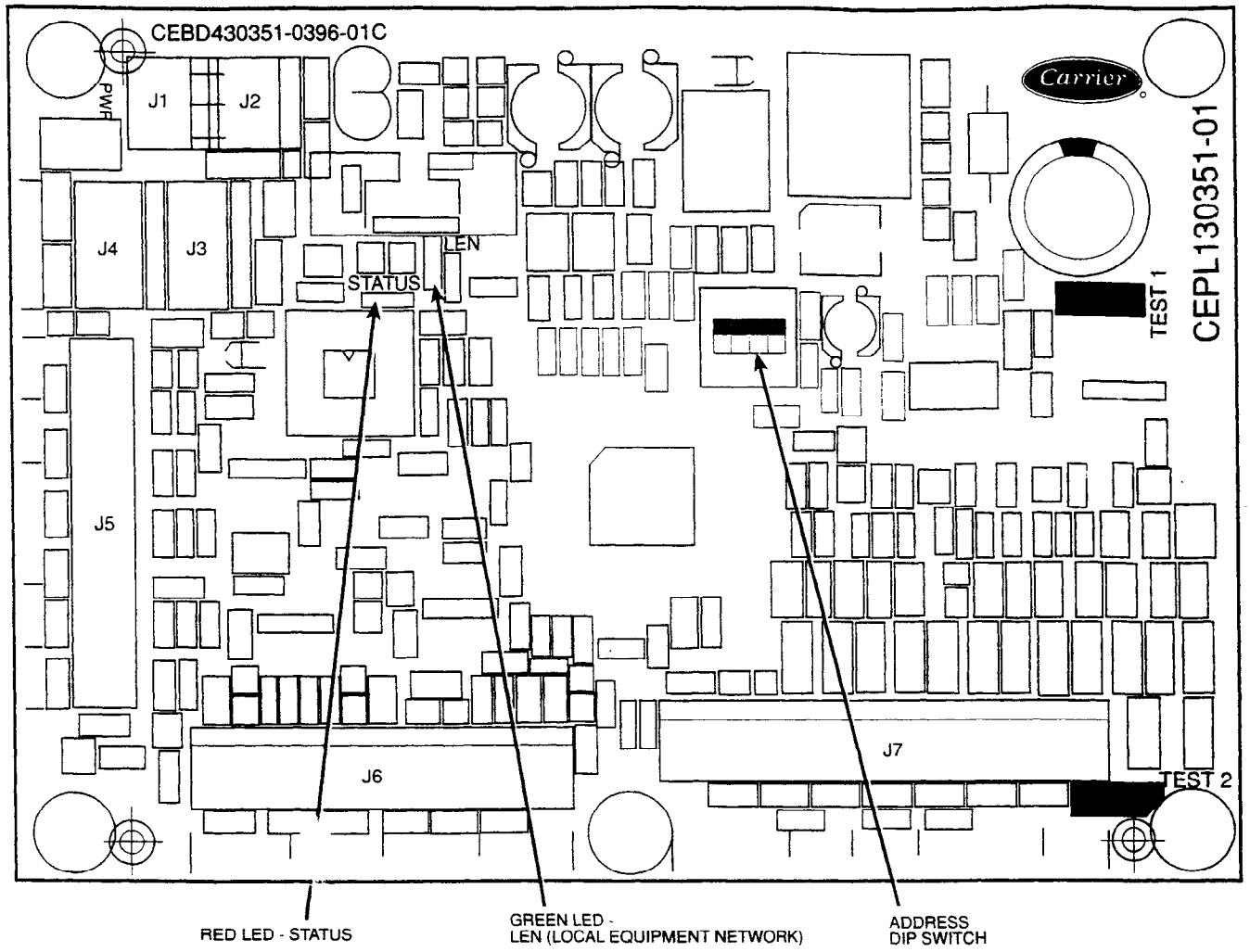


Fig. 10 — Energy Management Module

Table 6 — Part Load Data Percent Displacement, Standard Units

UNIT TYPE	CONTROL STEPS	LOADING SEQ A		LOADING SEQ B	
		% Displacement	Compressor	% Displacement	Compressor
30HK,HL 040 (60 Hz)	1	25	A1*	25	B1*
	2	50	A1	50	B1
	3	75	A1*,B1	75	A1,B1*
	4	100	A1,B1	100	A1,B1
30HK,HL 040 (50 Hz) 050 (60 Hz)	1	40	A1*	16	B1*
	2	60	A1	40	B1
	3	—	—	60	A1*,B1*
	4	80	A1*,B1	80	A1,B1*
	5	100	A1,B1	100	A1,B1
30HK,HL 050 (50 Hz) 060 (All)	1	33	A1*	33	B1*
	2	50	A1	50	B1
	3	67	A1*,B1*	67	A1*,B1*
	4	83	A1*,B1	83	A1,B1*
	5	100	A1,B1	100	A1,B1
30HW (All) 018,028-040	1	33	A1†	—	—
	2	67	A1*	—	—
	3	100	A1	—	—
30HW (All) 025	1	50	A1**	—	—
	2	100	A1	—	—
30GTN 015 (60 Hz) 020 (50 Hz) 025-035 (All)	1	33	A1†	—	—
	2	67	A1*	—	—
	3	100	A1	—	—
30GTN 015 (50 Hz) 020 (60 Hz)	1	50	A1**	—	—
	2	100	A1	—	—

*Unloaded compressor, one unloader energized.
†Unloaded compressor, two unloaders energized.
**Hot gas bypass energized as first stage.

MINUTES LEFT FOR START — This value is displayed only in the network display tables (using Service Tool or ComfortWORKS® software) and represents the amount of time to elapse before the unit will start its initialization routine. This value can be zero without the machine running in many situations. This can include being unoccupied, ENABLE/OFF/REMOTE CONTACT switch in the OFF position, CCN not allowing unit to start, Demand Limit in effect, no call for cooling due to no load, and alarm or alert conditions present. If the machine should be running and none of the above are true, a minimum off time (DELY, see below) may be in effect. The machine should start normally once the time limit has expired.

MINUTES OFF TIME (DELY, Configuration Mode under OPT2) — This user-configurable time period is used by the control to determine how long unit operation is delayed after power is applied/restored to the unit. It is also used to delay compressor restarts after the unit has shut off its lowest stage of capacity. Typically, this time period is configured when multiple machines are located on a single site. For example, this gives the user the ability to prevent all the units from restarting at once after a power failure. A value of zero for this variable does not mean that the unit should be running.

LOADING SEQUENCE (30HK,HL) — The compressor efficiency is greatest at partial load. Therefore, the following sequence list applies to capacity control.

The next compressor will be started with unloaders energized on the lead compressor.

All valid capacity combinations using unloaders will be used as long as the total capacity is increasing.

LEAD/LAG DETERMINATION — This is a configurable choice and is factory set to be automatic for 30HK,HL units. It is set for Circuit A leading for 30HW and 30GTN units. The value can be changed (30HK,HL only) to Circuit A or Circuit B leading as desired. Set at automatic, the control will sum the current number of logged circuit starts and one-quarter of the current operating hours for each circuit. The circuit with the lowest sum is started first. Changes to which circuit is the lead circuit and which is the lag are also made when total machine capacity is at 100% or when there is a change in the direction of capacity (increase or decrease) and each circuit's capacity is equal.

CAPACITY SEQUENCE DETERMINATION — This control choice does NOT have any impact on these machines.

CAPACITY CONTROL OVERRIDES — The following overrides will modify the normal operation of the routine.

Deadband Multiplier — The user configurable Deadband Multiplier (Z.GN, Configuration Mode under SLCT) has a default value of 1.0. The range is from 1.0 to 4.0. When set to other than 1.0, this factor is applied to the capacity Load/Unload Factor. The larger this value is set, the longer the control will delay between adding or removing stages of capacity. Figure 11 shows how compressor starts can be reduced over time if the leaving water temperature is allowed to drift a larger amount above and below the set point. This value should be set in the range of 3.0 to 4.0 for systems with small loop volumes.

First Stage Override — If the current capacity stage is zero, the control will modify the routine with a 1.2 factor on adding the first stage to reduce cycling. This factor is also applied when the control is attempting to remove the last stage of capacity.

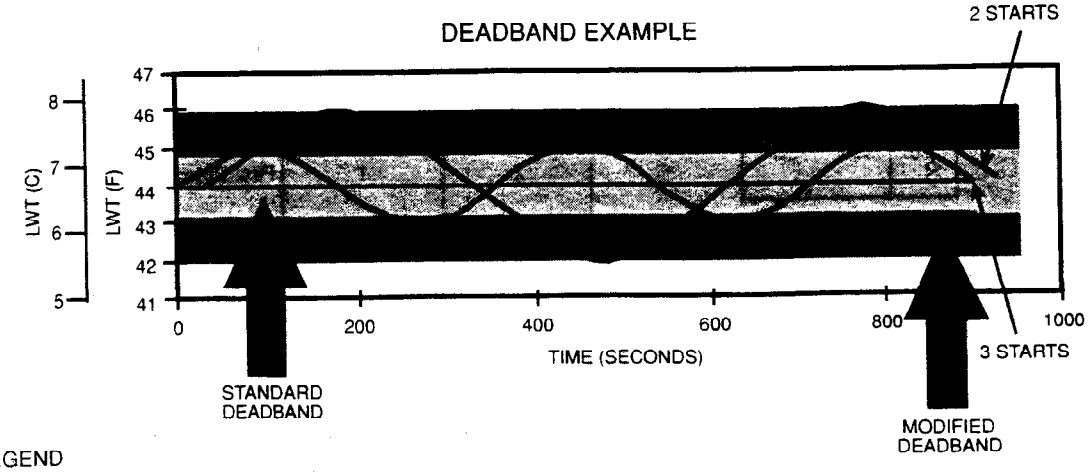
Slow Change Override — The control prevents the capacity stages from being changed when the leaving fluid temperature is close to the set point (within an adjustable deadband) and moving towards the set point.

Ramp Loading (CRMP, Configuration Mode under SLCT) — 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 Cooling Ramp Loading value (CRMP), the control does not allow any changes to the current stage of capacity.

Low Entering Fluid Temperature Unloading — When the entering fluid temperature is below the control point, the control will attempt to remove 25% of the current stages being used. If exactly 25% cannot be removed, the control removes an amount greater than 25% but no more than necessary. The lowest stage will not be removed.

HOT GAS BYPASS — If equipped, the hot gas bypass valve is energized only when all unloaders are energized. The valve is closed when unloaders are deenergized to increase capacity. The valve is energized on 30HK,HL units only when one circuit is operating unloaded.

Cooler Freeze Protection — The control will try to prevent shutting the chiller down on a Cooler Freeze Protection alarm by removing stages of capacity. If the cooler fluid selected is Water, the freeze point is 34 F (1.1 C). If the cooler fluid selected is Brine, the freeze point is 8° F (4.4° C) below the cooling set point (or lower of two cooling set points in dual set point configurations). If the cooler leaving fluid temperature is less than the freeze point plus 2.0° F (1.1° C), the control will immediately remove one stage of capacity. This can be repeated once every 30 seconds.



