ComfortLink™

Reciprocating Compressor Service Manual

Air-Cooled Chillers
30GTN015 - 035 Series 0
30GTN/GTR/GUN/GUR040 - 420 Series 2 & 3

Water-Cooled Chillers
30HK-040 – 060 Series 1
30HWB/HWC/HWS018-040 Series 1 & 2

Condenserless Chillers
30HL-050 – 060 Series 1
30HWA018 – 040 Series 1 & 2

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SAFETY CONSIDERATIONS

Installing, starting up, and servicing this equipment can be hazardous due to system pressures, electrical components, and equipment location (roof, elevated structures, etc.). Only trained, qualified installers and service mechanics should install, start-up, and service this equipment.

When working on this equipment, observe precautions in the literature, and on tags, stickers, and labels attached to the equipment and any other safety precautions that apply. Follow all safety codes. Wear safety glasses and work gloves. Use care in handling, rigging, and setting this equipment, an 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 that one disconnect switch. Tag all disconnect locations to alert others not to restore power until work is complete.

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). DO NOT VENT refrigerant 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 the system. DO NOT re-use compressor oil. DO NOT leave refrigerant system open to air any longer than necessary. Seal circuits being serviced and charge with dry nitrogen to prevent oil contamination when timely repairs cannot be completed.

INTRODUCTION

This information should be used with the Installation Instructions, and the Controls, Start-Up, Operation, Service and Troubleshooting books for these machines. Follow all safety precautions and procedures.

30GTN015-035 machines started into production beginning with serial numbers starting with 0800F. Production of these models ceased with serial numbers 3602F.

30GTN/GTR040-110 machines started into production beginning with serial numbers starting with 1399F. Production of the 040-050 models ceased with serial numbers 4902F. Production of the 040-050 50 Hz models only was resumed starting with serial number 1103F.

30GTN/GTR130-420 machines started into production beginning with serial numbers starting with 1599F.

30GTN/GTR040-420 Series 3 machines started into production with serial numbers 2503F. This series change implemented the 15,000 step EXV.

30GUN/GUR040-110 machines started into production beginning with serial numbers starting with 1399F. 30GUN/GUR130-420 machines started into production beginning with serial numbers starting with 1599F. Production of these models ceased with serial numbers 2402F.

30HK040-060 and 30HL050,060 machines started into production beginning with serial numbers starting with 0800F. This product was transferred to Carrier's Charlotte facility beginning with production serial number 1201Q.

30HWA/HWB/HWC/HWS018-040 machines started into production beginning with serial numbers starting with 0800F. This product was transferred to Carrier's Charlotte facility beginning with production serial number 1201Q.

30HWA/HWB/HWC/HWS018-040 Series 2 machines started into production beginning with ??03Q. These machines have different coolers in order to comply with ASHRAE 90.1 efficiency standards. Not all machines moved to Series 2.

Model Number Significance

30GTN015-035 Model Number Significance

The following chart is a model number breakdown for the 30GTN015-035 Machines.

Position	1-4	5	6-8	9	10	11	12	13	14	15	16
Description	30GT	N	015	-	D	-	5	1	0	-	-

Air-Cooled Packaged Chiller

Start Option
N – Across-the-Line

Nominal Tons
015 = 15 tons
020 = 20 tons
025 = 25 tons
030 = 30 tons
035 = 35 tons (60 Hz only)

Not Used

Control Options
- = Set Point Potentiometer
D = Scrolling Marquee Display
E = Scrolling Marquee Display & Energy Management Board

Condenser Coil Options
- = Al Fin/Cu Tube
C = Cu Fin/Cu Tube
E = E-coat Al Fin/Cu Tube
F = E-Coat Cu Fin/Cu Tube
K = Pre-coat Al Fin/Cu Tube

Voltage
1 = 575-3-60
2 = 380-3-60
5 = 208/230-3-60
6 = 460-3-60
9 = 380/415-3-50

Design Series

Packaging Options
0 = Base Model
1 = Standard Packaging with Bumper
2 = Full Crate with Bag
3 = Full Crate with Plastic Top Cover

Condenser Fan Option
- = Standard Condenser Fan Motor
B = MotorMaster

Leaving Water Option
- = Standard
B = Medium Temperature Brine

30GTN/GTR/GUN/GUR040-420 Model Number Significance

The following chart is a model number breakdown for the 30G**040-420 Machines.

Position	1-3	4	5	6-8	9	10	11	12	13	14	15-16
Description	30G	T	N	100	-	E	-	5	1	0	KA

Air-Cooled Packaged Chiller

Refrigerant

N = R-22
U = R-134a

Start Option

N = Across-the-Line
R = Part Winding Start

Nominal Tons

040 = 40 tons
045 = 45 tons
050 = 50 tons
060 = 60 tons
070 = 70 tons
080 = 80 tons
090 = 90 tons
100 = 100 tons
110 = 110 tons
130 = 130 tons
150 = 150 tons
170 = 170 tons
190 = 190 tons
210 = 210 tons
226 = 220 tons (50 Hz only)
230 = 230 tons†
245 = 245 tons†
255 = 255 tons†
270 = 270 tons†
290 = 290 tons†
315 = 315 tons†
330 = 330 tons†
360 = 360 tons†
390 = 390 tons†
420 = 420 tons†

Note †- Modular Unit

Duplex Module

A = Master Unit
B = Slave Unit

Control Options

E = Energy Management Module
S = Navigator Display, Energy Management Module, Service Port, Ground Fault Interrupter Convenience Outlet (208/230, 460, and 575 V Only)
U = Navigator Display, Energy Management Module, Service Port (380 and 380/415 V only)

Condenser Coil Options

- = Copper Tube/Aluminum Fin
K = Copper Tube/Pre-coated Aluminum Fin
C = Copper Tube/Copper Fin
E = Copper Tube/Aluminum Fin w/E-coat
F = Copper Tube/Copper Fin w/E-coat

Voltage Options

1 = 575-3-60
2 = 380-3-60
4 = 230-3-60
5 = 208/230-3-60
6 = 460-3-60
8 = 230-3-50
9 = 380/415-3-50

Packaging/Grille Options

1 = Standard Domestic (Coil Cover)
2 = Optional Domestic (Coil Cover and Bottom Skid)
3 = Standard Export (Coil Cover, Top and Bottom Skid, Shipping Bag)
4 = Full Export Crate
5 = Option #1 with Security Grilles
6 = Option #2 with Security Grilles
7 = Option #3 with Security Grilles
8 = Option #4 with Security Grilles
9 = 30GTN226 Packaging
0 = 30GTN226 with Security Grilles

Factory Installed Options

See

30HK/HL Model Number Significance

The following chart is a model number breakdown for the 30HK/HL Machines.

Position	1-3	4	6-8	9	10	11	12	13	14	15-16
Description	30H	K	045	-	C	-	6	1	1	--

Packaged Chiller

Condenser Options
K = Water-Cooled Condenser
L = Condenserless

Nominal Capacity
HK: 040 – 40 tons
050 – 50 tons
060 – 60 tons
HL: 050 – 50 tons
060 – 60 tons

Not Used

Control Options
C = Set Point Potentiometer
D = Scrolling Marquee Display
E = Scrolling Marquee Display, Energy Management Module

Not Used

Voltage Options
1 = 575-3-60
5 = 208/230-3-60
6 = 460-3-60
9 = 380/415-3-50

Design Series

Packaging Options
1 = Standard Domestic – (Bottom Skid) 3 = Standard Export (Bottom Skid, Shipping Bag)
Not Used

30HW Model Number Significance

The following chart is a model number breakdown for the 30HW Machines.

Position	1-4	5	6-8	9	10	11	12	13	14	15-16
Description	30HW	A	040	-	C	-	6	2	1	--

Packaged Chiller
Condenser Options A = Condenserless B = Water-Cooled Brazed Plate Condenser C = Water-Cooled Shell & Tube Condenser S = Water-Cooled Cu/Ni Condenser
Nominal Capacity 018 – 18 tons 025 – 25 tons 028 – 28 tons 035 – 35 tons 040 – 40 tons
Not Used
Control Options C = Set Point Potentiometer D = Scrolling Marquee Display E = Scrolling Marquee Display, Energy Management Module
Not Used
Voltage Options 1 = 575-3-60 5 = 208/230-3-60 6 = 460-3-60 9 = 380/415-3-50
Design Series
Packaging Options 1 = Standard Domestic – (Bottom Skid) 3 = Standard Export (Bottom Skid, Shipping Bag)
Factory Installed Options See Factory Installed Options below

30HW Factory Installed Option Codes
Factory installed options are determined by Positions 15 and 16 of the model number and are based on the following options:

Option Code	Description
1	**Fresh Water Operation** For use with Leaving Water Temperatures from 40 ºF to 60 ºF.
2	**Across–the-Line Compressor Start Option**
4	**Part-Wind Compressor Start Option** Provides a reduced in-rush current during start-up of the compressor. This option is not available for the 018 size.
5	**Non-Fused Disconnect** For a unit mounted electrical service disconnection.
6	**Brine Operation** For use with Leaving Water Temperatures from 15 ºF to 40 ºF. An inhibited antifreeze solution of the appropriate concentration must be added to the loop.
7	**Sound Panels** Unit is supplied with sound reduction panels installed.
8	**Minimum Load Control** For operation below standard lowest capacity step. Water loop volumes of at least 6-10 gallons per ton are recommended for prolonged operation at low load.
9	**Mobility Package** Option provides casters to allow for ease of moving. This option is not available on the 30HWC and 30HWS machines.

Code	Options	Code	Options	Code	Options	Code	Options
AF	4,6,9	HN	1,2,5,7,8	MH	1,4,7,8	RP	1,4,5,7,9
AV	1,2,5,7,8,9	HS	4,5,6,7,8	MK	2,6,8,9	SC	1,4,9
BC	1,2,5	JB	4,6	ML	4,5,6,8	SL	4,6,7,8
DC	1,2,7	JN	1,2,5,7,9	MR	2,5,6,7,9	SP	1,4,5,8,9
DG	1,2,5,7	JS	4,5,6,7,9	MS	4,6,7,8,9	TE	4,5,6
DK	2,5,6,7	KA	1,2	NC	1,4,5	TL	4,6,7,9
EC	1,2,8	KG	1,2,7,8	NH	1,4,7,9	VL	4,6,8,9
EG	1,2,5,8	KK	2,6,7,8	NL	4,5,6,9	WD	2,6,7
EK	2,5,6,8	KN	1,2,5,8,9	NR	2,5,6,8,9	XA	2,6
EX	4,5,6,7,8,9	KS	4,5,6,8,9	PH	1,4,8,9	XD	2,6,8
FC	1,2,9	LG	1,2,7,9	PN	1,2,7,8,9	XP	1,4,7,8,9
FG	1,2,5,9	LK	2,6,7,9	QC	1,4,7	XV	1,4,5,7,8,9
FH	1,4,5,7	LL	4,5,6,7	QP	1,4,5,7,8	XW	2,5,6,7,8,9
FK	2,5,6,9	LR	2,5,6,7,8	QK	2,6,7,8,9	YD	2,6,9
GH	1,4,5,8	MA	1,4	RC	1,4,8	YE	4,6,7
HH	1,4,5,9	MG	1,2,8,9	RD	2,5,6	ZE	4,6,8

APPLICATION

Cooler Freeze Protection

Freeze protection for the cooler and hydronic package is available as a factory installed option. Since power is sometimes lost for extended periods during winter storms, freeze protection provided by heater tapes will be effective only if a back-up power supply can be assured for the unit's control circuit, heater and cooler pump. If not protected with an antifreeze solution, draining the cooler and outdoor piping is recommended if the system will not be used during freezing weather conditions.

For chillers that must operate during cold weather conditions, the use of antifreeze is highly recommended. Two conditions that must be considered when determining antifreeze concentration are leaving water set point and ambient freeze conditions. These two conditions determine the recommended concentration level. After comparing these conditions, the condition indicating the use of a higher concentration level must be used to adequately protect the machine.

NOTE: Use only antifreeze solutions approved for heat exchanger duty.

Bulletins pertaining to this issue:

- Application TIP122 – Air Cooled Chiller Winterizing: Freeze Protection
  This bulletin discussed various freeze protection methods.

Medium Temperature Brine Applications, 15 to 39.9 ºF (-9.4 to 4.4 ºC)

For applications in which the leaving water temperature set point is less than 40 F (4.4 C), a suitable inhibited antifreeze solution must be used. The solution concentration must be sufficient to protect the chilled water loop to a freeze protection (first crystals) concentration of at least 15° F (8.3º C) below the leaving water temperature set point.

Low Ambient Protection

If the chiller refrigerant or fluid lines are in an area where ambient conditions fall below 34º F (1º C), it is recommended that an antifreeze solution be added to protect the unit and fluid piping to a temperature of 15º F (8.3º C) below the lowest anticipated ambient temperature.

Select concentration based on either burst or freeze protection as dictated by the application. If the chiller does not operate during the winter, nor is a start-up expected, a burst protection concentration is recommended. This concentration may not be high enough to pump the fluid through the system. Burst protection is typically a lower concentration that will provide better performance. If the chiller does operate during winter, a freeze protection concentration is recommended. This concentration will be high enough to keep the fluid in a condition that it can be pumped at low ambient conditions.

IMPORTANT: Adding antifreeze solution is the only certain means of protecting the unit from freeze-up if the cooler heater fails or electrical service is interrupted during low ambient temperatures.

Condenser Flow Switch (30HK, 30HWB/HWC/HWS Only)
Provisions to accept condenser flow switches are provided for the 30HK, 30HWB/HWC/HWS machines.

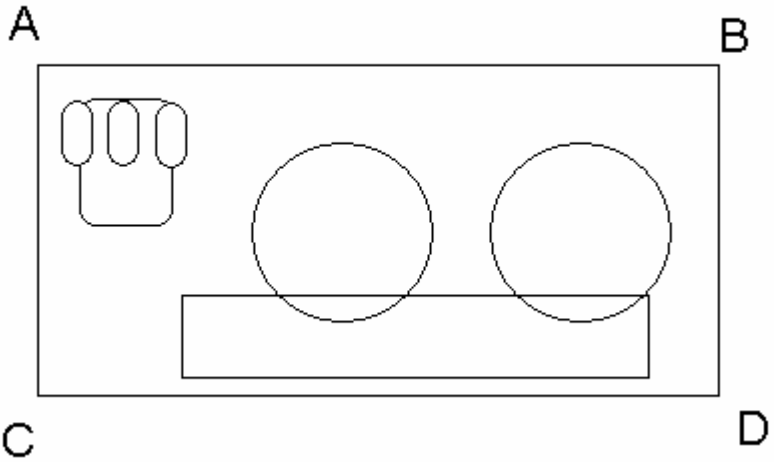
In the 30HWB/HWC/HWS, the condenser flow switch wiring shows on the wiring diagram a connecting to PL4. There is no mating plug provided from the factory. There are two options to connect a flow switch for these machines.

1. Cut the wires out of the plug and bypass it. This is the preferred method.
2. Make the mating plug assembly. To do this, a parts list is shown below.

Qty	Carrier Part Number	Description	Amp Universal Mate-N-Lok Connector Part Numbers
2	HY06MP106	6 Circuit Plug	1-480704-0
2	HY55AM025	Terminal Pin, Male	350538-1

Corner Weights

30GTN015-035
The following data is estimated corner weights for the 30GTN015-035.



Unit	Operational Weight lbs. (kg.)	A lbs. (kg.)	B lbs. (kg.)	C lbs. (kg.)	D lbs. (kg.)

030-60 Hz	2268 (1030.9)	692 (314.5)	445 (202.3)	671 (305.0)	460 (209.1)

30GTN/GTR040-110

30GTN/GTR130-226

30GTN/GTR			Operational Weight lbs. (kg.)	Weights, lbs. (kg)							
Unit	Hz	Coil Option		A	B	C	D	E	F	G	H
190											
	50										
		Cu-Cu		1555 (707)	2143 (974)	1997 (907)	1316 (598)	1620 (736)	2029 (922)	1955 (889)	1811 (823)
210	60	Al-Cu		1376 (625)	2128 (967)	1871 (850)	1120 (509)	1407 (639)	1846 (839)	2037 (925)	1595 (725)
		Cu-Cu									
	50										
226	50	Al-Cu	13,721 (6237)	1143 (656)	2057 (935)	1907 (867)	1188 (540)	1511 (687)	1936 (880)	1914 (870)	1764 (802)
		Cu-Cu	15,305 (6957)	1641 (746)	2261 (1028)	2096 (953)	1386 (630)	1700 (773)	2140 (973)	2116 (962)	1962 (892)

There is an error in 30GTN-1PD and 30GTN-3PD, where the duplex modules made from the 190-50 Hz Cu-Cu corner weight listed for “G” was incorrectly stated as 977 kg.

There is an error in 30GTN-1PD, 30GTN-3PD, and 30GTN-5PD (original release and 04/03 reprint) where the 210-60 Hz Al-Cu corner weight listed for “F” was incorrectly stated as 384 kg. This same error was duplicated in the duplex machines.

Duplex Chillers

Size 30GTN/GTR 30GUN/GUR	Frequency	Consists of (30GTN/GTR, 30GUN/GUR)	
		Module A	Module B
230	50 Hz & 60 Hz	150	080
245	50 Hz & 60 Hz	150	090
255	50 Hz & 60 Hz	150	100
270	50 Hz & 60 Hz	170	100
290	50 Hz & 60 Hz	190	110
315	50 Hz & 60 Hz	210	110
330	50 Hz & 60 Hz	170	170
360	50 Hz	190	170
360	60 Hz	190	190

Size 30GTN/GTR 30GUN/GUR	Frequency	Consists of (30GTN/GTR, 30GUN/GUR)	
		Module A	Module B
390	50 Hz & 60 Hz	210	190
420	50 Hz & 60 Hz	210	210

Electrical Information

Power Connections

30GTN/GTR/GUN/GUR040-420

Two power connection devices are offered, a terminal block or a non-fused disconnect. Below is a separate table listing the wire sizes that can be applied to each device.

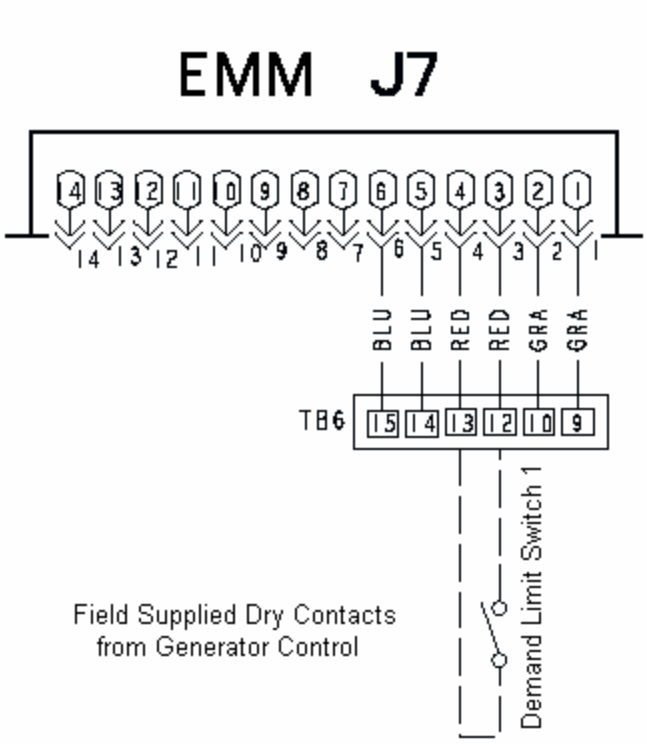
Unit 30GT* 30GU*	Terminal Block (Qty)…Wire Size					
	Voltage					
	575-3-60	380-3-60	208/230-3-60	460-3-60	230-3-50	380/415-3-50
060			(2) #4-500 kcmil			
070			(2) #4-500 kcmil			

Unit 30GT* 30GU*	Non-Fused Disconnect (Qty)…Wire Size Range					
	Voltage					
	575-3-60	380-3-60	208/230-3-60	460-3-60	230-3-50	380/415-3-50
060			(1) #2-600 kcmil †			
070			(1) #2-600 kcmil †			

Note: † - The Product Data indicates that 2 power supplies are required. A lug kit from ABB is available, OZXA-33 which allows for 2 power leads per phase of #2-600 kcmil. The kit has 6 lugs included. Only 3 of the 6 lugs are required for the line side.

Generator Operation

Frequently, there are specifications for 2-point power connections on air-cooled chillers. This specification stems from the utilization of an undersized generator for back-up power, to provide minimum cooling. Typically, the specification calls for the chiller to have one power feed from the utility and the other supplied from both the utility and a generator with a transfer switch. Carrier can provide the power modification under Quote Control. There are other, more effective solutions to meet this requirement that should be considered.



As an alternative to the dual power supply, Carrier recommends using the Demand Limit function provided by the ComfortLink Control System. The Energy Management Module and a dry switch closure are required for this option to function. Demand Limit is a function that limits the capacity of the machine. This function uses both circuits to achieve the desired cooling limit. When the generator is enabled, a switch closure to the Energy Management Module forces the chiller into a pre-set demand limit level. The benefit of this control scheme is that it does not rely on one circuit to provide the minimum cooling. For example, assume that the chiller's B circuit is connected to the generator. A service technician has the same circuit down for scheduled maintenance, or has faulted due to a problem. During a power failure, the generator starts, but because the circuit is down, no cooling can be provided. Using the Demand Limit function allows the control to start the available circuit and provide the desired minimum cooling requested. Utilizing the Demand Limit function also allows for single point power, reducing the associated costs with supplying an additional power supply.

There are several other items that must be reviewed in order to provide for the requirement.

- The control system runs on a separate power supply. If the control power is absent, the machine will not operate. With the use of the control transformer, control power can be supplied from the main generator feed.

- Chilled Water Pumps must also be operational. Without chilled water flow, the chiller will not operate.

Hail Guards
Hail Guards depend upon product family and is addressed below.

30GTN015-035
Hail Guards are not required on this product.

30GTN/GTR/GUN/GUR040-420
Hail Guards are field installed accessories for this product family. The guards extend over the outside edge of the machine by 4.76" (121 mm).

Part Number	Hail Guard Qty	Height,. in (mm) each	Width, in (mm) each	Depth, in (mm) each	Approximate Shipping Weight, lbs (kg) Complete package
30GT-910---077	2	45.87 (1165)	35.35 (898)	6.57 (167)	50 (22.7)
30GT-910---078	2	49.84 (1266)	35.35 (898)	6.57 (167)	50 (22.7)

Unit	Quantity Required	
	30GT-910---077	30GT-910---078
30GTN/GTR,GUN/GUR040 30GTN/GTR,GUN/GUR045 30GTN/GTR,GUN/GUR050	2	-
30GTN/GTR,GUN/GUR060 30GTN/GTR,GUN/GUR070	-	3
30GTN/GTR,GUN/GUR080 30GTN/GTR,GUN/GUR090	3	-
30GTN/GTR,GUN/GUR100 30GTN/GTR,GUN/GUR110	4	-
30GTN/GTR,GUN/GUR130 30GTN/GTR,GUN/GUR150 30GTN/GTR,GUN/GUR170	-	5
30GTN/GTR,GUN/GUR190 30GTN/GTR,GUN/GUR210 30GTN/GTR,GUN/GUR226	-	6
30GTN/GTR,GUN/GUR230 30GTN/GTR,GUN/GUR245	3	5
30GTN/GTR,GUN/GUR255 30GTN/GTR,GUN/GUR270	4	5
30GTN/GTR,GUN/GUR290 30GTN/GTR,GUN/GUR315	4	6
30GTN/GTR,GUN/GUR300	-	10
30GTN/GTR,GUN/GUR360-50 Hz	-	11
30GTN/GTR,GUN/GUR360-60 Hz 30GTN/GTR,GUN/GUR390 30GTN/GTR,GUN/GUR420	-	12

Head Pressure Control
Head Pressure Control depends upon the machine. See below for specific information.

30GTN/GTR015-035
Two packages are offered for head pressure control based on voltage. This family of product employed the MotorMaster I controller. All packages include the motor. Since the condenser coil is in a horizontal configuration, no wind baffles are required.

Voltage	Package
575-3-60	50DJ-902---801
380-3-60	
208/230-3-60	50DJ-902---801
460-3-60	50DJ-902---811
380/415-3-50	

30GTN/GTR/GUN/GUR040-420
There were several options offered for head pressure control, depending on the production date. Regardless of the device used, in areas where sustained wind velocity of 5 mph or greater is expected during low ambient operation, wind baffles must be field-installed. Head pressure control is not intended to be matched with the high static fans.

Motormaster III
This device was the original head pressure control offering. This device was offered on all machines from the factory from serial numbers starting with 1499F through 2202F. The field installed accessory part number is 30GT-911---079. Two accessory packages are need for each unit, one for each circuit. Duplex models require four packages, one for each module circuit.

575 volt models require an autotransformer circuit to change the operating voltage from 575 to 460 volts. Four (4) –HT-01AH-851 transformers are required to accomplish this circuit.

This kit was obsoleted by in Product Bulletin 111-02-38, dated May 27,2002.

Motormaster V
This device was introduced on machines with serial numbers starting with 2302F. This is a Variable Frequency Drive device that requires a VFD compatible motor. There were several field-installed packages offered depending on voltage and the number of motors controlled. No additional transformers are required for the 575 volt operation with the Motormaster V. This change was announced in Product Bulletin 111-02-38, dated May 27, 2002.

Unit 30GTN/GTR/GUN/GUR	Voltage	Accessory Part Number	Quantity Required
040-110, 230B-245B	208/230-3-60 230-3-50	30GT-911---064	1
040-110, 230B-245B	380-3-60 380/415-3-50 460-3-60	30GT-911---065	1
040-110, 230B-245B	575-3-60	30GT-911---066	1
130-210, 230A-315A, 330A/B-420A/B	208/230-3-60 230-3-50	30GT-911---067	1
130-210, 230A-315A, 330A/B-420A/B	380-3-60 380/415-3-50 460-3-60	30GT-911---068	1
130-210, 230A-315A, 330A/B-420A/B	575-3-60	30GT-911---069	1

These kits were obsoleted by Product Bulletin 111-04-04, Dated: 01/013/04 and Product Bulletin 111-04-02-E, Dated: 01/13/04.

Beginning with serial numbers 4503F, the control of the Motormaster V control was changed to using the Run-Stop contact feature of the Motormaster V. As a result, the packages changed to include this control contact relay. This product change was announced in Product Bulletin 111-04-04, Dated: 01/013/04 and Product Bulletin 111-04-02-E, Dated: 01/13/04.

Unit 30GTN/GTR/GUN/GUR	Voltage	Accessory Part Number	Quantity Required
040-110, 230B-245B	208/230-3-60 230-3-50	30GT-911---080	1
040-110, 230B-245B	380-3-60 380/415-3-50 460-3-60	30GT-911---081	1
040-110, 230B-245B	575-3-60	30GT-911---082	1
130-210, 230A-315A, 330A/B-420A/B	208/230-3-60 230-3-50	30GT-911---074	1
130-210, 230A-315A, 330A/B-420A/B	380-3-60 380/415-3-50 460-3-60	30GT-911---075	1
130-210, 230A-315A, 330A/B-420A/B	575-3-60	30GT-911---076	1

Hot Gas Bypass

As with all refrigeration accessory installation, follow all local codes such as National Electric Code, ASHRAE 15, etc.

30GTN015-035, 30GTN/GTR/GUN/GUR040-420, 30HK/HL040-060

There are two packages available, one for the 115 volt control circuit (30GA-900---161), the other for the 230 volt control circuit (30GA-900---171). This package provides a modulating valve for hot gas by pass.

Package Contents:

Package Number	30GA-900---161	30GA-900---171
Control Voltage	115	230
Solenoid Valve	EF11BS067	EF11BS066
Bypass Valve	EA52DC421	

Field Supplied Material:

	Units			
	30GTN015-035	30GTN/GTR040-060, and 070 (60 Hz) 30GUN/GUR040-060, and 070 (60 Hz)	30GTN/GTR080-420 and 070 (50 Hz) 30GUN/GUR080-420 and 070 (50 Hz)	30HK/HL040-060
Solenoid Valve				
Manual Shut-off Valve				
Filter Drier				
Filter Drier Cores				
Copper Tubing				
Control Wiring				

Remote Cooler Applications

If Hot Gas Bypass is used in remote applications, line sizes should be kept to a minimum to reduce the amount of liquid refrigerant that can condense in the line during the off cycle. Liquid refrigerant in the hot gas bypass line can result in a liquid slug entering the compressor at start-up. Line size is not as critical as if sizing for discharge lines, 5/8" line sizes are recommended for all applications. Be sure to loop the hot gas bypass line over the compressor, to help reduce the chance of the hot gas by pass line filling with liquid during the off cycle. A ¼" equalizer line should be connected to the suction line at the near the top of the suction line to reduce the chance of a liquid slug in the equalizer line. A recommended piping schematic is shown below.

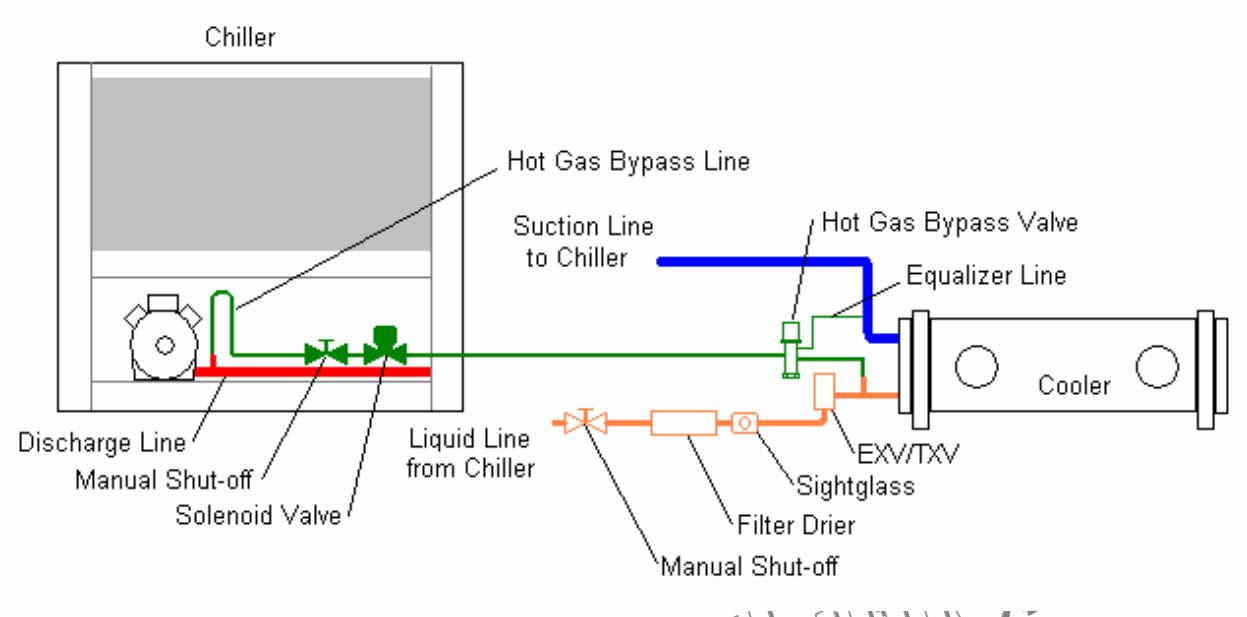


Figure 1 - Typical Hot Gas Bypass Piping

Oil Safety Pressure Switch

On all multiple compressor circuits and on single compressor circuit brine option machines an oil pressure safety switch is factory installed. For those machines that do not have oil pressure safety switches, a field-installed accessory is available.

30GTN/GTR/GUN/GUR040-060, 070-60 Hz:

The original release of this product featured the oil pressure safety switch kit, 30GB-900---121. This kit has 2 switches included.

Beginning in August 2003, a new kit was offered as the oil pressure safety switch, 30GT-911---073. This kit has only 1 switch included. As a result 2 kits are required per machine.

Bulletins pertaining to this issue:

111-04-35 – New Oil Pressure Safety Switch – 30GT-911---073, Dated July 2, 2004
This bulletin announced the new kit and the mistake on the Price Page Quantity required.

111-04-05-E – New Oil Pressure Safety Switch – 30GT-911---073, Dated July 2, 2004
This bulletin announced the new kit and the mistake on the Product Ordering Data Quantity required.

Security Grille Package

30GTN/GTR/GUN/GUR080-090

(1) 30GT-911---027 End Grille
(3) 30GT-911---028 Lower Side Grille
(3) 30GT-911---048 Upper Side Grille

30GTN/GTR/GUN/GUR100-110
(1) 30GT-911---027 End Grille
(4) 30GT-911---028 Lower Side Grille
(4) 30GT-911---048 Upper Side Grille

The Price Pages and Installation Instructions for the 30GTN/GTR/GUN/GUR080-110, indicate an upper side grille package that if used, may be too long to mount to the coil shelf or will interfere with the lower grille mounting.

Sound Reduction Options

Compressor Sound Blankets
RCD Totaline offers Acoustic Blankets for compressors as a potential sound reduction option. The blankets are custom designed to fit exactly to the compressors. They are fastened with Velcro and ties.

Bulletins pertaining to this option:
- PMB02-067 – Acoustic Blankets 101 – for 30 Series Applications
  This bulletin superceded by PMB02-114.
- PMB02-114 - Acoustic Blankets 101 – Revised
  This bulletin listed technical data for the acoustic blankets.
- PMB04-151 – Acoustic Blankets – Return Policy Notification
  This bulletin describes the RCD Return Policy for sound blankets.

Remote Condenser Piping (30HWA/HL Units Only)
Shipped with the machine from the factory are check valves for field-installation in the discharge line. One check valve is shipped with the 30HWA. Two check valves are shipped with the 30HL units, one for each circuit. The valve should be installed close to the 30HWA/HL unit in a horizontal position with the bonnet up.

Unit		Discharge Check Valve Part Number	Size
30HWA	30HL		
018-025	-	EC37BU331/EC37BU333	1-1/8”
028-035	050,060	EC37BU391/EC37BU393	1-3/8”
040	-	EC37BU451/EC37BU453	1-5/8”

Due to a packaging label error at the vendor, the 30HWA040 machines produced from 1503Q until 3503Q have the wrong discharge check valve shipped with the unit. A 1-3/8” check valve was shipped in a box labeled EC37BU451 instead of the 1-5/8” check valve.

On the 30HWA018-025 machines beginning with Serial Numbers starting with 3404Q, the check valve was changed to EC37BU333. While the same purpose is served, it is a different style. The valve can be installed in any orientation except upside down.

On the 30HWA028-035 and 30HL050-060 machines beginning with Serial Numbers starting with 3404Q, the check valve was changed to EC37BU393. While the same purpose is served, it is a different style. The valve can be installed in any orientation except upside down.

On the 30HWA040 machines beginning with Serial Numbers starting with 1804Q, the check valve was changed to EC37BU453. While the same purpose is served, it is a different style. The valve can be installed in any orientation except upside down.

Remote Cooler (30GTN/GTR040-420 Units Only)

The option to remotely mount the cooler is provided in a field installed accessory. This option allows for the cooler to be mounted indoors and thereby eliminate the need for glycol in the chilled water loop. The cooler must be located within 75 feet (22.8 m). The kit includes EXV cables and thermistor extensions. One package is required per chiller. For duplex machines, 2 kits are required.

With the introduction of the Series 3 machines (Serial numbers starting with 2503F), the kit changed to accommodate the new EXV valve. This kit was announced in Product Bulletin, 111-03-57, Dated: 11/06/03.

Series (Position 12)	Serial Number Range	Part Number
2	0199F-2403F	30GT-911---050
3	2503F-	30GT-911---083

CONTROLS

Accessory Compressor Unloaders

Additional unloaders can be added to ComfortLink machines. Below is a table outlining the required parts. The control will not allow 2 unloaders on a circuit with hot gas bypass on dual circuit machines.