LEGEND

LWT — Leaving Water Temperature

Fig. 11 — Deadband Multiplier

Head Pressure Control

COMFORTLINK™ UNITS (30GTN Only) — The Main Base Board (MBB) controls the condenser fans to maintain the lowest condensing temperature possible, and thus the highest unit efficiency. The fans are controlled by the saturated condensing temperature set from the factory. Fan control is determined by the Head Pressure Control Method (HPCM) setting in the Configuration Mode under the OPT1 sub-mode. This setting (HPCM=2) indicates set point control. During the first 10 minutes after circuit start-up, MBB-controlled fans are not turned on until T3 is greater than the head pressure set point plus 10° F (5.6° C). If T3 is greater than 95 F (35 C) just prior to circuit start-up, all MBB-controlled fan stages are turned on to prevent excessive discharge pressure during pull-down. At each change of the fan stage, the system will wait one minute to allow the head pressure to stabilize unless T3 is greater than 125 F (51.6 C), in which case all MBB-controlled fans will start immediately. This method allows the unit to run at very low condensing temperatures at part load. The control will turn off a fan stage when T3 is below the head pressure set point by 35 F (19.4 C). Fan sequences are shown in Fig. 12.

Motormaster® Option — For low-ambient operation, the lead fan on 30GTN units can be equipped with the Motormaster head pressure controller option or accessory. The fan controlled is that which is energized with compressor A1. Refer to Fig. 12 for condenser fan staging information.

Operation of Machine Based on Control Method and Cooling Set Point Selection Settings — Machine On/Off control is determined by the configuration of the control method (CTRL, Configuration mode under sub-mode OPT2) and cooling set point select (CLSP, Configuration mode under sub-mode SLCT) variables. For models using the Quickset Set Point Adjustment, these variables are factory configured for control method of 0 (Enable/Off/Remote Contact) and a cooling set point select of 5 (External Quickset POT). Models with the optional Scrolling Marquee have the same control method, but have cooling set point select set to 1 (single set point, CSP1). With the control method 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 control mode (MODE) will be 1 when the switch is Off and will be 5 when in the Enable position or Remote Contact position with external contacts closed.

Three other control methods are available for Machine On/Off control:

7-DAY SCHEDULE (CTRL=1) — The Main Base Board will use the schedule defined under the Time Clock mode. This schedule is accessible ONLY from the Scrolling Marquee or accessory Navigator display. Refer to example tables in the Marquee Display Usage section, page 15. The Enable/Off/Remote Contact must be in the Enable or Remote Contact position. Note that this is NOT the same schedule that is seen when using Building Supervisor, Service Tool, ComfortWORKS®, etc. The control mode (MODE) will be 1 when the switch is Off. The control mode will be 3 when the Enable/Off/Remote Contact switch input is On and the time of day is during an unoccupied period. Similarly, the control mode will be 7 when the time of day is during an occupied period

OCCUPANCY SCHEDULE (CTRL=2) — The Main Base Board will use the operating schedules that can only be accessed and configured using a CCN tool such as Building Supervisor, Service Tool or ComfortWORKS software. The Enable/Off/Remote Contact must be in the Enable or Remote Contact position. The control mode (MODE) will be 1 when the switch is Off. The control mode will be 3 when the Enable/Off/Remote Contact switch input is On and the time of day is during an unoccupied period. Similarly, the control mode will be 7 when the time of day is during an occupied period.

CCN SCHEDULE (CTRL=3) — An external CCN device such as Flotronic™ System Manager 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 control mode (MODE) will be 1 when the switch is Off. The control mode will be 2 when the Enable/Off/Remote Contact switch input is On and the CHIL_S_S variable is 'Stop.' Similarly, the control mode will be 6 when the CHIL_S_S variable is 'Start.'

Table 7 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. The illustration also shows the ON/OFF state of the machine for the given combinations.

Pumpout (30HL, 30GTN Units) — Pumpout is a time-based feature. On a command for start-up, the compressor starts with the liquid line solenoid closed (provided 15 minutes has elapsed since previous start). After 10 seconds, the liquid line solenoid opens. At shutdown, the liquid line solenoid is closed and the compressor is turned off 10 seconds later.

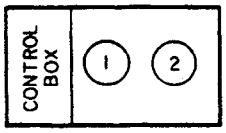
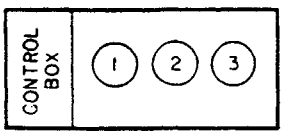
FAN ARRANGEMENT	FAN NO.	FAN RELAY	NORMAL CONTROL
30GTN015-030 	1	—	Compressor A1
	2	1	First Stage Condenser Fan
30GTN035 	1	—	Compressor A1
	2	1	First Stage Condenser Fan
	3	2	Second Stage Condenser Fan

Fig. 12 — 30GTN Condenser Fan Sequence

Table 7 — Control Methods and Cooling Set Points

CONTROL TYPE (CTRL)	OCCUPANCY STATE	COOLING SET POINT SELECT (CLSP)					
		0 (single)	1 (dual, switch)	2 (dual, 7 day)	3 (dual, occ)	4 (4 to 20 mA)	5 (QuickSet)
0 (switch)	Occupied	ON,CSP1	ON*	ON,CSP1	ON,CSP1	ON†	ON**
	Unoccupied	ON,CSP1	ON*	ON,CSP2	ON,CSP2	ON	ON**
1 (7 day)	Occupied	ON,CSP1	ON*	Illegal	Illegal	ON†	ON**
	Unoccupied	OFF	OFF	Illegal	Illegal	OFF	OFF
2 (Occupancy)	Occupied	ON,CSP1	ON*	Illegal	Illegal	ON†	ON**
	Unoccupied	OFF	OFF	Illegal	Illegal	OFF	OFF
3 (CCN)	Occupied	ON,CSP1	ON*	ON,CSP1	ON,CSP1	ON†	ON**
	Unoccupied	ON,CSP1	ON*	ON,CSP2	ON,CSP2	ON†	ON**

*Dual set point switch input used. CSP1 used when switch input is closed. CSP2 used when switch input is open.
†Cooling set point determined from 4 to 20 mA input to Energy Management Module (EMM) to terminals TB6-3.5.
**Cooling set point determined from QuickSet Set Point Adjustment input to the Main Base Board (MBB), J8 pins 9,10.

Marquee Display Usage (See Fig. 13 and Tables 8-27) — The Optional Marquee display module provides the user interface to the *ComfortLink*™ control system. The display has up and down arrow keys, an ESCAPE key, and an ENTER key. These keys are used to navigate through the different levels of the display structure. See Table 8. Press the ESCAPE key until the display is blank to move through the top 11 mode levels indicated by LEDs on the left side of the display.

Pressing the ESCAPE and ENTER keys simultaneously will scroll a clear language text description across the display indicating the full meaning of each display acronym. Pressing the ESCAPE and ENTER keys when the display is blank (Mode LED level) will return the Marquee display to its default menu of rotating display items. In addition, the password will be disabled requiring that it be entered again before changes can be made to password protected items.

Clear language descriptions in English, Spanish, French, or Portuguese can be displayed when properly configuring the LANG variable in the Configuration Mode, under DISP submode. See Tables 17A and 17B.

NOTE: When the LANG variable is changed to 1, 2, or 3, 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 display will flash showing the operator, the item, followed by the item value and then followed by the item units (if any). Press the ENTER key to stop the display at the item value. Items in the Configuration and Service Test modes are password protected. The display will flash PASS and WORD when required. Use the ENTER and arrow keys to enter the 4 digits of the password. The default password is 1111. The password can only be changed through CCN devices such as ComfortWORKS® and Service Tool.

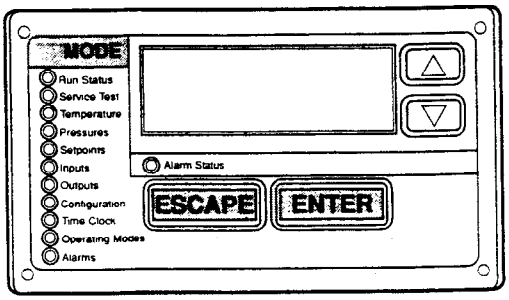


Fig. 13 — Scrolling Marquee Display

Changing item values or testing outputs is accomplished in the same manner. Locate and display the desired item. Press ENTER to stop the display at the item value. Press the ENTER key again so that the item value flashes. Use the arrow keys to change the value or state of an item and press the ENTER key to accept it. Press the ESCAPE key and the item, value, or units display will resume. Repeat the process as required for other items.

See Tables 8-27 for further details.

Service Test (See Tables 10A and 10B) — *Both main power and control circuit power must be on.*

The Service Test function should be used to verify proper operation of compressors, unloaders, liquid line solenoids, hot gas bypass (if installed), cooler pump and remote alarm relays, condenser pump, and condenser fans/relays. To use the Service Test mode, the Enable/Off/Remote Contact switch must be in the OFF position. Use the display keys and Tables 10A and 10B to enter the mode and display TEST. Press ENTER twice so that OFF flashes. Enter the password if required. Use either arrow key to change the TEST value to the On position and press ENTER . Press ESCAPE and the ▼ button to enter the OUTS or COMP sub-mode.

Test the condenser fans, liquid line solenoids, cooler pump, condenser pump, and alarm relays 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. All compressor outputs can be turned on, but the control will limit the rate by staging one compressor per minute. Compressor unloaders and hot gas bypass relays/solenoids (if installed) can be tested with compressors on or off. The relays under the COMP sub-mode will stay on for 10 minutes if there is no keypad activity. Compressors will stay on until they are turned off by the operator. 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 TEST mode. The STAT item (Run/status mode under sub-mode 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.

QuickSet Set Point Adjustment Usage — Standard units are shipped with the QuickSet Potentiometer. This device is used to set the desired leaving fluid temperature set point. The potentiometer is factory calibrated and the pointer on the dial should be aligned to the desired leaving fluid temperature. The chiller is factory configured for fluid type of water (FLUD=1) and the set point can be adjusted from 38 F to 70 F (3.3 C to 21.1 C). Settings between the –20 F to 38 F (–28.9 C to 3.3 C) temperature range are for brine applications only and require that the unit be equipped with the Scrolling Marquee display.

NOTE: Medium temperature brine units are factory-shipped with set point adjustable from 15 F to 70 F (–9.4 C to 21.1 C). Ensure that cooler fluid is adequately protected from freezing before setting desired temperatures below 38 F (3.3 C).

QUICKSET CALIBRATION — The potentiometer MUST be calibrated if it or the Main Base Board (MBB) is replaced. To calibrate the potentiometer, follow the steps shown below:

1. Turn the knob fully counterclockwise (CCW) so that the pointer is pointing to the asterisk on the label. The alarm/alert indicator light will illuminate.
2. Turn the knob clockwise (CW) so that the pointer is positioned at –20 F (–28.9 C) (outer temperature ring). The alarm/alert indictor light will turn OFF and then back ON.
3. Turn the knob clockwise (CW) so that the pointer is positioned at 70 F (21.1 C). The alarm/alert indicator light will turn OFF which indicates that the calibration is complete.
4. Turn the knob so that the pointer is positioned at the desired leaving fluid temperature.

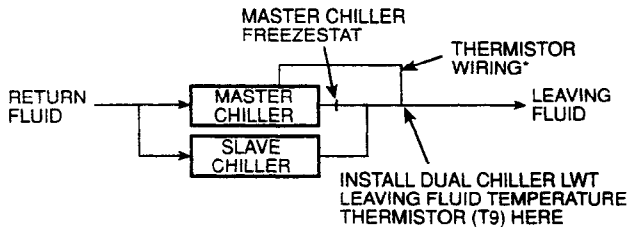
NOTE: If the alarm/alert indicator is illuminated, calibration is still allowed. The light turns OFF and then turns back to ON when positioned at asterisk as described in Step 1. There is no change during Steps 2-4. The light turns back ON after calibration if condition is still present.

Configuring and Operating Dual Chiller Control (See Table 20) — The dual chiller routine is available for the control of two 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 as shown in Fig. 14 and connected to the master chiller. Refer to Thermistors section, page 58, for sensor wiring.

To configure the two chillers for operation, follow the example shown in Table 20. The master chiller will be configured with a slave chiller at address 6. Also in this example, the master chiller will be configured to use Lead/Lag Balance to even out the chiller runtimes weekly. The Lag Start Delay feature will be set to 10 minutes. The master and slave chillers cannot have the same CCN address (CCNA, Configuration mode under OPT2). Both chillers must have the control method variable (CTRL, Configuration mode under OPT2) set to '3.' In addition, the chillers must both be connected together on the same CCN bus. Connections can be made to the CCN screw terminals on TB3 in both chillers. The master chiller will determine which chiller will be Lead and which will be Lag. The master chiller controls the slave chiller by forcing the slave chiller's CHIL_S_S (CCN) variable, control point (CTPT) and demand limit.

The master chiller is now configured for dual chiller operation. To configure the slave chiller, only the LLEN and MSSL variables need to be set. Enable the Lead/Lag chiller enable variable (LLEN) as shown Table 20. Similarly, set the Master/Slave Select variable (MSSL) to SLVE. The variables LLBL, LLBD, an LLDY are not used by the slave chiller.

Installation of a master chiller freezestat (part no. HH22CC050) and well (part no. HL79ZZ002) is also required.



*Depending on piping sizes, use either:
- HH79NZ014 sensor / 10HB50106802 well (3-in. sensor/well)
- HH79NZ029 sensor / 10HB50106801 well (4-in. sensor/well)

Fig. 14 — Dual Chiller Thermistor Location

Table 8 — Marquee Display Menu Structure

RUN STATUS	SERVICE TEST	TEMPERATURES	PRESSURES	SET POINTS	INPUTS	OUTPUTS	CONFIGURATION	TIME CLOCK	OPERATING MODES	ALARMS
Auto Display (VIEW)	Manual Mode On/Off (TEST)	Unit Temperatures (UNIT)	Ckt A Pressures (PRC.A)	Cooling (COOL)	Unit Discrete (GEN.I)	Unit Discrete (GEN.O)	Display (DISP)	Unit Time (TIME)	Modes (MODE)	Current (CRNT)
Machine Hours/Starts (RUN)	Ckt A/B Outputs (OUTS)	Ckt A Temperatures (CIR.A)	Ckt B Pressures (PRC.B)*	Heating (HEAT)	Ckt A/B (CRCT)	Ckt A (CIR.A)	Machine (UNIT)	Unit Date (DATE)		Reset Alarms (RCRN)
Compressor Run Hours (HOUR)*	Compressor Tests (COMP)	Ckt B Temperatures (CIR.B)*		Head Pressure (HEAD)	Unit Analog (4-20)	Ckt B (CIR.B)*	Options 1 (OPT1)	Schedule (SCHD)		Alarm History (HIST)
Compressor Starts (STRT)*							Options 2 (OPT2)			Reset History (RHIS)
Software Version (VERS)							Temperature Reset (RSET)			
							Set Point Select (SLCT)			

LEGEND
Ckt — Circuit
*30HK,HL only.

Table 9 — Run Status Mode and Sub-Mode Directory

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
VIEW	ENTER	EWT	XXX.X °F	ENTERING FLUID TEMP	
	▼	LWT	XXX.X °F	LEAVING FLUID TEMP	
	▼	SETP	XXX.X °F	ACTIVE SETPOINT	
	▼	CTPT	XXX.X °F	CONTROL POINT	
	▼	STAT	X	CONTROL MODE	0 = SERVICE TEST 1 = OFF — LOCAL 2 = OFF — CCN 3 = OFF —TIME 4 = OFF — EMRGCY 5 = ON — LOCAL 6 = ON — CCN 7 = ON TIME
	▼	OCC	YES/NO	OCCUPIED	
	▼	MODE	YES/NO	OVERRIDE MODES IN EFFECT	
	▼	CAP	XXX %	PERCENT TOTAL CAPACITY	
	▼	STGE	XX	REQUESTED STAGE	
	▼	ALRM	XX	CURRENT ALARMS & ALERTS	
	▼	TIME	XX.XX	TIME OF DAY	00.0 —23.59
	▼	MNTH	XX	MONTH OF YEAR	1=JAN,2=FEB, etc.
	▼	DATE	XX	DAY OF MONTH	01 —31
	▼	YEAR	XXXX	YEAR OF CENTURY	
RUN	ENTER	HRS.U	XXXX	MACHINE OPERATING HOURS	
	▼	STR.U	XXXX	MACHINE STARTS	
HOUR*	ENTER	HRS.A	XXXX	CIRCUIT A RUN HOURS	
	▼	HRS.B	XXXX	CIRCUIT B RUN HOURS	
	▼	HR.A1	XXXX	COMPRESSOR A1 RUN HOURS	
	▼	HR.A2	XXXX	COMPRESSOR A2 RUN HOURS	N/A
	▼	HR.A3	XXXX	COMPRESSOR A3 RUN HOURS	N/A
	▼	HR.A4	XXXX	COMPRESSOR A4 RUN HOURS	N/A
	▼	HR.B1	XXXX	COMPRESSOR B1 RUN HOURS	(30HK,HL Only)
	▼	HR.B2	XXXX	COMPRESSOR B2 RUN HOURS	N/A
	▼	HR.B3	XXXX	COMPRESSOR B3 RUN HOURS	N/A
	▼	HR.B4	XXXX	COMPRESSOR B4 RUN HOURS	N/A
STRT*	ENTER	ST.A1	XXXX	COMPRESSOR A1 STARTS	
	▼	ST.A2	XXXX	COMPRESSOR A2 STARTS	N/A
	▼	ST.A3	XXXX	COMPRESSOR A3 STARTS	N/A
	▼	ST.A4	XXXX	COMPRESSOR A4 STARTS	N/A
	▼	ST.B1	XXXX	COMPRESSOR B1 STARTS	(30HK,HL Only)
	▼	ST.B2	XXXX	COMPRESSOR B2 STARTS	N/A
	▼	ST.B3	XXXX	COMPRESSOR B3 STARTS	N/A
	▼	ST.B4	XXXX	COMPRESSOR B4 STARTS	N/A

*The following sub-modes do not appear on 30HW and 30GTN machines: HOUR, STRT.

Table 9 — Run Status Mode and Sub-Mode Directory (cont)

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
VERS	ENTER	MBB		CESR-131170-XX-XX CESR-131213-XX-XX	(30HK,HL Only) (30HW,GTN Only)
	▼	EXV			N/A
	▼	CXB			N/A
	▼	EMM		CESR-131174-XX-XX	
	▼	MARQ		CESR-131171-XX-XX	
	▼	NAV		CESR-130227-XX-XX	

*The following sub-modes do not appear on 30HW and 30GTN machines: HOUR, STRT.

Table 10A — Service Test Mode and Sub-Mode Directory (30HK,HL Units)

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
TEST	ENTER		ON/OFF	SERVICE TEST MODE	Use to Enable/Disable Manual Mode
OUTS	ENTER	LLS.A	OPEN/CLSE	LIQ. LINE SOLENOID VALVE	30HL Only
	▼	EXV.A	0-100%	EXV % OPEN	N/A
	▼	LLS.B	OPEN/CLSE	LIQ. LINE SOLENOID VALVE	30HL Only
	▼	ESV.B	0-100%	EXV % OPEN	N/A
	▼	FAN1	ON/OFF	FAN1 RELAY	N/A CRF-A (30HL Only)
	▼	FAN2	ON/OFF	FAN2 RELAY	N/A CFR-B (30HL Only)
	▼	FAN3	ON/OFF	FAN3 RELAY	N/A
	▼	FAN4	ON/OFF	FAN4 RELAY	N/A
	▼	CLR.P	ON/OFF	COOLER PUMP RELAY	
	▼	CND.P	ON/OFF	CONDENSER PUMP RELAY	
	▼	RMT.A	ON/OFF	REMOTE ALARM RELAY	
COMP	ENTER	CC.A1	ON/OFF	COMPRESSOR A1 RELAY	
	▼	CC.A2	ON/OFF	COMPRESSOR A2 RELAY	N/A
	▼	CC.A3	ON/OFF	COMPRESSOR A3 RELAY	N/A
	▼	CC.A4	ON/OFF	COMPRESSOR A4 RELAY	N/A
	▼	UL.A1	ON/OFF	UNLOADER A1 RELAY	
	▼	UL.A2	ON/OFF	UNLOADER A2 RELAY	
	▼	HGBP	ON/OFF	HOT GAS BYPASS RELAY	
	▼	CC.B1	ON/OFF	COMPRESSOR B1 RELAY	
	▼	CC.B2	ON/OFF	COMPRESSOR B2 RELAY	N/A
	▼	CC.B3	ON/OFF	COMPRESSOR B3 RELAY	N/A
	▼	CC.B4	ON/OFF	COMPRESSOR B4 RELAY	N/A
	▼	UL.B1	ON/OFF	UNLOADER B1 RELAY	
	▼	UL.B2	ON/OFF	UNLOADER B2 RELAY	

LEGEND

EXV — Electronic Expansion Valve

Table 10B — Service Test Mode and Sub-Mode Directory (30GTN and 30HW Units)