Unit 30GTN/GTR	Compressor Unloaders				(Qty) Part Number		
	Factory Standard		Field-Installed Accessory		Unloader Package	Solenoid Coil	CXB Accessory *
	A1	B1	A1	B1			
015 (60 Hz) 020 (50 Hz)	2	-	0	-	Not Applicable	Not Applicable	Not Applicable
015 (50 Hz) 020 (60 Hz)	1	-	0	-	Not Applicable	Not Applicable	Not Applicable
025-030 035 (60 Hz)	2	-	0	-	Not Applicable	Not Applicable	Not Applicable

Unit 30GTN/GTR	Compressor Unloaders				(Qty) Part Number		
	Factory Standard		Field-Installed Accessory		Unloader Package	Solenoid Coil	CXB Accessory *
	A1	B1	A1	B1			
040 (60 Hz)	1	0	0	1	(1) 06EA-660---138	(1) EF19ZE024	Not Required
040 (50 Hz) 045 (60 Hz)	1	0	0	1	(1) 06EA-660---138	(1) EF19ZE024	Not Required
			0	2	(2) 06EA-660---138	Not Required	(1) 30GT-911---061
045 (50 Hz) 050-070	1	0	1	0	(1) 06EA-660---138	Not Required	(1) 30GT-911---061
			1	1	(2) 06EA-660---138	Not Required	(1) 30GT-911---061
			1	2	(3) 06EA-660---138	(1) EF19ZE024	(1) 30GT-911---061
			0	1	(1) 06EA-660---138	(1) EF19ZE024	Not Required
			0	2	(2) 06EA-660---138	Not Required	(1) 30GT-911---061
080-110 † 130 (60 Hz)	1	1	1	0	(1) 06EA-660---138	Not Required	(1) 30GT-911---061
			0	1	(1) 06EA-660---138	Not Required	(1) 30GT-911---061
			1	1	(2) 06EA-660---138	Not Required	(1) 30GT-911---061
130 (50 Hz) 150,170 †	1	1	1	0	(1) 06EA-660---138	(1) EF19ZE024	Not Required
			0	1	(1) 06EA-660---138	(1) EF19ZE024	Not Required
			1	1	(2) 06EA-660---138	(2) EF19ZE024	Not Required
190,210, 226 (50 Hz) †	0	0	1	0	(1) 06EA-660---138	(1) EF19ZE024	Not Required
			0	1	(1) 06EA-660---138	(1) EF19ZE024	Not Required
			1	1	(2) 06EA-660---138	(2) EF19ZE024	Not Required

† - And associated modular units

9 - 2 solenoid coils and the Unloader Transformer are included in the CXB Accessory

The unloader coils are rated at 23 VA holding (50 Hz),18 VA holding (60 Hz). If adding a second unloader to the 080-170 and associated modular units, a transformer, HT01AW229 is supplied with the CXB Accessory kit.

Once installed configure the control to accept the additional unloaders. Change the appropriate CA.UN, *No. of Circuit A Unloaders* or CB.UN, *No. of Circuit B Unloaders* (Configuration Mode, Sub-mode OPT1).

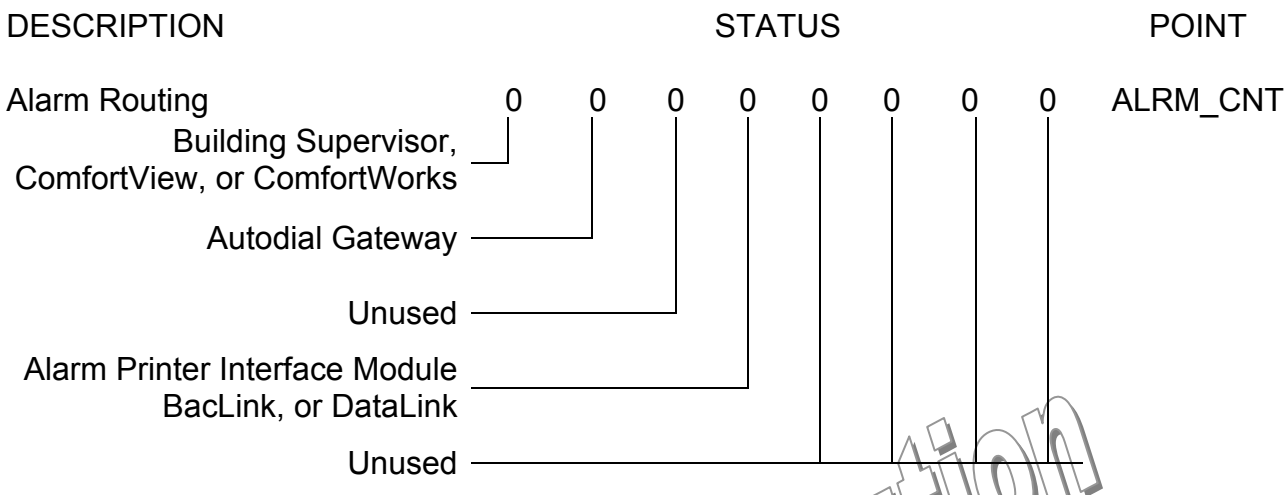
Carrier Comfort Network

The 30GTN,R/GUN,R/HK/HL/HWA/HWB/HWC/HWS chiller units can be connected to the CCN, if desired.

Alarm Routing Control

Alarms recorded on the chiller can be routed through the CCN. To configure for this option, the ComfortLink Control must be configured to determine which elements will receive and process alarms sent by the ComfortLink Control. Input for the decision consists of eight digits, each of which can be set to either 0 or 1. Setting a digit to 1 specifies that alarms will be sent to the system element that corresponds to that digit. Setting all digits to 0 disables alarm processing. The factory default is 0000000. This is based on the assumption that the unit will not be connected to a network. If the network does not contain a ComfortView, ComfortWorks, Building Supervisor, AutoDial Gateway

or Alarm Printer Interface Module (APIM), enabling this feature will only add unnecessary activity to the CCN Communication Bus.



Network Service Tool is required to configure the ComfortLink Control System of the chiller. With Network Service Tool attached to the chiller, go to:

Modify> Controller>ALARMDEF and change Alarm Routing Control to the desired configuration.

Typical configuration of Alarm Routing is 11010000. This Alarm Routing status will transmit alarms to:

Building Supervisor, ComfortView, or ComfortWorks;
Autodial Gateway; and
BacLink or DataLink

Communication Bus Wiring

The communication bus wiring is a shielded, 3-conductor cable with drain wire and is supplied and installed in the field.

CCN Communication Bus Wiring		
Manufacturer	Part Number	
	Regular Wiring	Plenum Wiring
Alpha	1895	-
American	A21451	A48301
Belden	8205	884421
Columbia	D6451	-
Manhattan	M13402	M64430
Quabik	6130	-

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.

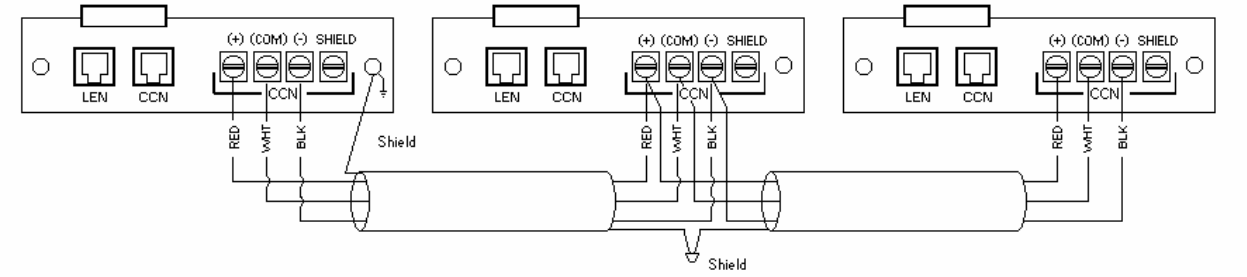


Figure 2 - TB3 – CCN Wiring

A problem with TB3 was uncovered on machines produced between 0102F and 1904F (30GXN/GXR), 0102Q and 1904Q (30HXA/HXC) where the TB3 "-" and Shield were connect by an internal trace connection. If the shield was connected CCN Communication failure alarms were generated. To alleviate this problem, connect the ground to the mounting screw instead of the Shield terminal.

Service Bulletins pertaining to this condition:

- SMB040026 – ComfortLink and CCN Communication Problems
  This bulletin was described the TB3 "-" and Shield internal trace problem.

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, disconnect the machine from the CCN Network. 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.

Carrier Comfort Network Interface Devices
Several options for interfaces to other Building Control Systems exist and are listed below.

BacLink™
BacLink functions as a gateway between a CCN and a BacNet system. Information from the chiller control to support the interface is listed in Appendix A – DataPort™, DataLink™, BAClink™ Object Definition on page 136.

DataLink™
DataLink is an interface device that allows other HVAC control systems to read and change “read/Write” values in system elements connected to a CCN bus. This device requests data from a specified CCN system element and translates this data into ASCII characters off network. Information from the chiller control to support the interface is listed in Appendix A – DataPort™, DataLink™, BAClink™ Object Definition on page 136.

DataPort™
DataPort is an interface device that allow other HVAC control systems to “read only” values in system elements connected to a CCN communication bus. Information from the chiller control to support the interface is listed in Appendix A – DataPort™, DataLink™, BAClink™ Object Definition on page 136.

Demand Limit Control
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. 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.

Configuration Mode					
Sub-Mode	Keypad Entry	Item	Display	Item Expansion	Comment
RSET	[ENTER]	DMDC	X	Demand Limit Select	0=None 1=Switch 2=4-20 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 %
	[▼]	SHTL	XXX	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%

2-Stage Switch Controlled Demand Limit

To configure Demand Limit for 2-stage switch control set the DMDC *Demand Limit Select* (Configuration Mode, Sub-mode RSET) to 1. Then configure the 2 Demand Limit Switch points, DLS1 *Demand Limit Switch 1* and DLS2 *Demand Limit Switch 2* (Configuration Mode, Sub-mode RSET) to the desired capacity limit. Capacity steps are controlled by 2 relay switch inputs field wired to TB6. Demand Limit Step 1 connects to TB6-12 and TB6-13. Demand Limit Step 2 connects to TB6-14 and TB6-15. 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.

Operation with this option enabled, activates MD15 – Demand Limit in Effect.

To disable demand limit configure the DMDC *Demand Limit Select* (Configuration Mode, Sub-mode RSET) to 0.

4 to 20 mA Controlled Externally Powered Demand Limit
This option requires the Energy Management Module. To configure Demand Limit for 4 to 20 mA control set DMDC *Demand Limit Select* (Configuration Mode, Sub-mode RSET) to 2. Then configure the DM20 *Demand Limit at 20 mA* (Configuration Mode, Sub-mode RSET) to the maximum loadshed value desired. The control will reduce allowable capacity to this level for the 20 mA signal. A 4-20 mA signal generator is required for this option. Care should be taken when interfacing with other manufacturer's control systems, due to power supply differences, full wave bridge versus half wave rectification. The two different power supplies cannot be mixed. ComfortLink controls use half wave rectification. A signal isolation device should be utilized if a full wave bridge signal generating device is used. The 4-20 mA "+" signal should be connected to TB6-1. The 4-20 mA "-" signal should be connected to TB6-5.

0-10 or 2-10 vdc inputs cannot be used without further modification. Failure to modify the signal will result in damage to the board. If this is a requirement, a signal converter is recommended.

In Dual Circuit Software versions prior to Version 2.3 (CESR-131170-02-03), the 4-20 mA algorithm acted in reverse. A 20 mA signal indicated to the control not to initiate Demand Limit. A 4 mA signal indicated to the control to go to full Demand Limit. Version 2.3 corrected this problem. The literature did not match the actual algorithm.

Operation with this option enabled, activates MD15 – Demand Limit in Effect.

To disable demand limit configure the DMDC *Demand Limit Select* (Configuration Mode, Sub-mode RSET) to 0.

Bulletins pertaining to this issue:
- SMB000068 – ComfortLink 4-20 mA Demand Limit
  This bulletin described the algorithm error in Software versions prior to 2.3.

CCN Loadshed Controlled Demand Limit
To configure Demand Limit for CCN Loadshed control set the DMDC *Demand Limit Select* (Configuration Mode, Sub-mode RSET) to 3. Then configure the SHNM *Loadshed Group Number* (Configuration Mode, Sub-mode RSET), SHDL *Loadshed Demand Delta* (Configuration Mode, Sub-mode RSET), and SHTM *Maximum Loadshed Time* (Configuration Mode, Sub-mode RSET). The CCN system designer establishes the Loadshed Group number. The ComfortLink 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 ComfortLink control will reduce the current stages by the value entered for Loadshed Demand delta. The Maximum Loadshed Time is 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.

Operation with this option enabled, activates MD15 – Demand Limit in Effect.

To disable demand limit configure the DMDC *Demand Limit Select* (Configuration Mode, Sub-mode RSET) to 0.

Displays
There are 3 types of displays that are offered for display/Interface Options for the ComfortLink Machines.

Quickset Display
The Quickset display is the least feature oriented control interface for ComfortLink. This device consists of a Set Point Potentiometer and an Alarm Light. This is the standard display on the 30GTN015-035, 30HK040-060, 30HL050-060, and 30HW machines.

Service Bulletins pertaining to this issue:

- SMB000058 – ComfortLink Scrolling Marquee Installation Instructions
  This bulletin described the installation instructions to remove the Quickset Display and install a Scrolling Marquee.

Scrolling Marquee Display
The Scrolling Marquee Display is the standard interface display to the ComfortLink Control System for the 30GTN/GTR/GUN/GUR040-420 machines. It is a factory installed option for the 30GTN015-035, 30HK040-060, 30HL050-060, and 30HW machines. The display has up and down arrow keys, an [ENTER] key, and an [ESCAPE] key. These keys are used to navigate through the different levels of the display structure. Press the [ESCAPE] key until the display is blank to move through the top 11 mode levels indicated by LEDs on the left side of the display.

Once within a Mode or Sub-mode, pressing the [ENTER] and [ESCAPE] keys simultaneously will put the Scrolling Marquee Display into expanded text mode where full meaning of all sub-modes, items and their values can be displayed for the current selection. Pressing the [ENTER] and [ESCAPE] keys when the display is blank (Mode LED level) will return the Scrolling Marquee Display to its default menu of rotating display items (those items in the Run Status Mode, sub-mode VIEW). In addition, the password will be disabled requiring that it be entered again before changes can be made to password protected items. The Service Test function should be used to verify proper protected items. Press the [ESCAPE] key to exit out of the expanded text mode.

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

When a specific item is located, the item name alternates with the value on the display. Press the [ENTER] key at a changeable item and the value will be displayed. Press [ENTER] again and the value will begin to flash indicating that the value can be

changed. Use the up and down arrow keys to change the value, and confirm the value by pressing the [ENTER] key.

Two items, OAT *Outside Air Temperature* (Temperature Mode, Sub-mode UNIT) and SPT *Space Temperature* (Temperature Mode, Sub-mode UNIT) can be forced to a value at the Scrolling Marquee Display. Use the procedure outlined above to change the value. If one of these two points has been forced, a flashing "●" in the lower right hand corner of the display indicates the force next to the value. To remove the force, select the item. Press the [ENTER] key so that the value is flashing. Press the up and down arrow keys simultaneously and the force will be removed.

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

Items in the Configuration and Service Test modes are password protected. The words 'PASS' and 'WORD' will alternate on the display when required. Press [ENTER] and the default password 1111 will be displayed. Press [ENTER] again and the first digit will begin to flash. Use the arrow keys to change the number and press [ENTER] to enter the digit. Continue with the remaining digits of the password. The password can only be changed at the Navigator or through CCN devices such as ComfortWORKS®, ComfortView™ and Service Tool.

Navigator

The Navigator module provides a mobile user interface to the ComfortLink control system. It can be a Factory installed Option or a Field Installed Accessory. The display has up and down arrow keys, an [ENTER] key, and an [ESCAPE] key. These keys are used to navigate through the different levels of the display structure. Press the [ESCAPE] key until 'Select a Menu Item' is displayed to move through the top 11 mode levels indicated by LEDs on the left side of the display.

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

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

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

Two items, OAT *Outside Air Temperature* (Temperature Mode, Sub-mode UNIT) and SPT *Space Temperature* (Temperature Mode, Sub-mode UNIT) can be forced to a value at the Navigator. Use the procedure outlined above to change and force the value. If one of these two points has been forced, a flashing "f" indicating the force will appear next to the value. To remove the force, select the item. Press the [ENTER] key so that the value is flashing. Press the up and down arrow keys simultaneously and the force will be removed.

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

Items in the Configuration and Service Test modes are password protected. The words 'Enter Password' will be displayed when required, with the default password also being displayed. Use the arrow keys to change the number and press [ENTER] to enter the digit. Continue with the remaining digits of the password. The default password is 1111. The password can only be changed at the Navigator or through CCN devices such as ComfortWORKS®, ComfortView™ and Service Tool.

Adjusting the Contrast

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

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

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

Adjust Contrast
10 - - + - - - - - - - - - - -

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

Adjusting the Backlight Brightness

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

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

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

Adjust Brightness
11 - - - - - - - - - - - - - +

Use the up or down arrow keys to adjust the brightness. The screen's brightness will change with the adjustment. Press [ENTER] to accept the change. The Navigator will keep this setting as along as it is plugged in to the LEN bus.

Dual Chiller Control

For Dual Chiller Control, additional hardware is required to complete the installation. A Dual Chiller Leaving Water Thermistor is required. Thermistor and Thermistor Well lengths of 3" and 4" are offered. Depending on chilled water piping size, order the appropriate thermistor and thermistor well for the site conditions.

Part Number	Description	Quantity Required
--HH—79NZ-026	Thermistor, 5k Ohm – 3" Water Temperature Sensor for Dual Chiller Control. Use 10HB-501---068-01, Thermistor Well.	1
10HB-501---068-01	Thermistor Well – 3"	1
--HH—79NZ-029	Thermistor, 5k Ohm – 4" Water Temperature Sensor for Dual Chiller Control. Use 10HB-501---068-02, Thermistor Well.	1

10HB-501---068-02	Thermistor Well – 4”	1

Earlier Product Ordering Data did not include this information.

For Parallel Dual Chiller Operation an additional thermistor must be installed in the common supply water header. The sensor should be located in a straight section of pipe, at least 5 pipe diameters from an elbow or tee to insure proper temperature sensing.

Several thermistor wells are available. All have ¼” NPT fittings for securing the well in the piping. An appropriate fitting must be supplied for the fitting. Select a location that will allow for removal of the thermistor without any restrictions.

Well Part Number	“A” Dimension, in. (mm)	“B” Dimension, in. (mm)
10HB50106801	3.10 (78.7)	1.55 (39.4)
10HB50106802	4.10 (104.1)	1.28 (32.5)

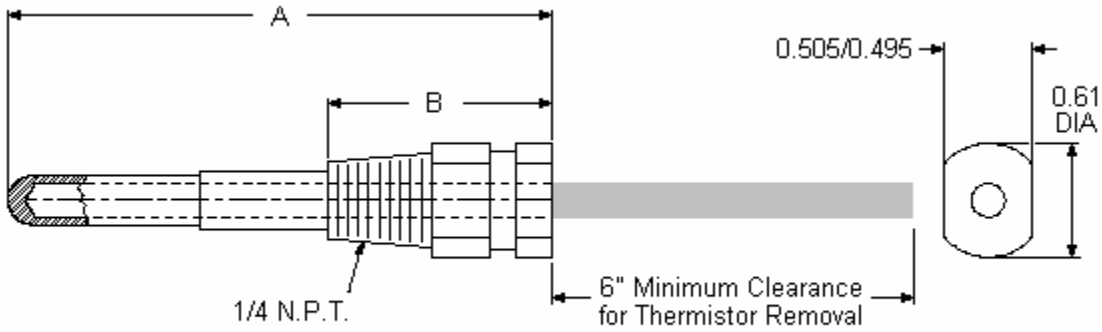


Figure 3 – Dual Leaving Water Thermistor Well

The thermistor should be inserted into the well with a small amount of Heat Sink Compound, 38AQ680001 (Dow Corning #340, or General Electric #641).

Once the well is inserted and the thermistor is in place, it is recommended that a thermistor wire loop be made and secured with a wire tie at the collar of the thermistor well. This will aid in thermistor retention in the well. This Dual Chiller Thermistor (T9) must wired to the master chiller for proper control.

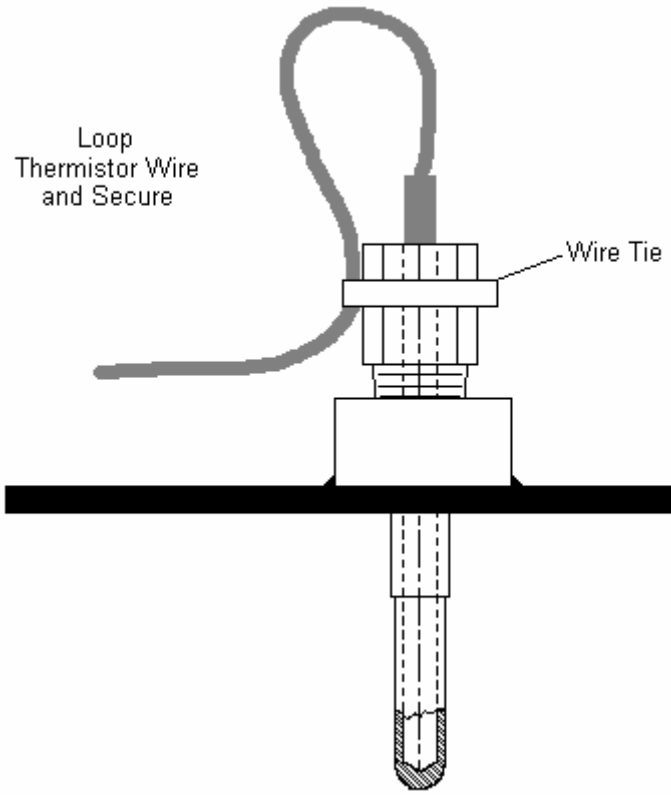


Figure 4 – Dual Leaving Water Thermistor

While in Dual Chiller Control mode, the LWT *Leaving Water Temperature* (Run Status Mode Sub-mode VIEW) default screen will be the Dual Chiller Mixed Water Temperature.

In the 2 circuit software, Version 3.1 (CESR-131170-03-01), the Dual Chiller software was changed to allow for series control. In order for the slave chiller to operate correctly, the parameter CTRL *Control Method* (Configuration Mode, Sub-mode OPT2) must be 0 (SWITCH).

In the 2 circuit software, Version 4.0 (CESR-131170-04-00), the Dual Chiller configuration parameters moved from (Configuration Mode, Sub-mode RSET) to its own sub-mode, (Configuration Mode, Sub-mode DLCH).

Hot Gas Bypass

Hot Gas Bypass is an option both from the factory and as a field-installed accessory. The control will not allow Hot Gas Bypass on a circuit with 2 unloaders active on dual circuit machines.

30GTN/GTR/GUN/GUR040-070
The 040-070 machines are shipped from the factory with an unloader on Compressor A1 only. For automatic lead lag to be operational, an unloader must be added to Compressor B1.

Early Price Pages and Product Ordering Data incorrectly indicated that for each 040-420 machine a control relay, time delay relay, and a ½ watt resistor is required.

30GTN/GTR/GUN/GUR080-420
Early Price Pages and Product Ordering Data incorrectly indicated that for each 040-420 machine a control relay, time delay relay, and a ½ watt resistor is required.

Head Pressure Control
Head pressure control depends upon the type of machine. Each machine family is listed separately below.

30GTN015-035
This family of units uses the MotorMaster I option.

380/415-3-50 Volt Applications
These machines have installed from the factory 3-phase motors. The Price Pages do not indicate which kit to use for this voltage machine. There are two options to provide Low Ambient Head Pressure Control.

MotorMaster I Option
Follow the instructions listed in 09/30/38-3SI for installation. The motor and capacitor part numbers are as follows:

Qty	Part Number	Description
1	HC52TE231	Motor
1	HC90BB025	Capacitor

Use the 50DJ-902---801 kit for the additional parts required. No transformer is needed since using the Line to Neutral leg provides 230 volts to the controller and motor. There may be some field provided additional wires needed to complete the wiring. The wiring is what is shown in the installation book.

MotorMaster III Option
Confirm that the motor is a HD52AK652 motor. This is a Magnetek motor, P/N X-176055-XX, and is an open drip proof motor, approved for speed control applications. If this is the motor installed, use the MotorMaster III option accessory, 30GT-910---079. It is the 3-phase speed control device that will not require a transformer, or a motor change. The sensor location is the same as for the MotorMaster I sensor location in 09/30/38-3SI book. The sensor connects to the VIO and GRA leads in the device.

Mount the controller in the same location as for MotorMaster III. Using field-supplied wire if needed, install the power wiring to and from the MotorMaster III controller. Set the Frequency Selection Switch to 50 Hz. Set the Control Input to THERMISTOR.

The power wiring will be the same as if it were a larger 30GT machine.

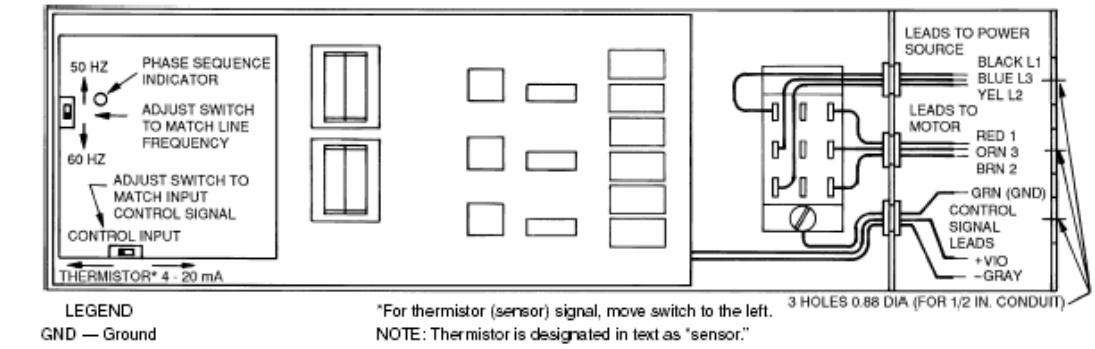
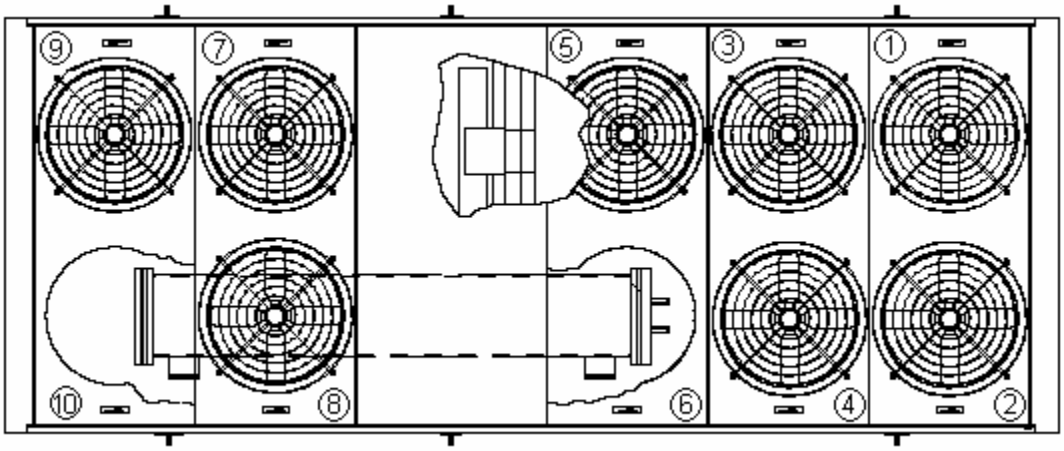


Figure 5 – MotorMaster III Controller

30GTN/GTR/GUN/GUR040-420

30GTN/GTR/GUN/GUR130 [60 Hz]



Condenser Fan Staging Programming

	Scrolling Marquee Display	Navigator Display	CCN Display †	Description
FAN.S *Fan Staging Select* (Configuration Mode, Sub-mode UNIT)	4	3 STAGE COMMON	4	1st stage compressor status. 2nd, and 3rd stage common control based on highest SCT.

Scrolling Marquee & Navigator/Contactor/Fan Cross Reference

Fan Type	Scrolling Marquee Point Name	Navigator Point Name	Fan Contactor	Fans Controlled
Standard or High Static	-	-	FC-A1 ‡	5,7
	-	-	FC-B1 ‡	6,8
	FAN1	Fan 1 Relay	FC-A3, FC-B3	1,2
	FAN2	Fan 2 Relay	FC-A2, FC-B2	3,4,9,10
	FAN3	Fan 3 Relay	-	-
	FAN4	Fan 4 Relay	-	-

Condenser Fan Staging

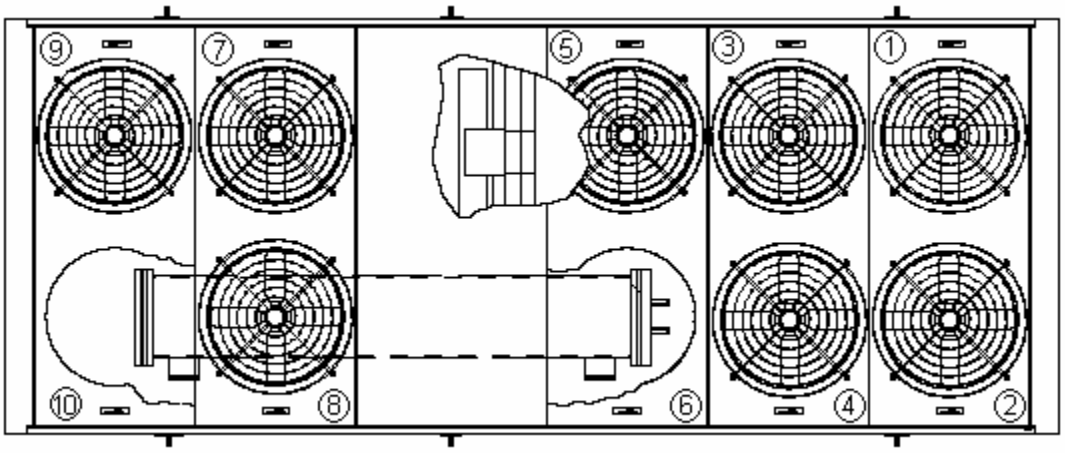
Condenser Fan Staging	Energized Fans
Compressor A1	5,7
Compressor B1	6,8
1	1,2,(5,6,7,8)*
2	3,4,(5,6,7,8)*,9,10
3	1,2,3,4,(5,6,7,8)*,9,10

Note: † - Viewable only through CCN Devices.

‡ - Units with MotorMaster V (Starting Serial Numbers 4503F) have FC-A1 and FC-B1 replaced with Start-Stop relays for the MotorMaster V Drive. Fans are connected to the MotorMaster V device.

* - Fans 5 and 7 will be ON if Compressor A1 is ON. Fans 6 and 8 will be ON if Compressor B1 is ON.

30GTN/GTR/GUN/GUR130 [50 Hz], 150, 170, 230A, 245A, 255A, 270A, 330A, 330B, 360B [50 Hz]



Condenser Fan Staging Programming

	Scrolling Marquee Display	Navigator Display	CCN Display †	Description
FAN.S *Fan Staging Select* (Configuration Mode, Sub-mode UNIT)	2	3 STAGE IND	2	1st stage each circuit, compressor status. 2nd and 3rd stage each circuit independent.

Scrolling Marquee & Navigator/Contactor/Fan Cross Reference

Fan Type	Scrolling Marquee Display Point Name	Navigator Point Name	Fan Contactor	Fans Controlled
Standard or High Static	-	-	FC-A1 ‡	5,7
	-	-	FC-B1 ‡	6,8
	FAN1	Fan 1 Relay	FC-A3	1
	FAN2	Fan 2 Relay	FC-B3	2
	FAN3	Fan 3 Relay	FC-A2	3,9
	FAN4	Fan 4 Relay	FC-B2	4,10

Condenser Fan Staging

Circuit	Condenser Fan Staging	Energized Fans
A	Compressor A1	5,7
	1	1,5,7
	2	3,5,7,9
	3	1,3,5,7,9
B	Compressor B1	6,8
	1	2,6,8
	2	4,6,8,10
	3	2,4,6,8,10

Note: † - Viewable only through CCN Devices.

‡ - Units with MotorMaster V (Starting Serial Numbers 4503F) have FC-A1 and FC-B1 replaced with Start-Stop relays for the MotorMaster V Drive. Fans are connected to the MotorMaster V device.

MotorMaster III
The original head pressure control device offered on these machines is the Motormaster III device. This device responds to the saturated temperature of the circuit. A special motor is required for the Motormaster III.

MotorMaster V
MotorMaster V began in production 2202F. This device is a Variable Frequency Drive device, which responds to a pressure transducer located on the liquid line. A special motor is required for the Motormaster V.

30HWB/HWC/HWS
A water-regulating valve provides Head pressure control. For open systems, the water-regulating valve should be installed on the outlet to prevent the condenser from draining while off. This will reduce the potential for corrosion. In a closed system, the water-regulating valve should be installed on the inlet.

Operating Modes

MD19 – Making Ice
This operating mode indicates that the machine is in the ice building mode. The unit is configured to make ice, ICE.M *Ice Mode Enable* (Configuration Mode, Sub-mode OPT2) set to YES, the unoccupied cooling set point is in effect and the Ice Done Switch is open. When this mode is in effect, CSP3 *Cooling Setpoint 3* (Set Point Mode, Sub Mode COOL), the Ice Making Set Point is in effect.

This mode was added to the Dual Circuit Software Version 2.2 (CESR-131170-02-02)

MD20 – Storing Ice
This operating mode indicates that the machine is in the ice storing mode. The unit is configured to make ice, ICE.M *Ice Mode Enable* (Configuration Mode, Sub-mode OPT2) set to YES, the unoccupied cooling set point is in effect and the Ice Done Switch is closed. When this mode is active, CSP2 *Cooling Setpoint 2* (Set Point Mode, Sub-mode COOL) is in effect.

This mode was added to the Dual Circuit Software Version 2.2 (CESR-131170-02-02)

MD21 – High SCT Circuit A
MD22 – High SCT Circuit B
These operating modes will be in effect when the circuit saturated condensing temperature reaches a predetermined set point. In this mode, the machine will either

stop loading or begin to unload to be able to continue operation without a high pressure switch trip, similar to the 30GX/HX controls.

This mode was added to the Dual Circuit Software Version 2.2 (CESR-131170-02-02)

MD23 – Unit Off – No Water Flow
This mode is in effect when chilled water flow is lost. During this mode, the chiller remains off for 5 minutes to attempt to re-establish chilled water flow. This allows time for a backup pump to start, and avoid the alarm. If flow is not re-established, the machine will alarm on A201 – Cooler Pump Interlock Failure Contacts Open During Normal Operation Alarm.

This mode was added to the Dual Circuit Software Version 2.4 (CESR-131170-02-04)

Outdoor Temperature Sensor
This device is required for Outdoor Temperature Reset. The device is a 5k Ohm outdoor rated thermistor.

Part Number	Description
--HH—79NZ-023	Sensor for Outdoor Temperature

Earlier Product Ordering Data Sheets did not list this part number.

Space Temperature Sensor
This device is required for Space Temperature Reset. The device is a 10k Ohm thermistor.

Part Number	Description
--HH—51BX-006	Sensor for Space Temperature – Wall Mount

Earlier Product Ordering Data Sheets did not list this part number.

Sequence of Operation – Dual Circuit

Pumpout at Start-Up
Before a unit is allowed to start, the circuit is purged of any liquid refrigerant that may have accumulated during the off cycle. Pumpout is skipped if the circuit has been off for less than 15 minutes.

EXV Units with Transducers
The lead compressor will be signaled to start. The EXV will remain closed until one of the following conditions has been met:

- SST < LWT – 10 ºF (SST < LWT – 5.5 ºC)
- SST < SST_i – 10 ºF (SST < SST – 5.5 ºC)
- SST < -15 ºF (SST < -26.1 ºC)
- 180 seconds has elapsed

Where,

LWT – Leaving Water Temperature
SST – Saturated Suction Temperature
SST_i – Initial Saturated Suction Temperature

EXV Units without Transducers
The lead compressor will be signaled to start. The EXV will remain closed for 10 seconds. Once the 10 seconds has elapsed the EXV will be commanded to move to the minimum position plus 15% of the maximum stroke of the valve.

TXV/Liquid Line Solenoid Valve Units
The lead compressor will be signaled to start. The Liquid Line Solenoid will remain closed for 10 seconds before opening allowing refrigerant to the TXV.

Pumpout at Shutdown
Before a unit is allowed to stop, the circuit is purged of any liquid refrigerant that may be remaining in the cooler and suction lines.