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
TEST	ENTER		ON/OFF	SERVICE TEST MODE	Use to Enable/Disable Manual Mode
OUTS	ENTER	LLS.A	OPEN/CLSE	LIQ. LINE SOLENOID VALVE	30GTN Only
	▼	EXV.A	0-100%	EXV % OPEN	N/A
	▼	LLS.B	OPEN/CLSE	LIQ. LINE SOLENOID VALVE	N/A
	▼	EXV.B	0-100%	EXV % OPEN	N/A
	▼	FAN1	ON/OFF	FAN1 RELAY	OFM2 (30GTN015-035) CFR-A (30HWA Only)
	▼	FAN2	ON/OFF	FAN2 RELAY	OFM3 (30GTN015-035)
	▼	FAN3	ON/OFF	FAN3 RELAY	N/A
	▼	FAN4	ON/OFF	FAN4 RELAY	N/A
	▼	CLR.P	ON/OFF	COOLER PUMP RELAY	
	▼	CND.P	ON/OFF	CONDENSER PUMP RELAY	
	▼	RMT.A	ON/OFF	REMOTE ALARM RELAY	
COMP	ENTER	CC.A1	ON/OFF	COMPRESSOR A1 RELAY	
	▼	UL.A1	ON/OFF	UNLOADER A1 RELAY	
	▼	UL.A2	ON/OFF	UNLOADER A2 RELAY	
	▼	HGBP	ON/OFF	HOT GAS BYPASS RELAY	

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EXV — Electronic Expansion Valve

Table 11A — Temperature Mode and Sub-Mode Directory (30HK,HL Units)

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
UNIT	ENTER	CEWT	XXX.X °F	COOLER ENTERING FLUID	
	▼	CLWT	XXX.X °F	COOLER LEAVING FLUID	
	▼	OAT	XXX.X °F	OUTSIDE AIR TEMPERATURE	
	▼	SPT	XXX.X °F	SPACE TEMPERATURE	
	▼	CNDE	XXX.X °F	CONDENSER ENTERING FLUID	
	▼	CNDL	XXX.X °F	CONDENSER LEAVING FLUID	
	▼	DLWT	XXX.X °F	LEAD/LAG LEAVING FLUID	
CIR.A	ENTER	SCT.A	XXX.X °F	SATURATED CONDENSING TMP	N/A
	▼	SST.A	XXX.X °F	SATURATED SUCTION TEMP	N/A
	▼	SGT.A	XXX.X °F	COMPRESSOR SUCTION TEMP	N/A
	▼	SUP.A	XXX.X °F	SUCTION SUPERHEAT TEMP	N/A
CIR.B	ENTER	SCT.B	XXX.X °F	SATURATED CONDENSING TMP	N/A
	▼	SST.B	XXX.X °F	SATURATED SUCTION TEMP	N/A
	▼	SGT.B	XXX.X °F	COMPRESSOR SUCTION TEMP	N/A
	▼	SUP.B	XXX.X °F	SUCTION SUPERHEAT TEMP	N/A

Table 11B — Temperature Mode and Sub-Mode Directory (30GTN and 30HW Units)

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
UNIT	ENTER	CEWT	XXX.X °F	COOLER ENTERING FLUID	
	▼	CLWT	XXX.X °F	COOLER LEAVING FLUID	
	▼	OAT	XXX.X °F	OUTSIDE AIR TEMPERATURE	
	▼	SPT	XXX.X °F	SPACE TEMPERATURE	
	▼	CNDE	XXX.X °F	CONDENSER ENTERING FLUID	
	▼	CNDL	XXX.X °F	CONDENSER LEAVING FLUID	
	▼	DLWT	XXX.X °F	LEAD/LAG LEAVING FLUID	
CIR.A	ENTER	SCT.A	XXX.X °F	SATURATED CONDENSING TMP	
	▼	SST.A	XXX.X °F	SATURATED SUCTION TEMP	
	▼	SGT.A	XXX.X °F	COMPRESSOR SUCTION TEMP	N/A
	▼	SUP.A	XXX.X °F	SUCTION SUPERHEAT TEMP	N/A
CIR.B	ENTER	SCT.B	XXX.X °F	SATURATED CONDENSING TMP	N/A
	▼	SST.B	XXX.X °F	SATURATED SUCTION TEMP	N/A
	▼	SGT.B	XXX.X °F	COMPRESSOR SUCTION TEMP	N/A
	▼	SUP.B	XXX.X °F	SUCTION SUPERHEAT TEMP	N/A

Table 12A — Pressure Mode and Sub-Mode Directory (30HK,HL Units)

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
PRC.A	ENTER	DP.A	XXX.X PSIG	DISCHARGE PRESSURE	Pressure is calculated. (N/A)
	▼	SP.A	XXX.X PSIG	SUCTION PRESSURE	Pressure is calculated. (N/A)
PRC.B	ENTER	DP.B	XXX.X PSIG	DISCHARGE PRESSURE	Pressure is calculated. (N/A)
	▼	SP.B	XXX.X PSIG	SUCTION PRESSURE	Pressure is calculated. (N/A)

Table 12B — Pressure Mode and Sub-Mode Directory (30GTN and 30HW Units)

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
PRC.A	ENTER	DP.A	XXX.X PSIG	DISCHARGE PRESSURE	Pressure is calculated. (N/A)
	▼	SP.A	XXX.X PSIG	SUCTION PRESSURE	Pressure is calculated. (N/A)
	▼	OILP	XXX.X PSIG	OIL PRESSURE	Pressure is calculated. (N/A)

Table 13 — Set Point Mode and Sub-Mode Directory

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
COOL	ENTER	CSP.1	XXX.X °F	COOLING SETPOINT 1	Default: 44 F
	▼	CSP.2	XXX.X °F	COOLING SETPOINT 2	Default: 44 F
	▼	CSP.3	XXX.X °F	ICE SETPOINT	Default: 32 F
HEAT	ENTER	HSP.1	XXX.X °F	HEATING SETPOINT 1	Default: 100 F
	▼	HSP.2	XXX.X °F	HEATING SETPOINT 2	Default: 100 F
HEAD	ENTER	HD.P.A	XXX °F	HEAD PRESSURE SETPOINT A	Default: 113 F
	▼	HD.P.B	XXX °F	HEAD PRESSURE SETPOINT B	Default: 113 F (30HK,HL Only)

Table 14 — Reading and Changing Chilled Fluid Set Point

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
COOL	ENTER	CSP.1	44.0 °F	COOLING SETPOINT 1	Default: 44° F
	ENTER		44.0 °F		Scrolling stops
	ENTER		44.0 °F		Value flashes
	▲				Select 46.0
	ENTER		46.0 °F		Change accepted
	ENTER	CSP.1	46.0 °F	COOLING SETPOINT 1	Item/Value/Units scrolls again

Table 15A — Inputs Mode and Sub-Mode Directory (30HK,HL Units)

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
GEN.I	ENTER	STST	STRT/STOP	START/STOP SWITCH	Enable/Off/Remote Contact Switch Input
	▼	FLOW	ON/OFF	COOLER FLOW SWITCH	
	▼	CND.F	ON/OFF	CONDENSER FLOW SWITCH	
	▼	DLS1	ON/OFF	DEMAND LIMIT SWITCH 1	
	▼	DLS2	ON/OFF	DEMAND LIMIT SWITCH 2	
	▼	ICED	ON/OFF	ICE DONE	
	▼	DUAL	ON/OFF	DUAL SETPOINT SWITCH	N/A
CRCT	ENTER	FKA1	ON/OFF	COMPRESSOR A1 FEEDBACK	
	▼	FKA2	ON/OFF	COMPRESSOR A2 FEEDBACK	N/A
	▼	FKA3	ON/OFF	COMPRESSOR A3 FEEDBACK	N/A
	▼	FKA4	ON/OFF	COMPRESSOR A4 FEEDBACK	N/A
	▼	OIL.A	OPEN/CLSE	OIL PRESSURE SWITCH A	
	▼	LPS.A	OPEN/CLSE	LOW PRESSURE SWITCH	
	▼	FKB1	ON/OFF	COMPRESSOR B1 FEEDBACK	
	▼	FKB2	ON/OFF	COMPRESSOR B2 FEEDBACK	N/A
	▼	FKB3	ON/OFF	COMPRESSOR B3 FEEDBACK	N/A
	▼	FKB4	ON/OFF	COMPRESSOR B4 FEEDBACK	N/A
	▼	OIL.B	OPEN/CLSE	OIL PRESSURE SWITCH B	
	▼	LPS.B	OPEN/CLSE	LOW PRESSURE SWITCH	
4-20	ENTER	DMND	XX.X MA	4-20 MA DEMAND SIGNAL	
	▼	RSET	XX.X MA	4-20 MA RESET SIGNAL	
	▼	CSP	XX.X MA	4-20 MA COOLING SETPOINT	
	▼	HSP	XX.X MA	4-20 MA HEATING SETPOINT	

Table 15B — Inputs Mode and Sub-Mode Directory (30GTN and 30HW Units)

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
GEN.I	ENTER	STST	STRT/STOP	START/STOP SWITCH	Enable/Off/Remote Contact Switch Input
	▼	FLOW	ON/OFF	COOLER FLOW SWITCH	
	▼	CND.F	ON/OFF	CONDENSER FLOW SWITCH	
	▼	DLS1	ON/OFF	DEMAND LIMIT SWITCH 1	
	▼	DLS2	ON/OFF	DEMAND LIMIT SWITCH 2	
	▼	ICED	ON/OFF	ICE DONE	
	▼	DUAL	ON/OFF	DUAL SETPOINT SWITCH	
CRCT	ENTER	FKA1	ON/OFF	COMPRESSOR A1 FEEDBACK	
	▼	OIL.A	OPEN/CLSE	OIL PRESSURE SWITCH A	
	▼	LPS.A	OPEN/CLSE	LOW PRESSURE SWITCH	
4-20	ENTER	DMND	XX.X MA	4-20 MA DEMAND SIGNAL	
	▼	RSET	XX.X MA	4-20 MA RESET SIGNAL	
	▼	CSP	XX.X MA	4-20 MA COOLING SETPOINT	
	▼	HSP	XX.X MA	4-20 MA HEATING SETPOINT	

Table 16A — Outputs Mode and Sub-Mode Directory (30HK,HL Units)

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
GEN.O	ENTER	FAN1	ON/OFF	FAN 1 RELAY	
	▼	FAN2	ON/OFF	FAN 2 RELAY	
	▼	FAN3	ON/OFF	FAN 3 RELAY	
	▼	FAN4	ON/OFF	FAN 4 RELAY	
	▼	C.PMP	ON/OFF	COOLER PUMP RELAY	
	▼	H.GAS	ON/OFF	HOT GAS BYPASS RELAY	
	▼	CNDP	ON/OFF	CONDENSER PUMP RELAY	
CIR.A	ENTER	CC.A1	ON/OFF	COMPRESSOR A1 RELAY	
	▼	CC.A2	ON/OFF	COMPRESSOR A2 RELAY	
	▼	CC.A3	ON/OFF	COMPRESSOR A3 RELAY	
	▼	CC.A4	ON/OFF	COMPRESSOR A4 RELAY	
	▼	UL.A1	ON/OFF	UNLOADER A1 RELAY	
	▼	UL.A2	ON/OFF	UNLOADER A2 RELAY	
	▼	LLS.A	OPEN/CLSE	LIQUID LINE SOLENOID VLV	
	▼	EXV.A	XXX.X %	EXV % OPEN	N/A
CIR.B	ENTER	CC.B1	ON/OFF	COMPRESSOR B1 RELAY	
	▼	CC.B2	ON/OFF	COMPRESSOR B2 RELAY	
	▼	CC.B3	ON/OFF	COMPRESSOR B3 RELAY	
	▼	CC.B4	ON/OFF	COMPRESSOR B4 RELAY	
	▼	UL.B1	ON/OFF	UNLOADER B1 RELAY	
	▼	UL.B2	ON/OFF	UNLOADER B2 RELAY	N/A
	▼	LLS.B	OPEN/CLSE	LIQUID LINE SOLENOID VLV	
	▼	EXV.B	XXX.X %	EXV % OPEN	N/A

LEGEND

EXV — Electronic Expansion Valve

Table 16B — Outputs Mode and Sub-Mode Directory (30GTN and 30HW Units)

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
GEN.O	ENTER	FAN1	ON/OFF	FAN 1 RELAY	
	▼	FAN2	ON/OFF	FAN 2 RELAY	
	▼	C.PMP	ON/OFF	COOLER PUMP RELAY	
	▼	H.GAS	ON/OFF	HOT GAS BYPASS RELAY	
	▼	CNDP	ON/OFF	CONDENSER PUMP RELAY	
CIR.A	ENTER	CC.A1	ON/OFF	COMPRESSOR A1 RELAY	
	▼	UL.A1	ON/OFF	UNLOADER A1 RELAY	
	▼	UL.A2	ON/OFF	UNLOADER A2 RELAY	
	▼	LLS.A	OPEN/CLSE	LIQUID LINE SOLENOID VLV	

LEGEND

EXV — Electronic Expansion Valve

Table 17A — Configuration Mode and Sub-Mode Directory (30HK,HL Units)

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
DISP	ENTER	TEST	ON/OFF	TEST DISPLAY LEDS	
	▼	METR	ON/OFF	METRIC DISPLAY	Off = English On = Metric
	▼	LANG	X	LANGUAGE SELECTION	Default: 0 0 = English 1 = Espanol 2 = Francais 3 = Portuguese
UNIT	ENTER	TYPE	X	UNIT TYPE	2 = Water Cooled (30HK) 3 = Split System (30HL)
	▼	TONS	XXX	UNIT SIZE	
	▼	CAP.A	XXX	CIRCUIT A % CAPACITY	**Unit Size** / **60 Hz** / **50 Hz** 30HK040 / 50 / 60 30HK,HL050 / 60 / 50 30HK,HL060 / 50 / 50
	▼	CMP.A	X	NUMBER CIRC A COMPRESSOR	1
	▼	CYL.A	X	COMPRESSOR A1 CYLINDERS	4 = HK040 6 = All other HK,HL Models
	▼	CMP.B	X	NUMBER CIRC B COMPRESSOR	1 (30HK,HL)
	▼	CYL.B	X	COMPRESSOR B1 CYLINDERS	4 = HK040, HK,HL050 (60 Hz) 6 = All other HK,HL Models
	▼	EXV	YES/NO	EXV MODULE INSTALLED	N/A
	▼	SH.SP	Δ F	EXV SUPERHEAT SETPOINT	N/A
	▼	SH.OF	Δ F	EXV SUPERHEAT OFFSET	N/A
	▼	REFG	X	REFRIGERANT	1 = R-22
	▼	FAN.S	X	FAN STAGING	Default: 1 1 = 1 Stage Independent
OPT1	ENTER	FLUD	X	COOLER FLUID	Default: 1 1 = Water 2 = Medium Temperature Brine 3 = Low Temperature Brine (Not Supported)
	▼	HGB.S	YES/NO	HOT GAS BYPASS SELECT	
	▼	HPCM	X	HEAD PRESS. CONT. METHOD	Default: 2 2 = Set Point Control
	▼	HPCT	X	HEAD PRESS. CONTROL TYPE	Default: 1 0 = No Control 1 = Air Cooled 2 = Water Cooled
	▼	MMR.S	YES/NO	MOTORMASTER SELECT	
	▼	PRTS	YES/NO	PRESSURE TRANSDUCERS	CURRENTLY NOT SUPPORTED
	▼	PMP.I	ON/OFF	COOLER PUMP INTERLOCK	Default: On (Off not allowed)
	▼	CPC	ON/OFF	COOLER PUMP CONTROL	Default: Off
	▼	CNP.I	ON/OFF	CONDENSER PUMP INTERLOCK	Default: Off
	▼	CNP.C	ON/OFF	CONDENSER PUMP CONTROL	Default: 0 0 = No control 1 = On when occupied 2 = On with compressor(s)
	▼	CWT.S	YES/NO	CONDENSER FLUID SENSORS	Default: No
	▼	CA.UN	X	NO. CIRCUIT A UNLOADERS	
	▼	CB.UN	X	NO. CIRCUIT B UNLOADERS	
	▼	EMM	YES/NO	EMM MODULE INSTALLED	

Table 17A — Configuration Mode and Sub-Mode Directory (30HK,HL Units) (cont)

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
OPT2	ENTER	CTRL	X	CONTROL METHOD	Default: 0 0 = Enable/Off/Remote Switch 1 = 7 Day Schedule 2 = Occupancy 3 = CCN Control
	▼	CCNA	XXX	CCN ADDRESS	Default: 1 Range: 1 to 239
	▼	CCNB	XXX	CCN BUS NUMBER	Default: 0 Range: 0 to 239
	▼	BAUD	X	CCN BAUD RATE	Default: 3 1 = 2400 2 = 4800 3 = 9600 4 = 19,200 5 = 38,400
	▼	LOAD	X	LOADING SEQUENCE SELECT	Default: 1 1 = Equal 2 = Staged
	▼	LLCS	X	LEAD/LAG CIRCUIT SELECT	Default: 1 (for HK,HL) 1 = Automatic 2 = Circuit A Leads 3 = Circuit B Leads
	▼	LCWT	XX.X ΔF	HIGH LCW ALERT LIMIT	Default: 60 Range: 2 to 60 F
	▼	DELY	XX	MIN MINUTES OFF TIME	Default: 0 Minutes Range: 0 to 15 Minutes
	▼	ICE.M	ENBL/DSBL	ICE MODE ENABLE	Default: Disable
RSET	ENTER	CRST	X	COOLING RESET TYPE	0 = No Reset 1 = 4 to 20 mA Input 2 = Outdoor Air Temperature 3 = Return Fluid 4 = Space Temperature
	▼	CRT1	XXX.X °F	NO COOL RESET TEMP	Default: 125 F Range: 0 to 125 F
	▼	CRT2	XXX.X °F	FULL COOL RESET TEMP	Default: 0° F Range: 0 to 125 F
	▼	DGRC	XX.X ΔF	DEGREES COOL RESET	Default: 0° F Range: –30 to 30 F
	▼	HRST	X	HEATING RESET TYPE	Default: 0 0 = No Reset 1 = 4 to 20 mA Input 2 = Outdoor Air Temp 3 = Return Fluid 4 = Space Temperature
	▼	HRT1	XXX.X °F	NO HEAT RESET TEMP	Default: 0° F Range: 0 to 125 F
	▼	HRT2	XXX.X °F	FULL HEAT RESET TEMP	Default: 125 F Range: 0 to 125 F
	▼	DGRH	XX.X ΔF	DEGREES HEAT RESET	Default: 0° F Range: –30 to 30 F
	▼	DMDC	X	DEMAND LIMIT SELECT	Default: 0 0 = None 1 = Switch 2 = 4 to 20 mA Input 3 = CCN Loadshed
	▼	DM20	XXX %	DEMAND LIMIT AT 20 MA	Default: 100% Range: 0 to 100%
	▼	SHNM	XXX	LOADSHED GROUP NUMBER	Default: 0 Range: 0 to 99
	▼	SHDL	XXX %	LOADSHED DEMAND DELTA	Default: 0% Range: 0 to 60%
	▼	SHTM	XXX MIN	MAXIMUM LOADSHED TIME	Default: 60 minutes Range: 0 to 120 minutes
	▼	DLS1	XXX %	DEMAND LIMIT SWITCH 1	Default: 80% Range: 0 to 100%

LEGEND

CCN — Carrier Comfort Network
EMM — Energy Management Module
EXV — Electronic Expansion Valve
LCW — Leaving Chilled Water

Table 17A — Configuration Mode and Sub-Mode Directory (30HK,HL Units) (cont)

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
RSET (cont)	▼	DLS2	XXX %	DEMAND LIMIT SWITCH 2	Default: 50% Range: 0 to 100%
	▼	LLEN	ENBL/DSBL	LEAD/LAG CHILLER ENABLE	Default: Disable
	▼	MSSL	SLVE/MAST	MASTER/SLAVE SELECT	Default: Master
	▼	SLVA	XXX	SLAVE ADDRESS	Default: 0 Range: 0 to 239
	▼	LLBL	ENBL/DSBL	LEAD/LAG BALANCE SELECT	Default: Disable
	▼	LLBD	XXX HRS	LEAD/LAG BALANCE DELTA	Default: 168 hours Range: 40 to 400 Hours
	▼	LLDY	XX	MIN LAG START DELAY	Default: 5 minutes Range: 0 to 30 minutes
SLCT	ENTER	CLSP	X	COOLING SETPOINT SELECT	0 = Single 1 = Dual Switch 2 = Dual 7 day 3 = Dual CCN Occupied 4 = 4 to 20 mA Input 5 = External POT
	▼	HTSP	X	HEATING SETPOINT SELECT	0 = Single 1 = Dual Switch 2 = Dual 7 day 3 = Dual CCN Occupied 4 = 4 to 20 mA Input
	▼	RL.S	ENBL/DSBL	RAMP LOAD SELECT	Default: Enable
	▼	CRMP	X.X	COOLING RAMP LOADING	Default: 1.0 Range: 0.2 to 2.0
	▼	HRMP	X.X	HEATING RAMP LOADING	Default: 1.0 Range: 0.2 to 2.0
	▼	HCSW	COOL/HEAT	HEAT COOL SELECT	Default: Cool
	▼	Z.GN	X.X	DEADBAND MULTIPLIER	Default: 1.0 Range: 1.0 to 4.0

LEGEND

CCN — Carrier Comfort Network
EMM — Energy Management Module
EXV — Electronic Expansion Valve
LCW — Leaving Chilled Water