EXV Units with Transducers
The lag compressor(s) will be signaled to stop. The EXV will start to close and the lead compressor will continue to run until one of the following conditions has been met:

- SST < SST_i – 10 ºF (SST < SST_i – 5.5 ºC)
- SST < -15 ºF (SST < -26.1 ºC)
- 180 seconds has elapsed

Where,

SST – Saturated Suction Temperature
SST_i – Initial Saturated Suction Temperature

EXV Units without Transducers
The lag compressor(s) will be signaled to stop. The EXV will start to close and the lead compressor will continue to run for the time to fully close the EXV + 10 seconds. The close time is calculated by the following formula:

EXV Close Time = [(% Open) * (Maximum Steps)] / (EXV Motor Speed)

The EXV motor speed is 30 steps/second for the 1,500 step valves. For the 15,000 step valves, the EXV motor speed is 300 steps/second. If the valve were fully open

1,500 steps, it could add an addition 50 seconds for a complete pumpout time of 1 minute.

TXV/Liquid Line Solenoid Valve Units
The lag compressor(s) will be signaled to stop. The liquid line solenoid will close and the lead compressor will continue to run for 10 seconds longer.

Software Revisions – Dual Circuit

Version 4.2 (CESR-131170-04-02)
Serial Number Start: 4604F (30GTN/GTR040-420)
- Corrected EXV maximum steps and steps in range for each circuit from 15,000 to 12,210 when EXV.T = 1. (Refer to SMB05-0008.)

Version 4.1 (CESR-131170-04-01)
Serial Number Start: 1704F (30GTN/GTR040-420)
- Added Current Sensing Board support for 30GTN/GTR040-420 (compressor enablement through parameters ***Configuration -> Comp***: **A1.EN, B1.EN**, etc.; CSB enablement through parameters ***Configuration -> Comp***: **A1.C.EN, B1.C.EN**, etc.).
- If a CXB (compressor expansion board) is present (sizes 130 – 210), a CXB software upgrade to Version 1.2 (CESR 131173-01-02) is required to support the Current Sensing Board usage.

Version 4.0 (CESR-131170-04-00)
Serial Number Start: 0204F (30GTN/GTR040-070)
- Added Current Sensing Board support for 30GTN/GTR040-070.

Version 3.1 (CESR-131170-03-01)
Serial Number Start: 2503F (30GTN/GTR040-420), 2503Q (30HK/HL040-060)

- Revised Software to handle the 15,000 step EXV. This includes a configuration for the EXV type, 1,500 or 15,000 step.
- Added series control for dual chiller control.
- In a dual chiller configuration, the slave chiller was disabled when the master chiller fails. Now, the slave goes into standalone mode when the master chiller fails.
- Corrected T077/T078 – Circuit A/B Saturated Suction Temperature Exceeds Cooler Leaving Fluid Temperature Alert algorithm. Prior versions of software monitored this alarm when the circuit was off.
- Added BR.FZ *Brine Freeze Point* (Setpoints Mode, Sub-mode COOL) for Cooler Freeze Protection set point.

Version 2.4 (CESR-131170-02-04)
Serial Number Start: Service Release Only

Version 2.3 (CESR-131170-02-03)
Serial Number Start: 1301F (30GTN/GTR040-420, 30HK/HL040-060)

- Condenser Flow Switch alarm 221 fix
- 2) A_UNIT text strings made upper case
- If LWT_SETPOT error, default to CSP1
- The alarm relay is controlled by alarms, not testmode
- The display item for MAN_CTRL corrected
- 6) ALM ascii strings – normal/alert/alarm
- 7) MIN_LEFT ascii strings in minutes and seconds
- 8) loadshed table block 1 size corrected
- 9) bit and check changed to logical and in wsmdatcc.c
- 10) 7 day unoccupied □rench string corrected
- 11) DELAY operation qualified.
- Startup delay on powerup AND STATE from OFF to ON
- 12) network service test capability “TESTMODE”
- 13) allow “UNIT” config table to be written(start in stop)
- 14) disallow len display config of “UNIT” sub-menu(start in start)
- 15) FSM error wasn’t being performed, added it in
- 16) Demand Limiting 4-20ma problem fixed
- 17) contrast & brightness adjustment vars added for navigator
- 18) operating system enhancements(eeupdate,int_len,lenscan,int_tmr0)
- 19) ccn buffer closed problem fixed
- 20) data handling of bytes&integers for points corrected(pointwrk)
- 21) unused broadcast enable flags in table 20 made to match driver
- 22) data handling of bytes&integers for the len displays(dispwork)
- 23) emulator capability added to source files
- 24) software revision bumped to 2.3
- 25) eeprom database version bumped to 10041
- 26) high ambient tweak. During corrosion period, add 5 not 15
- degrees to the offset(this may or may not be final)
- 27) Change the high pressure trip time from 15 seconds to 5 seconds
- 28) Use the ice making setpoint for freeze protection (CSP3 – 8 degrees) to alleviate a problem with nuisance freeze alarms when temperature reset is used.
- 29) (The hot gas bypass change from 2.2 to 2.3 fixed a problem where when hot gas was turned on, all unloaders in the circuit were turned off (loading up the compressor).
- (Also added / fixed hot gas in the % capacity calculation). –
- Fix Hot Gas Bypass – Was not working properly when staging down. Also accounted for hot gas bypass in percent capacity calculations and stage calculations.
- 30) Fix Startup delay being honored if the first compressor fails, control was delaying again.

- 31) Fix capacity control override when EWT falls below the control point (remove 2 stages of capacity).
- 32) Fix 15 minute “skip pumpdown” logic.
- 33) Monitor diagnostics when pumping down.
- 34) Only annunciate alarm 152 (unit down due to failure) when configured as FSM controlling the chiller.
- 35) Defaults for EXV minimum position changed from 8% to 4% (in the configuration program).
- 36) For split systems, fan relays follow the state of the compressors.
- 37) Fix Corrosion control for independent fan stages.
- 38) Bring on 2 stages of fans for independent fan control when SCT > 95 at startup.

Version 2.2 (CESR-131170-02-02)
Serial Number Start: 5099F (30GTN/GTR040-420), 0800F (30HK/HL040-060)

- Under Run Status, sub-mode VIEW, Control Mode was changed from “MODE” to “STAT” (Status). This was done to eliminate the confusion between the Control Mode and Operational Modes. MODE was added to identify if any Operational Modes are currently in effect. The YEAR display was changed to be four characters.
- Under Run Status, a new sub-Mode, VERS (Version) was added. Each element lists the version of software loaded into each module.
- Under Service Test, sub-mode OUTS, the order was changed and several new items were added for the addition of the new machines. LLS.A (Liquid Line Solenoid Valve A) and LLS.B (Liquid Line Solenoid Valve B) were added to test the outputs for the 30GTN015-035 and 30HL only. The names of the fan relays were changed from FR.A1 to FAN1 (Fan Relay 1), FR.A2 to FAN2 (Fan Relay 2), FR.B1 to FAN3 (Fan Relay 3), and FR.B2 to FAN4 (Fan Relay 4). CND.P (Condenser Pump Relay) was added to this sub-mode for the 30H Series product.
- Under the Temperature Mode, sub-mode UNIT, several new points were added for the addition of the 30H Series product, CNDE (Condenser Entering Fluid) and CNDL (Condenser Leaving Fluid). DLWT (Lead/Lag Leaving Water) was added for the master/slave routine. In all cases, if these thermistors are not connected, the readout will be 0 °F (-18 °C)
- Under Set Point Mode, COOL sub-mode, CSP.3 (Ice Set Point) was added.
- Under Set Point Mode, a new sub-mode was added, HEAT. Under this sub-mode, HSP.1 (Heating Set Point 1) and HSP.2 (Heating Set Point 2) were added. None of these points are supported at this time.
- Under Inputs Mode, GEN.I sub-mode, CND.F (Condenser Flow Switch) was added to support the 30H Series product.
- Under Inputs Mode, CRCT sub-mode, LPS.A (Low Pressure Switch) and LPS.B (Low Pressure Switch) were added to support the 30GT015-035, and 30HK/HL/HW machines. For the 30GTN/GTR/GUN/GUR040-420, this display will read “OPEN”, but is ignored by the control.
- Under Inputs Mode, 4-20 sub-mode, a new point was added, HSP (4-20 mA Heating Set Point). This point is not supported at this time.

- Under Outputs Mode many of the points have changed locations. Under the GEN.O sub-mode, all fan relay outputs, FAN1, FAN2, FAN3, and FAN4 have been moved to this sub-mode and have changed their designation to match the earlier description. Additionally, to support the 30H Series, CNDP (Condenser Pump Relay) was added.
- Under Outputs Mode, CIR.A sub-mode, LLS.A (Liquid Line Solenoid Valve) was added to support the 30GTN015-035 and 30HL product. For the other products, the display will always read “CLSE”.
- Under Outputs Mode, CIR.B sub-mode, LLS.B (Liquid Line Solenoid Valve) was added to support the 30GTN015-035 and 30HL product. For the other products, the display will always read “CLSE”.
- Under Configuration Mode, OPT1 sub-mode, MMR.S (Motor Master Select) was added. This feature is not currently supported. The Cooler Pump Interlock (PMP.I) is now forced to “ON”. There is no longer an option to disable this parameter through the Scrolling Marquee Display. To support the 30H Series product, CNPC (Condenser Pump Control) and CWT.S (Condenser Fluid Sensors) options were added.
- Under Configuration Mode, OPT2 sub-mode, ICE.M (Ice Mode Enable) was added for ice storage applications.
- Under Configuration Mode, RSET sub-mode, reset options for heating were added, but are not supported at this time. The new points are; HRST (Heating Reset Type), HRT1 (No Heat Reset Temperature), HRT2 (Full Heat Reset Temperature), DGRH (Degrees Heat Reset).
- Under Configuration Mode, SLCT sub-mode, item CLSP (Cooling Set Point Select), an option for the Quickset Potentiometer used in the 30GTN015-035, 30HK/HL/HW machines was added. Several heating options were added that are not supported at this time. The points are: HTSP (Heating Set Point Select), HRMP (Heating Ramp Loading), HCSW (Heat Cool Select).
- Under Operating Mode, MODE sub-mode, several new modes were added. MD19 (Making Ice), MD20 (Storing Ice), MD21 (High SCT Circuit A), and MD22 (High SCT Circuit B) were added to the sub-mode. MD19 will be displayed when the machine is making ice with CPS.3. MD20 will be displayed when the machine has completed its ice build period, but has not started the burn cycle. During this period the machine will be in its unoccupied period, producing chilled fluid at CSP.2. MD21 and MD22 will be displayed when the circuit saturated condensing temperature reaches a predetermined set point. In this mode, the machine will either stop loading or begin to unload to be able to continue operation without a high pressure switch trip, similar to the 30GX/HX controls.

Version 2.0 (CESR-131170-02-00)
Serial Number Start: 4199F (30GTN/GTR040-420)

Version 1.1 (CESR-131170-01-01)
Serial Number Start: 2599F (30GTN/GTR040-420)

Version 1.0 (CESR-131170-01-00) Original Software Release
Serial Number Start: 1499F (30GTN/GTR040-420)

Software Revisions – Single Circuit

Version 1.1 (CESR-131213-01-01)
Serial Number Start: 0501F (30GTN015-035, 30HW)

Version 1.0 (CESR-131213-01-00) Original Software Release
Serial Number Start: 0800F (30GTN015-035, 30HW)

Temperature Set Point
There are several options temperature set point options that the ComfortLink control system can utilize. Each option will be addressed independently below with configuration and material required.

There are three independent temperature set points available with the ComfortLink control system: Occupied Temperature Set Point – CSP.1 *Cooling Setpoint 1* (Set Point Mode, Sub-mode COOL), Unoccupied Temperature Set Point – CSP.2 *Cooling Setpoint 2* (Set Point Mode, Sub-mode COOL), and an Ice Build Set Point – CSP.3 *Cooling Setpoint 3* (Set Point Mode, Sub-mode COOL). Each set point has a valid range for the fluid type for the system, FLUD *Cooler Fluid* (Configuration Mode, Sub-mode OPT1) 1-WATER or 2-MEDIUM TEMPERATURE BRINE.

Cooling Set Point (Set Point Mode, Sub-mode COOL)		FLUD *Cooler Fluid* (Configuration Mode, Sub-mode OPT1)	
		Water	Medium Temperature Brine
CSP.1	Cooling Set Point 1	38 to 70 ºF (3.3 to 21.1 ºC)	14 to 70 ºF (-10.0 to 21.1 ºC)
CSP.2	Cooling Set Point 2	38 to 70 ºF (3.3 to 21.1 ºC)	14 to 70 ºF (-10.0 to 21.1 ºC)
CSP.3	Cooling Set Point 3	Not Applicable	14 to 32 ºF (-10.0 to 0.0 ºC)

Single Set Point/Switch Control
This is the factory default configuration. No other devices are required for this option. For this option, CTRL *Control Method* (Configuration Mode, Sub-mode OPT2) must be set to 0 – SWITCH, and CLSP *Cooling Set Point Select* (Configuration Mode, Sub-mode SLCT) set to 0 – SINGLE. Any time the Enable-Off-Remote Switch is in the Enable or Remote position with remote contacts closed, the machine will control the set point to CSP.1 *Cooling Setpoint 1* (Set Point Mode, Sub-mode COOL).

Dual Set Point, Switch/Switch Control
This option allows for a dual set point control of the machine, typically an occupied and unoccupied set point. This option is not available on 30HK/HL machines. A Dual Switch input is required connected to TB5-3 and TB5-4. For this option, CTRL *Control*

Method (Configuration Mode, Sub-mode OPT2) must be set to 0 – SWITCH, and CLSP *Cooling Set Point Select* (Configuration Mode Sub-mode SLCT) set to 1 – DUAL SWITCH. Operation with this option enabled, activates MD13 Dual Setpoint. Any time the Enable-Off-Remote Switch is in the Enable or Remote position with remote contacts closed, and the Dual Switch is closed, the machine will control the set point to CSP.1 *Cooling Setpoint 1* (Set Point Mode, Sub-mode COOL). With the Dual Switch open, the machine will control the set point to CSP.2 *Cooling Setpoint 2* (Set Point Mode, Sub-mode COOL).

Ice Build, Switch/Switch Control

This option allows for a triple set point control of the machine, an ice, occupied and unoccupied set point. This option is not available on 30HK/HL machines. A Dual Switch input is required connected to TB5-3 and TB5-4. An Ice Done Switch is required connected to TB6-9 and TB6-10. The Energy Management Module is also required. For this option, CTRL *Control Method* (Configuration Mode, Sub-mode OPT2) must be set to 0 – SWITCH, CLSP *Cooling Set Point Select* (Configuration Mode, Sub-mode SLCT) set to 1 – DUAL SWITCH, and ICE.M *Ice Mode Enable* (Configuration Mode, Sub-mode OPT2) set to YES. As a result, the EMM *EMM Installed* (Configuration Mode, Sub-mode OPT1) will be set to YES automatically by the controller. Operation with this option enabled activates MD13 – Dual Setpoint. Any time the Enable-Off-Remote Switch is in the Enable or Remote position with remote contacts closed, and the Dual Switch is closed, the machine will control the set point to CSP.1 *Cooling Setpoint 1* (Set Point Mode, Sub-mode COOL). With the Dual Switch open and the Ice Done Switch open, the machine will control the set point to CSP.3 *Cooling Setpoint 3* (Set Point Mode, Sub-mode COOL). This is typically the ice build set point. During operation at this set point, MD19 – Making Ice will be displayed. With the Dual Switch open and the Ice Done Switch closed, the machine will control the set point to CSP.2 *Cooling Setpoint 2* (Set Point Mode, Sub-mode COOL). This is typically the unoccupied set point. During operation at this set point, MD20 – Storing Ice will be displayed.

Single Set Point/Occupancy

This option determines a set point based on a local schedule or a global broadcast schedule that is accessible through the Scrolling Marquee Display, the Navigator, or a Carrier Comfort Network (CCN) interface. No additional hardware devices are required for this option. For this option, CTRL *Control Method* (Configuration Mode, Sub-mode OPT2) must be set to 2-OCCUPANCY, and CLSP *Cooling Set Point Select* (Configuration Mode, Sub-mode SLCT) set to 0 – SINGLE.

The use of this option allows for control of the machine to a preprogrammed schedule for each day and holiday. To use this option, an occupancy schedule for each day and holiday must be programmed.

Holiday Schedule Programming

ComfortLink Controls have 30 holidays that can be programmed with an occupancy schedule. There are no holidays set from the factory. Access to the holiday schedule is restricted to a CCN interface device only. Programming is accomplished by defining the starting month of the holiday, the starting day and the duration in days.

HOLDY01S: Holiday

Description	Value Units	Name
Holiday Start Month	0	HOL-MON
Start Day	0	HOL-DAY
Duration (days)	0	HOL-LEN

The remaining holiday schedules, HOLDY02S through HOLDY30S have the same format.

To program December 24 and 25 as a holiday, access one of the holiday schedules. In this example, HOLDY 01S will be used.

HOLDY01S: Holiday

Description	Value Units	Name	Comments
Holiday Start Month	12	HOL-MON	The holiday start month is December
Start Day	24	HOL-DAY	Start the holiday schedule on the 24th.
Duration (days)	2	HOL-LEN	The holiday covers the 2 days, the 24th and 25th.

Local Schedule Operation

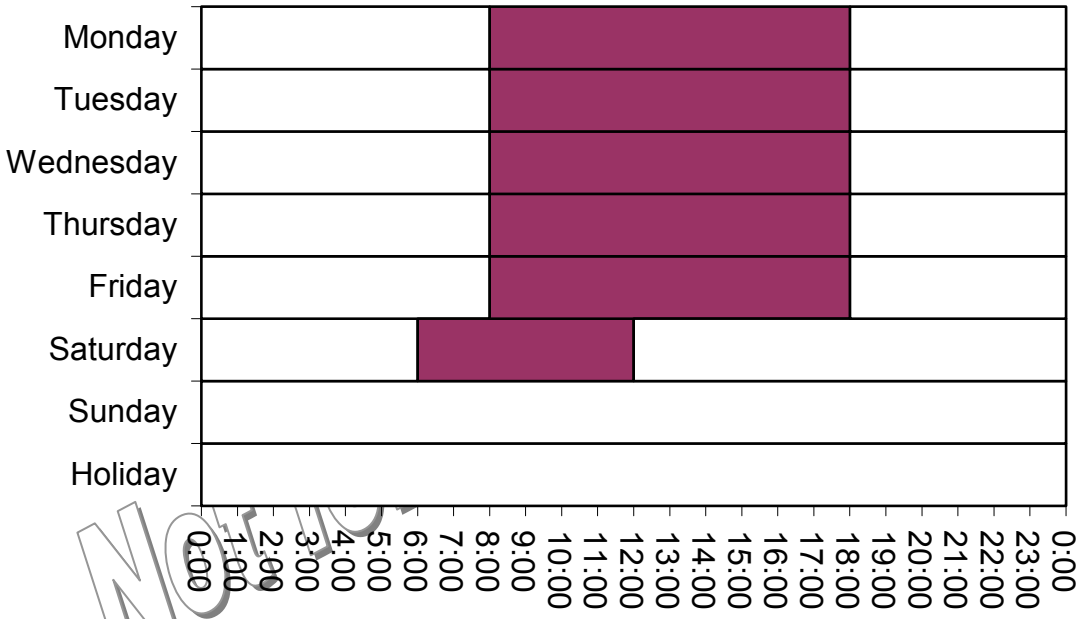
To use a local schedule, SCH.N *Schedule Number* (Time Clock Mode, Sub-mode SCH.N) must be set to 1. The factory default for SCH.N is 1. SCHD *Schedule Number* (Configuration Mode, Sub-Mode SLCT) will automatically change to match SCH.N. Changing SCHD will also change SCH.N.

For this option to function properly, the HH.MM *Hour and Minute* (Time Clock Mode, Sub-mode TIME), MNTH *Month*, DOM *Day of Month*, DAY *Day of Week* and YEAR *Year* (Time Clock Mode, Sub-mode DATE) must be set. The time clock is programmed in a 24-hour format, 00.00 to 24.00. Reciprocating ComfortLink Controls cannot automatically adjust the time for day light savings time.

Eight separate time periods are available, PER.1 *Occupancy Period 1*, through PER.8 *Occupancy Period 8* (Time Clock, Sub-mode SCH.N). Each period has an occupied and unoccupied time, all of the days of the week, Monday through Sunday and a Holiday flag. For the day flags: YES is occupied, NO is unoccupied.

To program a time schedule, select a period, access the appropriate day and change the time to the schedule desired. All times are in programmed as a 24-hour clock. Any day that is to remain unoccupied should have its unoccupied time programmed to 00.00. 24-hour operation can be programmed with this option by configuring the occupied time as 00:00 and an unoccupied time as 24:00.

For example, if an occupied time from 6:00 AM to 8:00 PM is desired from Monday through Friday. For Saturday an occupied period from 6:00 AM to 12:00 Noon is desired. Sunday is to remain unoccupied.



To program this schedule, two time periods will need to be programmed under Time Clock Mode, Sub-mode SCH.L as shown below.

Item	Sub-Item	Display	Expansion	Comment
PER.1			Occupancy Period 1	
	OCC.1	08:00	Period Occupied Time	
	UNC.1	18:00	Period Unoccupied Time	
	MON.1	YES	Monday in Period	
	TUE.1	YES	Tuesday in Period	
	WED.1	YES	Wednesday in Period	
	THU.1	YES	Thursday in Period	
	FRI.1	YES	Friday in Period	
	SAT.1	NO	Saturday in Period	
	SUN.1	NO	Sunday in Period	
	HOL.1	NO	Holiday in Period	
PER.2			Occupancy Period 2	
	OCC.2	06:00	Period Occupied Time	
	UNC.2	12:00	Period Unoccupied Time	

	MON.2	NO	Monday in Period	
	TUE.2	NO	Tuesday in Period	
	WED.2	NO	Wednesday in Period	
	THU.2	NO	Thursday in Period	
	FRI.2	NO	Friday in Period	
	SAT.2	YES	Saturday in Period	
	SUN.2	NO	Sunday in Period	
	HOL.2	NO	Holiday in Period	

To modify or access this schedule through CCN, select Time-Sched, and OCCPC01S. The following table will be displayed.

	M	T	W	T	F	S	S	H	Occupied	Unoccupied
Period 1	1	1	1	1	1	0	0	0	06:00	20:00
Period 2	0	0	0	0	0	1	0	0	06:00	12:00
Period 3	0	0	0	0	0	0	0	0	00:00	00:00
Period 4	0	0	0	0	0	0	0	0	00:00	00:00
Period 5	0	0	0	0	0	0	0	0	00:00	00:00
Period 6	0	0	0	0	0	0	0	0	00:00	00:00
Period 7	0	0	0	0	0	0	0	0	00:00	00:00
Period 8	0	0	0	0	0	0	0	0	00:00	00:00

During an occupied time and if the Enable-Off-Remote Switch is in the Enable or Remote position with remote contacts closed, the machine will control the set point to CSP.1 *Cooling Setpoint 1* (Set Point Mode, Sub-mode COOL). If the Enable-Off-Remote Switch is in the Off or Remote position with remote contacts open, the machine will not operate.

CCN Global Schedule Operation

To use a global broadcast schedule, SCH.N *Schedule Number* (Time Clock Mode, Sub-mode SCH.N) must be set to the Global Broadcast Schedule. Global Broadcast Schedule Numbers range from 65 to 99. SCHD *Schedule Number* (Configuration Mode, Sub-Mode SLCT) will automatically change to match SCH.N. Changing SCHD will also change SCH.N.

During an occupied time determined by the Global Broadcast Schedule and if the Enable-Off-Remote Switch is in the Enable or Remote position with remote contacts closed, the machine will control the set point to CSP.1 *Cooling Setpoint 1* (Set Point Mode, Sub-mode COOL).

Dual Set Point/Occupancy

This option determines a set point based on a local schedule or a global broadcast schedule that is accessible through the Scrolling Marquee Display, the Navigator, or a Carrier Comfort Network (CCN) interface. No additional hardware devices are required

for this option. For this option, CTRL *Control Method* (Configuration Mode, Sub-mode OPT2) must be set to 2 – OCCUPANCY, and CLSP *Cooling Set Point Select* (Configuration Mode, Sub-mode SLCT) set to 2 – DUAL CCN OCCUPPIED.

The use of this option allows for control of the machine to a preprogrammed schedule for each day and holiday and operate to a chilled water set point based on the occupied or unoccupied time period the unit is in. To use this option, an occupancy schedule for each day and holiday must be programmed. Programming the occupancy schedule is shown in Single Set Point/Occupancy on page 54.

Operation with this option enabled, activates MD13 – Dual Setpoint. During an occupied period with the Enable-Off-Remote Switch in the Enable or Remote position with remote contacts closed, the machine will control the set point to CSP.1 *Cooling Setpoint 1* (Set Point Mode, Sub-mode COOL). During an unoccupied period and the Enable-Off-Remote Switch in the Enable or Remote position with remote contacts closed, the machine will control the set point to CSP.2 *Cooling Setpoint* 2 (Set Point Mode, Sub-mode COOL).). If the Enable-Off-Remote Switch is in the Off or Remote position with remote contacts open, the machine will not operate.

Ice Build/Occupancy

This option determines a set point based on a local schedule or a global broadcast schedule that is accessible through the Scrolling Marquee Display, the Navigator, or a Carrier Comfort Network (CCN) interface and allows for triple set point control of the machine, an ice, occupied and unoccupied set point. An Ice Done Switch is required and must be connected to TB6-9 and TB6-10. The Energy Management Module is also required. For this option, CTRL *Control Method* (Configuration Mode, Sub-mode OPT2) must be set to 2 – OCCUPANCY, CLSP *Cooling Set Point Select* (Configuration Mode, Sub-mode SLCT) set to 2 – DUAL CCN OCCUPPIED, and ICE.M *Ice Mode Enable* (Configuration Mode, Sub-mode OPT2) set to YES. As a result, the EMM *EMM Installed* (Configuration Mode, Sub-mode OPT1) will be set to YES automatically by the controller.

To use this option, an occupied and unoccupied schedule for each day must be programmed. Programming the occupancy schedule is shown in Single Set Point/Occupancy.

Operation with this option enabled activates MD13 – Dual Setpoint. During an occupied period, with the Enable-Off-Remote Switch is in the Enable or Remote position with remote contacts closed, the machine will control the set point to CSP.1 *Cooling Setpoint 1* (Set Point Mode, Sub-mode COOL). During an unoccupied period and the Ice Done Switch open, the machine will control the set point to CSP.3 *Cooling Setpoint 3* (Set Point Mode, Sub-mode COOL). This is typically the ice build set point. During operation at this set point, MD19 – Making Ice will be displayed. Still in an unoccupied period and the Ice Done Switch closed, the machine will control the set point to CSP.2 *Cooling Setpoint 2* (Set Point Mode, Sub-mode COOL). This is typically the unoccupied

set point. During operation at this set point, MD20 – Storing Ice will be displayed. If the Enable-Off-Remote Switch is in the Off or Remote position with remote contacts open, the machine will not operate.

4 to 20 mA Input/Switch Control

This option requires the Energy Management Module. For this option, CTRL *Control Method* (Configuration Mode, Sub-mode OPT2) must be set to SWITCH, and CLSP *Cooling Set Point Select* (Configuration Mode, Sub-mode SLCT) set to 4 – 4-20 MA INPUT. As a result, the EMM *EMM Installed* (Configuration Mode, Sub-mode OPT1) will be set to YES automatically by the controller. A 4-20 mA signal generator is required for this option. Care should be taken when interfacing with other manufacturer's control systems, due to power supply differences, full wave bridge versus half wave rectification. The two different power supplies cannot be mixed. ComfortLink controls use half wave rectification. A signal isolation device should be utilized if a full wave bridge signal generating device is used. The 4-20 mA "+" signal should be connected to TB6-3. The 4-20 mA "-" signal should be connected to TB6-5.

Any time the Enable-Off-Remote Switch is in the Enable or Remote position with remote contacts closed, the machine will control the set point to CSP.1 *Cooling Setpoint 1* (Set Point Mode, Sub-mode COOL). This option functions on a linear relation between 10 to 80 °F (-12.2 to 26.7 °C). The equations are listed below:

$$°F = 4.375(mA) - 7.5 \qquad (°C = 2.43(mA) - 21.92)$$

The function is limited at the low end depending on the FLUD, *Cooler Fluid* (Configuration Mode, Sub-mode OPT1). If FLUD is set for WATER, the lower limit is 38 °F (3.3 °C). If FLUD is set for MEDIUM TEMPERATURE BRINE or LOW TEMPERATURE BRINE, the lower limit is 14 °F (-10.0 °C). If this option is used, the chilled water loop must be protected to at least 0 °F (-17.1 °C) to protect the loop from freezing if the signal sent incorrectly. The function is also clamped at the upper limit not to exceed 70 °F (21.1 °C).

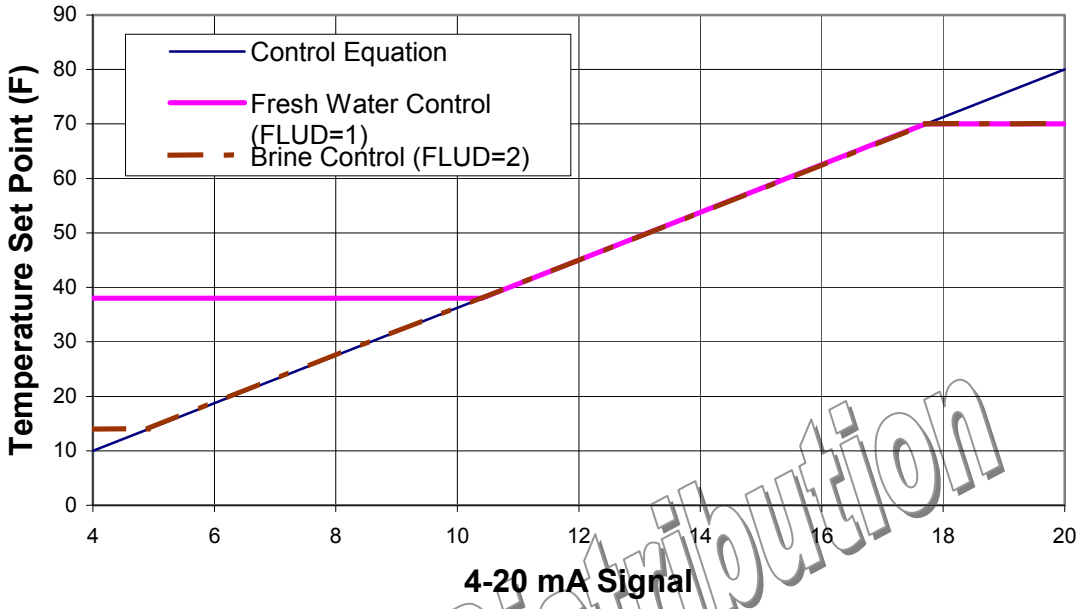


Figure 6 – 4-20 mA Temperature Set Point

Time Clock Function

ComfortLink Controls has an internal clock, which includes the date, day of week, and time. Provisions for automatic Daylight Savings Time corrections are also included in the ComfortLink Control system. This function is used by many other operational functions for the machine, from time and date stamps for alarms to occupancy schedule timing.

Setting the Internal Clock

The internal time clock is set when the program is loaded. The date, day of week, and time should be checked at start-up for accuracy, as well as after a software download.

To verify or program the internal clock, access the function under Time Clock Mode, Sub-mode TIME as shown below. The time function is displayed in a 24-hour format.

Sub-mode	Item	Display	Expansion	Comment
TIME			Time of Day	
	HH:MM		Hour and Minute	

LITERATURE

Below is a list of literature for the ComfortLink Reciprocating Compressor machines. Shaded literature is obsolete literature.