Table 17B — Configuration Mode and Sub-Mode Directory (30GTN and 30HW Units

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
DISP	ENTER	TEST	ON/OFF	TEST DISPLAY LEDS	
	▼	METR	ON/OFF	METRIC DISPLAY	Off = English On = Metric
	▼	LANG	X	LANGUAGE SELECTION	Default: 0 0 = English 1 = Espanol 2 = Francais 3 = Portuguese
UNIT	ENTER	TYPE	X	UNIT TYPE	1 = Air Cooled (30GTN) 2 = Water Cooled (30HWB,C,S) 3 = Split System (30HWA
	▼	TONS	XXX	UNIT SIZE -	
	▼	CYL.A	X	COMPRESSOR A1 CYLINDERS	4 = 30HW025, 30GTN015 (50 Hz), 30GTN020 (60 Hz) 6 = All other models
	▼	REFG	X	REFRIGERANT	1 = R-22
	▼	FAN.S	X	FAN STAGING SELECT	1 = 30HWA, 30GTN015-030 (Single Stage) 2 = 30GTN035 (Two Stage)

Table 17B — Configuration Mode and Sub-Mode Directory (30GTN and 30HW Units) (cont)

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
OPT1	ENTER	FLUD	X	COOLER FLUID	1 = Water 2 = Medium Temperature Brine 3 = Low Temperature Brine (Not Supported)
	▼	HGB.S	YES/NO	HOT GAS BYPASS SELECT	
	▼	PRTS	YES/NO	PRESSURE TRANSDUCERS	Default: No
	▼	PMP.I	ON/OFF	COOLER PUMP INTERLOCK	Default: On (Off not allowed)
	▼	CPC	ON/OFF	COOLER PUMP CONTROL	Default: Off
	▼	CNP.I	ON/OFF	CONDENSER PUMP INTERLOCK	Default: Off
	▼	CNP.C	ON/OFF	CONDENSER PUMP CONTROL	Default: 0 0 = No control 1 = On when occupied 2 = On with compressor(s)
	▼	CWT.S	YES/NO	CONDENSER FLUID SENSORS	Default: No
	▼	CA.UN	X	NO. CIRCUIT A UNLOADERS	1 = 30GTN015 (50 Hz), 020 (60 Hz), 30HW (025) 2 = All other models
	▼	EMM	YES/NO	EMM MODULE INSTALLED	
OPT2	ENTER	CTRL	X	CONTROL METHOD	Default: 0 0 = Enable/Off/Remote Switch 1 = 7 Day Schedule 2 = Occupancy 3 = CCN Control
	▼	CCNA	XXX	CCN ADDRESS	Default: 1 Range: 1 to 239
	▼	CCNB	XXX	CCN BUS NUMBER	Default: 0 Range: 0 to 239
	▼	BAUD	X	CCN BAUD RATE	Default: 3 1 = 2400 2 = 4800 3 = 9600 4 = 19,200 5 = 38,400
	▼	LCWT	XXX.X ΔF	HIGH LCW ALERT LIMIT	Default: 60 Range: 2 to 60 F
	▼	DELY	XX	MIN MINUTES OFF TIME	Default: 0 Minutes Range: 0 to 15 Minutes
	▼	ICE.M	ENBL/DSBL	ICE MODE ENABLE	Default: Disable
RSET	ENTER	CRST	X	COOLING RESET TYPE	0 = No Reset 1 = 4 to 20 mA Input 2 = Outdoor Air Temperature 3 = Return Fluid 4 = Space Temperature
	▼	CRT1	XXX.X °F	NO COOL RESET TEMP	Default: 125 F Range: 0 to 125 F
	▼	CRT2	XXX.X °F	FULL COOL RESET TEMP	Default: 0° F Range: 0 to 125 F
	▼	DGRC	XX.X ΔF	DEGREES COOL RESET	Default: 0° F Range: –30 to 30 F
	▼	HRST	X	HEATING RESET TYPE	Default: 0 0 = No Reset 1 = 4 to 20 mA Input 2 = Outdoor Air Temp 3 = Return Fluid 4 = Space Temperature

LEGEND

CCN — Carrier Comfort Network
EMM — Energy Management Module
EXV — Electronic Expansion Valve
LCW — Leaving Chilled Water

Table 17B — Configuration Mode and Sub-Mode Directory (30GTN and 30HW Units) (cont)

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
RSET (cont)	▼	HRT1	XXX.X °F	NO HEAT RESET TEMP	Default: 0° F Range: 0 to 125 F
	▼	HRT2	XXX.X °F	FULL HEAT RESET TEMP	Default: 125 F Range: 0 to 125 F
	▼	DGRH	XX.X ΔF	DEGREES HEAT RESET	Default: 0° F Range: –30 to 30 F
	▼	DMDC	X	DEMAND LIMIT SELECT	Default: 0 0 = None 1 = Switch 2 = 4 to 20 mA Input 3 = CCN Loadshed
	▼	DM20	XXX %	DEMAND LIMIT AT 20 MA	Default: 100% Range: 0 to 100%
	▼	SHNM	XXX	LOADSHED GROUP NUMBER	Default: 0 Range: 0 to 99
	▼	SHDL	XXX %	LOADSHED DEMAND DELTA	Default: 0% Range: 0 to 60%
	▼	SHTM	XXX MIN	MAXIMUM LOADSHED TIME	Default: 60 minutes Range: 0 to 120 minutes
	▼	DLS1	XXX %	DEMAND LIMIT SWITCH 1	Default: 80% Range: 0 to 100%
	▼	DLS2	XXX %	DEMAND LIMIT SWITCH 2	Default: 50% Range: 0 to 100%
	▼	LLEN	ENBL/DSBL	LEAD/LAG CHILLER ENABLE	Default: Disable
	▼	MSSL	SLVE/MAST	MASTER/SLAVE SELECT	Default: Master
	▼	SLVA	XXX	SLAVE ADDRESS	Default: 0 Range: 0 to 239
	▼	LLBL	ENBL/DSBL	LEAD/LAG BALANCE SELECT	Default: Disable
	▼	LLBD	XXX HRS	LEAD/LAG BALANCE DELTA	Default: 168 hours Range: 40 to 400 Hours
	▼	LLDY	XX	MIN LAG START DELAY	Default: 5 minutes Range: 0 to 30 minutes
SLCT	ENTER	CLSP	X	COOLING SETPOINT SELECT	0 = Single 1 = Dual Switch 2 = Dual 7 day 3 = Dual CCN Occupied 4 = 4 to 20 mA Input 5 = External POT
	▼	HTSP	X	HEATING SETPOINT SELECT	0 = Single 1 = Dual Switch 2 = Dual 7 day 3 = Dual CCN Occupied 4 = 4 to 20 mA Input
	▼	RL.S	ENBL/DSBL	RAMP LOAD SELECT	Default: Enable
	▼	CRMP	X.X	COOLING RAMP LOADING	Default: 1.0 Range: 0.2 to 2.0
	▼	HRMP	X.X	HEATING RAMP LOADING	Default: 1.0 Range: 0.2 to 2.0
	▼	HCSW	COOL/HEAT	HEAT COOL SELECT	Default: Cool
	▼	Z.GN	X.X	DEADBAND MULTIPLIER	Default: 1.0 Range: 1.0 to 4.0

LEGEND

CCN — Carrier Comfort Network
EMM — Energy Management Module
EXV — Electronic Expansion Valve
LCW — Leaving Chilled Water

Table 18 — Example of Temperature Reset (Outdoor Air) Configuration

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
RSET	ENTER	CRST	0	COOLING RESET TYPE	0 = No reset 1 = 4 to 20 mA input 2 = Outdoor Air Temp 3 = Return Fluid 4 = Space Temperature
	ENTER		0		Scrolling stops
	ENTER		0		Value flashes
	▲		2		Select 2
	ENTER		2		Change accepted
	ENTER	CRST	2		Item/Value/Units scrolls again
	▼	CRT1	125	NO COOL RESET TEMP	Range: 0 to 125 F
	ENTER		125		Scrolling stops
	ENTER		125		Value flashes
	▼		75		Select 75
	ENTER		75		Change accepted
	ESCAPE	CRT1	75		Item/Value/Units scrolls again
	▼	CRT2	0	FULL COOL RESET TEMP	Range: 0 to 125 F
	ENTER		0		Scrolling stops
	ENTER		0		Value flashes
	▲		50		Select 50
	ENTER		50		Change accepted
	ESCAPE	CRT2	50		Item/Value/Units scrolls again
	▼	DGRC	0	DEGREES COOL RESET	Range: −30 to 30 F
	ENTER		0		Scrolling stops
	ENTER		0		Value flashes
	▲		10		Select 10
	ENTER		10		Change accepted
	ESCAPE	DGRC	10		Item/Value/Units scrolls again

NOTE: The example above shows how to configure the chiller for temperature reset by an accessory outdoor-air temperature sensor. The chiller will be configured for a full reset of 10 degrees at 50 F and no reset at 75 F.

Table 19 — Example of Temperature Reset (Return Fluid) Configuration

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
RSET	ENTER	CRST	0	COOLING RESET TYPE	0 = No reset 1 = 4 to 20 mA input 2 = Outdoor Air Temp 3 = Return Fluid 4 = Space Temperature
	ENTER		0		Scrolling stops
	ENTER		0		Value flashes
	▲		3		Select 3
	ENTER		3		Change accepted
	ENTER	CRST	3		Item/Value/Units scrolls again
	▼	CRT1	125	NO COOL RESET TEMP	Range: 0 to 125 F
	ENTER		125		Scrolling stops
	ENTER		125		Value flashes
	▼		10		Select 10
	ENTER		10		Change accepted
	ESCAPE	CRT1	10		Item/Value/Units scrolls again
	▼	CRT2	0	FULL COOL RESET TEMP	Range: 0 to 125 F
	ENTER		0		Scrolling stops
	ENTER		0		Value flashes
	▲		2		Select 2
	ENTER		2		Change accepted
	ESCAPE	CRT2	2		Item/Value/Units scrolls again
	▼	DGRC	0	DEGREES COOL RESET	Range: –30 to 30 F
	ENTER		0		Scrolling stops
	ENTER		0		Value flashes
	▲		8		Select 8
	ENTER		8		Change accepted
	ESCAPE	DGRC	8		Item/Value/Units scrolls again

NOTE: The example above shows how to configure the chiller for temperature reset based on chiller return fluid. The chiller will be configured for no reset at a cooler delta (EWT–LWT) of 10 F (5.6 C) and a full reset of 8 F (4.4 C) at a cooler delta of 2 F (1.1 C).