Form Number	Catalog Number	Title	Print Date	Reprint Date	Superceded By
Product Data					
30GTN-1PD	523-056	30GTN,GTR Air cooled Reciprocating Chillers with ComfortLink Controls, 50/60 Hz	2/99		30GTN-3PD
30GTN-2PD	523-059	30GTN Packaged Air-Cooled Reciprocating Chillers, 50/60 Hz	11/99		
30GTN-3PD	523-062	30GTN,GTR Air-Cooled Reciprocating Chillers with ComfortLink Controls, 50/60 Hz	9/00		30GTN-5PD
30GTN-5PD	523-075	30GTN,GTR Air-Cooled Reciprocating Chillers with ComfortLink Controls, 50/60 Hz	4/03	01/04	
30GUN-1PD	523-055	30GUN,GUR Air –Cooled Reciprocating Chillers (HFC-134a) with ComfortLink Controls, 50/60 Hz	10/99		30GUN-2PD
30GUN-2PD	523-063	30GUN,GUR Air –Cooled Reciprocating Chillers (HFC-134a) with ComfortLink Controls, 50/60 Hz	1/01		
30H-7PD	523-057	30HK,HL,HW Reciprocating Liquid Chillers, 50/60 Hz	10/99	4/03	30H-8PD
30H-8PD	04-52300002-01	30HK,HL.HW Reciprocating Liquid Chillers with ComfortLink Controls, 50/60 Hz.	09/05		
Application Information					
	570-494	Totaline Acoustic Blanket System for 30 Series Chillers	6/02	8/03	
	811-019	Lunch & Learn Series – Environmental Corrosion Protection			
	811-217	Selection Guide: Environmental Corrosion Protection.	9/99		811-20062
	811-10121	Meeting ASHRAE 90.1-1999 (2001) Energy Standard for Buildings – A Reference Guide to Meeting the New Minimum Efficiency Requirements for HVAC Equipment with Carrier Products	12/02		
	811-20062	Selection Guide: Environmental Corrosion Protection.	10/04		
TIP115		30GTN040-420 ComfortLink Controls Help Guide	3/00		
TIP116		ComfortLink Options for the 30GTN015-035 and the 30HK, HL and HW	5/00		
TIP118		30GTN,GUN,GTR,GUR040-420 Factory Installed Options Extended List (FIOP's)	6/00		
TIP121		For Competitive Advantage, Take Control of the Chiller Plant	3/01		
TIP122		Air Cooled Chiller Winterizing: Freeze Protection	4/01		
TIP125		Factory Testing: 30GT, GU, GX, and RA Air-Cooled Chillers	7/01		
TIP127		30 Series ComfortLink Control Input Signals	4/02		
TIP128		30GX,GT Base Rails	8/02		
Product Bulletins					
111-98-63		30GN Last Call and Phase Out	12/04/98		111-99-04
111-99-04		30GN Last Order	1/22/99		
111-99-33		30GT Last Order	7/2/99		
111-99-85		New! 30GTN015-035 with ComfortLink Controls	12/23/99		

Form Number	Catalog Number	Title	Print Date	Reprint Date	Superceded By
111-00-44		Improved Leadtimes for Optional Condenser Coils	5/26/00		
111-00-46		30HK/L, HW,GTN015-035 ComfortLink Display Options	6/2/00		
111-00-47		Introducing the Navigator!	6/2/00		
111-00-69		E-Cat Version 2.32 Electrical Data Error	8/11/00		
111-00-74		30GTN,R040-420 Service Option Now Available	9/8/00		
111-02-04-E		30GTN/GTR/GUN/GUR040-420 Product Ordering Data	4/4/02		
111-02-05-E		30GTN/GTR/GUN/GUR040-420 Accessory Compressor Unloaders	4/4/02		
111-02-10-E		30GTN Phase Out	5/6/02		
111-02-14		30GUN Product Discontinuation	3/1/02		
111-02-15-E		MotorMaster V Low Ambient Control	5/27/02		
111-02-21		30GTN/GTR/GUN/GUR040-420 Price Page Correction	4/4/02		
111-02-22		30GTN/GTR/GUN/GUR040-420 Accessory Compressor Unloaders	4/4/02		
111-02-31		30GTN Phase Out	5/6/02		
111-02-38		MotorMaster V Low Ambient Control	5/27/02		
111-03-04-E		30GTN 40-50 Ton	3/4/03		
111-04-02-E		MotorMaster V Low Ambient Control Revision	1/13/04		
111-04-04		MotorMaster V Low Ambient Control Revision	1/13/04		
111-04-05-E		New Oil Pressure Safety Switch 30GT-911---073	7/2/04		
111-04-07		2004 Master Catalog 30GTN,GTR Omission	2/4/04		
111-04-35		New Oil Pressure Safety Switch 30GT-911---073	7/2/04		
111-04-57		Air-Cooled Chiller Product Offering	10/06/04		111-04-68
111-04-57		Air-Cooled Chiller Product Offering	10/13/04		111-04-68
111-04-68		Air-Cooled Chiller Product Offering	11/19/04		111-04-71
111-04-71		30GT Phase-out	12/07/04		
Promotional Information					
	830-077	30GTN Air-Cooled Chillers with ComfortLink Microprocessor Control System	2/99		
	848-113	Enviro-Shield Corrosion Protection	8/99		
Submittal Bulletin					
30GTN-1SB	513-465	30GTN015,020,025,030 & 035 Air-Cooled Reciprocating Liquid Chillers with ComfortLink Controls	11/99		
30GTN,GUN-1SB	513-460	30GTN,GTR,GUN,GUR040-110 Air-Cooled Chillers with ComfortLink Controls	3/99		
30GTN,GUN-2SB	513-461	30GTN,GTR,GUN,GUR130-420 Air-Cooled Chillers with ComfortLink Controls	3/99		
30HK-15SB	513-464	30HK040,050 &060 Water-Cooled Chillers with ComfortLink Controls	11/99		
30HL-15SB	513-463	30HL050 & 060 Condenserless Chillers with ComfortLink Controls	11/99		
30HWA-6SB	513-468	30HWA018-040 Condenserless Chillers with ComfortLink Controls	11/99		
30HWB-6SB	513-466	30HWB018-040 Water-Cooled Chillers with ComfortLink Controls	11/99		
30HWC/S-4SB	513-467	30HWC/S018-040 Water-Cooled Chillers with ComfortLink Controls	11/99		

Form Number	Catalog Number	Title	Print Date	Reprint Date	Superceded By
Installation Instructions					
30GTN-1SI	533-093	30GTN,GTR040-420 ComfortLink Reciprocating Liquid Chillers, 50/60 Hz	3/99		30GTN-9SI
30GTN-9SI	533-094	30GTN,GTR,GUN,GUR040-420 ComfortLink Reciprocating Liquid Chillers, 50/60 Hz	6/99		30GTN-12SI
30GTN-10SI	568-068	30GTN015-035 Reciprocating Liquid Chillers with ComfortLink Controls, 50/60 Hz	1/00		
30GTN-12SI	533-00014	30GTN,GTR,GUN,GUR040-420 ComfortLink Reciprocating Liquid Chillers, 50/60 Hz	1/01		
30H-12SI	563-021	30HK040-060, 30HL050-060, 30HW018-040 ComfortLink Reciprocating Liquid Chillers, 50/60 Hz	11/99		
Controls, Start-Up, Operation, Service and Troubleshooting					
30G,H003		30GTN,R040-420 Supplement to 30GTN-4T	10/03		
30G,H-6T	563-048	30HK,HL040-060, 30HWA,B,C,S018-040, 30GTN015-035 Reciprocating Liquid Chillers with ComfortLink Controls, 50/60 Hz	2/00		
30GTN-1T	533-099	30GTN,GTR040-420 Air-Cooled Reciprocating Liquid Chillers with ComfortLink Controls, 50/60 Hz	5/99		30GTN-2T
30GTN-2T	533-097	30GTN,GTR040-420 Air-Cooled Reciprocating Liquid Chillers with ComfortLink Controls, 50/60 Hz	8/99		30GTN-3T
30GTN-3T	563-025	30GTN,GTR040-420 Air-Cooled Reciprocating Liquid Chillers with ComfortLink Controls, 50/60 Hz	3/00		30GTN-4T
30GTN-4T	533-00043	30GTN,GTR040-420 Air-Cooled Reciprocating Liquid Chillers with ComfortLink Controls, 50/60 Hz	6/02		
30GU-1TS					30GTN-2T
Accessory Installation Instructions					
09/30/38-3SI	530-918	09DK020-044, 30GT,GTN015-035, 38AKS028-044 Accessory Motormaster Head Pressure Controller	2/00		
09/30/38-4SI	530-922	09DK054-094 (100%, 50%/50%), 30GTN,GTR,GUN,GUR040-420, 38AH044-134, Accessory Low Ambient Operation, Motormaster V Control, 50/60 Hz	5/02	6/02, 6/02A	09/30/38-5SI
09/30/38-5SI	530-925	09DK020-094 (100%, 50%/50%), 30GTN,GTR,GUN,GUR040-420, 38AH044-134, 38AKS028-034 Accessory Low Ambient Operation, Motormaster V Control, 50/60 Hz	11/02		09/30/38-6SI
09/30/38-6SI	530-930	09DK020-094, 30GTN,GTR,GUN,GUR040-420, 38AH044-134, 38AKS028-034 Accessory Low Ambient Operation, Motormaster V Control, 50/60 Hz	10/03		
30/48/50-4SI	533-00028	ComfortLink Series Units and 30GX080-350, 30HX076-271, 48/50 EJ,EK,EW,EY024-068 Remote Enhanced Display Accessory, 50/60 Hz	6/01		

Form Number	Catalog Number	Title	Print Date	Reprint Date	Superceded By
30G-21SI	533-018	30GN,GT,GU040-420, 30GTN,GTR,GUN,GUR040-420, 30GX080-350 Accessory Unit Control Display Access Door, 50/60 Hz	7/99		30G-25SI
30G-22SI	563-000	30GTN,GTR,GUN,GUR040-420 Remote Cooler Mounting Accessory, 50/60 Hz	6/99		30G-27SI
30G-23SI	563-001	30GT,GTN,GTR,GUN,GUR040-070 (60 Hz, 040-060 (50 Hz) Reciprocating Liquid Chillers Accessory Oil Safety Switch	6/99		
30G-24SI	563-002	30GN,GT,GTN,GTR,GUN,GUR230-420 Accessory Trim Kit, 50/60 Hz	6/99		
30G-25SI	563-064	30GN,GT,GU040-420, 30GTR,GUN,GUR040-420, 30GTN015-420, 30GXN,R080-528, 30GX080-350 Accessory Unit Control Display Access Door	7/00		30G,R-2SI
30G-26SI	533-00000	30GXN,R080-450, 30HXA,C076-271, 30GTN,GTR,GUN,GUR040-420 Ground-Fault Interrupter Convenience Outlet Accessory	7/00		
30G-27SI	533-00059	30GTN,GTR,GUN,GUR040-420 Remote Cooler Mounting Accessory, 50/60 Hz	11/03		
30G/38A-6SI	563-018	30GT,GTN,GTR,GUN,GUR/ 38AH,AK,AKS,AQS Accessory Gage Panel	6/99		
30G/38A-7SI	533-00054	30GTN/GTR/GUN/GUR040-070, 30GT040-420, 38AH044-134 Accessory Oil Safety Pressure Switch	5/03	10/03, 10/03A	
30G,H-3SI	563-065	30GTN,GTR, 30HK,HL,HR,HS,HW Accessory Flow Switch 50/60 Hz	7/99		
30G,H-6SI	563-075	30GTN015-035, 30GTN,GTR,GUN,GUR040-420, 30HK,HL,HW Energy Management Module (EMM) Accessory, 50/60 Hz	2/00		
30G,H-7SI	563-023	30GTN015-035, 30HK040-060, 30HL050-060, 30HW018-040 Accessory Compressor Ground Current Sensor, 50/60 Hz	3/00		
30G,H-8SI	563-024	30HK040-060, 30HWB,C,S018-040, 30GTN015-035 Accessory Oil Pressure Safety Switch, 50/60 Hz	4/00		
30G,H-9SI	533-00001	30GTN015-035, 30GTN,GTR,GUN,GUR040-420, 30HK040-060, 30HL050-060, 30HW018-040 ComfortLink Navigator Accessory Display Module, 50/60 Hz	6/00		30G,H,R-1SI
30G,H,R-1SI	533-00031	30GTN015-035, 30RA010-055, 30GTN,GTR,GUN,GUR040-420, 30HK040-060, 30HL050-060, 30HW018-040 ComfortLink Navigator Accessory Display Module, 50/60 Hz	7/01		
30G,H/38A-2SI	563-020	30GN,GT,GTN,GTR,GUN,GUR,HK,HL, 38AH,AKS Accessory Hot Gas Bypass Packages, 50/60 Hz	9/00		
30G,R-2SI	533-00030	30GN,GT,GU040-420, 30GTR,GUN,GUR040-420, 30GTN015-420, 30RA010-055, 30GXN,R080-528, 30GX080-350 Accessory Unit Control Display Access Door	7/01	1/02	

Form Number	Catalog Number	Title	Print Date	Reprint Date	Superceded By
30GT-53SI	563-006	09DK054-094, 30GN,GT,GTN,GTR,GUN,GUR040-420, 38AH-044-134 Accessory Sound Reduction Kit, 50/60 Hz	6/99		
30GT-54SI	563-008	09DK054-094, 30GN,GT,GTN,GTR,GUN,GUR040-420, 38AH-044-134, 48/50MP62L-10R Accessory Security Grille Package	6/99		
30GT-55SI	563-013	09DK054-094, 30GN,GT,GTN,GTR,GUN,GUR040-420, 38AH-044-134, 48/50MP62L-10R Accessory Condenser Coil Hail Guard Kit	6/99		
30GT-56SI	563-015	09DK054-094, 30GN,GT,GTN,GTR,GUN,GUR040-420, 38AH-044-134, 48/50MP62L-10R Accessory Low Ambient Operation Motormaster III Control, 50/60 Hz	9/99		30GT-57SI
30GT-57SI	563-010	09DK054-094, 30GN,GT,GTN,GTR,GUN,GUR040-420, 38AH-044-134 Accessory Low Ambient Operation Motormaster III Control, 50/60 Hz	3/00		30GT-58SI
30GT-58SI	533-00034	09DK054-094/30GTN,GTR,GUN,GUR040-420, 38AH044-134, Accessory Low Ambient Operation, Motormaster III Control, 50/60 Hz			09/30/38-4SI
30GTN-3SI	533-076	30GTN,GTR,GUN,GUR040-420, Energy Management Module (EMM) Accessory, 50/60 Hz	6/99		30G,H-6SI
30GTN-4SI	533-078	30GTN,GTR,GUN,GUR040-420, 30GXN,R080-450 ComfortLink Service Port Connection, 50/60 Hz	7/00		
30GTN-5SI	533-080	30GTN,GTR,GUN,GUR080-110, 1300 and 230B-315B Compressor Expansion Module, 50/60 Hz	5/99		30GTN-11SI
30GTN-6SI	533-081	30GTN,GTR,GUN,GUR040-420 Control Transformer Accessory, 50/60 Hz	5/99		
30GTN-7SI	533-082	30GTN,GTR,GUN,GUR040-420 Ground-Fault Interrupter Convenience Outlet Accessory	4/99		30G-26SI
30GTN-8SI	533-089	30GTN,GTR,GUN,GUR040-070 Compressor Protect (CPCS), 50/60 Hz	4/99		
30GTN-11SI	563-051	30GTN,GTR,GUN,GUR080-110, 1300 and 230B-315B Compressor Expansion Module, 50/60 Hz	2/00		
30H-6SI	563-012	30HK,HL015-060, 30HWA,HWB018-040 Accessory Gage Panel, 50/60 Hz	9/93		
30H-9SI	563-084	30HK040-060, 30HWB018-040, Accessory Oil Pressure Safety Switch	1/96		30G,H-8SI
30H-11SI	533-077	30HK040-060, 30HL050-060, 30HW018-040, Accessory Compressor Ground Fault Sensor, 50/60 Hz	5/99		30G,H-7SI
30HK-1SI	533-065	30HK040-060 Accessory Water Manifold	6/78		30HK-3SI
30HK-3SI	533-067	30HK040-060 Accessory Water Manifold	9/95		30HK-5SI
30HK-5SI	533-024	30HK040-060 Accessory Water Manifold 50/60 Hz	12/97		
30HK,HL-3SI					30H-6SI
30HK,HL-15SI	533-038	30HK,HL040-060 Accessory Sound Enclosure	10/98		

Form Number	Catalog Number	Title	Print Date	Reprint Date	Superceded By
30HW-2SI	563-003	30HWA,HWB018-040 Accessory Sound Enclosure	9/93		
30HW-3SI	563-004	30HW018-040 Accessory Vibration Isolator, 50/60 Hz	7/93		30HW-11SI
30HW-4SI	563-027	30HW018-040 Accessory Compressor Ground Fault Sensor, 50/60 Hz	8/93		30H-11SI
30HW-5SI	563-028	30G, 30H Accessory Flow Switch, 50/60 Hz	9/93		30HW-7SI
30HW-6SI	563-011	30HW018-040 Accessory Oil Pressure Safety Switch, 50/60 Hz	7/93		30G,H-8SI
30HW-7SI	563-032	30G, 30H Accessory Flow Switch, 50/60 Hz	1/94		30G,H-3SI
30HW-9SI	563-040	30HW Accessory Mobility Package	6/94		30HW-12SI
30HW-10SI	563-044	30HWC,S018-040 Accessory Sound Enclosure Package, 50/60 Hz	7/94		
30HW-11SI	533-047	30HW018-040 Accessory Vibration Isolator, 50/60 Hz	11/97		
30HW-12SI	533-00065	19XR Pumpout Unit, 30HW Reciprocating Liquid Chillers, Accessory Mobility Package	8/04		
Wiring Diagrams					
30G-5W	533-091	30GTN,GTR040-420, 30GUN,GUR040-420 ComfortLink Reciprocating Liquid Chillers, 50/60 Hz	10/99		
30GTN-1W	533-096	30GTN015-035 Air-Cooled Reciprocating Liquid Chillers with ComfortLink Controls, 50/60 Hz	11/99		
30H-3W	563-060	30HK040-060, 30HL050-060, 30HW018-040 Reciprocating Liquid Chillers with ComfortLink Controls, 50/60 Hz			
Technical Training					
30GTN-01	023-005	30GTN,R/GUN,R Reciprocating Air-Cooled Liquid Chillers with ComfortLink Controls			
30GTN-02PP	023-004	30GTN,R/GUN,R Reciprocating Air-Cooled Liquid Chillers with ComfortLink Controls (PowerPoint Presentation)			
30HK,HL,HW-01	023-056	30HK,L,W and 30GTN Reciprocating Chillers with ComfortLink Controls			
30HK,HL,HW-02	023-057	30HK,L,W and 30GTN Reciprocating Chillers with ComfortLink Controls (PowerPoint Presentation)			
GTC 3-101	020-343	06D,06E Compressor Familiarization, Service, Troubleshooting			
GTC 4-101	020-490	Preventing Compressor Failures Diagnosing and Correcting System/Compressor Problems			
TDP-622C	796-054	Technical Development Program – Air-Cooled Chillers	10/04		

SERVICE

Alarm and Alert Codes

Alarm and Alert Codes are displayed as 4 digit codes. To determine the expansion of the alarm/alert code, press the [ENTER] and [ESCAPE] keys together once the item is selected.

As a general rule, codes preceded by a “T” are alerts indicating that a circuit has been shut down. Codes preceded by an “A” are alarms indicating that the unit has been shut down.

Communication Failure
Action taken by control: Machine is shut down
Reset Method: Automatic once communication is restored (MBB)

This alarm is generated any time the LEN (Local Equipment Network) communication is lost. An A152 may be generated also.

If this condition is encountered, check the following items:

- Check the MBB Instance Jumper. It should be set to “1”. If it is missing or installed on “2”, this alarm will be generated.
- Check the LEN for a wiring error or short to ground.
- Check all Input connections for a short to ground.
- Check the machine grounding.
- Check the power supply for the Main Base Board. It should be 24 vac. Voltages less than 18 can cause this problem.

A051 – Compressor A1 Failure Alarm
A051 – Circuit A, Compressor 1 Current Detected After Shutdown
A052 – Circuit A, Compressor 2 Current Detected After Shutdown
A053 – Circuit A, Compressor 3 Current Detected After Shutdown
A054 – Circuit A, Compressor 4 Current Detected After Shutdown
A055 – Circuit B, Compressor 1 Current Detected After Shutdown
A056 – Circuit B, Compressor 2 Current Detected After Shutdown
A057 – Circuit B, Compressor 3 Current Detected After Shutdown
T051 – Compressor A1 Failure Alert
T051 – Circuit A, Compressor 1 Failure
T052 – Compressor A2 Failure Alert
T052 – Circuit A, Compressor 2 Failure
T053 – Compressor A3 Failure Alert
T053 – Circuit A, Compressor 3 Failure
T054 – Compressor A4 Failure Alert
T054 – Circuit A, Compressor 4 Failure
T055 – Compressor B1 Failure Alert
T055 – Circuit B, Compressor 1 Failure
T056 – Compressor B2 Failure Alert
T056 – Circuit B, Compressor 2 Failure
T057 – Compressor B3 Failure Alert
T057 – Circuit B, Compressor 3 Failure
Action taken by control:

30GTN015-035, 30HW:	Unit shut down
30GTN/GTR040-420, 30HK/HL:	Software Versions up to CESR-131170-03-01 – Circuit shut down for T051 and T055. Circuit shutdown but restarts in 1 minute with the appropriate compressor locked out for T052-054, T056, and T057. Software Versions starting with CESR-131170-04-00 – Circuit shut down for T051 and T055. Circuit shutdown but restarts in 1 minute with the appropriate compressor locked out for T052-054, T056, and T057. For A051-A057, all compressors are turned off.
Reset Method:	Manual (MBB)

In order for this alarm to trip, the relay state must match that of the commanded state. In other words, the control relay status, either from the Control Relay or the Compressor Protection and Control System (CPCS) must be ON if the Main Base Board either directly or through the Compressor Expansion is calling for that compressor or OFF when the Main Base Board is not calling for the compressor.

On single circuit machine software, CESR-131213-XX-XX, the Compressor A1 Failure will be A051 – Compressor A1 Failure, since there is only one compressor available the machine will be shut down.

In the Dual Circuit Software up to Version 3.1 (CESR-131170-03-01) the alarms are as follows: T051 – Compressor A1 Failure Alert, T052 – Compressor A2 Failure Alert, T053 – Compressor A3 Failure Alert, T054 – Compressor A4 Failure Alert, T055 – Compressor B1 Failure Alert, T056 – Compressor B2 Failure Alert, and T057 – Compressor B3 Failure Alert. Use the following guide to troubleshoot these alarms:

If this condition is encountered, check the following items:

- Check the operation of the High Pressure Switch.
- Check for non-condensibles in the refrigerant circuit, a potential high pressure switch trip.
- Check for the proper refrigerant charge, potentially either a loss of charge switch trip for T051 or T055 on 30GTN/GTR/GUN/GUR040-420 only (low charge), or high pressure switch trip (overcharged).
- Check for operation beyond the limit of the machine, a potential high pressure switch trip.
- Check the condenser coils for debris or restriction, a potential high pressure switch trip.
- Check the condenser fans and motors for proper rotation and operation a potential high pressure switch trip.
- Check the discharge service valve to be sure that it is open. A closed or restricted valve is a potential high pressure trip.
- Check the control relay or Compressor Protection and Control System (CPCS) operation for the compressor. Check the wiring of the control relay both to the compressor contactor and to the Main Base Board or Compressor Expansion Board.

Sometimes removing and replacing the MBB-J9 plug or CXB-J5 plug may wipe any corrosion inhibiting the circuit.

- 30GT and 30HWA/HL machines, check for condenser air recirculation.
- On 30GTN015-035 with serial numbers prior to 1600F, and 30GTN/GTR/GUN/GUR040-420 with serial numbers prior to 1900F, check the feedback circuit to be sure that the connections are made with trifurcated terminals.
- For 30GTN/GTR/GUN/GUR040-420 units check to the operation and wiring of the Loss of Charge Switch.
- For 30GTN/GTR/GUN/GUR040-420 units with serial numbers between 1600F94483 and 3200F22578 check for condenser fan baffles in the machine. If they are not there, check to be sure that the solution described in SMB000075 was completed.
- On 30GTN/GTR/GUN/GUR040-070 machines produced prior to 0204F, consider upgrading the feedback circuit and software with 30GT-911---084.
- On 30GTN/GTR/GUN/GUR130-210 and the associated modular units produced prior to 1704F, consider upgrading the feedback circuit and software with 30GT-911---086.
- On the 30GTN/GTR/GUN/GUR080-110 and associated modular units, be sure that the Compressor Protection Control System is operating properly, including the ground fault protection.
- For the 30GTN/GTR/GUN/GUR130-210 and the associated modular units, check to be sure that the Compressor Ground Fault Board did not open. On repeated Compressor Ground Fault Board trips, see SMB010001 for a solution.
- For 30HWA machines with serial numbers 0800F-3200F, the condenser output does not work with Version 1.0 MBB software. Either connect the output in parallel with the compressor contactor as described in SMB000030A or upgrade the software.

Service Bulletins pertaining to this condition:

- SMB000030 – 30HWA ComfortLink Remote Condenser Fan Configuration
  This bulletin was superceded by SMB000030A.
- SMB000030A – 30HWA ComfortLink Remote Condenser Fan Configuration
  This bulletin described the electrical solution to enable the condenser fans for machines with Version 1.0 MBB Software.
- SMB000075 – 30/38/09 High Pressure Trips
  This bulletin described the electrical solution for machines that were produced without internal fan baffles.
- SMB010001 – Nuisance Compressor Fault Codes
  This bulletin described the troubleshooting procedure to determine the cause of the alarms. The bulletin described a solution to repeated Compressor Ground Fault Board trips.
- SMB010002 – Troubleshooting ComfortLink 051-057 Alarms
  This bulletin described the troubleshooting procedure to determine the cause of the alarms.
- SMB010022 – 30 Series ComfortLink Nuisance Alerts 051-057
  This bulletin described a solution for the 5 vdc feedback control relay contacts not reliably making.
- SMB040007 – 30GTN040-070 T051-T055 Alerts

This bulletin identified an alternative feedback method for verifying compressor operation with the use of a Current Sensing Board to eliminate nuisance alarms.

Beginning with Dual Circuit Version 4.0 Software (CESR-131170-04-00) the alarm text strings changed to provide additional information. On 30GTN/GTR040-070 machines beginning with Serial Number 0204F, the control relay was changed to a Current Sensing Board. On 30GTN/GTR130-226 the Current Sensing Board was added beginning 1704F. The Dual Circuit Version 4.0 Software (CESR-131170-04-00) is required in order for the Current Sensing Board feedback to be recognized.

In the Dual Circuit Software starting with Version 4.0 (CESR-131170-04-00) the alarms are as follows: T051 – Circuit A, Compressor 1 Failure, T052 – Circuit A, Compressor 2 Failure, T053 – Circuit A, Compressor 3 Failure, T054 – Circuit A, Compressor 4 Failure, T055 – Circuit B, Compressor 1 Failure, T056 – Circuit B, Compressor 2 Failure, and T057 – Circuit B, Compressor 3 Failure. As with the earlier Versions of software, the Current Sensing Board state must match that of the commanded state. In other words, the Current Sensing Board status must be ON if the Main Base Board either directly or through the Compressor Expansion is calling for that compressor. Use the following guide to troubleshoot these alarms:

If this condition is encountered, check the following items:

- Check the operation of the High Pressure Switch.
- Check for non-condensibles in the refrigerant circuit, a potential high pressure switch trip.
- Check for the proper refrigerant charge, potentially either a loss of charge switch trip for T051 or T055 on 30GTN/GTR/GUN/GUR040-420 only (low charge), or high pressure switch trip (overcharged).
- Check for operation beyond the limit of the machine, a potential high pressure switch trip.
- Check the condenser coils for debris or restriction, a potential high pressure switch trip.
- Check the condenser fans and motors for proper rotation and operation a potential high pressure switch trip.
- Check the discharge service valve to be sure that it is open. A closed or restricted valve is a potential high pressure switch trip.
- Check the control relay operation for the compressor. If the relay does not signal the compressor contactor to start, no current will be sensed.
- Check the wiring of the control relay or the Compressor Protection and Control System (CPCS) Board both to the compressor contactor and to the Main Base Board or Compressor Expansion Board.
- Check for a compressor circuit breaker trip.
- Check unit for main power.
- Check the Current Sensing Board for proper operation.
- Check the Current Sensing Board for wiring errors.
- For 30GTN/GTR/GUN/GUR040-420 units check to be sure that the Loss of Charge Switch did not open.

- On 30GTN/GTR/GUN/GUR040-070 machines produced starting with serial numbers 0204F, with field installed Compressor Protection Control System (CPCS) Modules installed, be sure that the feedback circuits are not connected to the J9 connection. Only the feedback from the Current Sensing Boards (CSB) should be connected.
- On 30GTN/GTR/GUN/GUR040-070 machines produced starting with serial numbers 0204F and 30GTN/GTR130-226 and associated modular units machines produced starting with serial numbers 1704F be sure that the Current Sensing Board is enabled, A1.C.E, A2.C.E, A3.C.E, A4.C.E, B1.C.E, B2.C.E, B3.C.E (Configuration Mode, Sub-mode COMP) should be enabled for the appropriate compressor.
- On the 30GTN/GTR/GUN/GUR080-110 and associated modular units, be sure that the Compressor Protection Control System is operating properly, including the ground fault protection.
- For the 30GTN/GTR/GUN/GUR130-210 and the associated modular units, check to be sure that the Compressor Ground Fault Board did not open. On repeated Compressor Ground Fault Board trips, see SMB010001 for a solution.

Service Bulletins pertaining to this condition:

- SMB010001 – Nuisance Compressor Fault Codes
  This bulletin described the troubleshooting procedure to determine the cause of the alarms. The bulletin described a solution to repeated Compressor Ground Fault Board trips.
- SMB040032 – 30GTN/GTR/GUN/GUR040-070 with Compressor Protection Control System (CPCS) and Current Sensing Boards (CSB)
  This bulletin clarified the control and feedback wiring of the CSB when used with the CPCS modules.

In the Dual Circuit Software starting with Version 4.0 (CESR-131170-03-01) additional alerts were added as follows: A051 – Circuit A, Compressor 1 Current Detected After Shutdown, A052 – Circuit A, Compressor 2 Current Detected After Shutdown, A053 – Circuit A, Compressor 3 Current Detected After Shutdown, A054 – Circuit A, Compressor 4 Current Detected After Shutdown, A055 – Circuit B, Compressor 1 Current Detected After Shutdown, A056 – Circuit B, Compressor 2 Current Detected After Shutdown, and A057 – Circuit B, Compressor 3 Current Detected After Shutdown. As with the earlier Versions of software, the Current Sensing Board state must match that of the commanded state. In this case, the Current Sensing Board status must be OFF if the Main Base Board either directly or through the Compressor Expansion is not calling for that compressor. Use the following guide to troubleshoot these alarms:

If this condition is encountered, check the following items:

- Check the control relay operation for the compressor. If the relay stays on the compressor contactor will stay energized and compressor current will be sensed.
- Check the wiring of the control relay both to the compressor contactor and to the Main Base Board or Compressor Expansion Board.
- Check for a compressor contactor for proper operation or welded contacts.
- Check the Current Sensing Board for proper operation.
- Check the Current Sensing Board for wiring errors.

A060 – Cooler Leaving Water Thermistor Failure Alarm
A061 – Cooler Entering Water Thermistor Failure Alarm
Action taken by control: Machine is shut down after pumpdown.
Reset Method: Automatic

The alarm will be generated if the corresponding thermistor read by the control is outside of the –40 to 245 °F (-40 to 118 °C) range.

Thermistor	
Leaving Water Temperature	T3
Entering Water Temperature	T5

If this condition is encountered, check the following items:
- Check for a thermistor failure.
- Check for a thermistor wiring error.

T064 – Circuit A Saturated Condensing Thermistor Failure Alert
T065 – Circuit B Saturated Condensing Thermistor Failure Alert
T066 – Circuit A Saturated Suction Thermistor Failure Alert
T067 – Circuit B Saturated Suction Thermistor Failure Alert
T068 – Circuit A Suction Gas Thermistor Failure Alert
T069 – Circuit B Suction Gas Thermistor Failure Alert
Action taken by control: Circuit is shut down after pumpdown.
Reset Method: Automatic

The alarm will be generated if the corresponding thermistor read by the control is outside of the –40 to 245 °F (-40 to 118 °C) range.

Thermistor	Circuit A	Circuit B
Saturated Condensing Temperature	T3	T4
Saturated Suction Temperature	T5	T6
Return Gas Temperature	T7	T8

If this condition is encountered, check the following items:
- Check for a thermistor failure.
- Check for a thermistor wiring error.

T073 – Outside Air Thermistor Failure Alert
T074 – Space Temperature Thermistor Failure Alert
Action taken by control: Temperature Reset is disabled and the machine continues to run with normal control/set points.
Reset Method: Automatic

The alarm will be generated if the corresponding thermistor, Outside Air or Space Temperature, read by the control is outside of the –40 to 245 °F (-40 to 118 °C) range.

Thermistor	
Outside Air Temperature	T9
Space Temperature	T10

If this condition is encountered, check the following items:
- Check for a thermistor failure.
- Check for a thermistor wiring error.

T077 – Circuit A Saturated Suction Temperature Exceeds Cooler Leaving Fluid Temperature Alert
T078 – Circuit B Saturated Suction Temperature Exceeds Cooler Leaving Fluid Temperature Alert

Action taken by control: Circuit shut down after pump down (30GTN/GTR040-420)
Reset Method: Automatic

This alert is checked only when the circuit is on. The alert is generated if the circuit's saturated suction temperature is greater than the leaving water temperature for more than 5 minutes. The circuit will be reset if the saturated suction temperature is less than the leaving water temperature minus 0.1 ºF (0.05 ºC).

Software Versions prior to 3.1 (CESR-131170-03-01) monitored this algorithm while the circuit was off. This was corrected in Version 3.1.

There is a known problem with Dual Circuit Software Version 2.3 (CESR-131170-02-03). If the machine is in the alert condition, but has not timed out on the 5 minute timer and shuts down due to a load recycle, the timer is not reset and continues to accumulate time. As a result, the alert can be signaled when the machine is off.

If this condition is encountered, check the following items:
- Check the saturated suction thermistor accuracy.
- Check the leaving water thermistor accuracy.
- Check to be sure that the saturated suction thermistor is seated securely in the thermistor well.
- Check the EXV for proper operation.
- Check for an over charge condition.
- Consider upgrading the software to at least 3.1.
- If the unit is equipped with pressure transducers, check the transducer wiring and accuracy.

T079 – Lead/Lag Thermistor Failure Alert
Action taken by control: Lead/Lag algorithm runs using Master LWT sensor. Master is the lead chiller.
Reset Method: Automatic

The alarm will be generated if the Lead/Lag thermistor read by the control is outside of the –40 to 245 °F (-40 to 118 °C) range.

If this condition is encountered, check the following items:
- Check for a thermistor failure.
- Check for a thermistor wiring error.
- For Single Circuit Software CESR-131213-XX-XX and Dual Circuit Software (CESR-131170-03-01) and earlier, LLEN *Lead/Lag Chiller* (Configuration Mode, Sub-mode RSET) has been set to ENBL, enabling Dual Chiller Control, without a lead/lag thermistor installed. For Dual Circuit Software (CESR-131170-04-00) and later, LL.EN *Lead/Lag Chiller* (Configuration Mode, Sub-mode D.CHL) has been set to ENBL, enabling Dual Chiller Control, without a lead/lag thermistor installed.

T090 – Circuit A Discharge Pressure Transducer Failure
T091 – Circuit B Discharge Pressure Transducer Failure
Action taken by control: Circuit shut down after pump down (30GTN/GTR040-420)
Reset Method: Automatic

This alarm will be generated only if Pressure Transducers are enabled, PRTS *Pressure Transducers* (Configuration Mode, Sub-mode OPT1) = ENBL and the voltage ratio, (Voltage $_{Measured}$ / Voltage $_{Reference}$) is less than 0.5% or greater than 99.9%.

If this condition is encountered, check the following items:
- Check for a faulty transducer.
- Check for a wiring error or problem between transducer and the MBB.
- Check for a faulty power supply from the MBB for the pressure transducers.
- If transducers are not supplied, check the configuration value for PRTS.

T092 – Circuit A Suction Pressure Transducer Failure
T093 – Circuit B Suction Pressure Transducer Failure
Action taken by control: Circuit shut down without pump down (30GTN/GTR040-420)
Reset Method: Automatic

This alarm will be generated only if Pressure Transducers are enabled, PRTS *Pressure Transducers* (Configuration Mode, Sub-mode OPT1) = ENBL and the voltage ratio, (Voltage $_{Measured}$ / Voltage $_{Reference}$) is less than 0.5% or greater than 99.9%.

If this condition is encountered, check the following items:
- Check for a faulty transducer.

- Check for a wiring error or problem between transducer and the MBB.
- Check for a faulty power supply from the MBB for the pressure transducers.
- If transducers are not supplied, check the configuration value for PRTS.

T110 – Circuit A Loss of Charge Alert
T111 – Circuit B Loss of Charge Alert
Action taken by control: Circuit is prevented from starting
Reset Method: Automatic (MBB) when discharge pressure is greater than 15 psig (95 kPa)

This alert will be generated only if Pressure Transducers are enabled, PRTS *Pressure Transducers* (Configuration Mode, Sub-mode OPT1) = ENBL and if the control senses a discharge pressure less than 10 psi (68.3 kPa) for 30 seconds. This alert is active only if a compressor in the circuit is ON. The al

If this condition is encountered, check the following items:
- Check the discharge pressure transducer accuracy. Replace the transducer if necessary.
- Check the refrigerant charge for the circuit.
- Check for a wiring error or problem between transducer and the MBB.
- Check for a faulty power supply from the MBB for the pressure transducers.
- If transducers are not supplied, check the configuration value for PRTS.

T112 – Circuit A High Suction Superheat Alert
T113 – Circuit B High Suction Superheat Alert
Action taken by control: Circuit shut down after a pumpdown
Reset Method: Manual (MBB)

This alert will be generated if the following conditions are met:
- EXV is open greater than 98%
- Suction superheat is greater than 75 ºF (41.7 ºC), and
- Saturated suction temperature is greater than Maximum Operating Pressure, 50 ºF (10 ºC) for 5 minutes.

T114 – Circuit A Low Suction Superheat Alert
T115 – Circuit B Low Suction Superheat Alert
Action taken by control: Circuit shut down after pump down (30GTN/GTR040-420)
Reset Method: Automatic for the first daily occurrence, Manual thereafter (MBB)

This alarm will be generated if the EXV is less than 10%, and either the suction superheat is less than SH.SP *EXV Superheat SetPoint* (Configuration Mode, Sub-mode

Unit) minus 10 ºF (5.6 ºC). The control calculates the superheat by subtracting the Saturated Suction Temperature (Circuit A – T5, Circuit B – T6) from the Return Gas Temperature (Circuit A – T7, Circuit B – T8). Another condition to generate this alarm is if the Saturated Suction Temperature is greater than Maximum Operating Pressure (MOP) for 5 minutes. The MOP is factory set at 50 ºF (10 ºC) and cannot be adjusted.

For the 30GTN/GTR/GUN/GUR040-420, beginning with serial number 0700F, the return gas thermistors were lengthen to better sense the return gas.

If this condition is encountered, check the following items:
- Check the thermistor accuracy. Remember to check both thermistors.
- Check the corresponding Saturated Suction Thermistor T5 or T6 to be sure that it is firmly seated completely in the well. If it is outside of the well, it will sense ambient temperature rather than the saturated suction temperature.
- Confirm the refrigerant charge for the circuit.
- Confirm that the machine is not operating outside of the temperature limits.
- Check for the proper EXV Orifice.
- Check the EXV and motor for proper operation.
- Check the EXV Cable for continuity.
- Check the EXV Board for proper operation.

Service Bulletins pertaining to this condition:
- SMB000064 – Compressor Return Gas Thermistor Changes
  This bulletin described the changes to the production units and field retrofit to longer return gas thermistor and well assemblies. These changes were implemented about 0700F.
- SMB05-0008 – Along with changes to EXV steps which can affect suction superheat, recommendations have also been made to modify the superheat setpoint: Configuration→UNIT→SH.SP to 35 ºF (19.4 ºC), or apply a superheat offset Configuration→UNIT→SH.OF of 6 ºF (3.3 ºC).

T116 – Circuit A Low Saturated Suction Temperature Alert
T117 – Circuit B Low Saturated Suction Temperature Alert

Action taken by control: Circuit shutdown (See stage 2 below.)
Reset Method: Manual

Stage 1 (turns on Mode 7 for Circuit A, Mode 8 for Circuit B): If the circuit is running, and the saturated suction temp is 24° F below the cooler leaving fluid temperature, and the saturated temp is 2° F below the freeze point for 5 minutes, then no lag comp is allowed to be added (mode 7/8 for CIR_A /CIR_B)

Stage 2 (shuts down the circuit): If the circuit is running, and the saturated suction temp is 30° F below the cooler leaving fluid temperature, and the saturated temperature is 2° F less than freeze point for 10 minutes, then the alert shall be triggered.

T118 – Circuit A Low Oil Pressure Alert
T119 – Circuit B Low Oil Pressure Alert
Action taken by control: Circuit shut down without pump down
Reset Method: Manual (MBB)

The oil switch is standard on all 30GTN/GTR070–50 Hz, 080-420, 30HWA, 30HL machines. It is also used on all brine modified machines for 30GTN015-035, 30GTN/GTR040-060, 070-60Hz, 30HK, 30HWB/HWC/HWS. It can also be supplied as field installed accessory.