Table 20 — Example of Configuring Dual Chiller Control

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
RSET	ENTER	CRST	0	COOLING RESET TYPE	
	▲	LLDY	5	LAG START DELAY	
	ENTER		5		Scrolling stops
	ENTER		5		Value flashes
	▲		10		Select 10
	ENTER		10		Change accepted
	ESCAPE	LLDY	10		
	▲	LLBD	168	LEAD/LAG BALANCE DELTA	No change needed. Default set for weekly changeover
	▲	LLBL	DSBL	LEAD/LAG BALANCE SELECT	
	ENTER		DSBL		Scrolling stops
	ENTER		DSBL		Value flashes
	▲		ENBL		Select Enable
	ENTER		ENBL		Change accepted
	ESCAPE	LLBL	ENBL		
	▲	SLVA	0	SLAVE ADDRESS	
	ENTER		0		Scrolling stops
	ENTER		0		Value flashes
	▲		6		Select 6
	ENTER		6		Change accepted
	ESCAPE	SLVA	6		
	▲	MSSL	MAST	MASTER/SLAVE SELECT	No change needed. Default set for Master
	▲	LLEN	DSBL	LEAD/LAG CHILLER ENABLE	
	ENTER		DSBL		Scrolling stops
	ENTER		DSBL		Value flashes
	▲		MAST		Select Master
	ENTER	LLEN	MAST		Change accepted
	ESCAPE	LLEN	MAST	LEAD/LAG CHILLER ENABLE	Item/Value/Units scrolls again

Table 21 — Example of Compressor Lead/Lag Configuration

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
OPT2	ENTER	CTRL	0	CONTROL METHOD	
	▼	CCNA	1		
	▼	CCNB	0		
	▼	BAUD	3		
	▼	LOAD	1		
	▼	LLCS	1	LEAD/LAG CIRCUIT SELECT	DEFAULT: 1 (30HK,HL) 2 (30HW,GTN) 1 = Automatic* 2 = Circuit A Leads 3 = Circuit B Leads*
	ENTER		1		Scrolling stops
	ENTER		1		Value flashes
	▲		3		Select 3*
	ENTER		3		Change accepted
	ESCAPE	LLCS	3	LEAD/LAG CIRCUIT SELECT	Item/Value/Units scrolls again

*Options 1 and 3 are valid for 30HK,HL units only.

Table 22 — Time Clock Mode and Sub-Mode Directory

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
TIME	ENTER	HH.MM	XX.XX	HOUR AND MINUTE	Military (00.00-23.59)
DATE	ENTER	MNTH	XX	MONTH	1=Jan, 2=Feb, etc.
	▼	DOM	XX	DATE OF MONTH	Range 1-31
	▼	DAY	X	DAY OF WEEK	1=Mon, 2=Tue, etc.
	▼	YEAR	XXXX	YEAR OF CENTURY	
SCHD	ENTER	MON.O	XX.XX	MONDAY OCCUPIED TIME	Range: 00.00 to 23.59 Default: 00.00
	▼	MON.U	XX.XX	MONDAY UNOCCUPIED TIME	Range: 00.00 to 23.59 Default: 00.00
	▼	TUE.O	XX.XX	TUESDAY OCCUPIED TIME	Range: 00.00 to 23.59 Default: 00.00
	▼	TUE.U	XX.XX	TUESDAY UNOCCUPIED TIME	Range: 00.00 to 23.59 Default: 00.00
	▼	WED.O	XX.XX	WEDNESDAY OCCUPIED TIME	Range: 00.00 to 23.59 Default: 00.00
	▼	WED.U	XX.XX	WEDNESDAY UNOCC TIME	Range: 00.00 to 23.59 Default: 00.00
	▼	THU.O	XX.XX	THURSDAY OCCUPIED TIME	Range: 00.00 to 23.59 Default: 00.00
	▼	THU.U	XX.XX	THURSDAY UNOCCUPIED TIME	Range: 00.00 to 23.59 Default: 00.00
	▼	FRI.O	XX.XX	FRIDAY OCCUPIED TIME	Range: 00.00 to 23.59 Default: 00.00
	▼	FRI.U	XX.XX	FRIDAY UNOCCUPIED TIME	Range: 00.00 to 23.59 Default: 00.00
	▼	SAT.O	XX.XX	SATURDAY OCCUPIED TIME	Range: 00.00 to 23.59 Default: 00.00
	▼	SAT.U	XX.XX	SATURDAY UNOCCUPIED TIME	Range: 00.00 to 23.59 Default: 00.00
	▼	SUN.O	XX.XX	SUNDAY OCCUPIED TIME	Range: 00.00 to 23.59 Default: 00.00
	▼	SUN.U	XX.XX	SUNDAY UNOCCUPIED TIME	Range: 00.00 to 23.59 Default: 00.00

Table 23 — Setting an Occupied Time Schedule

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
SCHD	ENTER	MON.O	00.00	MONDAY OCCUPIED TIME	TIME IN MILITARY FORMAT (HH.MM)
	ENTER		00.00		Scrolling stops
	ENTER		00.00		Hours flash
	▲		07.00		Select 7 AM
	ENTER		07.00		Change accepted, minutes flash
	▲		07.30		Select 30
	ENTER		07.30		Change accepted
	ESCAPE	MON.O	07.30	MONDAY OCCUPIED TIME	Item/Value/Units scrolls again

Table 24 — Operating Mode and Sub-Mode Directory

SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
MODE	ENTER	MD01	ON/OFF	FSM CONTROLLING CHILLER	
	▼	MD02	ON/OFF	WSM CONTROLLING CHILLER	
	▼	MD03	ON/OFF	MASTER/SLAVE CONTROL	
	▼	MD04	ON/OFF	LOW SOURCE PROTECTION	Not Supported
	▼	MD05	ON/OFF	RAMP LOAD LIMITED	
	▼	MD06	ON/OFF	TIMED OVERRIDE IN EFFECT	
	▼	MD07	ON/OFF	LOW COOLER SUCTION TEMP A	N/A
	▼	MD08	ON/OFF	LOW COOLER SUCTION TEMP B	(30HK,HL Only)
	▼	MD09	ON/OFF	SLOW CHANGE OVERRIDE	
	▼	MD10	ON/OFF	MINIMUM OFF TIME ACTIVE	
	▼	MD11	ON/OFF	LOW SUCTION SUPERHEAT A	N/A
	▼	MD12	ON/OFF	LOW SUCTION SUPERHEAT B	(30HK,HL Only)
	▼	MD13	ON/OFF	DUAL SETPOINT	
	▼	MD14	ON/OFF	TEMPERATURE RESET	
	▼	MD15	ON/OFF	DEMAND LIMIT IN EFFECT	
	▼	MD16	ON/OFF	COOLER FREEZE PROTECTION	
	▼	MD17	ON/OFF	LO TMP COOL/HI TMP HEAT	
	▼	MD18	ON/OFF	HI TMP COOL/LO TMP HEAT	
	▼	MD19	ON/OFF	MAKING ICE	
	▼	MD20	ON/OFF	STORING ICE	
	▼	MD21	ON/OFF	HIGH SCT CIRCUIT A	(30GTN Only)
	▼	MD22	ON/OFF	HIGH SCT CIRCUIT B	(30HK,HL Only)

LEGEND

FSM — Flotronic™ System Manager
SCT — Saturated Condensing Temperature
WSM — Water System Manager

Table 25 — Operating Modes

MODE NO.	ITEM EXPANSION	DESCRIPTION
01	FSM CONTROLLING CHILLER	Flotronic™ System Manager (FSM) is controlling the chiller.
02	WSM CONTROLLING CHILLER	Water System Manager (WSM) is controlling the chiller.
03	MASTER/SLAVE CONTROL	Lead/Lag Chiller control is enabled.
04	LOW SOURCE PROTECTION	Not currently supported.
05	RAMP LOAD LIMITED	Ramp load (pulldown) limiting in effect. In this mode, the rate at which leaving fluid temperature is dropped is limited to a predetermined value to prevent compressor overloading. See CRMP set point in the Set Point Select (SLCT) section of the Configuration mode. The pulldown limit can be modified, if desired, to any rate from 0.2° F to 2° F (0.1 to 1 C)/minute.
06	TIMED OVERRIDE IN EFFECT	Timed override is in effect. This is a 1 to 4 hour temporary override of the programmed schedule, forcing unit to Occupied mode. Override can be implemented with unit under Local (Enable) or CCN control. Override expires after each use.
07	LOW COOLER SUCTION TEMP A	Circuit A capacity may be limited due to operation of this mode. Control will attempt to correct this situation for up to 10 minutes before shutting the circuit down. The control may decrease capacity when attempting to correct this problem. See Alarms and Alerts section for more information.
08	LOW COOLER SUCTION TEMP B	Circuit B capacity may be limited due to operation of this mode. Control will attempt to correct this situation for up to10 minutes before shutting the circuit down. The control may decrease capacity when attempting to correct this problem. See Alarms and Alerts section for more information
09	SLOW CHANGE OVERRIDE	Slow change override is in effect. The leaving fluid temperature is close to and moving towards the control point.
10	MINIMUM OFF TIME ACTIVE	Chiller is being held off by Minutes Off Time (DELY) found under Options 2 (OPT2) section of Configuration mode.
11	LOW SUCTION SUPERHEAT A	Circuit A capacity may be limited due to operation of this mode. Control will attempt to correct this situation for up to 5 minutes before shutting the circuit down. See Alarms and Alerts section for more information.
12	LOW SUCTION SUPERHEAT B	Circuit B capacity may be limited due to operation of this mode. Control will attempt to correct this situation for up to 5 minutes before shutting the circuit down. See Alarms and Alerts section for more information.
13	DUAL SETPOINT	Dual set point mode is in effect. Chiller controls to CSP.1 during occupied periods and CSP.2 during unoccupied periods. Both CSP.1 and CSP.2 are located under COOL in the Set Point mode.
14	TEMPERATURE RESET	Temperature reset is in effect. In this mode, chiller is using temperature reset to adjust leaving fluid set point upward and is currently controlling to the modified set point. The set point can be modified based on return fluid, outdoor-air-temperature, space temperature, or 4 to 20 mA signal.
15	DEMAND LIMIT IN EFFECT	Demand limit is in effect. This indicates that the capacity of the chiller is being limited by demand limit control option. Because of this limitation, the chiller may not be able to produce the desired leaving fluid temperature. Demand limit can be controlled by switch inputs or a 4 to 20 mA signal.
16	COOLER FREEZE PROTECTION	Cooler fluid temperatures are approaching the Freeze point (see Alarms and Alerts section for definition). The chiller will be shut down when either fluid temperature falls below the Freeze point.
17	LO TMP COOL/HI TMP HEAT	Chiller is in Cooling mode and the rate of change of the leaving fluid is negative and decreasing faster than -0.5° F per minute. Error between leaving fluid and control point exceeds fixed amount. Control will automatically unload the chiller if necessary.
18	HI TMP COOL/LO TMP HEAT	Chiller is in Cooling mode and the rate of change of the leaving fluid is positive and increasing. Error between leaving fluid and control point exceeds fixed amount. Control will automatically load the chiller if necessary to better match the increasing load.
19	MAKING ICE	Chiller is in an unoccupied mode and is using Cooling Setpoint 3 (CSP.3) to make ice. The ice done input to the Energy Management Module (EMM) is open.
20	STORING ICE	Chiller is in an unoccupied mode and is controlling to Cooling Setpoint 2 (CSP.2). The ice done input to the Energy Management Module (EMM) is closed.
21	HIGH SCT CIRCUIT A	Chiller is in a cooling mode (30GTN only) and the Saturated Condensing temperature (SCT) read by sensor T3 is greater than 140 F (60 C). No additional stages of capacity will be added. Chiller may be unloaded if SCT continues to rise to avoid high-pressure switch trips by reducing condensing temperature.
22	HIGH SCT CIRCUIT B	N/A

Table 26 — Alarms Mode and Sub-Mode Directory

SUB-MODE	KEYPAD ENTRY	ITEM	ITEM EXPANSION	COMMENT
CRNT	ENTER	AXXX or TXXX	CURRENTLY ACTIVE ALARMS	Alarms are shown as AXXX. Alerts are shown as TXXX.
RCRN	ENTER	YES/NO	RESET ALL CURRENT ALARMS	
HIST	ENTER	AXXX or TXXX	ALARM HISTORY	Alarms are shown as AXXX. Alerts are shown as TXXX.
RHIS	ENTER	YES/NO	RESET ALARM HISTORY	

Table 27 — Example of Reading and Clearing Alarms

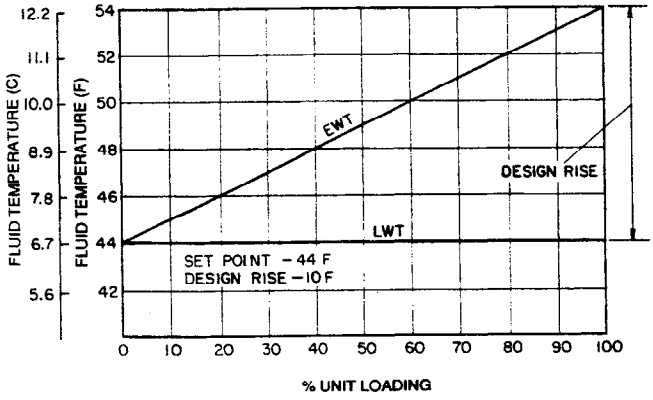
SUB-MODE	KEYPAD ENTRY	ITEM	ITEM EXPANSION	COMMENT
CRNT	ENTER	AXXX or TXXX	CURRENTLY ACTIVE ALARMS	ACTIVE ALARMS (AXXX) OR ALERTS (TXXX) DISPLAYED.
CRNT	ESCAPE			
RCRN	▼	NO		Use to clear active alarms/alerts
	ENTER	NO		NO Flashes
	▲	YES		Select YES
	ENTER	NO		Alarms/alerts clear, YES changes to NO

Temperature Reset — The control system is capable of handling leaving-fluid temperature reset based on return cooler fluid temperature. Because the change in temperature through the cooler is a measure of the building load, the return temperature 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. Accessory sensors must be used for OAT and SPT reset (HH79NZ073 for OAT and HH51BX006 for SPT). The Energy Management Module (EMM) must be used for temperature reset using a 4 to 20 mA signal.

To use the return reset, four variables must be configured. In the Configuration mode under the sub-mode RSET, items CRST, CRT1, CRT2, and DGRC must be set properly. See Table 28 on page 38 for correct configuration. See Fig. 2-4 for wiring details.

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 entering cooler fluid will change in proportion to the load as shown in Fig. 15. 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 colder than required. If the leaving fluid temperature was allowed to increase at part load, the efficiency of the machine would increase.

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



LEGEND

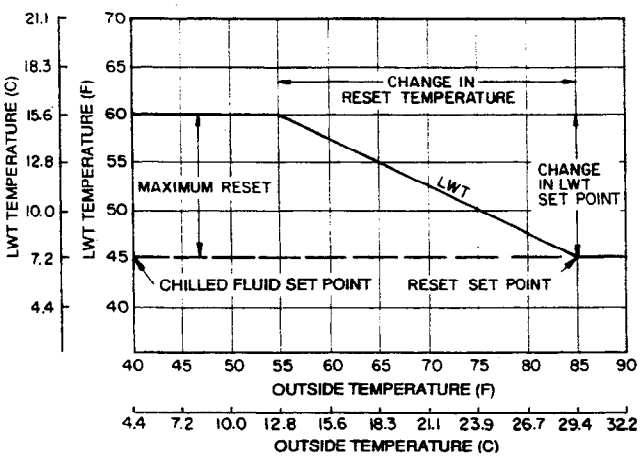
EWT — Entering Water (Fluid) Temperature
LWT — Leaving Water (Fluid) Temperature

Fig. 15 — Standard Chilled Fluid Temperature Control — No Reset

Table 28 — Configuring Temperature Reset

MODE (GREEN LED)	KEYPAD ENTRY	SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
CONFIGURATION	ENTER	DISP	ENTER	TEST	ON/OFF	TEST DISPLAY LEDs	
	▼	UNIT	ENTER	TYPE	X	UNIT TYPE	
	▼	OPT1	ENTER	FLUD	X	COOLER FLUID	
	▼	OPT2	ENTER	CTRL	X	CONTROL METHOD	
	▼	RSET	ENTER	CRST	X	COOLING RESET TYPE	0 = No Reset 1 = 4 to 20 mA Input (EMM required) (Connect to EMM J6-2,5) 2 = Outdoor-Air Temperature (Connect to TB5-7,8) 3 = Return Fluid (Connect to TB5-5,6) 4 = Space Temperature
			▼	CRT1	XXX.X F	NO COOL RESET TEMP	Default: 125 F (51.7 C) Range: 0 to125 F Set to 4.0 for CRST= 1
			▼	CRT2	XXX.X F	FULL COOL RESET TEMP	Default: 0° F (–17.8 C) Range: 0 to 125 F Set to 20.0 for CRST=1
			▼	DGRC	XX.X ΔF	DEGREES COOL RESET	Default: 0° F (0° C) Range: –30 to 30°F (–16.7 to 16.7 C)

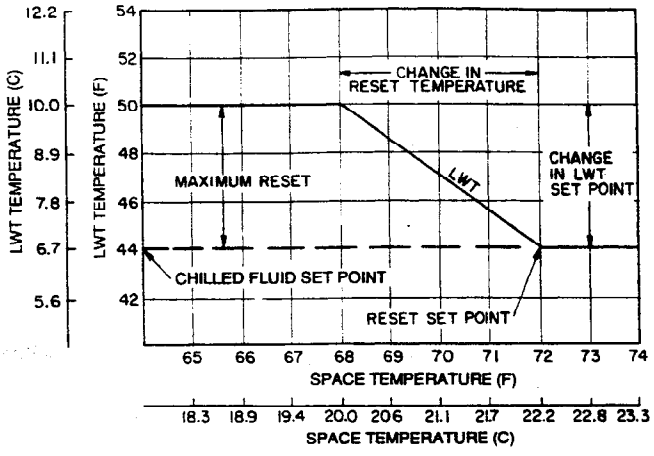
Figures 16 and 17 are examples of outdoor air and space temperature resets:



LEGEND

LWT — Leaving Water (Fluid) Temperature

Fig. 16 — Outdoor-Air Temperature Reset



LEGEND

LWT — Leaving Water (Fluid) Temperature

Fig. 17 — Space Temperature Reset

Demand Limit — Demand Limit is a feature that allows the unit capacity to be limited during periods of peak energy usage. There are 3 types of demand limiting that can be configured. The first type is through 2-stage 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 CNN Loadshed module and has the ability to limit the current operating capacity to maximum and further reduce the capacity if required.

NOTE: The 2-stage 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.

DEMAND LIMIT (2-Stage Switch Controlled) — To configure Demand Limit for 2-stage switch control set the Demand Limit Select (DMDC) to 1. Then configure the 2 Demand Limit Switch points (DLS1 and DLS2) to the desired capacity limit. See Table 29. Capacity steps are controlled by 2 relay switch inputs field wired to TB6 as shown in Fig. 2-4.

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.

To disable demand limit configure the DMDC to 0. See Table 29.

EXTERNALLY POWERED DEMAND LIMIT (4 to 20 mA Controlled) — To configure Demand Limit for 4 to 20 mA control set the Demand Limit Select (DMDC) to 2. Then configure the Demand Limit at 20 mA (DM20) to the maximum loadshed value desired. The control will reduce allowable capacity to this level for the 20 mA signal. See Table 29 and Fig. 18.

DEMAND LIMIT (CCN Loadshed Controlled) — To configure Demand Limit for CCN Loadshed control set the Demand Limit Select (DMDC) to 3. Then configure the Loadshed Group Number (SHNM), Loadshed Demand Delta (SHDL), and Maximum Loadshed Time (SHTM). See Table 29.

The Loadshed Group number is established by the CCN system designer. The PIC (product integrated control) will respond to a Redline command from the Loadshed control. When the Redline command is received, the current stage of capacity is set to the maximum stages available. Should the loadshed control send a Loadshed command, the PIC will reduce the current stages by the value entered for Loadshed Demand delta. The Maximum Loadshed Time is the defines the maximum length of time that a loadshed condition is allowed to exist. The control will disable the Redline/Loadshed command if no Cancel command has been received within the configured maximum loadshed time limit.

Table 29 — Configuring Demand Limit

MODE	KEYPAD ENTRY	SUB-MODE	KEYPAD ENTRY	ITEM	DISPLAY	ITEM EXPANSION	COMMENT
CONFIGURATION	ENTER	DISP	ENTER	TEST	ON/OFF	Test Display LEDs	
	▼	UNIT	ENTER	TYPE	X	Unit Type	
	▼	OPT1	ENTER	FLUD	X	Cooler Fluid	
	▼	OPT2	ENTER	CTRL	X	Control Method	
	▼	RSET	ENTER	CRST	X	Cooling Reset Type	
			▼	CRT1	XXX.X °F	No Cool Reset Temperature	
			▼	CRT2	XXX.X °F	Full Cool Reset Temperature	
			▼	DGRC	XX.X ΔF	Degrees Cool Reset	NOTE: Heating Reset values skipped in this example.
			▼	DMDC	X	Demand Limit Select	Default: 0 0 = None 1 = Switch 2 = 4 to 20 mA Input 3 = CCN Loadshed
			▼	DM20	XXX %	Demand Limit at 20 mA	Default: 100% Range: 0 to 100
			▼	SHNM	XXX	Loadshed Group Number	Default: 0 Range: 0 to 99
			▼	SHDL	XXX%	Loadshed Demand Delta	Default: 0% Range: 0 to 60%
			▼	SHTM	XXX MIN	Maximum Loadshed Time	Default: 60 min. Range: 0 to 120 min.
			▼	DLS1	XXX %	Demand Limit Switch 1	Default: 80% Range: 0 to 100%
			▼	DLS2	XXX %	Demand Limit Switch 2	Default: 50% Range: 0 to 100%