The machines use a Robertshaw Oil Pressure Switch. Later the switch was changed to a Danfoss Oil Pressure Switch. There are two criteria that will trip this alarm. See Oil Pressure Safety Switch on page 121 for the pressure switch settings.

1. When the circuit is called to start, there is a 2-minute bypass of the Oil Pressure Switch. If the switch is open continuously after two (2) minutes of operation the alarm will be generated.
2. After the start-up period, if the Oil Pressure Switch opens and remains open for one (1) minute, the alarm will be generated.

If this condition is encountered, check the following items:

- Check the Oil Pressure Switch operation.
- Check the compressor's oil pump operation.
- Check for an oil level in the sight glass.
- Check the crankcase heater operation.
- Check the compressor's circuit breaker. If the circuit breaker is open, the compressor will not start, therefore no oil pressure.
- Check the compressor contactor operation.
- Check the Saturated Suction and Return Gas Thermistors for accuracy. Flood back conditions can flush oil from the compressor resulting in a loss of oil pressure.
- Confirm the refrigerant charge for the circuit.
- Confirm that the machine is not operating outside of the temperature limits.
- Check for the proper EXV Orifice.
- Check the EXV and motor for proper operation.
- On 30GTN/GTR Series 3 machines, reports of low oil pressure alarms and flooding at start-up. The problem has been traced to the 15,000-step EXV. The full travel of valve is 12,210 steps. Update the software to Version 4.2 to correct the upper limit of the valve. In addition to updating the software, configure the superheat set point, **Configuration→UNIT→SH.SP** to 35 ºF (19.4 ºC) or apply a superheat offset **Configuration→UNIT→SH.OF** of 6 ºF (3.3 ºC).

Service Bulletins pertaining to this condition:

- SMB050008 – Low Oil Pressure Alerts
  This bulletin described the EXV configuration changes required on the 30GTN/GTR040-420 Series 3 machines to eliminate nuisance Low Oil Pressure Alerts.

A133 – Circuit A Low Refrigerant Pressure Alarm
T133 – Circuit A Low Refrigerant Pressure Alert
T134 – Circuit B Low Refrigerant Pressure Alert
Action taken by control: Circuit shut down
Reset Method: Automatic for the first daily occurrence, Manual thereafter (MBB)

This alarm is only on the 30GTN015-035, 30HK/HL/HW machines only. It is generated if the low pressure switch opens during normal operation.

If this condition is encountered, check the following items:
- Check the TXV for proper operation.
- Check the TXV for proper superheat.
- Confirm the refrigerant charge for the circuit.
- Confirm that the machine is not operating outside of the temperature limits.
- Check the liquid line for any restriction, partially or closed liquid line service valve, plugged liquid line filter drier.
- For 30GTN015-035 and 30HL machines, check the Liquid Line Solenoid Valve for proper operation.
- Check head pressure control operation. If not equipped, consider adding head pressure control.
- For air-cooled systems, check for wind baffles. Consider adding wind baffles, if required.
- Maximum Operating Pressure (MOP) type valves are used on all machines and are subject to cross ambient conditions. When the ambient is 20 °F (11 °C) or more colder than the suction line, the gas in the bulb condenses in the power head of the TXV. The liquid in the power head interferes with the operation of the TXV, and does not allow it to open. As a result, the cooler is starved of refrigerant, and the unit trips on low refrigerant pressure. If this condition is encountered, the TXV power head should be wrapped with self-regulating heater tape. Wrapping the power head will keep the temperature of power head higher than the bulb and not allow the gas to condense on the power head. The heater should be wired to turn on and off with cooler heater.
- On 30HWA models, consider changing the Low Pressure Switch from HK02ZB042 to HK02ZB041. The HK02ZB041 switch has an Cut-out Pressure of 27 ± 3 psi (186 ± 20 kPa) and a Cut-in Pressure of 44 ± 5 psi (303 ± 34 kPa). This switch has a lower setting to allow for the machine start under cooler ambient conditions.

A151 – Illegal Configuration – XX Alarm
Action taken by control: Unit not allowed to start
Reset Method: Manual (MBB)

At least one of the following illegal configurations exists. The alarm can only be reset after the configuration has been corrected.

Code	Description
01	Unit type (Configuration mode, Sub-mode UNIT) TYPE=0
06	Unit type (Configuration mode, Sub-mode UNIT) TYPE= 2 (Water-Cooled), without pressure transducers and configured for Water-Cooled Head Pressure Control HPCT (Configuration Mode, Sub-mode OPT1)=2
08	Cooler Fluid, (Configuration Mode, Sub-mode OPT1) FLUD=3 Low Temperature Brine and Unit type (Configuration mode, Sub-mode UNIT) TYPE=1 (Air-Cooled)
11	Lead/Lag (Configuration Mode, Sub-Mode RSET) LLEN=ENBL (Enabled), Master/Slave (Configuration Mode, Sub-mode RSET) MSST = MAST (Master) and Cooling Setpoint Select (Configuration Mode, Sub-mode SLCT) CLSP=5 (External Potentiometer).
13	Condenser Pump Interlock (Configuration Mode, Sub-mode OPT1) CNP.I=ON, and Unit type (Configuration mode, Sub-mode UNIT) TYPE=1 (Air-Cooled)
14	Low pressure set point out of range
15	Conflicting Occupancy Schedules
16	Cooler Fluid, (Configuration Mode, Sub-mode OPT1) FLUD=1 (Fresh Water) and Ice Mode (Configuration Mode, Sub-mode OPT2) ICE.M=ENBL (Enable)

A153 – Real Time Clock Hardware Failure Alarm
Action taken by control: Occupancy defaults to Occupied
Reset Method: Automatic

This alarm is indicated when the time clock is not initialized or fails to increment. The alarm will reset when the time is initialized or starts incrementing again. If this condition is encountered, replace the Main Base Board.

If this condition is encountered, check the following items:
- Check the HH.MM, *Hour and Minute*, (Time Clock Mode, Sub-mode TIME).

A154 – Serial EEPROM Hardware Failure Alarm
Action taken by control: Machine shuts down
Reset Method: Manual

This alarm is indicated when the internal diagnostics determines an internal failure of the EEPROM.

If this condition is encountered, the Main Base Board will need to be replaced.

A155 – Serial EEPROM Storage Failure Error Alarm
Action taken by control: Machine is shut down.
Reset Method: Manual

This alarm is indicated when an internal diagnostic finds an error on critical data. The following points are critical data items:

TYPE, *Unit Type* (Configuration Mode, Sub-mode UNIT)
TONS, *Unit Size* (Configuration Mode, Sub-mode UNIT)
CMP.A, *Number Circ A Compressor* (Configuration Mode, Sub-mode UNIT)
CMP.B, *Number Circ B Compressor* (Configuration Mode, Sub-mode UNIT)
FAN.S, *Fan Staging Select* (Configuration Mode, Sub-mode UNIT)
FLUD, *Cooler Fluid* (Configuration Mode, Sub-mode OPT1)
HPCT, *Head Press Control Type* (Configuration Mode, Sub-mode OPT1)
CNP.I, *Condenser Pump Interlock* (Configuration Mode, Sub-mode OPT1)
CSP1, *Cooling Set Point 1* (Set Point Mode, Sub-mode COOL)
HSP1, *Heating Set Point 1* (Set Point Mode, Sub-mode HEAT)

If this condition is encountered,
- Download the software to the module.
- Consider replacing the Main Base Board.

A156 – Critical Serial EEPROM Storage Failure Error Alarm
Action taken by control: Machine is shut down.
Reset Method: Manual

This alarm is indicated when an internal diagnostic finds an error on critical data.

If this condition is encountered,
- Consider replacing the Main Base Board.

A157 – A/D Hardware Failure Alarm
Action taken by control: Machine is shut down.
Reset Method: Manual

This alarm occurs when the Analog to Digital Converter, an internal component on the Main Base Board, fails.

If this condition is encountered check the following items:
- Consider replacing the Main Base Board.

T170 – Loss of Communication with CXB
Action taken by control: Compressors A3, A4, and B3 and Unloaders A2 and B2 will not operate.
Reset Method: Automatic

If the Main Base Board looses communication with the CXB Module, the alarm will be tripped. If the unit is configured for more than 2 compressors in a circuit or more than 1 unloader in a circuit, the CXB is automatically turned on by the software.

The alarm will reset automatically, once communication is re-established.

If this condition is encountered, check the following items:
- Check the red LED on the board. All red LEDs should be blinking in unison.
- Check the Local Equipment Network (LEN) for a wiring error.
- Check for a 24 volt supply to the CXB module.
- Check the CXB module address.
- Check the configuration data for the following points:
  CMP.A *Number of Circuit A Compressors* (Configuration Mode, Sub-mode UNIT) cannot be greater than 2 without a CXB installed.
  CMP.B *Number of Circuit B Compressors* (Configuration Mode, Sub-mode UNIT) cannot be greater than 2 without a CXB installed.
  CA.UN *No. of Circuit A Unloaders* (Configuration Mode, Sub-mode OPT1) cannot be greater than 1 without a CXB installed.
  CB.UN *No. of Circuit B Unloaders* (Configuration Mode, Sub-mode OPT1) cannot be greater than 1 without a CXB installed.

A172 – Loss of Communication with EXV Module Alarm
Action taken by control: Machine is shut down.
Reset Method: Automatic

If the Main Base Board looses communication with the EXV Module, the alarm will be tripped.

The alarm will reset automatically, once communication is re-established.

If this condition is encountered, check the following items:
- Check the red LED on the board. All red LEDs should be blinking in unison.
- Check the Local Equipment Network (LEN) for a wiring error.
- Check for a 24 volt supply to the EXV module.
- Check the EXV module address.
- Check for a grounded EXD/Economizer Cable or motor assembly. A short to ground can disable the communications bus.

T173 – Loss of Communications with Energy Management Module Alert
Action taken by control: EMM options are disabled.
Reset Method: Automatic

This alarm is tested only if EMM, *EMM Module Installed*, (Configuration Mode, Sub-mode OPT1) is YES, or an option is configured that requires the EMM. The alert is triggered if the MBB looses communication with the EMM. If the alert is indicated the following actions will be taken by the control:

CRST, *Cooling Reset Type*, (Configuration Mode, Sub-mode RSET) from external temperature or 4-20 ma input will be disabled.
DMDC, *Demand Limit Select*, (Configuration Mode, Sub-mode RSET) Demand Limit by Switch Control or 4-20 ma input will be disabled.
CLSP, *Cooling Set Point Select*, (Configuration Mode, Sub-mode SCLT) Set point by an external switch or 4-20 ma will be ignored. Set point will be controlled by CSP1, *Cooling Set Point 1*, (Set Point Mode, Sub-mode COOL).
ICE.M, *Ice Mode Enable*, (Configuration Mode, Sub-mode OPT2) Ice Build shall be disabled.

The alert will reset automatically, once communication is re-established.

If this condition is encountered, check the following items:

- Check the red LED on the board. All red LEDs should be blinking in unison.
- Check the Local Equipment Network (LEN) for a wiring error.
- Check for a 24 volt supply to the EMM module.
- Check the EMM module address.
- If there is no EMM board installed, check the configurations that would require the EMM board. If any are enabled, and the EMM is not installed, this alarm will be generated.

T174 – 4-20 mA Cool Setpoint Input Failure Alert
Action taken by control: CSP.1 will be used for set point.
Reset Method: Automatic

This alarm is tested only if EMM, *EMM Module Installed*, (Configuration Mode, Sub-mode OPT1) is YES, and the communication status is good. The alert is triggered if the input signal is less than 2 mA or greater than 22 mA. If the alert is indicated the control will use CSP.1, *Cooling Set Point 1*, (Set Point Mode, Sub-mode COOL).

The alert will reset automatically, once the input signal returns to the normal range of 2-22 mA. Once the signal returns to normal range, the option will function again.

Care should be taken when interfacing with other manufacturer's control systems, due to power supply differences, full wave bridge versus half wave rectification. The two different power supplies cannot be mixed. ComfortLink controls use half wave

rectification. A signal isolation device should be utilized if a full wave bridge signal generating device is used.

If this condition is encountered, check the following items:
- Confirm the input signal value, CSP, *4-20 mA Cooling Set Point* (Inputs Mode, Sub-mode 4-20). A flashing * indicates an input error.
- Confirm the proper polarity of the 4-20 mA signal.
- Check the input signal wiring.

T175 – 4-20 mA Heat Setpoint Input Failure Alert
Action taken by control: HSP.1 is used for set point.
Reset Method: Automatic

This alarm is tested only if EMM, *EMM Module Installed*, (Configuration Mode, Sub-mode OPT1) is YES, and the communication status is good. The alert is triggered if the input signal is less than 2 mA or greater than 22 mA. If the alert is indicated the control will use HSP.1, *Heating Set Point 1*, (Set Point Mode, Sub-mode HEAT).

The alert will reset automatically, once the input signal returns to the normal range of 2-22 mA. Once the signal returns to normal range, the option will function again.

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

If this condition is encountered, check the following items:
- Confirm the input signal value, HSP, *4-20 mA Heating Set Point* (Inputs Mode, Sub-mode 4-20).
- Confirm the proper polarity of the 4-20 mA signal.
- Check the input signal wiring.

T176 – 4-20 mA Reset Input Failure Alert
Action taken by control: Reset option is disabled.
Reset Method: Automatic

This alarm is tested only if EMM, *EMM Module Installed*, (Configuration Mode, Sub-mode OPT1) is YES, and the communication status is good. The alert is triggered if the input signal is less than 2 mA or greater than 22 mA. If the alert is indicated the control will terminate reset.

The alert will reset automatically, once the input signal returns to the normal range of 2-22 mA, and reset will begin again.

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

If this condition is encountered, check the following items:
- Confirm the input signal value, RSET, *4-20 mA Reset Signal* (Inputs Mode, Sub-mode 4-20). A flashing * indicates an input error.
- Confirm the proper polarity of the 4-20 mA signal.
- Check the input signal wiring.

T177 – 4-20 mA Demand Limit Input Failure Alert
Action taken by control: Reset option is disabled.
Reset Method: Automatic

This alarm is tested only if EMM, *EMM Module Installed*, (Configuration Mode, Sub-mode OPT1) is YES, and the communication status is good. The alert is triggered if the input signal is less than 2 mA or greater than 22 mA. If the alert is indicated the control will terminate reset.

The alert will reset automatically, once the input signal returns to the normal range of 2-22 mA, and reset will begin again.

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

If this condition is encountered, check the following items:
- Confirm the input signal value, DMND, *4-20 mA Demand Signal* (Inputs Mode, Sub-mode 4-20). A flashing "*" indicates an error on the input.
- Confirm the proper polarity of the 4-20 mA signal.
- Check the input signal wiring.

A200 – Cooler Pump Interlock Failed at Start-Up
Action taken by control: Unit prevented from starting.
Reset Method: Manual

This alarm is signaled by one of two conditions. If the cooler pump interlock does not close within 5 minutes of the unit transitioning from OFF to ON, or after the start of the cooler pump, the alarm will be generated.

A software bug was found in the MBB Dual Circuit Software (CESR-131170-XX-XX) in versions prior to and including Version 4.1. If an A201 alarm is generated, and the alarm is manually reset, the instance timer for the A200 alarm is not properly reset, resulting in a premature trip of the alarm. The alarm must be cleared, then power must be completely cycled to reset the instance timer.

If this condition is encountered, check the following items:
- Check the operation of the cooler pump.
- Check the operation of the chilled water flow switch.
- Check the wiring of the chilled water pump interlock, flow switch, auxiliary contacts, etc.
- Check to be sure that any isolation valves are open or are functioning properly.
- Check the chilled water strainer for any restriction.

A201 – Cooler Pump Interlock Failure Contacts Open During Normal Operation Alarm

Action taken by control: Unit shut down.
Reset Method: Manual

This alarm is tested only after the criteria for A200 has been satisfied. On single circuit machine software, this alarm is signaled if the cooler pump interlock opens for 16 seconds continuously. On dual circuit machine software, this alarm is signaled if the cooler pump interlock opens for 30 seconds continuously.

If this condition is encountered, check the following items:
- Check the chilled water flow switch for proper operation.
- Check the chilled water loop to be sure that it is completely filled with water.
- Check the chilled water pump interlock circuit for proper operation
- Check the pump electrical circuit for power.
- Check the pump circuit breaker
- Check the pump contactor for proper operation.
- Check the chilled water pump for proper operation. Look for overload trips.
- Check the chilled water strainer for a restriction.
- Check to be sure that all isolation valves are open completely.

A202 – Cooler Pump Interlock Closed When Pump is Off Alarm

Action taken by control: Unit is not allowed to start.
Reset Method: Manual

For this alarm to be checked by the controls, CPC *Cooler Pump Control* (Configuration Mode, Sub-mode OPT1) must be set to ON. This alarm is signaled only if the cooler pump interlock circuit is closed for 5 minutes when the cooler pump is OFF.

If this condition is encountered, check the following items:
- Check the operation of the cooler pump.
- Check the operation of the chilled water flow switch.
- Check the wiring of the chilled water pump interlock, flow switch, auxiliary contacts, etc.
- Check to be sure that any isolation valves are open or are functioning properly.

A208 – Low Cooler Fluid Flow Alarm
Action taken by control: Unit shut down.
Reset Method: Manual

This alarm is generated if the cooler entering water temperature is less than the leaving water temperature by 3 ºF (1.7 ºC) for 1 minute. If this condition is found, the machine is shut down without a pumpdown for the circuit. If enabled, the cooler pump will be shutdown also.

If this condition is encountered, check the following items:
- Check the operation of the cooler pump.
- Check to be sure that any isolation valves are open or are functioning properly.
- Check the chilled water strainer for any restriction.
- Check the Entering Water Thermistor (T2) and Leaving Water Thermistor (T1) are in the proper locations.
- Check the accuracy of the Entering Water Thermistor and Leaving Water Thermistor.
- Check to be sure that the water flow direction is correct.

A212 – Condenser Interlock Opened During Normal Operation Alarm
Action taken by control: Unit shut down.
Reset Method: Manual

This alarm is generated if the machine is configured for CNP.C *Condenser Pump Control* (Configuration Mode, Sub-mode OPT1) is 1-ON WHEN OCCUPIED or 2-ON WITH COMPRESSOR with the CNP.I *Condenser Pump Interlock* (Configuration Mode, Sub-mode OPT1) is ON and the condenser pump interlock circuit opens for at least 15 seconds. If this condition is found, the machine is shut down without a pumpdown for the circuit. If enabled, the cooler pump will be shutdown also.

If this condition is encountered, check the following items:
- Check the operation of the condenser water flow switch.

- Check to be sure that any head pressure control valves are open or are functioning properly. If the machine has head pressure control valves, consider disabling CNP.I *Condenser Pump Interlock*. Normal operation of the head pressure controls may cause the condenser water flow rate to decrease enough to trip the flow switch.
- On 30HWB/HWC/HWS machines with Version 1.0 software have known problem with the condenser pump interlock routine. With the Condenser Pump Control configured for ON WITH COMPRESSOR. The alarm would be generated 30 seconds after the compressor shuts down. Upgrade the software to correct the problem.

T500 – Current Sensor Board A1 Alert
T501 – Current Sensor Board A2 Alert
T502 – Current Sensor Board A3 Alert
T503 – Current Sensor Board A4 Alert
T504 – Current Sensor Board B1 Alert
T505 – Current Sensor Board B2 Alert
T506 – Current Sensor Board B3 Alert
Action taken by control: Circuit shut down, not allowed to start.
Reset Method: Manual

This alarm was introduced with the implementation of Dual Circuit Software Version 4.0, (CESR131170-04-00). This alarm is generated when a Current Sensing Board is configured, but is not recognized by the board.

If this condition is encountered, check the following items:
- Check to be sure that the correct current sensing boards are configured for the appropriate number of compressors under Configuration Mode, Sub-mode COMP.
- Check the wiring from the Current Sensing Board to be sure that it is connected to the correct point on the MBB or CXB where appropriate.
- Check the MBB for a bad monitoring channel.
- Check for a failed Current Sensing Board.

Resetting Alarms and Alerts
The method to reset any alarm or alert depends upon the device that generated the alarm and the type of alarm or alert, automatic or manual. Before any alarm or alert is reset, first find the cause of the alarm or alert and correct the situation

Automatic Alarm or Alert:
An automatic alarm or alert will reset itself, without operator intervention if the condition corrects itself.

Manual Alarm or Alert:
One or more of the following methods must be used to reset the manual alarm or alert.

MBB Alarms and Alerts
To reset a MBB alarm or alert, once the condition has been corrected, from the Scrolling Marquee or Navigator. Change the RCRN *Reset All Current Alarms* (Alarms Mode, Sub-mode RCRN) from NO to YES. Another method is to move the LOCAL-OFF-REMOTE switch from "LOCAL" or "REMOTE" to "OFF" for less than four (4) seconds and back to the its original position to reset the alarm or alert.

Chilled Water Flow Switch/Interlock
A field installed chilled water flow switch is recommended and the preferred method of flow detection with all ComfortLink machines. There are two styles of switches available, a differential pressure switch and a paddle switch. The paddle switch is the preferred chilled water flow switch.

An alternative to the chilled water flow switch is the chilled water pump/control valve end switch interlock. The chilled water pump or control valve should be interlocked with the chiller to prevent the chiller from operating without the chilled water pump energized or the control valve open. This does not prove chilled water flow, however.

Chilled Water Flow Switch – Paddle
The vapor-proof, paddle-type flow switch is preferred over the differential pressure switches. The factory provided flow switch is Carrier Part Number, HR81LG005 (McDonnell & Miller P/N: FS8-W). The switch is rated for waterside pressures of 150 psig (1034 kPa), fluid and ambient temperatures down to 32 °F (0 °C) during operation. This switch is acceptable in lower ambients, if the chilled water loop is drained and winterized. If the application is outside of this range, a different flow switch must be field installed, Carrier Part Number, HR81LG010 (McDonnell & Miller P/N: FS7-4W) with a rating of 300 psig (2068 kPa), fluid and ambient temperatures down to –65 °F (-53 °C) must be purchased and installed. With both switches, the conduit connection to the flow switch must be sealed. Failure to do so will allow water to accumulate on the switch head. The flow switch still requires that the paddle be trimmed for the appropriate size pipe. See the manufacturer's instructions supplied with the switch.

Chilled Water Flow Switch – Differential Pressure
The 30HW machines originally used one of 2 differential pressures switches as chilled water flow switches. The accessory, 30HW-900---003 was used on applications with waterside pressures no greater than 150 psig (1034 kPa). This package used the HK06ZC033 switch. Another switch, HK06ZC001 was set-up for waterside pressures no greater than 300 psig (2068 kPa). In 2000, the differential pressure switches were removed from the Price Pages in favor of the paddle-style chilled water flow switches.

ComfortLink Control Boards

Connections
All connections to the Comfortlink Control Boards are made with trifurcated crimp terminals in board connectors. Use the following tool to make the crimp connections for the board connector for all connections other than thermistors. For thermistor connections, see Thermistors on page 128.

Description	Manufacturer	Part Number
Crimper, Micro Pin	Packard Electric	3157075
	Paladin Tools	1631

Compressor Expansion Board (CXB)
Addressing
The CXB board has 4-position DIP switch that must be set to “ON” for proper addressing.

Troubleshooting:

Communications
The following table has the design resistance in ohms as measured between the pins of the connector listed. Values to as little as half of the listed resistance can be expected to perform without any problems. All measurements are to be made with power removed from the board and no connections to either the LEN ports.

Part Number			Serial Number	(LEN) Resistance between Pins / Connector		
With Software	Without Software	Vendor		Pins 1 to 3	Pins 1 to 2	Pins 2 to 3
30GT515219	HK50AA027	CEPL130350-01	Prior to 5002N	40K Ω J3 & J4	20K Ω J3 & J4	20K Ω J3 & J4
			Starting 5002N	41.1K Ω J3 & J4	20.7K Ω J3 & J4	20.7K Ω J3 & J4

Displays

Scrolling Marquee Display

Troubleshooting:

Communications
The following table has the design resistance in ohms as measured between the pins of the connector listed. Values to as little as half of the listed resistance can be expected to perform without any problems. All measurements are to be made with power removed from the board and no connections to either the LEN or CCN ports.

Part Number			Serial Number	(LEN) Resistance between Pins / Connector		
With Software	Without Software	Vendor		Pins 1 to 3	Pins 1 to 2	Pins 2 to 3
HK50AA031	HK50AA030	CEPL130347-01	Prior to 4802N	40K Ω J1	20K Ω J1	20K Ω J1
			Starting 4802N	287K Ω J1	7.25M Ω J1	5.9M Ω J1

If the arrow, [ENTER], or [ESCAPE] keys do not respond when pushed, check the seating of the printed circuit board into the casing of the scrolling marquee. If the board is not seated, the keys will not respond when pushed.

Service Bulletins pertaining to this condition:

- SMB020070 – ComfortLink Scrolling Marquee Failures
  This bulletin addressed erratic operation of the keys and described the proper seating of the display to the circuit board for proper operation.

Navigator

Cleaning

The Navigator can be cleaned with a mild detergent. Isopropyl alcohol or a glass cleaner can be used on all Navigator surfaces.

Connection Cord/Plug Assembly Replacement

If the RJ14 plug is damaged, it can be replaced. If it is replaced, the wiring to the plug must be as shown below:

	Pin					
	1	2	3	4	5	6
Wire Color	Black	Green	Blue	Yellow	Red	White

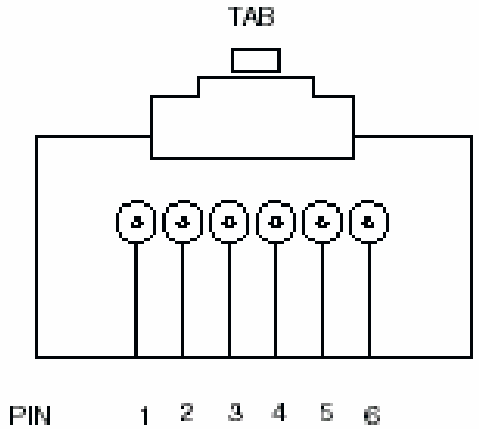


Figure 7 – Navigator Connection Diagram

The connection cable can be replaced if damaged. Replacement cables are available from Replacement Components Division. Remove the Navigator from the LEN connection before proceeding.

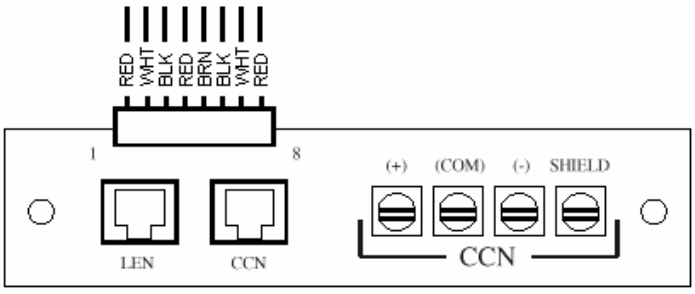
1. Remove the 6 screws from the back of the case to gain access to the internal plug for the device, and keep them for installation later.
2. The back cover is connected to the touch pad by a ribbon cable. The ribbon cable is not long enough to allow the two halves to be completely separated. To be able to access the plug connection, slightly offset the back cover. Be careful not to damage the ribbon cable.
3. Unplug the damaged cable.
4. Plug in the new cable.
5. Insert the rubber grommet (included with new cable assembly) into the cable entrance hole.
6. Realign the two halves of the Navigator. Be sure that the grommet is properly seated in the cable entrance hole.
7. Reinstall the 6 screws previously removed.

NOTE: Failure to properly seal the Navigator with the screws and grommet will compromise the watertight integrity of the device.

Troubleshooting:

Communications

The following table has the design resistance in ohms as measured between the pins of the connector listed. Values to as little as half of the listed resistance can be expected to perform without any problems. All measurements are to be made with power off and no connections to either the LEN or CCN ports. Due to the difficultly in accessing the RJ14 connection, it is recommended the LEN resistance be measured at TB3. With the Navigator plugged into the TB3 RJ14 Port use the TB3 board connector pins after the internal harness has been disconnected to find the resistance.



TB3

Figure 8 – TB3 Field Connections – LEN/CCN

Part Number			Serial Number	(LEN) Resistance between Pins / Connector		
With Software	Without Software	Vendor		Pins 1 to 3	Pins 1 to 2	Pins 2 to 3
HK50AA033		CEPL130435-01	All	220 Ω TB3	1000 Ω TB3	1000 Ω TB3

Loss of Communication
This failure is identified by a "Communication Failure" on the Navigator and a "COMM FAIL" on the Scrolling Marquee Display.

The Navigator to be very sensitive to the polarity of the 24 vac power connection. If the polarity of the power source is not correct, a Communication Failure will occur. Additionally, check the ground wire at TB3. This wire is a shielded wire and is not connected to the terminal block. It should be trimmed and insulated. If this wire comes in contact with the 24 vac power connection, the same problem can result.

If this condition is encountered, check the following items:

- Check the wiring from the MBB to TB3.
- Check for the proper polarity of the power supply.
- Check the ground wire at TB3. It should be insulated. Check the resistance of the Navigator.
- Disconnect all of the remaining Boards from the LEN connection. This will allow for a check of the communication chips of the other control boards. With the Navigator plugged in, check to see if the alarm disappears. If it does, reconnect the devices individually to see which board is suspect.
- Disconnect all inputs to the MBB. A grounded input to the MBB can also cause a communication alarm.

Service Bulletins pertaining to this condition:

- SMB000067 – Navigator Failures
  This bulletin described the potential wiring problems that can lead to a Communication Failure.

Energy Management Board (EMM)
The EMM is available as a factory-installed option or as a field-installed accessory. The EMM receives 4 to 20 mA inputs for the temperature reset, cooling set point reset and demand limit functions. The EMM also receives the switch inputs for the field-installed 2-stage demand limit and ice done functions. The EMM communicates the status of all inputs with the MBB, and the MBB adjusts the control point, capacity limit, and other functions according to the inputs received.

Addressing
The EMM board has 4-position DIP switch that must be set to "ON" for proper addressing.

Troubleshooting:

Communications
The following table has the design resistance in ohms as measured between the pins of the connector listed. Values to as little as half of the listed resistance can be expected to perform without any problems. All measurements are to be made with power removed from the board and no connections to either the LEN ports.

Part Number			Serial Number	(LEN) Resistance between Pins / Connector		
With Software	Without Software	Vendor		Pins 1 to 3	Pins 1 to 2	Pins 2 to 3
30GT515218	HK50AA028	CEPL130351-01	Prior to 4902N	40K Ω J3 & J4	20K Ω J3 & J4	20K Ω J3 & J4
			Starting 4902N	287K Ω J3 & J4	7.25M Ω J3 & J4	5.9M Ω J3 & J4

EXV Board (EXV)
The EXV Board is used on 30GTN,GTR040-420 machines with EXVs only. The EXV Board has 2 inputs and 2 outputs. It receives signals from the MBB and operates the electronic expansion devices. The electronic expansion device board also sends the MBB the status of its 2 input channels.

Addressing
The EXV board has 4-position DIP switch that must be set to “ON” for proper addressing.

Troubleshooting:

Communications
The following table has the design resistance in ohms as measured between the pins of the connector listed. Values to as little as half of the listed resistance can be expected to perform without any problems. All measurements are to be made with power removed from the board and no connections to either the LEN ports.

Part Number			Serial Number	(LEN) Resistance between Pins / Connector		
With Software	Without Software	Vendor		Pins 1 to 3	Pins 1 to 2	Pins 2 to 3
30GT515217	HK50AA026	CEPL130349-01	Prior to 4802N	40K Ω J3 & J4	20K Ω J3 & J4	20K Ω J3 & J4
			Starting 4802N	287K Ω J3 & J4	7.25M Ω J3 & J4	5.9M Ω J3 & J4

Main Base Board (MBB)

Troubleshooting:

Communications

The following table has the design resistance in ohms as measured between the pins of the connector listed. Values to as little as half of the listed resistance can be expected to perform without any problems. All measurements are to be made with power removed from the board and no connections to either the LEN or CCN ports.

Part Number			Serial Number	(LEN) Resistance between Pins / Connector		
With Software	Without Software	Vendor		Pins 1 to 3	Pins 1 to 2	Pins 2 to 3
30GT515165 30HW500437	HK50AA029	CEPL130346-01	Prior to 4702N	15K Ω J3, J4, & J5	7.5K Ω J3, J4, & J5	7.5K Ω J3, J4, & J5
			Starting 4702N	18.9K Ω J3, J4, & J5	9.9K Ω J3, J4, & J5	9.9K Ω J3, J4, & J5

Part Number			Serial Number	(CCN) Resistance between Pins / Connector		
With Software	Without Software	Vendor		Pins 5 to 7	Pins 5 to 6	Pins 6 to 7
30GT515165 30HW500437	HK50AA029	CEPL130346-01	Prior to 4702N	15K Ω J5	7.5K Ω J5	7.5K Ω J5
			Starting 4702N	18.9K Ω J5	9.9K Ω J5	9.9K Ω J5

Loss of Communication

If this condition is encountered, check the following items:

- Check the LEN connections for proper connection.
- If the machine is connected to a CCN network, check the connections to TB3. Be sure that only one end of the CCN wiring is connected.
- Disconnect all external input devices to the MBB. A short on any of these devices can cause the communications to be lost.
- If this does not correct the problem, disconnect the internal input devices on MBB-J6 and MBB-J7. Voltage across any device connection should be between 24 and 27 vac. Placing a jumper across any device pin should be registered by the MBB and can be verified under the Inputs Mode.

Machine does not start.

If this condition is encountered, check the following items:

- Check STAT *Control Mode* (Run Status, Sub-mode VIEW) for the machine status. LOCAL OFF means there is no signal to start. Check the Remote-Off-Enable Switch to be sure that is in the proper position. It must be in Enable even if the machine is controlled by CCN.
- Check the Remote-Off-Enable Switch to be sure it is correctly wired.
- If the Remote-Off-Enable switch is in the Remote position, check the remote contacts for a closure.

- Disconnect all external input devices to the MBB. A short on any of these devices can cause the communications to be lost.
- If this does not correct the problem, disconnect the internal input devices on MBB-J6 and MBB-J7. Voltage across any device connection should be between 24 and 27 vac. Placing a jumper across any device pin should be registered by the MBB and can be verified under the Inputs Mode.

Compressor

06D Model Number Significance

06E Compressor Model Number Significance

Description	Position						
	1-3	4	5	6-7	8	9	10
	06E	A	2	65	3	1	0
Reciprocating Compressor							
Air Conditioning Duty – Unloader Characteristics A – No Unloading F – No Unloading, Reversed Head T – Service Compressor, No Unloading 2 – 1 Step Electric Unloading, Suction Cut-off, Standard Head 3 – 2 Step Electric Unloading, Suction Cut-off, Standard Head 6 – 1 Step Electric Unloading, Suction Cut-off, Reverse Head 7 – 2 Step Electric Unloading, Suction Cut-off, Reverse Head							
Motor Size (Does not signify Horsepower) 0, 1, 2 – Models with Oil 3, 4, 5 – Models without Oil							
Compressor Displacement 50 – 50 CFM 65 – 65 CFM 75 – 75 CFM 99 – 99 CFM							
Electrical Characteristics 0 – 208/230-3-60 1– 575-3-60 3 – 208/230/460-3-60 (460 volt XL Only) 4 – 200-3-60 5 – 230-3-50 6 – 400/460-3-50/60 8 – 230-3-50 9 – 220/380-3-60							
Design Variable 0 – OEM Model 1 – New, Carrier A/C Model 2 – New, Service, A/C Model 6 – Remanufactured, Service, A/C Model							
Packaging Designation A – Packaged, shipped without oil 0 – Model without packaging 1 – Packaged 9 – Packaged							

Compressor Usage

Unit	Hz	Compressor						
		A1	A2	A3	A4	B1	B2	B3
30GTN/GTR040	60							
30GTN/GTR045	60	06E2250	-	-	-	06EF265	-	-
30GTN/GTR050	60							
30GTN/GTR060	60	06E6275	-	-	-	06EF299	-	-
30GTN/GTR070	60	06E6299	-	-	-	06EF299	-	-
30GTN/GTR080	60	06E6275	06EA250	-	-	06E6299	-	-
30GTN/GTR090	60	06E6265	06EA250	-	-	06E6265	06EF265	-
30GTN/GTR100	60	06E6265	06EF275	-	-	06E6265	06EF275	-
30GTN/GTR110	60	06E6265	06EF299	-	-	06E6265	06EF275	-
30GTN/GTR130	60	06E6275	06EF299	-	-	06E6275	06EF299	-
30GTN/GTR150	60	06E6265	06EF265	06EF265	-	06E6299	06EF299	-
30GTN/GTR170	50	06E6275	06EF275	06EF299	-	06E6275	06EF299	06EF299
	60	06E6275	06EF275	06EF275	-	06E6275	06EF275	06EF275
30GTN/GTR190	60	06EF265	06EF275	06EF299	-	06EF265	06EF275	06EF299
30GTN/GTR210	50	06EF265	06EF265	06EF299	-	06EF299	06EF299	06EF299
	60	06EF265	06EF265	06EF265	06EF275	06EF275	06EF299	06EF299
30GTN/GTR226	50	06EF299	06EF299	06EF299	06EF299	06EF299	06EF299	06EF299
30HWB040	60	06E7299	-	-	-	-	-	-

Compressor Weights

The following compressors weights are approximate.

Compressor	Weight, lbs. (kg)
06EA250	425 (193)
06EA265	460 (209)
06EA275	470 (214)
06EA299	530 (241)

Compressor Controllers

Several different devices are used to control the compressor and crankcase heaters if equipped. Each is discussed separately.

Control Relay

This device is a double pole, double throw relay. One pole controls the compressor contactor and crankcase heater, if equipped. The other pole provides a feedback for the compressor operation.

Compressor Protection and Control System (CPCS)

Current Sensing Board

Current Sensing Board Retrofit Kits are available. These kits convert the Control Relay to the Current Sensing Board. The following kits were set-up in Finished Goods.

Kit Number	Used on:
30GT-911---084	30GTN/GTR040-070 30GUN/GUR040-070
30GT-911---086	30GTN/GTR130-210*, 226 30GUN/GUR130-210*, 226

Note: * - And Associated Modular Units
Per SMB04-0007A, if the unit is factory or field-equipped with current sensing boards (CSBs), CXB (if present) software must be upgraded to CESR131173-01-02.

Service Bulletins pertaining to this issue:

- SMB040007 – 30GTN040-070 T051-T055
  This bulletin was superseded by SMB040007A
- SMB040007A – 30GTN T051-T055
  This bulletin described the changes required for all 30GTN/GTR/GUN/GUR040-070, 30GTN/GTR/GUN/GUR130-226 machines to convert from the Control Relay to the Current Sensing Board.

Coolers
The 30GTN/GTR/GUN/GUR/HK/HL product uses a direct expansion cooler design. Two separate refrigerant circuits are contained within one vessel.

The 30HW products use a brazed plate heat exchanger cooler design.

Cooler Physical Data

30GTN/GTR/GUN/GUR040-420 Cooler									
30GTN/GTR 30GUN/GUR	No. of Baffles	Heaters	Cooler Part No.	Water Nozzle Size (Victaulic)	Weight, approximate lbs. (kg)		Shell OD/ Wall Thick. (In.)	Tube P/N OD…Tube Length (in.)	No. of Tubes
					Empty	Filled †			
040	9	No	10HB40201101	3”	485 (220)		10.75	10HB50000504 0.625…62.25	134
		Yes	10HB40007401						
045,050	11	No	10HB40109401	3”	545 (247)		10.75	10HB50000503 0.625…74.25	134
		Yes	10HB40109301						
060,070	11	No	10HB40200301	4”	620 (281)		12.75	10HB50000503 0.625…74.25	204
		Yes	10HB40200201						
080,090	9	No	10HB40107201	4”	745 (338)		12.75	10HB50000506 0.625…98.43	204
		Yes	10HB40104101						
100,110	7	No	10HB403006	5”	860 (391)		14.00	10HB50000506 0.625…98.43	250
		Yes	10HB403005						
130,150	7	No	10HB40205701	6”	1320 (600)		16.00/ 0.188	10HB50000501 0.625…108.25	280
		Yes	10HB40205601						
170,190	9	No	10HB40203601	6”	1630 (741)		18.00	10HB50000501 0.625…108.25	366
		Yes	10HB40203501						
210,226	7	No	10HB40205401	6”	1865 (848)		20.00	10HB50000505 0.625…110.78	494
		Yes	10HB40205301						

Note: † - Approximate cooler weight when filled with water or brine.

30HW018-040 Cooler					
30HW	Cooler Part Number	Empty Weight lbs. (kg)	Water Connections		Water Volume, gal. (l)
			Size, in.	Type	
C035	LL01SB009	104.7 (47.5)	1-1/2 †	Female NPT	2.1 (66.2)

Note: † - Factory supplied with a 1-1/2” Victaulic-type connection for field connection.

Cooler Heaters

30GTN015-035

All 30GTN015-035 machines are shipped with a factory installed cooler heater as standard. A single 210 watt (+5/-10%) heater is used on all coolers. Two different types of heaters are used, depending on voltage.

Heater	Primary Voltage	Control Voltage	Resistance (ohms) @ 75 ºF
HT38AZ120	208/230-3-60, 460-3-60, 575-3-60	115-1-60	65.1 (62.0 – 72.4)

HT38AZ230	380-3-60	230-1-60	239.2 (209.5 – 273.0)
	380/415-3-50	230-1-50	

If installing or replacing the heater tape, the heater tape must not touch another section of the same or similar heater tape.

A control voltage thermostat controls the heater. The thermostat closes at 35 +/- 3 ºF (1.7 +/- 1.7 ºC). The thermostat opens at 45 +/- 3 ºF (7.2 +/- 1.7 ºC). The cooler heater status is unaffected by compressor status. If the compressor is on, and the thermostat is closed, the heater will be on.

30GTN/GTR/GUN/GUR040-420

On the 30GTN/GTR/GUN/GUR040-420 machines, factory installed cooler heaters are an option. Multiple 210 watt (+5/-10%) heaters are used when ordered. Two different heaters are used, depending on the machine. The lead length is the only difference. The heaters are connected differently for the control voltage.

30GTN/GTR/GUN/GUR	Heater Quantity	Primary Voltage	Control Voltage	Heater
040, 045, 050	2	208/230-3-60, 460-3-60, 575-3-60	115-1-60	HT38AZ120
		380-3-60	230-1-60	
		230-3-50, 380/415-3-50	230-1-50	
060, 070	4	208/230-3-60, 460-3-60, 575-3-60	115-1-60	HT38AZ120
		380-3-60	230-1-60	
		230-3-50, 380/415-3-50	230-1-50	
080, 090, 100, 110	4	208/230-3-60, 460-3-60, 575-3-60	115-1-60	HT38AZ121
		380-3-60	230-1-60	
		230-3-50, 380/415-3-50	230-1-50	
130, 150, 170, 190, 210, 226	8	208/230-3-60, 460-3-60, 575-3-60	115-1-60	HT38AZ121
		380-3-60	230-1-60	
		230-3-50, 380/415-3-50	230-1-50	
230, 245, 255, 270, 290, 315, 330, 360, 390, 420	16 (8/module)	208/230-3-60, 460-3-60, 575-3-60	115-1-60	HT38AZ121

30GTN/GTR/GUN/GUR	Heater Quantity	Primary Voltage	Control Voltage	Heater
		380-3-60	230-1-60	
		230-3-50, 380/415-3-50	230-1-50	

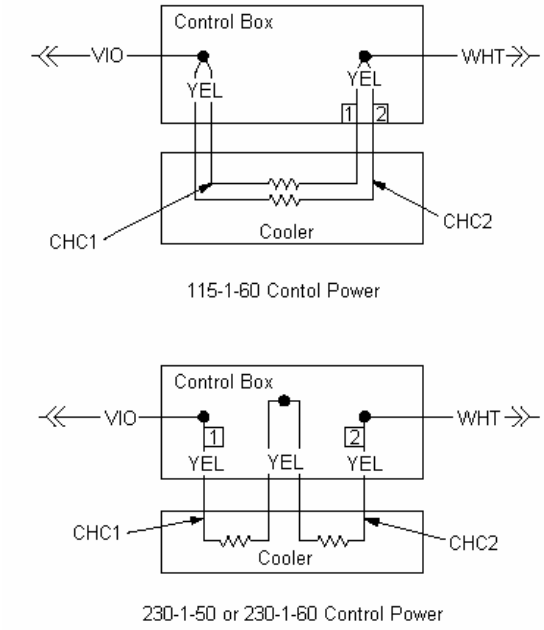


Fig. 9 - 30GTN/GTR/GUN/GUR040-050 Cooler Heater Wiring

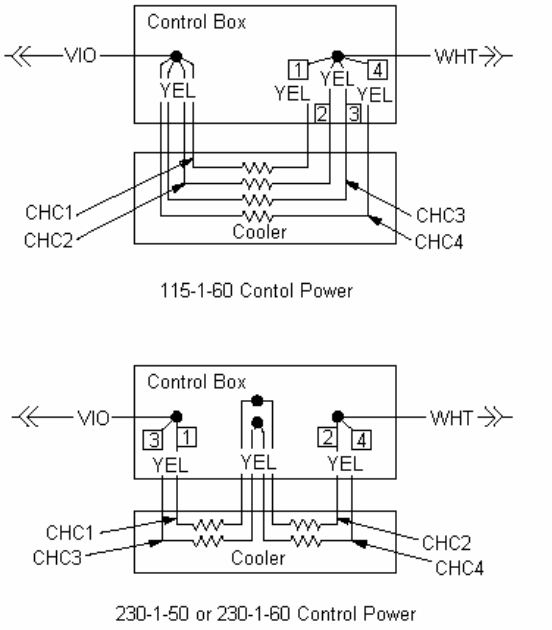


Fig. 10 - 30GTN/GTR/GUN/GUR060-110 Cooler Heater Wiring

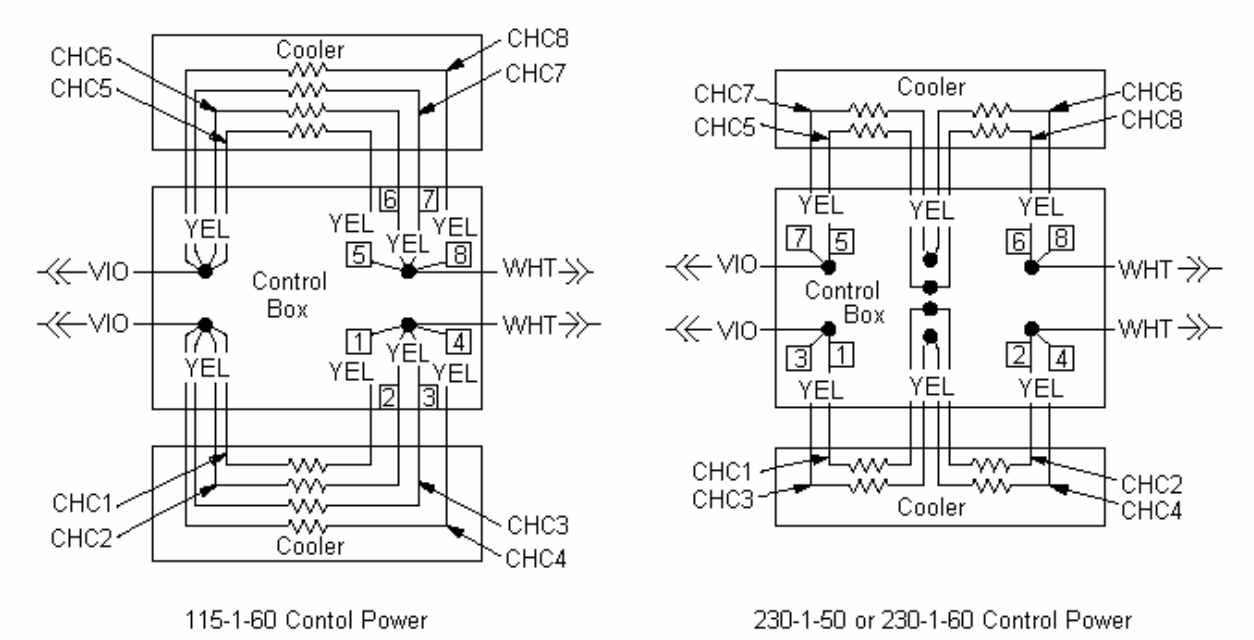


Figure 11 - 30GTN/GTR/GUN/GUR130-226 Cooler Heater Wiring

Heater	Primary Voltage	Control Voltage	Resistance (ohms) @ 75 ºF
HT38AZ120	208/230-3-60, 460-3-60, 575-3-60	115-1-60	65.1 (62.0 – 72.4)
HT38AZ121	380-3-60	230-1-60	
	230-3-50, 380/415-3-50	230-1-50	

If installing or replacing the heater tape, the heater tape must not touch another section of the same or similar heater tape.

A control voltage thermostat controls the heater. The thermostat closes at 35 +/- 3 ºF (1.7 +/- 1.7 ºC). The thermostat opens at 45 +/- 3 ºF (7.2 +/- 1.7 ºC). The cooler heater status is affected by compressor status. If the compressor is on, and the thermostat is closed, the heater will be off.

On units produced prior to 5101F, the incorrect cooler thermostat HH22HB058 was installed. This thermostat closes at 28 +/- 6 ºF (-2.2 +/- 3.3 ºC). The thermostat opens at 38 +/- 6 ºF (3.3 +/- 3.3 ºC). SMB020040 advised of this situation.

Service Bulletins pertaining to this condition:

- SMB020040 – 30GTN,R, 30GUN,R Wrong Cooler Heater Thermostat
  This bulletin described the wrong cooler heater thermostat in the 30GT/GTR/GUN/GUR040-420 chilllers.

Cooler Water Flow Rate Limits
The table below has the minimum and maximum flow rates for the coolers

Unit	Minimum Flow Rate		Maximum Flow Rate	
	gpm	l/s	gpm	l/s
30GTN015-020	25	2	294	19
30GTN025-030	20	2	356	22
30GTN035	34	2	406	26

Condenser

Condenser Coils (30GTN/GTR/GUN/GUR Only)
Several condenser coil options are offered for corrosion protection.

Position 11 in the model number indicates the coil option

"-" Standard Aluminum Fin/Copper Tube Coil
"C" Copper Fin/Copper Tube Coil
"E" Aluminum Fin/Copper Tube Coil with E-Coat
"F" Copper Fin/Copper Tube Coil with E-Coat
"K" Aluminum Pre-coast Fin/Copper Tube

Unit	Condenser Coil, FPI				
	"-"	"C"	"E"	"F"	"K"
30GT*/30GU*060	17.0		17.0		17.0

Non-E-coat Coil Cleaning
For standard aluminum, copper and pre-coated aluminum fin coils, clean the coils with a vacuum cleaner, fresh water, compressed air, or a bristle brush (not wire). Units installed in corrosive environments should have coil cleaning as part of a planned maintenance schedule. In this type of application, all accumulations of dirt should be cleaned off the coil.

CAUTION
Do not use high-pressure water or air to clean coils — fin damage may result.

E-Coat Coil Cleaning
Follow the outlined procedure below for proper care, cleaning and maintenance of E-coated aluminum or copper fin coils:

Coil Maintenance and Cleaning Recommendations — Routine cleaning of coil surfaces is essential to maintain proper operation of the unit. Elimination of contamination and removal of harmful residues will greatly increase the life of the coil and extend the life of the unit.

Remove Surface Loaded Fibers — Surface loaded fibers or dirt should be removed with a vacuum cleaner. If a vacuum cleaner is not available, a soft brush may be used. In either case, the tool should be applied in the direction of the fins. Coil surfaces can be easily damaged (fin edges bent over) if the tool is applied across the fins. NOTE: Use of a water stream, such as a garden hose, against a surface loaded coil will drive the fibers and dirt into the coil. This will make cleaning efforts more difficult. Surface loaded fibers must be completely removed prior to using low velocity clean water rinse.

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

Routine Cleaning of Coil Surfaces — Monthly cleaning with Environmentally Sound Coil Cleaner is essential to extend the life of coils. It is recommended that all coils, including standard aluminum, pre-coated, copper/copper or E-coated coils are cleaned with the Environmentally Sound Coil Cleaner as described below. Coil cleaning should be part of the units regularly scheduled maintenance procedures to ensure long life of the coil. Failure to clean the coils may result in reduced durability in the environment. Environmentally Sound Coil Cleaner is non-flammable, hypo allergenic, non-bacterial, USDA accepted biodegradable and 100% ecologically safe agent that will not harm the coil or surrounding components such as electrical wiring, painted metal surfaces or insulation. Use of non-recommended coil cleaners is strongly discouraged since coil and unit durability could be affected.

Environmentally Sound Coil Cleaner Application Equipment
- 2-1/2 Gallon Garden Sprayer
- Water Rinse with Low Velocity Spray Nozzle

Environmentally Sound Coil Cleaner Application Instructions:
- Although Environmentally Sound Coil Cleaner is harmless to humans, animals, and marine life, proper eye protection such as safety glasses is recommended during mixing and application.
- Remove all surface loaded fibers and dirt with a vacuum cleaner as described above.
- Thoroughly wet finned surfaces with clean water and a low velocity garden hose being careful not to bend fins.
- Mix Environmentally Sound Coil Cleaner in a 2-1/2 gallon garden sprayer according to the instructions included with the Enzyme Cleaner. The optimum solution temperature is 100 ºF (38 ºC). NOTE: DO NOT USE water in excess of 130 ºF (55 ºC) as the enzymatic activity will be destroyed.

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

CAUTION

Harsh Chemical and Acid Cleaners — Harsh chemical, household bleach or acid cleaners should not be used to clean outdoor or indoors coils of any kind. These cleaners can be very difficult to rinse out of the coil and can accelerate corrosion at the fin/tube interface where dissimilar materials are in contact. If there is dirt below the surface of the coil, use the Environmentally Sound Coil Cleaner as described above.

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

Condenser Fan System (30GTN/GTR Only)
There are several options offered depending upon the model.

30GTN/GTR040-420
Four options are offered for this product family. Each is described below.

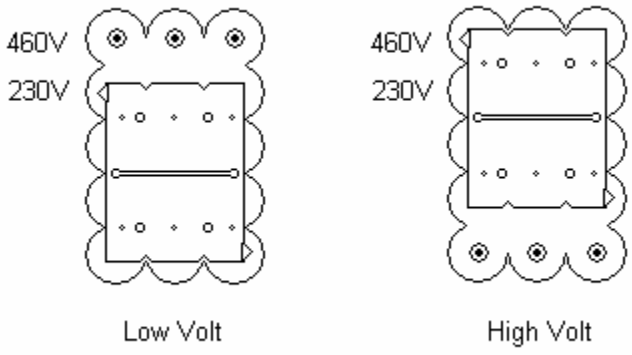
Standard Condenser Fans
This system consists of a metal fan blade and 3-phase motor. This fan system is compatible with both the Motormaster III and Motormaster V controller with qualified motors.

Several motors were used with this option.

Carrier Part Number	Voltage	Compatible with	
		MotorMaster III	MotorMaster V
HD52AK001	208/230-3-60 230-3-50 380/415-3-50 460-3-60 575-3-60	No	No

Carrier Part Number	Voltage	Compatible with	
		MotorMaster III	MotorMaster V
HD52AK002	208/230-3-60 230-3-50 380/415-3-50 460-3-60 575-3-60	No	Yes
HD52AK651	208/230-3-60 460-3-60	No	No
HD52AK652	208/230-3-60 230-3-50 380/415-3-50 460-3-60 575-3-60	Yes	No
HD52AK653	208/230-3-60 230-3-50 380/415-3-50 460-3-60 575-3-60	No	No
HD52AK654	208/230-3-60 230-3-50 380/415-3-50 460-3-60 575-3-60	No	Yes

Starting 1303F, the 208/230/460-3-60, 200/400-3-50 fan motor changed from a wired 9-lead motor to a Voltage Change Device (VCD) style motor. A plug sets the voltage of the motor.



Standard Condenser Fans (30GTN/GTR226 Only)

This system consists of the Flying Bird Fan and a 3-phase motor. It is only offered on the 30GTN/GTR226 machine.

0.4 ESP High Static Condenser Fans

This system consists of a 12 bladed molded fan and a 3-phase motor. Due to the motor frame size, there are no internal overloads. As a result, external overloads are used to protect the motor.

1.0 ESP High Static Condenser Fans

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Expansion Valves

Two types of expansion valves are used on this equipment, Thermostatic Expansion Valves and Electronic Expansion Valves. Both valves are addressed separately.

Electronic Expansion Valve

The 30GTN/GTR/GUN/GUR040-420 all use Carrier's Electronic Expansion Valve (EXV) as the standard expansion device. There are two EXV styles available.

EXV

The original production of ComfortLink chillers used the 1500 step, bottom seal EXV. The motor is a unipolar motor with a stepper rate of 30 steps/second.

EXV Usage Chart				
30GTN/GTR	Standard Option		Brine Option	
30GUN/GUR	Circuit A	Circuit B	Circuit A	Circuit B
040	32GB400974	32GB400974	See Thermostatic Expansion Valve	
045	32GB400974	32GB400974	See Thermostatic Expansion Valve	
050	32GB400974	32GB400974	32GB400974	32GB400974
060	32GB400974	32GB400984	32GB400974	32GB400974
070	32GB400984	32GB400984	32GB400974	32GB400974
080	32GB400994	32GB400994	32GB400984	32GB400984
090	32GB400994	32GB400994	32GB400984	32GB400984
100	32GB401004	32GB401004	32GB400994	32GB400994
110	32GB401004	32GB401004	32GB400994	32GB400994
130	32GB401024	32GB401024	32GB401014	32GB401014
150	32GB401034	32GB401034	32GB401024	32GB401024
170	32GB401034	32GB401034	32GB401024	32GB401024
190	32GB401044	32GB401044	32GB401034	32GB401034
210	32GB401054	32GB401054	32GB401044	32GB401044
226			N/A	N/A

Since this style of EXV is no longer available, RCD has superceded the original EXV design to the EXV-II style. Tables of equivalent EXVs are listed below:

Bottom Seal EXV Assemblies Used on: 30GN/GT/GTN/GTR/GU/GUR/GUN				
EXV Part No.	EXV Orifice Part No.	EXV-II Part No.	EXV-II Orifice Part No.	Nominal Tonnage
32GB400974	32GB500844	32GB402534		20
32GB400984	32GB500854	32GB402544		30
32GB400994	32GB500864	32GB402554		40
32GB401004	32GB500874	32GB402564		50
32GB401014	32GB500874	32GB402574		50
32GB401024	32GB500894	32GB402584		60
32GB401034	32GB500904	32GB402594		75
32GB401044	32GB500914	32GB402604		90
32GB401054	32GB500634	32GB402614		110
32GB401064	32GB500614	32GB402624		120

EXV-II

Beginning with units with serial number 1400F, the 30GTN/GTR/GN/GUR Chillers started production with the new Electronic Expansion Valve (EXV-II) design. The motor is a unipolar motor with a stepper rate of 30 steps/second. This valve has new features to enhance the reliability of the valve.

EXV-II Usage Chart				
30GTN/GTR 30GUN/GUR	Standard Option		Brine Option	
	Circuit A	Circuit B	Circuit A	Circuit B
040	32GB402534	32GB402534	See Thermostatic Expansion Valve	
045	32GB402534	32GB402534	See Thermostatic Expansion Valve	
050	32GB402544	32GB402544	32GB402534	32GB402534
060	32GB402544	32GB402544	32GB402534	32GB402534
070	32GB402544	32GB402544	32GB402534	32GB402534
080	32GB402554	32GB402554	32GB402544	32GB402544
090	32GB402554	32GB402554	32GB402544	32GB402544
100	32GB402564	32GB402564	32GB402554	32GB402554
110	32GB402564	32GB402564	32GB402554	32GB402554
130	32GB402584	32GB402584	32GB402574	32GB402574
150	32GB402594	32GB402594	32GB402584	32GB402584
170	32GB402594	32GB402594	32GB402584	32GB402584
190	32GB402604	32GB402604	32GB402594	32GB402594
210	32GB402614	32GB402614	32GB402604	32GB402604
226	32GB402614	32GB402614	N/A	N/A

The refrigerant connection points are the same as with the old design. The part numbers of the EXV will change to designate the new design. The valves are physically interchangeable.

The valve body is a one-piece design. The potential leak path at the base has been eliminated.

The EXV motor is in its own sealed canister. The motor canister is open to the refrigerant environment. The EXV-II motor is the same stepper motor used in the old design. The electrical connections remain the same. An o-ring is used to seal the motor canister and the valve body.

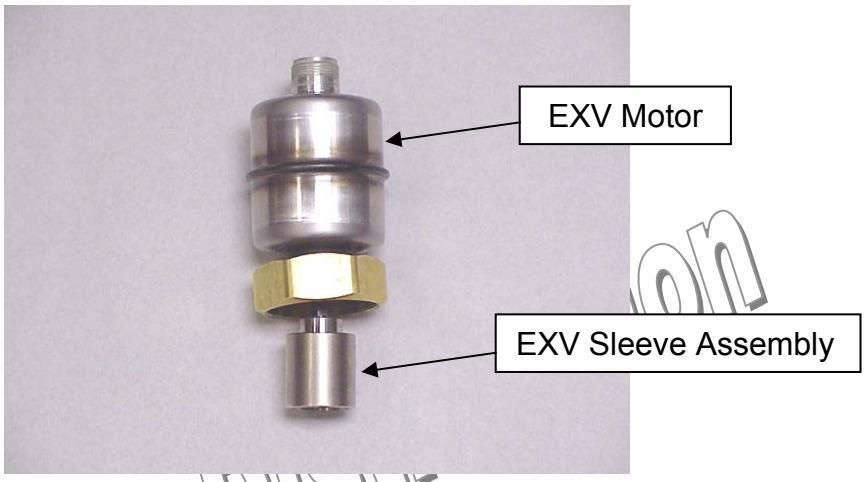

Figure 12 – EXV Motor/Sleeve Assembly

The orifice in the new design is removable. The guide pin that was on the old design is no longer used. An anti-rotation device is installed in the motor canister assembly.

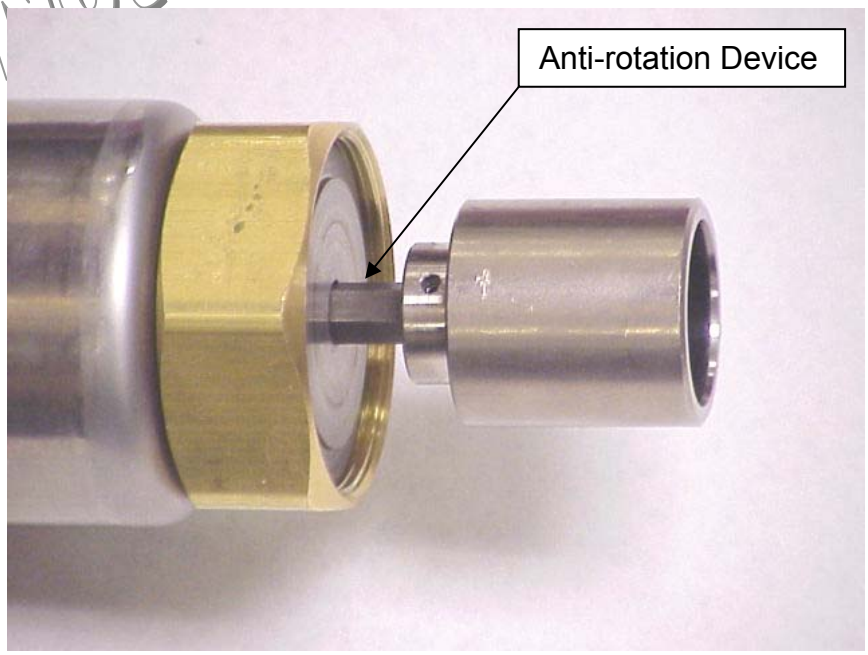

Figure 13 – EXV Sleeve Anti-rotation Device

Servicing
For ease of service, it is recommended that the following tools be available:

Part Number	Description
TS429	EXV Orifice Removal Tool
19XL680001 or 06NA680001	O-ring Grease
	2-1/8” Wrench
	5/8” Socket
	Volt-Ohm Meter

The EXV Orifice Removal Tool is available through RCD. Contact your RCD Order Correspondent for price and availability.

RCD is setting up the following parts for service work.

- Housing o-ring, P-36046
- Seal Kit, 32GB660013 includes the housing o-ring
- Motor Kit, 30GT660010 includes the housing o-ring, dielectric grease, o-ring grease, and sleeve assembly
- All EXV orifices

Before any service work is started, remove the refrigerant from the low side. Open and tag out all disconnects.

Once the refrigerant has been removed from the circuit, access to the valve orifice is obtained by using a 2-1/8” Wrench. The seal is made with an o-ring. Use caution while loosening the 2-1/8” nut. Do not twist the valve.

To remove/replace the orifice
Order the seal kit from RCD. The orifice can be removed by using the orifice removal tool. A large screwdriver can also be used. Remove the orifice. Install the new orifice and tighten to 100 lb-in (11.3 N-m). Replace the housing seal o-ring found in the seal kit. Apply a small amount of o-ring grease to the housing seal o-ring before installing it. Reinstall the motor canister assembly. Tighten the motor nut to 15-25 lb-ft (20.3-33.9 N-m)

Figure 14 – EXV Orifice and TS429 Orifice Removal Tool

To replace the seal

To replace the seal, order the seal kit from RCD. Remove the orifice. Remove the old seal. Using the orifice as a guide, add a small amount of o-ring grease, to the underside of the orifice. Be careful not to plug the vent holes on the under side of the orifice. Carefully seat the seal with the o-ring into the orifice. The o-ring grease will hold the seal in place. If the o-ring grease is not used, the seal o-ring will twist and bind when the orifice is screwed into the EXV base. Remove the orifice to be sure the seal is seated correctly. Install the orifice and seal assembly. Tighten the orifice to 100 lb-in (11.3 N-m). Replace the housing seal o-ring. Apply a small amount of o-ring grease to the housing seal o-ring before installing it. Reinstall the motor canister assembly. Tighten the motor nut to 15-25 lb-ft (20.3-33.9 N-m)

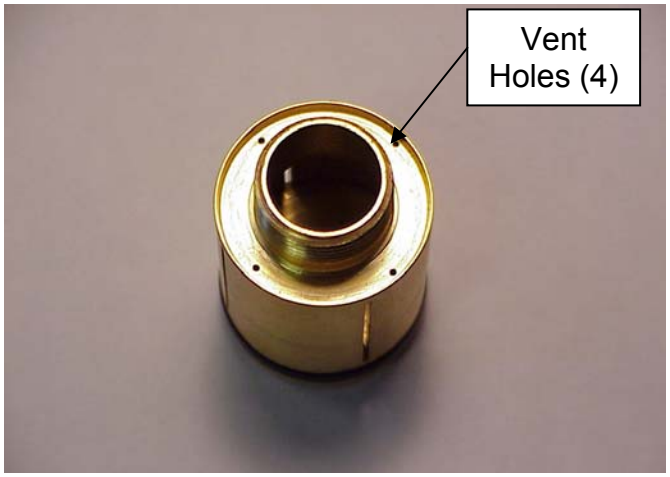

Figure 15 – Orifice Vent Holes

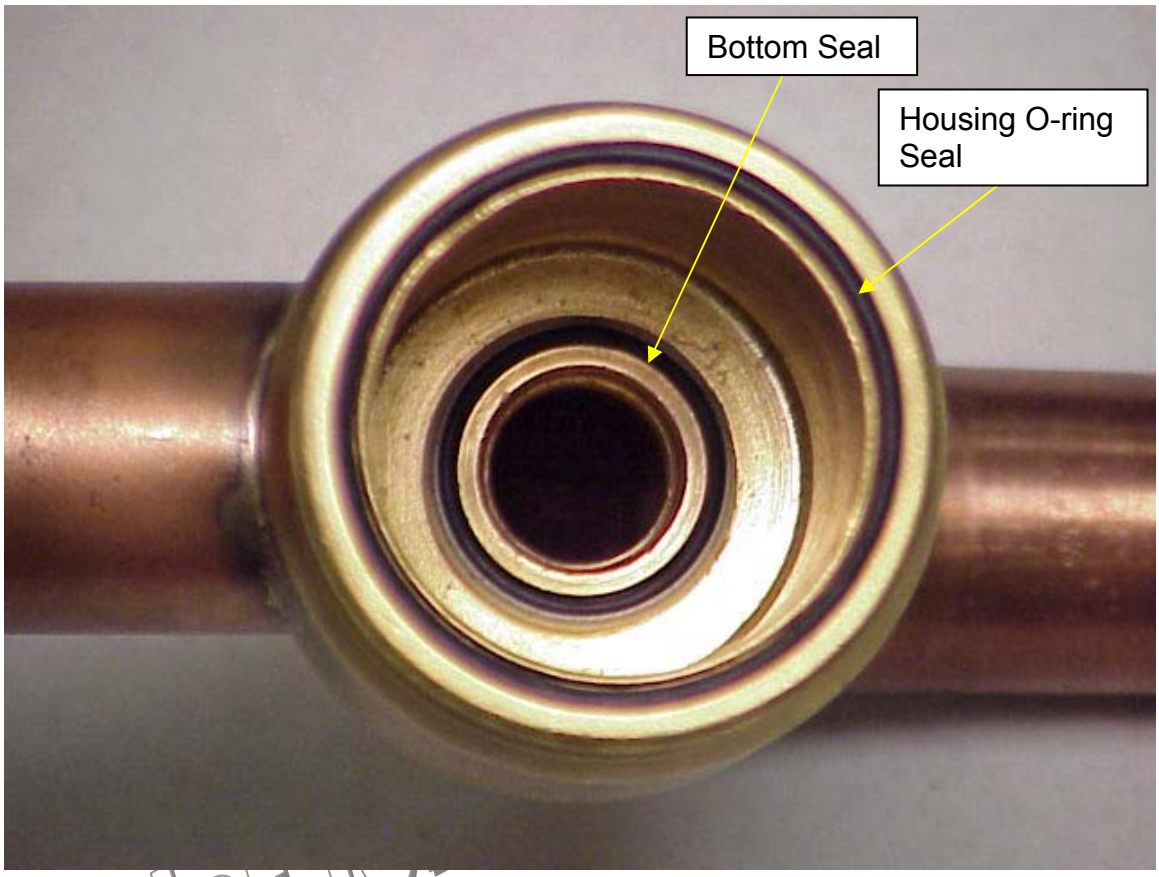

Figure 16 – Housing o-ring and Bottom seal

To service the motor canister
If a problem is suspected with the motor, using a volt-ohm meter measure the resistance of each winding. They should be 25 ± 1 Ω. Check all pins to ground. Infinite or no reading should be found during the test. If anything other than these values are found, replace the motor.

Before opening the motor canister, remove the refrigerant from the low side using accepted refrigerant practices and have a seal kit available for the housing o-ring. With the motor canister removed, use the Quick Test function to determine if the motor assembly can be driven open and closed. If the motor does not respond to the command, check for a pulsing voltage output from the driver module, and the EXV Cable wiring for continuity or a short. If the driver module checks out and the EXV cable are okay, replace the motor canister.

Remove the motor canister. Replace the housing seal o-ring found in the motor kit. Apply a small amount of o-ring grease to the housing seal o-ring before installing it. Install the motor canister assembly, tightening the motor nut to 15-25 lb-ft (20.3-33.9 N-m). Apply a small amount of dielectric grease to the EXV electrical connector. Insert and secure the cable.

Service Bulletins pertaining to this condition:

- PMB02-113 – Chiller Electronic Expansion Valve Redesign – Phase II
  This bulletin described the RCD parts available for the old and new style valve.

EXV-III

Beginning with units with serial number 2503F, the 30GTN/GTR Chillers started production with the new Electronic Expansion Valve (EXV-III) design. The unit Series designation changed to "3" with this change. This EXV assembly is a 15,000 step, bottom seal valve and includes a sight glass and dry eye included in the body. This enhancement provides for a visual verification of the EXV sleeve movement. The motor is a bi-polar motor with a stepper rate of 300 steps/second.

Reports from the field indicated that machines equipped with this EXV may experience flooding at start-up and may trip on low oil pressure, T118/T119. The problem has been traced to the 15,000-step EXV. The full travel of valve is less than 15,000 steps and should be re-configured. Using Service Tool, modify EXVARANG, EXVBRANG, EXVAMAXS, and EXVBMAXS to all equal 12210, not 15000. EXV.T (Configuration Mode, Sub-mode OPT1) will change to 0; leave it at 0.

EXV-III Usage Chart				
30GTN/GTR	Standard Option		Brine Option	
	Circuit A	Circuit B	Circuit A	Circuit B
040	32GB403824	32GB403824	See Thermostatic Expansion Valve	
045	32GB403824	32GB403824	See Thermostatic Expansion Valve	
050	32GB403834	32GB403834	32GB403824	32GB403824
060	32GB403834	32GB403834	32GB403824	32GB403824
070	32GB403834	32GB403834	32GB403824	32GB403824
080	32GB403844	32GB403844	32GB403834	32GB403834
090	32GB403844	32GB403844	32GB403834	32GB403834
100	32GB403854	32GB403854	32GB403844	32GB403844
110	32GB403854	32GB403854	32GB403844	32GB403844
130	32GB403874	32GB403874	32GB403864	32GB403864
150	32GB403884	32GB403884	32GB403874	32GB403874
170	32GB403884	32GB403884	32GB403874	32GB403874
190	32GB403894	32GB403894	32GB403884	32GB403884
210	32GB403904	32GB403904	32GB403894	32GB403894
226	32GB403194	32GB403194	N/A	N/A

Servicing

To service the Motor

If a problem is suspected with the motor, using a volt-ohm meter measure the resistance of each winding. They should be 70 to 75 Ω. Check all pins to ground.

Infinite or no reading should be found during the test. If anything other than these values are found, replace the motor.

Before removing the motor assembly, remove the refrigerant from the low side using accepted refrigerant practices and have a housing o-ring available. With the motor assembly removed, use the Quick Test function to determine if the motor assembly can be driven open and closed. If the motor does not respond to the command, check for a pulsing voltage output from the driver module, and the EXV Cable wiring for continuity or a short. If the driver module checks out and the EXV cable are okay, replace the motor assembly.

To install a new motor assembly, 32GB403924 replace the housing seal o-ring found in the motor assembly kit. Apply a small amount of o-ring grease to the housing seal o-ring before installing it. Install the motor canister assembly, tightening the nut to 18-22 ft-lbs (24-30 N-m). Apply a small amount of dielectric grease to the EXV electrical connector. Attach the EXV cable. Evacuate and recharge the circuit. Test the valve operation.

To Change The Sightglass/Dry Eye:
RCD offers a sightglass kit, 32GB503934 that includes the sight glass and o-ring. The Sightglass/Dry Eye is 15-25 ft-lbs (20-34 N-m).

Service Bulletins pertaining to this condition:

- PMB03-096 – 30 Series Chiller EXV's, Phase III, 15,000 Step Motor
  This bulletin described a mistake in the original release of RCD's EPIC parts breakdown on the Series 3 machines. The correct valve part numbers are listed on the bulletin.

Thermostatic Expansion Valve
Thermostatic Expansion Valves (TXV) are used on all 30GTN015-035, 30HK/HL040-060, and 30HWA/HWB/HWC/HWS018-040. The 30GTN/GTR040-070 offer a factory installed option for a TXV. The 30GTN/GTR040-045 uses a TXV for the factory installed brine option. All valves are Maximum Operating Pressure (MOP) valves to limit the suction pressure entering the compressor.

MOP type valves are subject to cross ambient conditions. When the ambient is 20 °F (11 °C) or more colder than the suction line, the gas in the bulb condenses in the power head of the TXV. The liquid in the power head interferes with the operation of the TXV, and does not allow it to open. As a result, the cooler is starved of refrigerant, and the unit trips on low refrigerant pressure. If this condition is encountered, the TXV power head should be wrapped with self-regulating heater tape. Wrapping the power head will keep the temperature of power head higher than the bulb and not allow the gas to condense on the power head. The heater should be wired to turn on and off with cooler heater.

Unit	Standard Option		Brine Option	
	Circuit A	Circuit B	Circuit A	Circuit B
30GTN/GTR040 30GUN/GUR040			EA02HB515	EA02HB515
30GTN/GTR045 30GUN/GUR045			EA02HB515	EA02HB515
30HWC035	EA02CG558	-	EA02CG521	-

Low Pressure Switch

Unit	Standard		Brine	
	Circuit A	Circuit B	Circuit A	Circuit B
30HWA	HK02ZB042	-		
30HWC	HK02ZB042	-	HK02ZB041	-

The switch characteristics are shown below.

Switch Part Number	Pressure, psi (kPa)	
	Open	Close
HK02ZB041	27 ± 3 (186 ± 20)	44 ± 5 (303 ± 34)
HK02ZB042	42 ± 3 (290 ± 20)	57 ± 5 (393 ± 34)

Low Ambient Head Pressure Control
There are several types of head pressure control devices used on the 30G products, depending upon the machine.

MotorMaster III
ComfortLink machines were introduced with MotorMaster III as the device of choice for head pressure control for these machines.

In January 2004, the vendor for the MotorMaster III discontinued production. It was later re-instated by the vendor. See below for additional information. As a result of the original discontinuation, RCD procured another device to replace the MotorMaster III. This device is larger than the original MotorMaster III and as a result must be mounted on the outside of the control box. There are 2 devices available, based on voltage.

Voltage	RCD Part Number	Horsepower Range
240-3-60	P251-0096	1-3
480-3-60	P251-0097	1-5

This device can be controlled via a thermistor, pressure transducer, 4-20 mA or 0-10 vdc signal.

Bulletins pertaining to this issue:

- PMB04-013 – Three Phase Motor Head Pressure Controllers
  This bulletin announced the MotorMaster III discontinuation and that RCD has superceded the MotorMaster to the P251-0096 and P251-0097.

In June 2004, RCD began stocking the original Motormaster III under the part number 32LT660006.

Conversion from MotorMaster III to Motormaster V

In order to convert the MotorMaster III control to a MotorMaster V controller, there are several items that must be field-supplied and installed.

Following are instructions for conversion of units using MotorMaster III head pressure control to MotorMaster V. For best operation, MotorMaster V should be wired direct to the fan motors, without using the fan contactors. By bypassing the contactors the effect of the inrush current as the capacitors charge is minimized. This also reduces the possibility of condensation forming inside the drive.

The MotorMaster V can be enabled and disabled based by the closing or opening of the start command jumper. The MotorMaster III fan contactors will be removed and a control relays, powered from the fan contactor coil wires, will provide the start command to enable the MotorMaster V.

The Table below identifies the components necessary to perform the conversion. The finished goods accessory kit will be required along with the additional components listed.

MotorMaster III Conversion to MotorMaster V				
30GTN/GTR 30GUN/GUR	Voltage	MotorMaster V Accessory Kit	MotorMaster V Motor † (Qty) Part No.	Shielded Cable 30GX405293
040-110	208/230-3-60	30GT-911---080	(2) HD52AK654	2
	230-3-50	30GT-911---080	(2) HD52AK654	
	380-3-60	30GT-911---081	(2) HD52GE381	
	380/415-3-50	30GT-911---081	(2) HD52AK654	
	460-3-60	30GT-911---081	(2) HD52AK654	
	575-3-60 ‡	30GT-911---082	(4) HD52AK576	
130-210	208/230-3-60	30GT-911---074	(4) HD52AK654	2
	230-3-50	30GT-911---074	(4) HD52AK654	
	380-3-60	30GT-911---075	(4) HD52GE381	
	380/415-3-50	30GT-911---076	(4) HD52AK654	
	460-3-60	30GT-911---076	(4) HD52AK654	
	575-3-60 ‡	30GT-911---076	(4) HD52AK576	

Note: † - MotorMaster Motors have external junction box. 1/2" conduit connector, HW60FZ001 is required per motor.
‡ - 575 Volt Motormaster V does not require the autotransformers used with MotorMaster III.

1. Turn off and lock out all power to the unit.
2. Remove power wires and thermistor from MotoMaster III.
3. Remove MotorMaster III's.
4. Remove power and coil wires from FC-A1 and FC-B1. Note phasing for reconnection.
5. Remove contactors FC-A1 and FC-B1 and install fuse block(s).
6. Replace MotorMaster motors with those listed in the Table above.
7. Replace power wiring from control panel to MotorMaster motors with shielded power cable. This reduces EMI produced by MotorMaster V.
8. Route power wiring from the fan circuit breaker through the fuse block to the MotorMaster V. Be sure to follow the same phasing as original wiring.
9. Install two relays p/n HN61KK041 in vicinity of the original contactors and connect the fan contactor coil wires to the relay coil.
10. Wire the Run-Stop command relay. For 208/230-3-60, 460-3-60, and 575-3-60 machines route the start command jumper wire from TB1 on MotorMaster V, through normally open terminals 4 and 6 on the HN61KK912 relay and back to TB2 on MotorMaster V. For 380-3-60 machines route the start command jumper wire from TB13A on MotorMaster V, through normally open terminals 4 and 6 on the HN61KK913 relay and back to TB2 on MotorMaster V. For 230-3-50 machines route the start command jumper wire from TB13B on MotorMaster V, through normally open terminals 4 and 6 on the HN61KK913 relay and back to TB2 on MotorMaster V. For 380/415-3-50 machines route the start command jumper wire from TB13C on MotorMaster V, through normally open terminals 4 and 6 on the HN61KK913 relay and back to TB2 on MotorMaster V.
11. Follow MotorMaster V installation instructions for proper installation of discharge pressure transducers.
12. Restore power and check for proper operation in Service Test.
13. Follow procedure in MotorMaster V installation instructions to adjust MotorMaster V control parameter P34 to maintain desired head pressure. Default setting is 18.0, which corresponds to approximately 135 psig.
14. Installation of line reactors may be required if low impedance power distribution system is present. Fuses blowing at start-up may indicate this.

MotorMaster V

On the 30GTN/GTR040-420, MotorMaster V began in production 2202F. MotorMaster V is a Variable Frequency Drive Head Pressure Control Device that adjusts condenser fan motor speed in response to declining liquid refrigerant pressure. A properly applied Motormaster V control extends the operating range of air-conditioning systems and permits operation at lower outdoor ambient temperatures.

Motormaster V control cannot be installed with the high static fan option.

The drive is configured by the use of a command jumpers connected as follows:

Table 1 - MotorMaster V Configuration Table

Mode	Voltage	Hz	Control Input	Start Jumper	Set Point Jumper	Refrigerant
1	208*/230/ 460/575	60	Internal PI Control, 0-5 V Feedback	TB1-TB2	None	R-22
2	208*/230	60		TB13A-TB2		
3	230	50		TB13B-TB2		
4	380/415	50		TB13C-TB2		
9	208*/230/ 460/575	60		TB1-TB2	TB12-TB2	R-134a
10	208*/230	60		TB13A-TB2		
11	230	50		TB13B-TB2		
12	380/415	50		TB13C-TB2		

Note: * - At 208 V, the drive can run in either mode.

Beginning with Serial Number 4303F, the head pressure set point parameter of the Motormaster V, P34 was changed from 18 to 24. This change raised the approximate setting from 140 psi to 200 psi.

Beginning with Serial Number 4503F, the control of the MotorMaster V device was changed to use the Run-Stop jumper on the MotorMaster V. The original release of these Motormaster V packages designed to operate with the Run-Stop feature were missing the relay sub-base. The sub-base, HN79KK035 was added to the kits starting Week 5, 2004. RCD stocks this part as HY07RB030.

To modify the MotorMaster to use the Run-Stop feature, perform the following steps:

Following are instructions for modification to power the Motormaster V direct, without using fan contactors. The intent is to keep the capacitors powered to minimize the affect of inrush current.

The Motormaster V control can be enabled and disabled based on the switching of the start command jumper. This modification eliminates the condenser fan contactor(s) FC-A1 and FC-B1 and uses a relay(s) powered from the fan contactor coil wires that will make and break the start command jumper to operate the MotorMaster control.

Early kits were provided with fuses that were too small. Increase the fuse size as indicated. All fuses are KTK-R, Class CC.

Voltage	Low Ambient Kit	MotorMaster V	Original Fuse (Amps)	Recommended Fuse (Amps)
208/230	30GT-911---064	HR46TN001	HY10KB151 (15A)	HY10KB251 (25A)
	30GT-911---067	HR46TN004	HY10KB251 (25A)	HY10KB300 (30A)
460	30GT-911---065	HR46TN002	HY10KB101 (10A)	HY10KB151 (15A)
	30GT-911---068	HR46TN005	HY10KB151 (15A)	HY10KB200 (20A)
575	30GT-911---066	HR46TN003	HY10KB101 (10A)	HY10KB151 (15A)
	30GT-911---069	HR46TN006	HY10KB101 (10A)	HY10KB200 (20A)

Step 1. Turn off and lock out all power to the unit.

Step 2. Remove power and coil wires from FC-A1 and FC-B1. Note phasing for reconnection.

Step 3. Remove contactors. Relocate fuse blocks to contactor location.

Step 4. Rewire power wiring from the circuit breaker through the fuse block to the MotorMaster V. Be sure to follow the same phasing as original wiring.

Step 5. Install two relays p/n HN61KK041 in vicinity of the original contactors and connect the fan contactor coil wires to the relay coil.

Step 6. Route the start command jumper wire from TB1 on MotorMaster V, through normally open terminals 1 and 3 on the relay and back to TB2 on MotorMaster V. (Note: MotorMaster V start jumper terminals vary with unit voltage, consult MotorMaster V Configuration Table for proper location if other than 230, 460 or 575 volt power).

Step 7. Restore power and check for proper operation in Service Test.

Troubleshooting

Condenser Fan speed does not modulate.

If the condenser fan speed does not modulate, check the following items:

- Check the polarity of the drive speed signal.
- Check the transducer to be sure that it is sensing refrigerant pressure on the proper circuit.
- Check the Run-Stop circuit for proper wiring.

Fuses are blowing.

If the fuses are blowing, check the following items:
- Check for the proper size fuse.
- Check for short in the wiring.
- Check the fan motor for a short to ground in the windings.
- If the modifications to use the Run-Stop feature of the Motormaster have not been performed, consider modifying the control. Rapid power cycling of the drive can cause the drive to fail, or blow the fuses.

Network Service Tool IV
Network Service Tool can be a useful diagnostic tool.

When using Service Tool and incorrect data is displayed, remove and add the current unit. This is especially true if new software has been loaded since the last time the unit was viewed through Service Tool. New versions of software may include table structure changes. In order for the information to be correct, the unit must be removed and added within Service Tool to have the new table structure created. If changes to the program did change the table structure, the software version will be incremented by a whole number, such as 1.0 to 2.0. If changes to the program did not change the table structure, the software will increment by a revision number, such as 2.0 to 2.1.

Troubleshooting:

If communications cannot be established with the control, check the following items:
- Check the B&B Converter.
- Confirm the CCNA *CCN Address* (Configuration Mode, Sub-mode OPT2) and CCNB *CCN Bus Number* (Configuration Mode, Sub-mode OPT2) of the device.
- Confirm the BAUD *CCN Baud Rate* (Configuration Mode, Sub-mode OPT2). It should be set for 3 (*9600*). Machines produced prior to 2599F were shipped with the wrong baud rate.

Service Bulletins pertaining to this condition:
- SMB990036 – ComfortLink Baud Rate
  This bulletin described the incorrect factory baud rate setting in 30GT/GTR/GUN/GUR040-420 chilllers produced prior to 2599F.

Oil
The type of oil depends on the refrigerant used.

30GTN/GTR/HK/HL/HW
Mineral Oil is used for all R-22 machines.

Unit	Refrigerant	Oil Type	Compressor Oil Factory Charge Quantity (Pints)						
			A1	A2	A3	A4	B1	B2	B3
30GTN015-50 Hz 30GTN020-60 Hz	R-22	Mineral Oil	14	-	-	-	-	-	
30HWA025	R-22	Mineral Oil	14	-	-	-	-	-	-

Criteria	Specification Requirement*	Acceptable Limit
Total Acid Number (TAN)	0.10 mg KOH/g	≤0.10 mg KOH/g
Moisture	35 ppm	≤50 ppm
Viscosity @ 40 °C		cSt<Sample Viscosity< cSt

Note: * - The specification requirement refers to the acceptability criteria for new oil based on Carrier Material Specification PP33-6.

Caution must be exercised in preparing an oil sample for testing. Refrigerant dissolved in the oil will dilute the sample reducing its viscosity. If an independent laboratory is contracted to perform the analysis, be sure to inform the laboratory the sample contains refrigerant that must be removed prior to the oil viscosity test.

If any of the parameters are outside of the acceptable limits, the oil should be changed.

RCD does offer a Fluid Analysis Service, should the need arise.

Service Bulletins pertaining to this condition:

- SMB990071 – Totaline Fluid Analysis Service
  This bulletin announced RCD's Fluid Analysis Service.

- PMB03-024 – Totaline Fluid Analysis Services 2003 Price List
  This bulletin describes the services available, with lead times and prices.

30GUN/GUR

Polyolester Oil is used for all R-134a machines.

Criteria	Specification Requirement*	Acceptable Limit
Total Acid Number (TAN)	0.10 mg KOH/g	≤0.10 mg KOH/g
Moisture	50 ppm	≤100 ppm
Viscosity @ 40 °C	cSt	cSt<Sample Viscosity< cSt

Note: * - The specification requirement refers to the acceptability criteria for new oil based on Carrier Material Specification PP47-26.

Caution must be exercised in preparing an oil sample for testing. Refrigerant dissolved in the oil will dilute the sample reducing its viscosity. If an independent laboratory is contracted to perform the analysis, be sure to inform the laboratory the sample contains refrigerant that must be removed prior to the oil viscosity test.

If any of the parameters are outside of the acceptable limits, the oil should be changed.

RCD does offer a Fluid Analysis Service, should the need arise.

Service Bulletins pertaining to this condition:

- SMB990071 – Totaline Fluid Analysis Service
  This bulletin announced RCD's Fluid Analysis Service.

- PMB03-024 – Totaline Fluid Analysis Services 2003 Price List
  This bulletin describes the services available, with lead times and prices.
- PMB04-037 – Castrol POE Lubricants – Shortage and Excusable Delay Notice
  This bulletin describes the shortage of POE lubricants and the RCD hold for review on all shipments of POE orders. The bulletin recommends testing the oil and replacing only when necessary.

Oil Pressure Safety Switch

On multiple compressor circuits, and brine machines oil pressure safety switches are standard from the factory. There are 2 styles of pressure switches can be used with the reciprocating compressor products.

30GTN/GTR/GUN/GUR040-420

This product line uses the Robertshaw/Invensys differential pressure switch. The switch, HK06UB006 has a cutout pressure of 5 ± 1 psid (34.5 +/- 6.9 kPa). This switch is mounted on the compressor terminal box. It is rated for outdoor duty. The switch is mounted on the lead compressor of the circuit and connected to the oil circuit by capillary tubes. Electrically, the switch is wired to a circuit channel on the Main Base Board.

A production problem at Robertshaw/Invensys was found on Oil Pressure Switches with date codes of July 25, 2002 through July 31, 2002. The date code can be found on the side of the switch. The problem is with the solder seal of the pressure set point set screw. The solder did not seal the set screw in place and could open, resulting in a loss of charge.

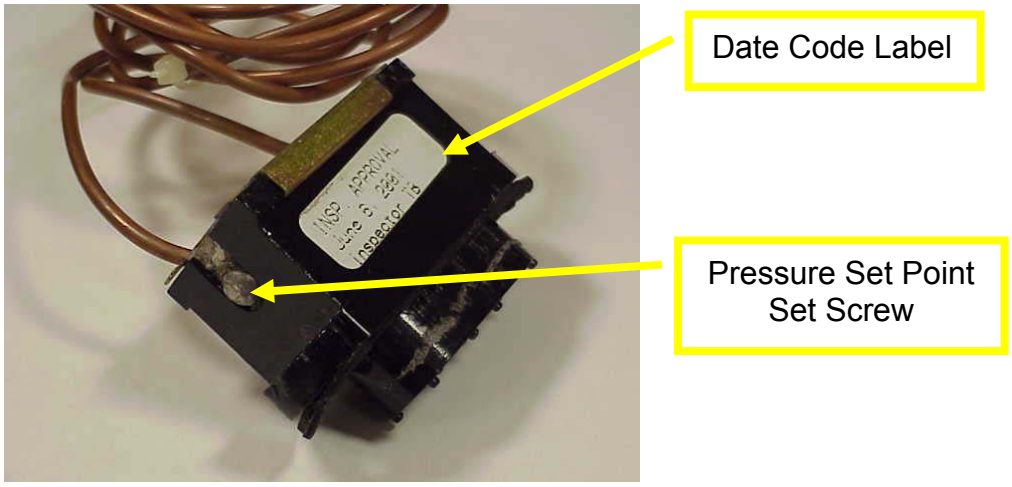

Figure 17 - Robertshaw/Invensys Oil Pressure Differential Pressure Switch

Beginning with Serial Number 3103F, a new oil pressure safety switch HK06UC011 started production. This is a Danfoss device and is sealed. The switch is non-adjustable, and therefore the cover should not be removed. Removing the cover will damage the seal.

Service Bulletins pertaining to this issue:

- SMB030050 – New Oil Pressure Safety Switch
  This bulletin described the replacement of the HK06UB006 oil pressure switch with the HK06UC011.

Paint

All chillers are painted in American Sterling Grey. RCD stocks a touch-up can of paint for this color under the part number, 313974-751.

Pressure Transducers

Although, not supplied from the factory, the Dual Circuit Software can support the addition of pressure transducers. The following modification can be made to the 30GTN/GTR/GUN/GUR040-420 and 30HK/HL040-060 machines.

Materials Required:

Qty	Part Number	Description
2	CA20JB051	Tee, ¼" Flare x ¼" Flare x ¼" Female Flare
2	DD15CA045	Tee, ¼" Flare x ¼" Flare x ¼" Male NPT
2	DD19CA061	Flare Cap
2	DK06DA051	Adapter, ¼" NPT Male x ¼" NPT Female
4	EC39DM062	Shrader Valve Core
2	HK05YZ001	Pressure Transducer, Low Pressure
2	HK05YZ100	Pressure Transducer, High Pressure

4	30GT409069	Harness, Pressure Transducer Connector
1	32MP660023	Board Connector Kit

Field Supplied Material:

Part Number	Description
32GB680004	Dielectric Grease
	Junction Box, Cover, and mounting hardware
	Strain Relief (for Junction Box Wiring)
Loctite 567 PST	Thread Sealer
	Wire Nuts
	16 AWG wire, or 3-conductor, 18 AWG cable. Suitable for outdoor and wet locations.

Required Tools:

Part Number	Description
1631	Paladin Tools – Micro Pin Crimper

Safety Considerations:
Installing, starting up and servicing air conditioning equipment can be hazardous due to system pressures, electrical components and equipment location.

Only trained, qualified installers and service mechanics should install, start-up and service equipment. When working on the equipment, observe precautions in the literature and on tags, stickers and labels attached to the equipment. Follow all safety codes. Wear safety glasses and work gloves.

Instructions:
Read all instructions carefully before starting any work. These instructions are intended for 30GTN/GTR/GUN/GUR040-420, 30HK/HL040-060 only. Due to various configurations of machines, not all of the parts listed above will be used.

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

1. Open and tag all disconnects to the unit.
2. Close both the suction and discharge service valves to all compressors in the circuit.
3. Recover any remaining refrigerant within the compressor using accepted refrigeration practices.
4. On the lead compressor for a circuit, remove the High Pressure Switch from the snubber assembly 50EQ400532. Attach the CA20JB051 tee to the snubber assembly. Reattach the high pressure switch to one side of the tee. Do not

install a shrader valve core under the high pressure switch. Attach one Pressure Transducer, HK05YZ100 to the other side of the tee. Be sure to install the correct transducer. Installing the incorrect transducer will lead to faulty pressure readings. Do not use thread sealer on either the pressure transducer or high pressure switch.

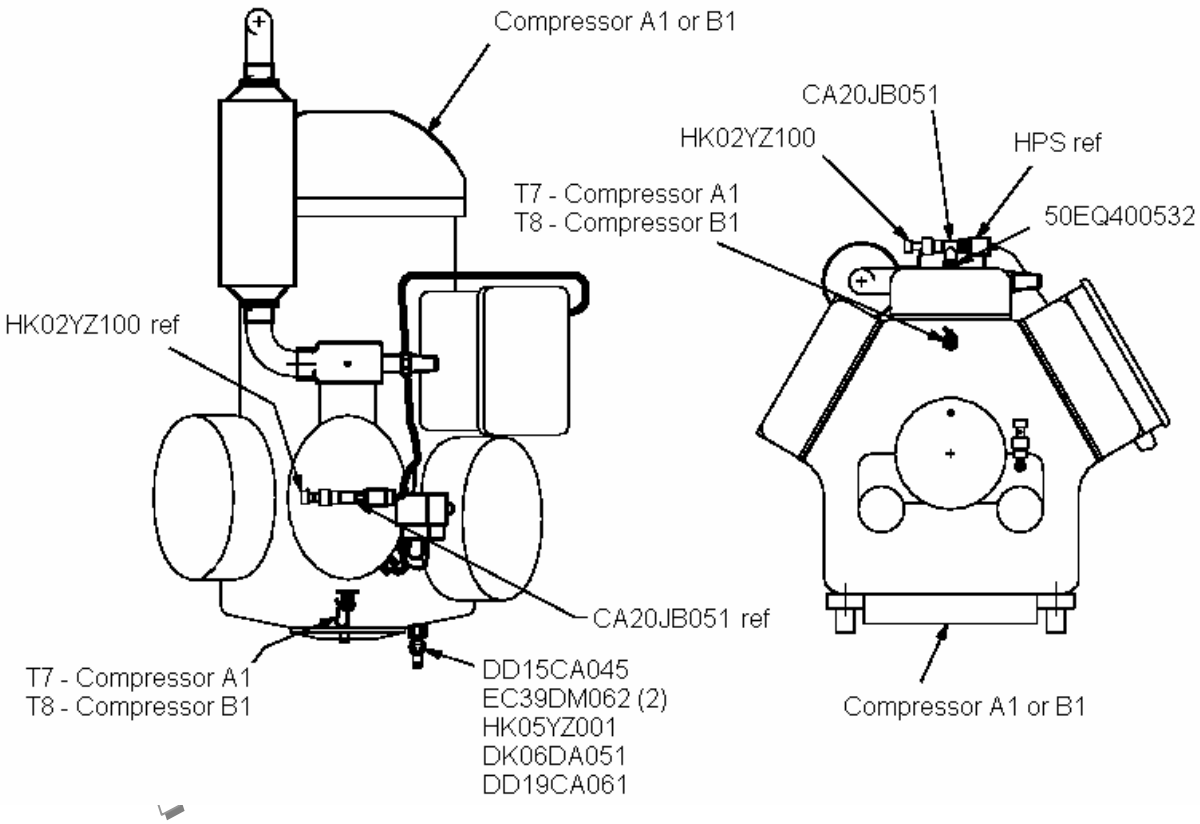

Figure 18 - Compressor A1/B1 Transducer Mounting

5. For units without an oil pressure safety switch installed, remove the Shrader Valve or pipe plug from one of the low side pressure ports of the compressor. Attach the DD15CA045 to the adapter DK06DA051 and install the assembly into the port previously exposed. Install (2) Shrader valve cores, EC39DM062, one in the branch and one in the run of the tee, DD15CA045. Install one Pressure Transducer, HK05YZ001 to branch of the tee. Install a Flare Cap, DD19CA061 on the tee run flare fitting. Be sure to install the correct transducer. Installing the incorrect transducer will lead to faulty pressure readings. Do not use thread sealer for the pressure transducer. See Figure 18 for fitting and transducer locations.
   For units with an oil pressure safety switch installed, remove the flare cap from the tee. Install one Pressure Transducer, HK05YZ001 to the tee. Be sure to install the correct transducer. Installing the incorrect transducer will lead to faulty pressure readings. Do not use thread sealer for the pressure transducer. See Figure 18 for fitting and transducer locations.

6. Leak check all installed fittings. Once complete, evacuate the compressor assembly. After evacuation is complete open all service valves.
7. Repeat steps 2 through 6 on the other circuit's lead compressor.
8. Remove the thermistors T3, T4, T5, and T6 from Main Base Board, MBB-J8. Remove the thermistors through the control box. The strain relief used for the thermistors will be used for the transducer connection.
9. Install a recommended strain relief in the junction box. Mount the Junction Box on a post near the compressor.
10. Place a small amount of dielectric grease in the transducer connector. Connect the transducer wiring harness, 30GT409069 to the transducer. Route the transducer wiring harness to the junction box.
11. With field supplied 16 AWG or the 3-conductor 18 AWG wiring, route 2 sets of 3 wires from the junction box to the control box with enough slack to reach the Main Base Board, MBB-J8 terminals. Using field supplied wire nuts, connect the field supplied wiring to the transducer harness. Be sure to label each of the wires as to the appropriate connection at the both ends. Use the same access/strain relief for the thermistors T3, T4, T5, and T6.
12. Using the Paladin Tool Crimper, connect trifurcated terminals from the Board Connector Kit, 32MP660023 on to the wires routed from the junction box. Install the terminals into the 12 pin board connector located in the Board Connector Kit, 32MP660023. Be sure to install the wires/pins in the correct order as shown in Figure 19.

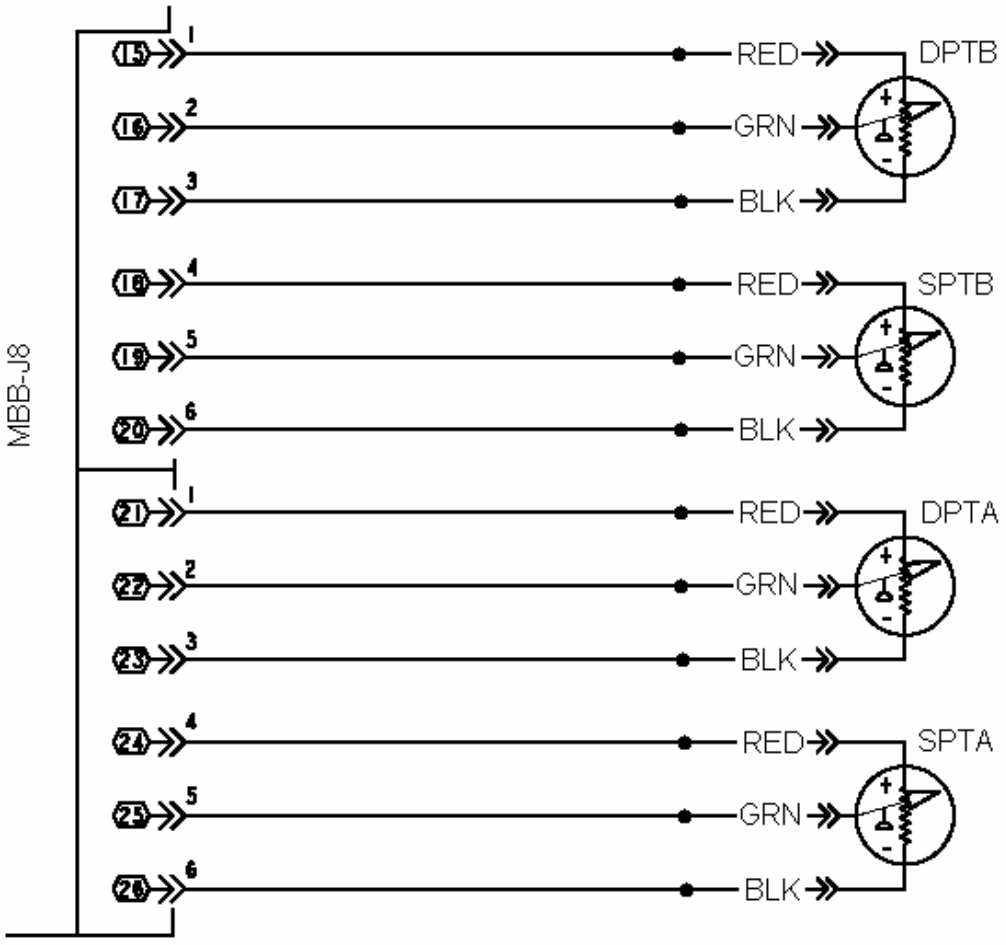

Figure 19 - MBB Transducer Wiring

13. Install the field-assembled plug to MBB-J8, terminals 15-26 as shown in Figure 2.
14. Repeat steps 9 through 13 for the other circuit's lead compressor.
15. Confirm the wiring is correct for the transducers and restore power to the unit.
16. Configure the transducers for operation. Access PRTS *Pressure Transducers* (Configuration Mode, Sub-mode OPT1), and set the value to YES.
17. Confirm that the pressure transducers are reading properly. Pressure Readings can be found under the Pressures Mode, Sub-Mode PRC.A for circuit A and PRC.B for circuit B.
18. Start the machine and verify operation.

Refrigerant

The 30GT, 30HK/HL, and 30HW machines all use R-22. The 30GU machines all use R-134a.

Unit	Refrigerant	Circuit A, lbs. (kg)	Circuit B, lbs. (kg)
30GTN015-50 Hz	R-22	26 (11.8)	-

30GTN020-60 Hz	R-22	31 (14.1)	-
30GTN/GTR080	R-22	78.0 (35.4)	78.0 (35.4)
30GTN/GTR090	R-22	78.0 (35.4)	78.0 (35.4)
30GTN/GTR100	R-22	98.0 (44.5)	105.0 (47.7)
30GTN/GTR110	R-22	98.0 (44.5)	105.0 (47.7)
30GUN/GUR080	R-134a	102.0 (46.3)	102.0 (46.3)
30GUN/GUR090	R-134a	102.0 (46.3)	102.0 (46.3)
30GUN/GUR100	R-134a	129.0 (58.5)	129.0 (58.5)
30GUN/GUR110	R-134a	129.0 (58.5)	129.0 (58.5)

Refrigerant Moisture Limit

The upper limit for moisture in a system is based on the water saturation limit at 35 °F (1.6 °C). An additional requirement placed on R-134a due to the type of oil used. R-134a has a maximum limit of 625 ppm. The POE oil has a max limit of 100 ppm. Since there is a strong POE/water interaction, the refrigerant limit is too high. The refrigerant limit was established to prevent free water freeze up. As a result, the upper limit has been lowered to the upper limit of the POE moisture limit.

Criteria	Refrigerant	Carrier Material Specification	Specification Requirement*	Acceptable Limit
Moisture	R-134a	PS10-34	10 ppm	≤100 ppm
	R-22	PS10-22	10 ppm	≤650 ppm

Note: * - The specification requirement refers to the acceptability criteria for new oil based on Carrier Material Specification.

If higher moisture content is found, check the following:

- Check for a cooler or condenser leak

If a high moisture content condition is found, repair the leak, evacuate and dehydrate the system using standard refrigerant practices.

Refrigerant Relief Devices

Fusible Plugs

Pressure Relief Valves

Pressure relief valves are located on the high and side of each circuit on select machines. Pressure settings and flow rates are listed below. Some local building codes require that the relieved gases be removed, and as a result all relief valves are equipped with connections for conformance to this requirement. Do not use this list as a parts list for the machine. Confirm the correct number with EPIC before placing the order.

Unit	Location	Part Number	Relief Pressure, psi (kPa) +/- 3%	Flow Capacity, lb. of dry air/min	Connection Size
30GTN/GTR 040-420	Compressor	EB51LP062	450 (3102)	15.1	3/8” SAE Flare
30GUN/GUR 040-420	Compressor	EB51LP062	450 (3102)	15.1	3/8” SAE Flare
30HWC	Condenser	EB51LZ185	350 (2413)	6.3	3/8” SAE Flare

These valves should not be capped. If a valve relieves, it should be replaced. If the valve is not replaced, it may relieve at a lower pressure or leak due to trapped dirt from the system, which may prevent resealing.

Thermistors

The ComfortLink control uses 3 to 8 thermistors to sense temperatures for controlling chiller operation. These sensors are outlined below.

Thermistors T1 though T9 are 5k Ω at 77 ºF (25 ºC) and are identical in temperature versus resistance and voltage drop performance. Thermistor T10 is 10k Ω at 77 ºF (25 ºC) and has a different temperature vs resistance and voltage drop performance.

T1 - Leaving Chilled Water Thermistor

T2 - Entering Chilled Water Thermistor

T3/T4 - Saturated Condensing Thermistor

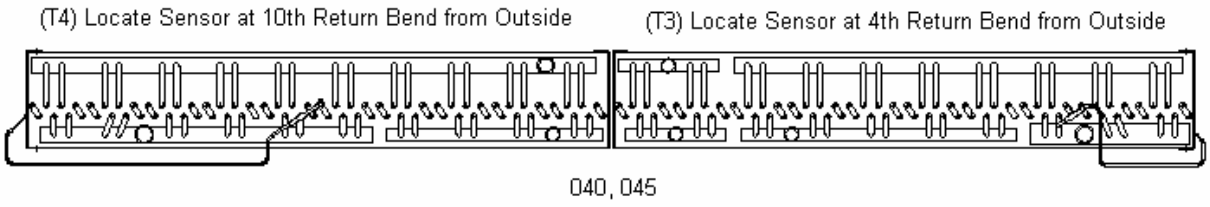

Figure 20 - 30GTN/GTR040-045 T3 and T4 Location

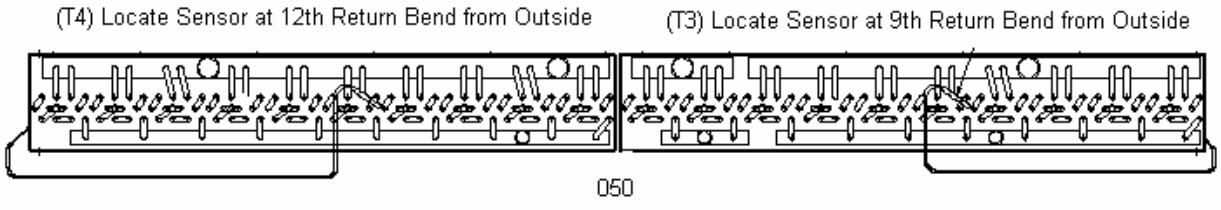

Figure 21 - 30GTN/GTR050 T3 and T4 Location

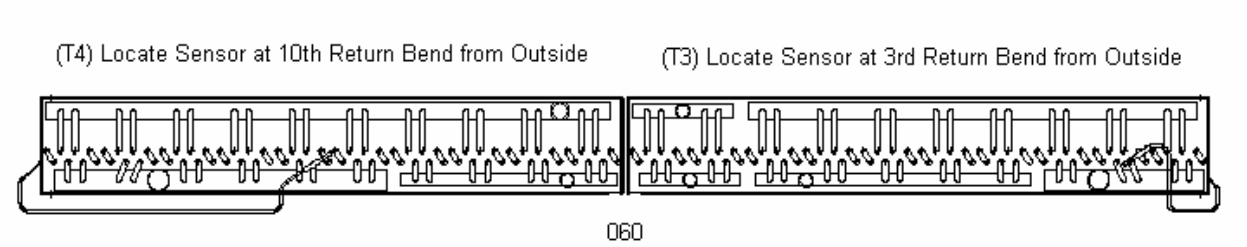

Figure 22 - 30GTN/GTR060 T3 and T4 Location

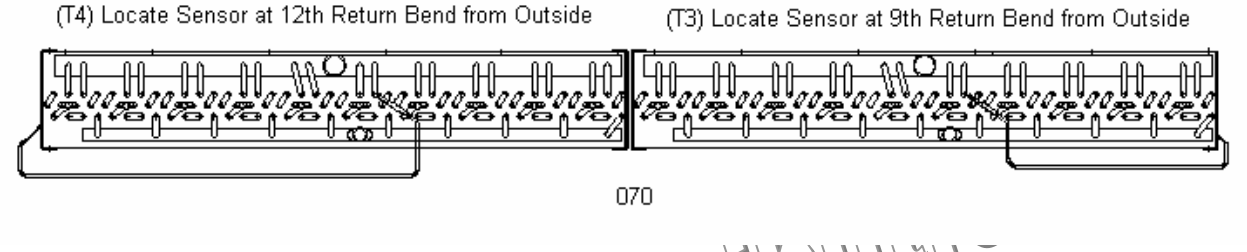

Figure 23 - 30GTN/GTR070 T3 and T4 Location

T5/T6 - Saturated Suction Temperature Thermistor

T7/T8 - Return Gas Temperature Thermistor

T9 - Outdoor Air Thermistor

T9 - Lead/Lag Leaving Fluid Thermistor - In Master/Slave parallel flow applications, the thermistor T9 is the common supply water temperature. The 30GTN-4T incorrectly identified this thermistor as T10 in Figure 21 on page 32.

T10 - Space Temperature Thermsitor – T10 is a 10 kΩ @ 77 °F (25 °C) thermistor. Sensor T10 is an accessory sensor that is remotely mounted in the controlled space and used for space temperature reset. This sensor is connected to TB?-? and TB?-?. 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).

Starting around Serial Number 0699F, several improvements to the 5 kΩ thermistor construction were implemented into this product family. The improvements provided a better water seal for the devices.

Starting with serial numbers 0700F, the 30GTN/GTR/GUN/GUR040-420 the length of the return gas thermistors and wells were lengthened. The longer thermistor improved the system's response to superheat. A service kit was set-up in RCD, 30GT660011 with the longer thermistors and wells.

For the above sensors, either voltage drop or resistance can be used to verify accuracy of the thermistors. Be careful to select the correct table for the voltage drop/temperature correlation. Voltage drop depends on the channel to which the thermistor is connected. 30GTN-1T and 30GTN-2T did not list the separate tables. The correct tables are listed are listed in 30GTN-3T.

The thermistors are connected to the Main Base Board (MBB) with IDC (Insulation Displacement Connector) connections. The tools required to make these connections are as follows:

Manufacturer	Part Number	Description
Tyco Electronics (Amp)	58580-1	Hand Tool with Terminating Head
	58074-1	Hand Tool (included in 58580-1)
	58247-1	Terminating Head (included in 58580-1)
Ideal Industries	45-165	UTP/Coax Stripper

The cable stripper is easier to strip the gray jacket of the thermistor cable. It is not required.

Service Bulletins pertaining to this subject:

- SMB990029 – Thermistor Improvements
  This bulletin described the supplier improvements made to the thermistor construction. These changes were implemented about 0699F.
- SMB000064 – Compressor Return Gas Thermistor Changes
  This bulletin described the factory changes to the Return Gas Thermistor lengths for better superheat control on 30GTN/GTR/GUN/GUR040-420 units. These changes were implemented about 0700F.

MAINTENANCE

Recommended Maintenance Schedule

The following are only recommended guidelines. Job site conditions may dictate that maintenance schedules be performed more often than recommended.

Routine:

For 30GT/GU and 30HL/HWA machines with E-coat Condenser Coils:

- Check condenser coils for debris, clean as necessary
- Periodic clean water rinse, especially in coastal and industrial applications.

Every month:

For all machines:
- Check Sightglass Dry Eye for moisture. If moisture is indicated, obtain and test an oil sample, change as necessary. Check the chilled water loop for signs of refrigerant, which may indicate a cooler leak.
-

For 30GT/GU and 30HL/HWA machines:
- Check condenser coils for debris, clean as necessary. Use a Carrier Approved coil cleaner. For machines with E-coat Condenser Coils, use Carrier Approved Environmentally Sound Coil Cleaner.

Every 3 months:

For all machines:
- Check the refrigerant charge.
- Check all refrigerant joints and valves for refrigerant leaks, repair as necessary
- Check chilled water flow switch operation
- Check compressor oil level
- Check Crankcase Heater operation

For 30GT/GU and 30HL/HWA machines:
- Check condenser coils for debris, clean as necessary
- Check condenser fan operation

Every 12 months:

- Check all electrical connections for tightness, tighten as necessary.
- Inspect all contactors and relays, replace as necessary
- Check accuracy of thermistors, replace if greater than +/-2 F (1 C)
- Obtain and test an oil sample. Change oil only if necessary
- If the application is an open chilled water loop, consider flushing the cooler to remove any sediment.
- Check to be sure that the proper concentration of antifreeze is present in the chilled water loop, if applicable
- Check to be sure that the proper amount of inhibitor is present in the chilled water loop.
- Check all refrigerant filter driers for pressure drops, replace/clean as necessary
- Check chilled water strainers, clean as necessary
- Perform Service Test to confirm proper operation of components.

For 30GT/GU machines:
- Check cooler heater operation, if equipped

For 30GT/GU and 30HL/HWA machines:

- Check condition of condenser fan blades and that they are securely fastened to the motor shaft

For 30HK/HWB/HWC/HWS machines:
- Check Condenser Water Regulating Valve operation, if equipped
- Check to be sure that the proper amount of inhibitor is present in the condenser water loop.
- Check condenser water strainers, clean as necessary

For 30HK/HWB/HWC/HWS machines:
- Check condenser approach (Saturated Condensing Temperature – Condenser Leaving Water Temperature), clean tubes if appropriate

RECOMMENDED SPARE PARTS LIST

The following recommended spare parts list is divided into critical and recommended replacement parts. Critical parts are components that, if they fail, will cause the equipment to stop functioning, or otherwise fail to deliver the required cooling capacity. Without these parts, the machine cannot be made operational. Recommended parts are components that, if they fail, could cause deterioration of the system performance. If a recommended part fails, the system can be usually made somewhat functional, even if only partial operation, until the correct part can be obtained. If the deterioration of the system performance is not acceptable by the customer, then the recommended, should be treated as critical parts.

Refer to RCD's EPIC 2000 for the appropriate part number and quantity of parts for each machine.

In the Comments Section the following abbreviations are used:
PSN – Prior Serial Number
SSN – Starting Serial Number

30GTN,GTR040-420 Spare Parts List

30GTN,GTR040-420 Critical Parts:		
Part Number	Description	Comments
HH79NZ029	Thermistor	Leaving Water Thermistor
HH83ZB001	Circuit Breaker	
HN61KK025	Compressor Control Relay	040-060, 070-60 Hz, 130-210
HN65KZ027	Compressor Protection Control System, CPCS	Opt on 040-060, 070-60 Hz Std on 070-50 Hz, 080-110
HR53VK120	Switch, Enable-Off –Remote	
HT01BD118	Transformer	

30GTN,GTR040-420 Critical Parts:		
Part Number	Description	Comments
SC15	Fuse	See EPIC 2000 for appropriate usage
SC20	Fuse	See EPIC 2000 for appropriate usage
30GB660002	Thermistor includes Swagelock	Entering Water Thermistor
30GT515217	EXV Board	w/o Software HK50AA026
30GT515165	Main Base Board	w/o Software HK50AA029
853002-570	Tube Plug Ring	Do not plug any more than 10% of the total number of tubes.
853103-500	Tube Plug Pin	Do not plug any more than 10% of the total number of tubes.
	Cooler Gaskets	See EPIC 2000 for appropriate part numbers

30GTN,GTR040-420 Recommended Parts:		
Part Number	Description	Comments
EB51LP062	Relief Valve, Compressor	
EF19ZE024	Solenoid Coil	
EK02JA170	Fusible Plug	040-110 Only
EK02JA203	Fusible Plug	040-110 Only
EK02KK105	Fusible Plug	080-110 Only
EK41JK101	Fusible Plug	130-210 Only
EK41JK168	Fusible Plug	130-210 Only
HH83ZH001	Switch, ON/OFF	SW2
HK02ZA439	High Pressure Switch	
HK02ZB038	Loss of Charge Switch	
HK05YZ007	MotorMaster V Transducer	If equipped (SSN 2202F)
HK06UB006	Oil Pressure Safety Switch	Opt on 040-060, 070-60 Hz Std on 070-50 Hz, 080-210
HK50AA031	Scrolling Marquee Display	
HH79NZ013	MotorMaster III Thermistor	If equipped (PSN 2202F)
HH79NZ029	Thermistor	Return Gas Temperature, Suction Gas Temperature
HN65CT011	Compressor Ground Fault Relay, CGF	130-210 Only
HT08DZ026	Current Transformer for CPCS or CGF	
HR46GN001	MotorMaster III Controller	(PSN 2202F)
	MotorMaster V Contoller	(SSN 2202F) See EPIC 2000 for appropriate part numbers.
P903-0101	Compressor Mineral Oil	
30GT412176	MotorMaster III Sensor	(PSN 2202F)

30GTN,GTR040-420 Recommended Parts:		
Part Number	Description	Comments
30GT515218	Energy Management Module	w/o software HK50AA028
30GT515219	Compressor Expansion Board	w/o Software HK50AA032
30GT660003	EXV Motor Kit	EXV units only (PSN 1400F)
30GT660010	EXV Motor Kit	EXV units only (SSN 1400F)
32GB400022	EXV Cable	EXV units only
32GB660008	EXV O-ring Kit	EXV units only (PSN 1400F)
32GB660013	EXV O-ring Kit	EXV units only (SSN 1400F)
32MP660022	EXV, CXB or EMM Connector Kit	
32MP660023	MBB Connector Kit	
	Compressors	See EPIC 2000 for appropriate part numbers.
	Compressor Circuit Breakers	See EPIC 2000 for appropriate part numbers.
	Compressor Contactor	See EPIC 2000 for appropriate part numbers.
	Chilled Water Flow Switch	See EPIC 2000 for appropriate part numbers. Use caution, may have been field supplied.
	EXV	If EXV assembly is ordered, EXV O-ring Kit, and EXV Motor Rebuild Kit are not required. See EPIC 2000 for appropriate part numbers.
	Fan Blades	See EPIC 2000 for appropriate part numbers.
	Fan Circuit Breaker	See EPIC 2000 for appropriate part numbers.
	Fan Contactor	See EPIC 2000 for appropriate part numbers.
	Fan Motor	See EPIC 2000 for appropriate part numbers.
	Fan Overload Contactor	See EPIC 2000 for appropriate part numbers. Used only on High Static Fan Options.
	Fan Overload Heater	See EPIC 2000 for appropriate part numbers. Used only on High Static Fan Options.
	Filter Drier/ Filter Drier Core	See EPIC 2000 for appropriate part numbers.
	Liquid Line Solenoid Valve Coil	040-070 with TXV only. See EPIC 2000 for appropriate part numbers.
	Liquid Line Solenoid Valve	040-070 with TXV only. See EPIC 2000 for appropriate part

30GTN,GTR040-420 Recommended Parts:		
Part Number	Description	Comments
		numbers.
	Power-to-Control Transformer	See EPIC 2000 for appropriate part numbers.
	Power-to-Control Transformer Fuses	See EPIC 2000 for appropriate part numbers.
	TXV	040-070 Only. See EPIC 2000 for appropriate part numbers.

30GTN,GTR040-420 Recommended Tools:		
Part Number	Description	Comments
30GX680004	Direct Download Cable	Cable Connection for bench top software downloads using SmartLoader.
30GX680005	ComfortLink Power Cube	Power Cube with Connection for bench top software downloads using SmartLoader.
TS429	EXV Orifice Removal Tool	Designed to remove and replace the EXV orifice.

APPENDIX A – DATAPORT™, DATALINK™, BACLINK™ OBJECT DEFINITION

30GTN015-035, 30HWA/HWB/HWC/HWS018-040 w/ Software Versions 1.0 and later							
CCN Table Name	**Description**	**Status**	**Units**	**Point**	**DataPort**	**DataLink**	**BAClink**
A_UNIT	GENERAL PARAMETERS						
	Control Mode	0 = Service 1 = OFF-Local 2 = OFF-CCN 3 = OFF-Time 4 = Emergency 5 = ON-Local 6 = ON-CCN 7 = ON-Time		STAT	RO	RO	RO
	Occupied	No/Yes		OCC	RO	RO	RO
	CCN Chiller Start/Stop	Start/Stop		CHIL_S_S	RO	RW	RW
	Alarm State	Normal/Alert/Alarm		ALM	RO	RO	RO
	Active Demand Limit	0 to 100	%	DEM_LIM	RO	RW	RW
	Override Modes In Effect	No/Yes		MODE	RO	RO	NA
	Percent Total Capacity	0 to 100	%	CAP_T	RO	RO	RO
	Requested Stage	0 to 99		STAGE	RO	RO	NA
	Active Setpoint	-20 to 70 (-28.8 to 21.1)	dF (dC)	SP	RO	RO	NA
	Control Point	-20 to 70 (-28.8 to 21.1)	dF (dC)	CTRL_PNT	RO	RW	RW
	Entering Fluid Temp	snnn.n	dF (dC)	EWT	RO	RO	RO
	Leaving Fluid Temp	snnn.n	dF (dC)	LWT	RO	RO	RO
	Emergency Stop	Enable/Emstop		EMSTOP	RO	RW	RW
	Minutes Left for Start	00:00 to 15:00	Minutes	MIN_LEFT	RO	RO	NA
	Heat Cool Select	Heat/Cool		HEATCOOL	RO	RW	RW
CIRCADIO	OUTPUTS						
	Compressor A1 Relay	Off/On		K_A1_RLY	RO	RO	RO
	Unloader A1 Relay	Off/On		UNL_A1	RO	RO	NA
	Unloader A2 Relay	Off/On		UNL_A2	RO	RO	NA
	Liq. Line Solenoid Valve	Open/Close		LLSV_A	RO	RO	NA
	Hot Gas Bypass Relay	Off/On		HGB	RO	RO	NA
	INPUTS						
	Compressor A1 Feedback	Off/On		K_A1_FBK	RO	RO	NA
	Oil Pressure Switch A	Open/Close		OILSW_A	RO	RO	NA
	Low Pressure Switch A	Open/Close		LPS_A	RO	RO	NA
CIRCA_AN	CIRCUIT A ANALOG VALUES						
	Percent Total Capacity	0 to 100	%	CAPA_T	RO	RO	RO
	Percent Available Cap.	0 to 100	%	CAPA_A	RO	RO	RO
	Discharge Pressure	nnn.n	PSIG (KPA)	DP_A	RO	RO	RO
	Suction Pressure	nnn.n	PSIG (KPA)	SP_A	RO	RO	RO
	Saturated Condensing Tmp	snnn.n	dF (dC)	TMP_SCTA	RO	RO	RO
	Saturated Suction Temp	snnn.n	dF (dC)	TMP_SSTA	RO	RO	RO
	Oil Pressure	nnn.n	PSIG (KPA)	OILP_A	RO	RO	NA

30GTN015-035, 30HWA/HWB/HWC/HWS018-040 w/ Software Versions 1.0 and later							
CCN Table Name	**Description**	**Status**	**Units**	**Point**	**DataPort**	**DataLink**	**BAClink**
	FANS						
	Fan 1 Relay	Off/On		FAN_1	RO	RO	RO
	Fan 2 Relay	Off/On		FAN_2	RO	RO	RO
	UNIT ANALOG VALUES						
	Cooler Entering Fluid	snnn.n	dF (dC)	COOL_EWT	RO	RO	RO
	Cooler Leaving Fluid	snnn.n	dF (dC)	COOL_LWT	RO	RO	RO
	Condenser Entering Fluid	snnn.n	dF (dC)	COND_EWT	RO	RO	RO
	Condenser Leaving Fluid	snnn.n	dF (dC)	COND_LWT	RO	RO	RO
	Lead/Lag Leaving Fluid	snnn.n	dF (dC)	DUAL_LWT	RO	RO	NA
	TEMPERTURE RESET						
	4-20 mA Reset Signal	nn.n	ma	RST_MA	RO	RO	RO
	Outside Air Temperature	snnn.n	dF (dC)	OAT	RO	RW	NA
	Space Temperature	snnn.n	dF (dC)	SPT	RO	RW	NA
	DEMAND LIMIT						
OPTIONS	4-20 mA Demand Signal	nn.n	ma	LMT_MA	RO	RO	RO
	Demand Limit Switch 1	Off/On		DMD_SW1	RO	RO	NA
	Demand Limit Switch 2	Off/On		DMD_SW2	RO	RO	NA
	CCN Loadshed Signal	0 = Normal 1 = Redline 2 = Loadshed		DL_STAT	RO	RO	RO
	PUMPS						
	Cooler Pump Relay	Off/On		COOL_PMP	RO	RO	RO
	Condenser Pump Relay	Off/On		COND_PMP	RO	RO	RO
	MISCELLANEOUS						
	Dual Setpoint Switch	Off/On		DUAL_IN	RO	RO	NA
	Cooler LWT Setpoint	snnn.n	dF (dC)	LWT_SP	RO	RO	NA
	Cooler Flow Switch	Off/On		COOLFLOW	RO	RO	NA
	Condenser Flow Switch	Off/On		CONDFLOW	RO	RO	NA
	Ice Done	Off/On		ICE	RO	RO	NA
	COOLING						
	Cooling Setpoint 1	-20 to 70 (-28.8 to 21.1)	dF (dC)	CSP1	NA	RW	RW
	Cooling Setpoint 2	-20 to 70 (-28.8 to 21.1)	dF (dC)	CSP2	NA	RW	NA
	ICE Setpoint	-20 to 32 (-28.8 to 0.0)	dF (dC)	CSP3	NA	RW	NA
	HEATING						
	Heating Setpoint 1	80 to 140 (26.7 to 60.0)	dF (dC)	HSP1	NA	RW	RW
SETPOINT	Heating Setpoint 2	80 to 140 (26.7 to 60.0)	dF (dC)	HSP2	AN	RW	NA
	RAMP LOADING						
	Cooling Ramp Loading	0.2 to 2.0 (0.1 to 1.1)	^F (^C)	CRAMP	NA	RW	NA
	Heating Ramp Loading	0.2 to 2.0 (0.1 to 1.1)	^F (^C)	HRAMP	NA	RW	NA
	HEAD PRESSURE						
	Head Pressure Setpoint A	80 to 140 (26.7 to 60.0)	dF (dC)	HSP_A	NA	RW	NA

30GTN015-035, 30HWA/HWB/HWC/HWS018-040 w/ Software Versions 1.0 and later							
CCN Table Name	**Description**	**Status**	**Units**	**Point**	**DataPort**	**DataLink**	**BAClink**
	Timed Override Hours	0	Hours	OVR-EXT	NA	RW	RW
	Period 1 DOW (MTWTFSSH)	00000000		DOW1	NA	RW	RW
	Occupied Time	00:00		OCCTOD1	NA	RW	RW
	Unoccupied Time	00:00		UNOCTOD1	NA	RW	RW
	Period 2 DOW (MTWTFSSH)	00000000		DOW2	NA	RW	RW
	Occupied Time	00:00		OCCTOD2	NA	RW	RW
	Unoccupied Time	00:00		UNOCTOD2	NA	RW	RW
	Period 3 DOW (MTWTFSSH)	00000000		DOW3	NA	RW	RW
	Occupied Time	00:00		OCCTOD3	NA	RW	RW
	Unoccupied Time	00:00		UNOCTOD3	NA	RW	RW
	Period 4 DOW (MTWTFSSH)	00000000		DOW4	NA	RW	RW
	Occupied Time	00:00		OCCTOD4	NA	RW	RW
OCCPC01S	Unoccupied Time	00:00		UNOCTOD4	NA	RW	RW
	Period 5 DOW (MTWTFSSH)	00000000		DOW5	NA	RW	RW
	Occupied Time	00:00		OCCTOD5	NA	RW	RW
	Unoccupied Time	00:00		UNOCTOD5	NA	RW	RW
	Period 6 DOW (MTWTFSSH)	00000000		DOW6	NA	RW	RW
	Occupied Time	00:00		OCCTOD6	NA	RW	RW
	Unoccupied Time	00:00		UNOCTOD6	NA	RW	RW
	Period 7 DOW (MTWTFSSH)	00000000		DOW7	NA	RW	RW
	Occupied Time	00:00		OCCTOD7	NA	RW	RW
	Unoccupied Time	00:00		UNOCTOD7	NA	RW	RW
	Period 8 DOW (MTWTFSSH)	00000000		DOW8	NA	RW	RW
	Occupied Time	00:00		OCCTOD8	NA	RW	RW
	Unoccupied Time	00:00		UNOCTOD8	NA	RW	RW

Note: dC - Degrees Celsius
dF - Degrees Fahrenheit
^F - Delta Degrees Fahrenheit
^C - Delta Degrees Celsius
NA - Not Available
RO - Read Only
RW - Read/Write

In order to write to any point with DataLink or BAClink, the machine must be configured for CCN control. CTRL *Control Method* (Configuration Mode, sub-mode OPT2) must be set to 3=CCN Control.

30GTN/GTR/GUN/GUR040-420, 30HK/HL040-060
DataPort™, DataLink™, BAClink™ Object Definition

30GTN/GTR/GUN/GUR040-420, 30HK/HL040-060 w/ Software Versions 2.2 and later							
CCN Table Name	**Description**	**Status**	**Units**	**Point**	**DataPort**	**DataLink**	**BAClink**
	GENERAL PARAMETERS						
	Control Mode	0 = Service 1 = OFF-Local 2 = OFF-CCN 3 = OFF-Time 4 = Emergency 5 = ON-Local 6 = ON-CCN 7 = ON-Time		STAT	RO	RO	RO
	Occupied	No/Yes		OCC	RO	RO	RO
	CCN Chiller	Start/Stop		CHIL_S_S	RO	RW	RW
A_UNIT	Alarm State	Normal/Alert/Alarm		ALM	RO	RO	RO
	Active Demand Limit	0 to 100	%	DEM_LIM	RO	RW	RW
	Override Modes In Effect	No/Yes		MODE	RO	RO	NA
	Percent Total Capacity	0 to 100	%	CAP_T	RO	RO	RO
	Requested Stage	0 to 99		STAGE	RO	RO	NA
	Active Setpoint	-20 to 70 (-28.8 to 21.1)	dF (dC)	SP	RO	RO	NA
	Control Point	-20 to 70 (-28.8 to 21.1)	dF (dC)	CTRL_PNT	RO	RW	RW
	Entering Fluid Temp	snnn.n	dF (dC)	EWT	RO	RO	RO
	Leaving Fluid Temp	snnn.n	dF (dC)	LWT	RO	RO	RO
	Emergency Stop	Enable/Emstop		EMSTOP	RO	RW	RW
	Minutes Left for Start	00:00 to 15:00	Minutes	MIN_LEFT	RO	RO	NA
	Heat Cool Select	Heat/Cool		HEATCOOL	RO	RW	RW
	CIRC. A DISCRETE OUTPUTS						
	Compressor A1 Relay	Off/On		K_A1_RLY	RO	RO	RO
	Compressor A2 Relay	Off/On		K_A2_RLY	RO	RO	RO
	Compressor A3 Relay	Off/On		K_A3_RLY	RO	RO	RO
	Compressor A4 Relay	Off/On		K_A4_RLY	RO	RO	RO
	Unloader A1 Relay	Off/On		UNL_A1	RO	RO	NA
	Unloader A2 Relay	Off/On		UNL_A2	RO	RO	NA
	Liq. Line Solenoid Valve	Open/Close		LLSV_A	RO	RO	NA
CIRCADIO	Hot Gas Bypass Relay	Off/On		HGB	RO	RO	NA
	CIRC. A DISCRETE INPUTS						
	Compressor A1 Feedback	Off/On		K_A1_FBK	RO	RO	NA
	Compressor A2 Feedback	Off/On		K_A2_FBK	RO	RO	NA
	Compressor A3 Feedback	Off/On		K_A3_FBK	RO	RO	NA
	Compressor A4 Feedback	Off/On		K_A4_FBK	RO	RO	NA
	Oil Pressure Switch A	Open/Close		OILSW_A	RO	RO	NA
	Low Pressure Switch A	Open/Close		LPS_A	RO	RO	NA
	CIRCUIT A ANALOG VALUES						
	Percent Total Capacity	0 to 100	%	CAPA_T	RO	RO	RO
	Percent Available Cap.	0 to 100	%	CAPA_A	RO	RO	RO
	Discharge Pressure	nnn.n	PSIG (KPA)	DP_A	RO	RO	RO
	Suction Pressure	nnn.n	PSIG (KPA)	SP_A	RO	RO	RO
CIRCA_AN	Saturated Condensing Tmp	snnn.n	dF (dC)	TMP_SCTA	RO	RO	RO
	Saturated Suction Temp	snnn.n	dF (dC)	TMP_SSTA	RO	RO	RO
	Compressor Suction Temp	snnn.n	dF (dC)	CTA_TMP	RO	RO	RO
	Suction Superheat Temp	snnn.n	^F (^C)	SH_A	RO	RO	RO
	EXV % Open	0 to 100.0	%	EXV_A	RO	RO	NA

30GTN/GTR/GUN/GUR040-420, 30HK/HL040-060 w/ Software Versions 2.2 and later							
CCN Table Name	**Description**	**Status**	**Units**	**Point**	**DataPort**	**DataLink**	**BAClink**
	CIRC. B DISCRETE OUTPUTS						
	Compressor B1 Relay	Off/On		K_B1_RLY	RO	RO	RO
	Compressor B2 Relay	Off/On		K_B2_RLY	RO	RO	RO
	Compressor B3 Relay	Off/On		K_B3_RLY	RO	RO	RO
	Compressor B4 Relay	Off/On		K_B4_RLY	RO	RO	RO
	Unloader B1 Relay	Off/On		UNL_B1	RO	RO	NA
	Unloader B2 Relay	Off/On		UNL_B2	RO	RO	NA
	Liq. Line Solenoid Valve	Open/Close		LLSV_B	RO	RO	NA
CIRCBDIO	Hot Gas Bypass Relay	Off/On		HGB	RO	RO	NA
	CIRC. B DISCRETE INPUTS						
	Compressor B1 Feedback	Off/On		K_B1_FBK	RO	RO	NA
	Compressor B2 Feedback	Off/On		K_B2_FBK	RO	RO	NA
	Compressor B3 Feedback	Off/On		K_B3_FBK	RO	RO	NA
	Compressor B4 Feedback	Off/On		K_B4_FBK	RO	RO	NA
	Oil Pressure Switch B	Open/Close		OILSW_B	RO	RO	NA
	Low Pressure Switch B	Open/Close		LPS_B	RO	RO	NA
	CIRCUIT B ANALOG VALUES						
	Percent Total Capacity	0 to 100	%	CAPB_T	RO	RO	RO
	Percent Available Cap.	0 to 100	%	CAPB_A	RO	RO	RO
	Discharge Pressure	nnn.n	PSIG (KPA)	DP_B	RO	RO	RO
CIRCB_AN	Suction Pressure	nnn.n	PSIG (KPA)	SP_B	RO	RO	RO
	Saturated Condensing Tmp	snnn.n	dF (dC)	TMP_SCTB	RO	RO	RO
	Saturated Suction Temp	snnn.n	dF (dC)	TMP_SSTB	RO	RO	RO
	Compressor Suction Temp	snnn.n	dF (dC)	CTB_TMP	RO	RO	RO
	Suction Superheat Temp	snnn.n	^F (^C)	SH_B	RO	RO	RO
	EXV % Open	0 to 100.0	%	EXV_B	RO	RO	NA

30GTN/GTR/GUN/GUR040-420, 30HK/HL040-060 w/ Software Versions 2.2 and later							
CCN Table Name	**Description**	**Status**	**Units**	**Point**	**DataPort**	**DataLink**	**BAClink**
OPTIONS	FANS						
	Fan 1 Relay	Off/On		FAN_1	RO	RO	RO
	Fan 2 Relay	Off/On		FAN_2	RO	RO	RO
	Fan 3 Relay	Off/On		FAN_3	RO	RO	RO
	Fan 4 Relay	Off/On		FAN_4	RO	RO	RO
	UNIT ANALOG VALUES						
	Cooler Entering Fluid	snnn.n	dF (dC)	COOL_EWT	RO	RO	RO
	Cooler Leaving Fluid	snnn.n	dF (dC)	COOL_LWT	RO	RO	RO
	Condenser Entering Fluid	snnn.n	dF (dC)	COND_EWT	RO	RO	RO
	Condenser Leaving Fluid	snnn.n	dF (dC)	COND_LWT	RO	RO	RO
	Lead/Lag Leaving Fluid	snnn.n	dF (dC)	DUAL_LWT	RO	RO	NA
	TEMPERTURE RESET						
	4-20 mA Reset Signal	nn.n	ma	RST_MA	RO	RO	RO
	Outside Air Temperature	snnn.n	dF (dC)	OAT	RO	RW	NA
	Space Temperature	snnn.n	dF (dC)	SPT	RO	RW	NA
	DEMAND LIMIT						
	4-20 mA Demand Signal	nn.n	ma	LMT_MA	RO	RO	RO
	Demand Limit Switch 1	Off/On		DMD_SW1	RO	RO	NA
	Demand Limit Switch 2	Off/On		DMD_SW2	RO	RO	NA
	CCN Loadshed Signal	0 = Normal 1 = Redline 2 = Loadshed		DL_STAT	RO	RO	RO
	PUMPS						
	Cooler Pump Relay	Off/On		COOL_PMP	RO	RO	RO
	Condenser Pump Relay	Off/On		COND_PMP	RO	RO	RO
	MISCELLANEOUS						
	Dual Setpoint Switch	Off/On		DUAL_IN	RO	RO	NA
	Cooler LWT Setpoint	snnn.n	dF (dC)	LWT_SP	RO	RO	NA
	Cooler Flow Switch	Off/On		COOLFLOW	RO	RO	NA
	Condenser Flow Switch	Off/On		CONDFLOW	RO	RO	NA
	Ice Done	Off/On		ICE	RO	RO	NA
SETPOINT	COOLING						
	Cooling Setpoint 1	-20 to 70 (-28.8 to 21.1)	dF (dC)	CSP1	NA	RW	RW
	Cooling Setpoint 2	-20 to 70 (-28.8 to 21.1)	dF (dC)	CSP2	NA	RW	NA
	ICE Setpoint	-20 to 32 (-28.8 to 0.0)	dF (dC)	CSP3	NA	RW	NA
	HEATING						
	Heating Setpoint 1	80 to 140 (26.7 to 60.0)	dF (dC)	HSP1	NA	RW	RW
	Heating Setpoint 2	80 to 140 (26.7 to 60.0)	dF (dC)	HSP2	NA	RW	NA
	RAMP LOADING						
	Cooling Ramp Loading	0.2 to 2.0 (0.1 to 1.1)	^F (^C)	CRAMP	NA	RW	NA
	Heating Ramp Loading	0.2 to 2.0 (0.1 to 1.1)	^F (^C)	HRAMP	NA	RW	NA
	HEAD PRESSURE						
	Head Pressure Setpoint A	80 to 140 (26.7 to 60.0)	dF (dC)	HSP_A	NA	RW	NA
	Head Pressure Setpoint B	80 to 140 (26.7 to 60.0)	dF (dC)	HSP_B	NA	RW	NA

30GTN/GTR/GUN/GUR040-420, 30HK/HL040-060 w/ Software Versions 2.2 and later							
CCN Table Name	**Description**	**Status**	**Units**	**Point**	**DataPort**	**DataLink**	**BAClink**
	Timed Override Hours	0	Hours	OVR-EXT	NA	RW	RW
	Period 1 DOW (MTWTFSSH)	00000000		DOW1	NA	RW	RW
	Occupied Time	00:00		OCCTOD1	NA	RW	RW
	Unoccupied Time	00:00		UNOCTOD1	NA	RW	RW
	Period 2 DOW (MTWTFSSH)	00000000		DOW2	NA	RW	RW
	Occupied Time	00:00		OCCTOD2	NA	RW	RW
	Unoccupied Time	00:00		UNOCTOD2	NA	RW	RW
	Period 3 DOW (MTWTFSSH)	00000000		DOW3	NA	RW	RW
	Occupied Time	00:00		OCCTOD3	NA	RW	RW
	Unoccupied Time	00:00		UNOCTOD3	NA	RW	RW
	Period 4 DOW (MTWTFSSH)	00000000		DOW4	NA	RW	RW
	Occupied Time	00:00		OCCTOD4	NA	RW	RW
OCCPC01S	Unoccupied Time	00:00		UNOCTOD4	NA	RW	RW
	Period 5 DOW (MTWTFSSH)	00000000		DOW5	NA	RW	RW
	Occupied Time	00:00		OCCTOD5	NA	RW	RW
	Unoccupied Time	00:00		UNOCTOD5	NA	RW	RW
	Period 6 DOW (MTWTFSSH)	00000000		DOW6	NA	RW	RW
	Occupied Time	00:00		OCCTOD6	NA	RW	RW
	Unoccupied Time	00:00		UNOCTOD6	NA	RW	RW
	Period 7 DOW (MTWTFSSH)	00000000		DOW7	NA	RW	RW
	Occupied Time	00:00		OCCTOD7	NA	RW	RW
	Unoccupied Time	00:00		UNOCTOD7	NA	RW	RW
	Period 8 DOW (MTWTFSSH)	00000000		DOW8	NA	RW	RW
	Occupied Time	00:00		OCCTOD8	NA	RW	RW
	Unoccupied Time	00:00		UNOCTOD8	NA	RW	RW

Note: dC - Degrees Celsius
dF - Degrees Fahrenheit
^F - Delta Degrees Fahrenheit
^C - Delta Degrees Celsius
NA - Not Available
RO - Read Only
RW - Read/Write

In order to write to any point with DataLink or BAClink, the machine must be configured for CCN control. CTRL *Control Method* (Configuration Mode, sub-mode OPT2) must be set to 3=CCN Control.

APPENDIX B – RCD SERVICE KITS

RCD Kit Number	Includes the following Items		
30GT680001	**Title**	Communication Harness	
	Used on	ComfortLink Machines – 30GTN/GTR, 30GUN/GUR 30GXN/GXR, 30HK/HL, 30HW, 30HXA/HXC, 30RA	
	Comment		
	Part Number	**Qty**	**Description**
		1	MBB-J4 to Scrolling Marquee Display Harness
		1	MBB-J5 to TB3 Harness

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